SANS
Social & Affective Neuroscience Society

Abstract Book

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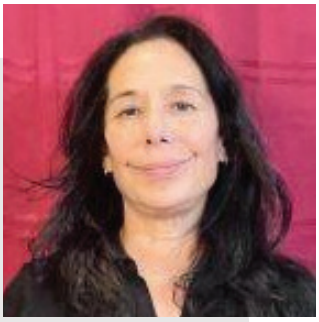
Keynote Speaker Talk

Friday, April 25 2:00-3:00pm



Beatriz Luna

University of Pittsburgh

Adolescent Neurocognitive Plasticity and Specialization Shaping Adult Trajectories

During adolescence, the foundation of adult neurocognitive trajectories is being established. Studies will be presented that characterize neurobiological mechanisms that provide evidence for unique developmental plasticity and specialization underlying this maturational period. We performed longitudinal studies using an accelerated cohort design spanning 10-30 years of age using high-field 7T MRI and EEG. We investigated the shape of cognitive development and reward processing and applied multimodal neuroimaging to measure concomitant developmental changes reflecting plasticity in neural activity (EEG), myelination (MRI R1), glutamate/GABA balance (MRSI) in prefrontal cortex, dopaminergic function (striatal tissue iron) in limbic systems and their connectivity informing a model of developmental specialization. Our findings provide evidence for adolescent-specific plasticity of executive brain systems that may underlie risk for atypical trajectories that underlie the emergence of psychopathology but also identify a window of unique malleability when trajectories can be affected.

Presidential Keynote Speaker Talk

Thursday, April 24 1:45-2:45pm

Earl K. Miller

The Picower Institute for Learning and Memory and Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology

Cognition Emerges from Neural Dynamics

Traditional views compared brain function to a network of neuron connections, like telegraph systems. However, growing evidence suggests higher cognition involves emergent properties: rhythmic oscillations, or “brain waves.” Brain functionality goes beyond simple connections, resembling a system where “telegraph wires” also generate “radio waves” (electric fields) for rapid communication. This enables millions of neurons to self-organize, similar to a crowd doing ‘the wave’. These rhythms play a vital role in organizing our thoughts.

SANS Conference Oral Presentations

Thursday, April 24 09:30-10:45am

Symposium 1: From Emotion to Social Interaction: New Insights from Direct Brain Recordings in Humans

S1 – From Emotion to Social Interaction: New Insights from Direct Brain Recordings in Humans

Shawn Rhoads[1], Salman Qasim[2], Katherine Kabotyanski[3], Sai Sun[4]
[1]Icahn School of Medicine at Mount Sinai, [2]Rutgers University, [3]Baylor College of Medicine, [4]Tohoku University

1. Neurons in the human entorhinal cortex map abstract emotion space
2. Identifying ethologically relevant neurobehavioral biomarkers of emotional state
3. Neural mechanisms and causal modulation of decision variables in emotionally ambiguous perceptual judgments
4. Intracranial neural signatures of accurate social inference in human dyads

Recent advances in human intracranial recordings have transformed our understanding of how the brain encodes complex social and emotional information Our symposium brings together innovative research examining how direct neural recordings (e.g., local field potentials, single unit recordings) can enhance research in social and affective neuroscience. We will showcase work from a panel of early career researchers representing diverse geographic and demographic Backgrounds. The panel of speakers includes Dr. Salman Qasim (Assistant Professor at Rutgers University; New Brunswick, NJ), Katya Kabotyanski (MD/PhD student at Baylor College of Medicine; Houston, TX), Dr. Sai Sun (Assistant Professor at Tohoku University; Sendai, Japan), and Dr. Shawn Rhoads (Assistant Professor at Icahn School of Medicine at Mount Sinai; New York, NY). Each speaker will be allocated 18 minutes for their talk (including Q&A). The symposium will conclude with a 15-minute panel discussion.

The first talk (Dr. Qasim) will present findings on how neurons in the medial temporal lobe dynamically encode emotional information, revealing that entorhinal cortex and amygdala neurons exhibit grid-like activations in a 2D arousal-valence emotion space. This work suggests a neural substrate for cognitive maps of emotion. The second presentation (Ms. Kabotyanski) will characterize the temporal, behavioral, and neural dynamics underlying emotional state changes in treatment-resistant depression. Using continuous, synchronized audio, video, and neural recordings, this work highlights how cross-modal features predict self-reported affect and neural activity with implications for effective diagnosis and treatment of affective disorders. The third talk (Dr. Sun) will focus on perceptual decision-making about emotionally ambiguous facial expressions using a multi-modal evidence from single neuron recordings, fMRI, transcranial direct current stimulation, and drift-diffusion modeling of behavior. This study elucidates the neural bases of emotion judgment under uncertainty and offers insights into the neural dynamics underlying decision-making. The final talk (Dr. Rhoads) will present work using simulataneous hyper-recordings of local field potentials among interacting pairs of participants to examine how the brain enables accurate social inference during cooperation. Using computational modeling, results reveal context-dependent neural signatures supporting the intersubject alignment of abstract representations during social belief updating.

Together, this panel highlight the promise of direct brain recordings in advancing our understanding of the neurocomputational basis of emotion and social interaction. The symposium will conclude with a panel discussion on how these findings can bridge basic and clinical research, and how future work can integrate multi-modal approaches to uncover the neural processes underlying human affect and social cognition.

Friday, April 25 10:15-11:30am

Symposium 2: Advances in Best Practices & Method SANS Symposium

S2 - Advances in Best Practices & Methods SANS Symposium

Harry Clelland[1], Danielle Cosme[2], Gang Chen[3], Shannon Burns[4]
[1]ELTE, [2]University of Pennsylvania, [3]National Institutes of Health, [4]Pomona College

1. Multi100: Estimating the Analytical Robustness of the Social Sciences – Implications for SAN

   The same dataset can be analysed in different justifiable ways to answer the same research question, potentially challenging the robustness of empirical science. In my talk I will walk through the results of a recently completed large-scale big team science effort to estimate the analytical robustness of the social and behavioural sciences (known as the Multi100). I will present many-analyst data from more than 400 independent researchers, quantifying the extent to which 'researcher degrees of freedom' influences published effect sizes and Conclusions: s. I will then introduce potential implications for social and affective neuroscience, setting the stage for Dr Cosme's talk on multiverse analysis in fMRI.

2. Analytic flexibility and multiverse analyses with fMRI data

   Analytic flexibility is a major issue in neuroimaging and can affect the Conclusions: s we draw from our analyses. This talk will discuss the impact of undisclosed analytic flexibility on replicability and present an overview of how multiverse analyses can be used with fMRI data to systematically map how analytic decisions affect results and assess the robustness of results across sets of possible decisions.

3. Challenges in Neuroimaging Data Analysis: Should Statistics Respect Science More?

   Statistical modeling plays a central role in shaping how neuroimaging data are analyzed and interpreted. Yet tensions often arise between statistical rigor and scientific relevance. In this talk, I'll highlight several common challenges in neuroimaging analysis where strict adherence to conventional statistical practices can sometimes obscure, rather than clarify, scientific insight. Topics will include multiple comparisons, result reporting, and sample size considerations. I'll argue that aligning statistical methods more closely with scientific goals can lead to more meaningful and reproducible findings.

4. Evaluating the impact of speaking motion on intersubject correlation measurement in naturalistic fMRI

   Dr. Burns will discuss her lab's efforts to characterize the impact of speaking-related head motion on signal quality and statistics in naturalistic fMRI studies, and the extent to which different motion filtering and exclusion practices can improve results.

Saturday, April 26 09:00-10:15am

Symposium 3: Single-neuron Mechanisms of Face Perception in the Human Medial Temporal Lobe

S3 - Single-Neuron Mechanisms of Face Perception in the Human Medial Temporal Lobe

Shuo Wang[1], Hongbo Yu[2], Chujun Lin[3], Hernan Rey[4]
[1]Washington University in St. Louis, [2]University of California, Santa Barbara, [3]University of California, San Diego, [4]Medical College of Wisconsin

Title 1: Faces, concepts, and memories at single neuron resolution in the human medial temporal lobe (and beyond)

Title 2: Feature-based encoding of face identity by single neurons in the human medial temporal lobe

Title 3: Dissociating the perceptual and conceptual contributions to social trait perception from faces: Triangulating behavior, single-neuron recording, and AI models

Title 4: Context-dependent encoding of social traits by single-neurons in the human amygdala and hippocampus

Faces are among the most significant visual stimuli we encounter in daily life, and the human medial temporal lobe (MTL) plays a critical role in face processing. This symposium explores the single-neuron mechanisms underlying face perception in the human MTL through four distinct investigations. Specifically, we present a coherent set of studies on conceptual, visual, and social trait representations in the human MTL. The first talk discusses the computational principles underlying face perception, conceptual integration, and memory formation in the human MTL. The second talk introduces a novel visual feature-based neural coding framework in the MTL, revealing “receptive fields” within a high-level visual feature space. This framework expands beyond traditional semantic and conceptual neural codes previously associated with the MTL. The third talk focuses on quantifying the relative contributions of visual and semantic processing at the neuronal population level, providing insight into how these processes interact to support face recognition. Finally, the fourth talk examines dynamic naturalistic video stimuli to demonstrate how single neurons in the human MTL encode a wide array of information, including visual features, semantic attributes, and social traits, highlighting the comprehensive nature of MTL neural coding. Together, these findings uncover the sophisticated computational mechanisms of face perception in the human brain, bridging visual and semantic domains and deepening our understanding of how social information is represented at the neuronal level.

Saturday, April 26 10:30-11:45am

Symposium 4: Universality and Specificity in Prosocial Decision-Making

S4 - Universality and Specificity in Prosocial Decision Making

Huan Wang[1], Inbal Ben Ami Bartal[2], Yi Yang[3], Rui Pei[1]
[1]Stanford University, [2]Tel-Aviv university, [3]Temple University

- Evolutionary roots of empathy and prosocial behavior
- Age-Related Differences in Neural Responses during the Ultimatum Game
- Neural Representation in the Salience Network Supports Social Risk Decision Making
- Different neuroaffective mechanisms promote trust in individuals from Eastern versus Western cultures

Details: A harmonious society thrives on kindness and cooperation, yet the factors driving prosocial behaviors vary widely across individuals and contexts. Why do some people dedicate their wealth to charitable causes while others keep it within their family? What circumstances promote cooperation among individuals who vary in their cooperative regard? To address these questions, it is essential to understand the neuropsychological mechanisms of prosocial decision making across diverse contexts, examining both universal and context-specific aspects of these processes.

This symposium explores the universality and specificity in the neural mechanisms of prosocial decision making. The first talk (Bartal) presents findings from rodent models, highlighting evolutionarily conserved neural circuits that predict helping behaviors in rats, suggesting a universal foundation for prosocial decision making. The subsequent three talks focus on distinct aspects of specificity in these neural mechanisms. The second talk (Yang) examines age-related differences in neural responses to unfair offers during the Ultimatum Game, identifying stage of life as an important aspect of specificity. The third talk (Pei) investigates individual differences of the neuropsychological mechanisms when college students decide whether to initiate conversations with peers, emphasizing the role of positive expectations of others as the second aspect of specificity. The final talk (Wang) explores differences in the neuropsychological mechanisms underlying trust in strangers between Eastern and Western cultures, highlighting culture as the last aspect of specificity.

Together, this symposium provides an interdisciplinary perspective on prosocial decision making, employing methods ranging from animal model and neuroimaging to computational approaches and cross-cultural comparisons. It also examines various aspects of prosocial behaviors including helping, preferences for fairness, social risk-taking, and trust. Our diverse team of researchers (three women and one man from Israel and the USA) offers novel insights into how prosocial behaviors are shaped across species, life stages, and sociocultural contexts.

SANS Conference Blitz Talks

Blitz Talks #1: April 24, 2025 | 2:45-3:30pm

B1.1 Attitudes Shape Neural Responses to Narratives of Racial Discrimination

Eunjee Ko[1], Steven Spencer[1], Dylan Wagner[1]

[1]The Ohio State University

Background and Aims: Neural synchrony during exposure to naturalistic stimuli has been shown to reflect similar understandings of narrative contents and perspectives. Given that attitudes and prior experiences shape our understanding of social information, the way racial minorities and majorities make sense of racial discrimination at the neural level might differ due to their substantially different experiences. Here, we investigated how attitudes modulate neural similarity of racial minorities and majorities in understanding a narrative of racial discrimination and how these predict subsequent evaluations of the storyteller.

Method: 28 black and 27 white participants reported their attitudes and beliefs about prejudice followed by a measure of implicit racial attitudes (the Evaluative Priming Task). Afterwards, they watched a video of a black woman recounting an experience of racial discrimination during functional neuroimaging (fMRI), and participants evaluated the storyteller. Using Intersubject Representational Similarity Analysis we computed the intersubject correlations of all participant pairs based on activity within the dmPFC. We then tested whether race moderated the relationship between attitudes and neural synchrony and whether neural synchrony itself predicts similarity in evaluations of the storyteller.

Results: Across racial groups of the pairs, neural synchrony after the revelation of racial discrimination was predicted by the similarity in political ideology (b=.013, permuted p<.001) and belief about malleability of the individual prejudice (b=.021, permuted p< .001). Significant interaction effects revealed some unique predictors of neural synchrony in each racial group. For black participants, similarity in social identity threat concern was a unique predictor of neural synchrony (b=.022, permuted p=.005), whereas for white participants, mean negative implicit racial attitude was associated (b=.030, permuted p<.001). Neural synchrony predicted similarity in trait evaluation on both stereotype dimension (b=4.283, permuted p <.001) and personality dimension (b=9.894, permuted p<.001) only for white participants.

Conclusions: Our results suggest that black and white people engage in both common and distinct processes when understanding a narrative of racial discrimination and these can lead to different evaluations of the storyteller among racial majorities. The relationship between neural synchrony and beliefs and political attitudes was shared across both black and white participants, whereas social identity threats and implicit racial attitudes were unique and depended on participants' racial identity. The findings suggest that shared understanding of a story of racial discrimination may be driven by attitudes and may lead to similar impression of a storyteller.

Acknowledgements and Funding: We would like to thank Tim Broom for materials and advice and Russell Fazio for his recommendations about study design and the Evaluative Priming Task.

B1.2 - Identifying Ethologically Relevant Neurobehavioral Biomarkers of Emotional State

Katherine Kabotyanski[1], Han Yi[2], Rahul Hingorani[2], Brian Robinson[2], Hannah Cowley[2], Matthew Fifer[2], Brock Wester[2], Sanjay Mathew[3], Wayne Goodman[3], Benjamin Hayden[1], Nicole Provenza[1], Sameer Sheth[1]

[1]Baylor College of Medicine, [2]Johns Hopkins University, [3]Menninger Department of Psychiatry and Behavioral Sciences

Background and Aims: Affective disorders are the most common subset of psychiatric conditions. Major depressive disorder (MDD), in particular, affects over 120 million people worldwide and is the leading cause of disability as well as death from suicide. Emotion dysregulation is the hallmark of depression and other affective disorders, so developing tools for Objective, quantitative characterization of the temporal, behavioral, and neural dynamics underlying emotional state change is critical for properly diagnosing and treating these debilitating conditions.

Methods: We analyzed continuous, synchronized audio, video, and neural recordings during naturalistic conversations in human neurosurgical patients implanted with both stereo-EEG (sEEG) and deep brain stimulation (DBS) electrodes as part of a clinical trial (NCT03437928) for treatment-resistant depression (TRD). We then developed a pipeline for automated transcription with diarization and utterance-level timestamps of audio recordings and used natural language processing (NLP) tools to identify emotional state change points. Pre-trained affective computing models were then used for extraction of linguistic, acoustic, and kinesic features associated with emotional state change. These behavioral features were then correlated to measures of self-reported affect, as well as brain-wide features of concurrent spontaneous neural activity. Finally, we used a multi-modal intermediate fusion model to investigate whether cross-modal features can better predict self-reported affect and neural activity, than any single modality alone.

Results: Both content-relevant (linguistic, semantic) and content-irrelevant (acoustic, kinesic) features of emotional state change in naturalistic behavior were correlated with asynchronous self-reported affect, as well as with brain-wide neural features

previously found to be associated with mood. Convergence points across multiple modalities showed a stronger correlation with self-reported affect than any single modality alone. Cross-modal behavioral features associated with positive emotional state also showed a positive correlation with high-gamma activity in limbic regions.

Conclusions: Naturalistic conversations provide a wealth of Objective, quantifiable behavioral data that is highly temporally resolved and closely aligned with underlying neural activity. By relating semantic features from "what" is expressed, as well as acoustic and kinesic features from "how" it is expressed, to simultaneous neural activity, we can build multi-modal models for more effective diagnosis, assessment, and treatment of affective disorders.

Acknowledgements and Funding: This work was supported by the National Institutes of Health (Grant No. UH3 NS103549 [to SAS and NP], R01 MH130597 [to SAS], T32GM136611 [to KEK]), the McNair Foundation (to SAS and NP), the Gordon and Mary Cain Pediatric Neurology Research Foundation (to SAS), and BRASS: Baylor Research Advocates for Student Scientists (to KEK).

B1.3 - Reduced Functional Efficiency Within the Working Memory Network in Adolescents Predicts Cannabis Initiation Four Years Later While Cannabis Use Does Not Lead to Future Changes in Working Memory Activation

Mona Darvishi[1], Charles Ferris[2], Ping Bai[2], Bethany Boettner[1], Christopher Browning[1], Dylan Wagner[1], Baldwin Way[1]
[1]The Ohio State University, [2]McGill University

Details: The bulk of imaging studies on the relationship between neural activity during working memory and cannabis use have been cross-sectional, leaving questions about whether brain activity differences between cannabis users and non-users reflect pre-existing vulnerabilities (vulnerability model) or result from neuroadaptive changes due to cannabis exposure (toxicity/neuroadaptation model). The present work takes advantage of a longitudinal sample to (1) determine if neural activity in working memory-related ROIs at baseline predicts cannabis initiation four years later (vulnerability model) and (2) determine if cannabis use over this period predicts changes over time in working memory-related neural activity (neuroadaptation model). At time point 1, the study sample was 177 adolescents (100 females) from the Adolescent Health and Development in Context (AHDC) study, with an initial average age of 15.98 years (SD = 2.06). For the cross-sectional analysis at time point 1, a standard fMRI GLM model was used with group-level models (2-Back vs. 0-back) to generate differentiated activation clusters (voxel-wise uncorrected $p < 1x10\text{-}13$) for which a 6mm sphere around each peak voxel was generated (n=14). After FDR correction, any lifetime cannabis use positively correlated with neural activity in the left superior medial gyrus ($r = .27$, $p = .005$), inferior parietal lobule ($r = .22$, $p = .019$), insula/inferior frontal gyrus ($r = .23$, $p = .019$), and right middle frontal gyrus ($r = .20$, $p = .022$). For aim 1 (vulnerability model), logistic regression analyses among youth who had never used cannabis at baseline (n=109) assessed if neural activity in these 4 ROIs predicted cannabis initiation four years later, controlling for working memory performance as well as alcohol/cigarette use, household income, sex, age, and race. At follow-up (mean age = 19.93 years), 36 participants had initiated cannabis use, while 73 had not. Increased activation in the left superior medial gyrus (OR = 2.23, CI = 1.09–5.33, p = .044), left inferior parietal lobule (OR = 3.79, CI = 1.65–10.41, p = .004), left insula/inferior frontal gyrus (OR = 1.80, CI = 0.65–7.36, p = .020), and right middle frontal gyrus (OR = 3.20, CI = 1.40–8.64, p = .011) predicted cannabis initiation 4 years later. Comparable results (all p's < .05) for these 4 ROIs were obtained when using a measure of cannabis use in the last 12 months. These results provide robust evidence for the predictive role of neural activation in these regions on future cannabis initiation when controlling for behavioral performance. For aim 2 (neuroadaptation model), multiple linear regression analyses were conducted for those who had neuroimaging data at both time points (n = 63) using the same ROIs, controlling for baseline activity and the same covariates. Neither a lifetime history of cannabis use nor cannabis use in the last 12 months predicted altered brain functioning over time in these ROIs (all p's > .29). These results indicate that cannabis use may not result in significant changes in brain functioning within the observed timeframe. However, heightened activation for the same level of behavioral performance in specific brain regions during the N-Back task may indicate increased susceptibility to cannabis initiation, independent of other risk factors. This research is important for distinguishing risk factors from the outcomes of substance use.

B1.4 - A Neural Signature of the Bias Towards Self-Focus

Danika Geisler[1], Meghan Meyer[1]
[1]Columbia University

Background and Aims: People are remarkably self-focused, disproportionately choosing to think about themselves relative to other topics. Self-focus can be adaptive, helping individuals fulfill their needs. It can also go haywire, with maladaptive self-focus a risk and maintenance factor for internalizing disorders like depression. Yet, the drive to focus on the self remains to be fully characterized. We discovered a brain state that when spontaneously brought online during a quick mental break predicts the desire to focus on oneself just a few seconds later.

Methods: In Study 1, we identified a default network neural signature from pre-trial activity that predicts multiple indicators of self-focus within our sample. In Study 2, we applied our neural signature to independent resting-state data from the Human Connectome project.

Results: In Study 1, multi-voxel pattern analysis revealed that spatial patterns in the default network core subsystem are able to predict a subsequent choice to focus on the self (vs. others) with 83% accuracy ($p<.001$). We named this pattern the "pre-self" pattern and investigated its ability to predict self focus in other contexts. First, we applied it to a baseline resting state scan and found it's presence significantly predicted self-reported self-focus ($\beta=.19$, $t(105.1)=2.03$, $p=0.045$) as well as the presence

of an active self reflection neural pattern 8 seconds later (β=0.16, t(14310)=4.55, p<0.001). Then in Study 2, we found that individuals who score high on internalizing, a form of maladaptive self-focus, similarly move in-and-out of this pattern during rest (r=0.01, p<0.001), suggesting a systematic trajectory towards self-focused thought.

Conclusions: We identified a default network neural signature from pre-trial activity that predicts 1) multiple indicators of self-focus within our sample and 2) internalizing symptoms in a separate sample from the HCP. This is the first work to "decode" the bias to focus on the self and paves the way towards stopping maladaptive self-focus in its course.

Acknowledgements and Funding: This work was supported by an R01 grant from NIMH awarded to Dr. Meghan L. Meyer.

B1.5 - Language-Informed Neural Networks Predict Brain Responses to Emotional Experiences

Nilofar Vafaie[1], Monica Thieu[1], Katherine Soderberg[1], Yumeng Ma[1], Philip Kragel[1]

[1]*Emory University*

Background and Aims: Artificial neural networks (ANNs) have proven useful for modeling how the brain encodes the external environment, capturing both low-level and abstract levels of representation. Previous studies have shown that models trained exclusively on visual stimuli predict activity in high-level visual regions. More recently, vision-language models such as CLIP have been shown to outperform vision transformers in association cortices, including regions involved in multimodal integration and abstract representation (Wang et al., 2023). However, it remains unclear how these models perform in emotionally rich, dynamic contexts and whether their pretraining helps encode consistent, context-sensitive emotion-related representations. Using the EmoFilm dataset—a collection of film clips curated to evoke diverse emotional responses—this study evaluates the performance of vision-language (CLIP, BLIP) and purely visual models (AlexNet, ResNet50, EmoNet) in predicting brain activity across visual regions involved in socio-emotional processing. We also tested how well these models generalize across movies and predict continuous emotion ratings, hypothesizing that language-informed models would better detect abstract representations that generalize across contexts.

Methods: We fit encoding models to predict voxel-wise fMRI responses during movie viewing using features extracted from AlexNet, ResNet50, EmoNet, CLIP, and BLIP. Features were temporally aligned with fMRI data via resampling and convolution with a hemodynamic response. Focusing on brain regions involved in socioemotional processing, multivoxel estimation was fit with partial least squares regression models separately in the amygdala, posterior superior temporal sulcus (pSTS), ventral visual cortex (VVC), and higher-order association areas. Generalization performance was estimated using leave-one-run-out cross-validation, such that responses to independent videos were used for evaluation. A repeated-measures ANOVA assessed the main effects of model and region, as well as their interaction.

Results: The ANOVA revealed a significant model × region interaction ($F(12, 288) = 4.577$, $p < 0.0001$). Post-hoc analyses showed that language-informed models (CLIP, BLIP) significantly outperformed purely visual models (AlexNet, ResNet50, EmoNet) in the ventral visual cortex (e.g., VVC) and higher-order association cortices (e.g., IPS, VMV). Differences in the VVC ranged from 0.0228 to 0.0369 ($p = 0.0002$ to $p = 0.0275$), while differences in higher-order areas ranged from 0.0224 to 0.0298 ($p = 0.0000$ to $p = 0.0078$). Additionally, a small but significant difference of 0.0080 was observed in the amygdala ($p = 0.0486$). Model performance remained comparable in the pSTS.

Conclusions: This study demonstrates that language-informed ANNs (CLIP, BLIP) outperform purely visual models in predicting brain activity in higher-order cortical areas, supporting the role of language-informed pretraining in stabilizing abstract, emotion-related representations. These findings extend prior research by leveraging dynamic, emotionally rich stimuli to underscore the advantages of language-informed representations in brain encoding and emotion prediction tasks. By highlighting the contributions of language-based pretraining, this work emphasizes the importance of integrating multimodal sources of information in models designed to capture complex human experiences.

Blitz Talks #2: April 25 - 3:30-4:15pm

B2.1- Autonomic Arousal Predicts Functional Network Integration and Memory Performance During Story Listening

Jadyn Park[1], Kruthi Gollapudi[1], Yuan Chang Leong[1]
[1]*University of Chicago*

Background and Aims: Emotional events are often remembered with greater accuracy and detail. While earlier studies of this phenomenon focused on isolated brain regions, such as the amygdala and the hippocampus, recent work suggests that arousal has a more global effect. For example, animal studies demonstrated rapid changes in the functional connectivity across the whole brain following activations in the locus coeruleus. Similarly, human resting-state fMRI studies have revealed greater integration across functional networks during periods of heightened endogenous arousal. Here, we used an ambiguous social narrative to demonstrate that emotionally arousing events are recalled with higher fidelity to the encoded content. We then tested the hypothesis that changes in autonomic arousal, triggered by surprising events and changing plotlines, modulate the integration of functional brain networks.

Methods: In a publicly available fMRI dataset, participants (n=22) listened to a 20-minute-long story involving a mysterious social event while in the scanner. In our analysis, the story was segmented into 24 events, defined by major shifts in the storyline. For each event and participant, we constructed an unweighted, undirected graph from the pairwise functional connectivity matrices. We then calculated the average participation coefficient (PC) across all brain regions as a measure of overall network integration. A high average PC indicates a brain state with high levels of intermodular connectivity across the brain. To obtain measures of arousal, we invited an independent set of participants (n=35) to listen to the same story. Pupil dilation during story listening was used to measure autonomic arousal. Participants were then asked to recall the story from memory. To obtain a measure of recall performance, we converted both the transcriptions of the audio clip of the participants' verbal recall to text embeddings using Google's Universal Sentence Encoder. We then computed the recall accuracy as the cosine similarity between the stimulus and participant recall embeddings for each event. The higher the fidelity score, the more similar the participants' recall was to the story.

Results: Our analyses revealed events associated with greater pupil dilation were later recalled with greater accuracy ($b=0.09$, $t=2.44$, $p<0.05$). In other words, consistent with previous research, memory for arousing events was better compared to non-arousing events. We also found that events with increased pupil dilation were associated with greater functional network integration ($b=0.2$, $t=6.89$, $p<0.01$), providing further support for arousal-modulated functional integration. Finally, we found that functional network integration predicted recall performance ($b=7.6$, $t=4.6$, $p<0.01$), such that events associated with greater integration at encoding were later recalled with greater similarity to the encoded content.

Conclusions: These results suggest that physiological arousal facilitates the integration between functional brain networks, which may underlie arousal-driven memory enhancements. Using audio narratives as stimuli, our work adds to the literature on arousal and memory by demonstrating that widespread integration across brain networks strengthens memory for emotional events.

B2.2 - Emotion Regulation Strategies Moderate the Association Between Anterior Insula Responses to Fairness And Relative Deprivation

Melanie Kos[1], Daniel Sazhin[1, 2], Yi Yang[1], Jeremy Mennis[1], Chelsea Helion[1], David Smith[1]
[1]*Temple University,* [2]*National Research Council of the National Academies*

Background and Aims: The Ultimatum Game (UG) has been used to study how offer fairness impacts decisions to accept or reject a proposal. However, while these decisions are made within an experimental context, they are still not made within a vacuum impervious to outside influence. Internal norms calibrate how "unfair" of an offer someone is willing to accept. These internal norms for this financial decision can be influenced by external factors, such as social context of the choice and an individual's socioeconomic status (SES). Further, emotions may impact an individual's internal decision parameters and push them to reject or accept Objectively unfair offers. One that is more adept at bettering theirs and others' emotions, for example, may accept unfair offers more often. We seek to elucidate the respective influence of 1) social context , 2) individual deprivation and community-level deprivation, and 3) emotion regulation on individuals' neural responses to proposed offers varying in fairness and agent sociality during the UG.

Methods: Ninety-four participants (mean age = 34.3, age range = 21-55, SD age = 10.9; 60 female) from our ongoing data collection (Smith et al., 2024, Data in Brief) underwent fMRI scanning while completing the UG task as the responder. Participants responded to offers (5, 10, 25, or 50%) of a $16 or $32 endowment from either a stranger (social) or computer (nonsocial). The Emotional Regulation of Others and Self (EROS) was administered to gather participant scores across four subscales: extrinsic bettering or worsening, and intrinsic bettering or worsening. Participants provided their home address, which was used to determine their Area Deprivation Index (ADI) score, and completed the U.S. Index of Socioeconomic Deprivation (USiDEP) to determine their individual deprivation score. Novel relative deprivation scores were calculated to be the difference between their individual deprivation and their area deprivation scores.

Results: : In line with previous research, participants rejected unfair offers at a higher rate compared to fair offers (e.g., Güth et al., 1982). Further, we found that fair offers resulted in activation in the ventral striatum (e.g., Tabibnia et al, 2008), whereas unfair offers elicited aINSactivation (e.g., Sanfey et al., 2003). We also found that participants with lower USiDEP scores had increased activation in the dorsolateral prefrontal cortex (dlPFC) (MNI = 22, 20, 65; 27 voxels, p = .010) as offers from social agents became increasingly (un)fair. We also found that the association between aINS response to fairness and relative deprivation was moderated by extrinsic bettering (MNI = 36, 20, 8; 39 voxels, p = .001).

Conclusions: Overall, our preliminary results are indicative of SES-related differences in neural responses to social agents proposing offers of varying fairness. Our results also suggest that the links between neural responses to fairness and community- and individual-level deprivation depend on emotion regulation strategies. These initial results showcase the interaction between SES and emotion regulation in individuals' perceptions of offer fairness, which may drive social decision making.

Acknowledgements and Funding: This work was supported by a National Institute on Aging grant (R01-AG067011 to DVS), which includes a diversity supplement awarded to MCK.

B2.3 - Computational Single-Neuron Mechanisms of Face Coding in the Human Temporal Lobe

Shuo Wang[1], Runnan Cao[1]

[1]Washington University in St. Louis

Faces are among the most important visual stimuli we perceive every day. The neural circuits and pathways underlying face recognition involve a critical progression of information processing from the ventral temporal cortex (VTC) to the medial temporal lobe (MTL). In this process, complex visual features are extracted and transformed into meaningful semantic representations, enabling us to recognize faces regardless of changes in viewpoint, size, or context. To investigate the neural computational mechanisms of face recognition, we conducted a comprehensive study using intracranial EEG (iEEG) and single-neuron recordings in the human VTC and MTL when neurosurgical patients viewed 500 naturalistic face images. First, we characterized the spatiotemporal organization of visual representations in the human VTC. Neural responses from the VTC demonstrated axis-based feature coding, a finding that parallels observations in the macaque inferotemporal cortex. Second, using VTC neural feature axes (i.e., electrodes exhibiting axis coding), we constructed a neural feature space. Within this space, MTL neurons encoded a receptive field (i.e., coding region), demonstrating region-based feature coding. This, in turn, accounted for the sparse coding properties observed in the MTL and provided a computational framework linking visual processing to semantic encoding in the brain. Third, using the same stimuli, we replicated similar findings with single-neuron recordings in the macaque inferotemporal cortex, further validating our observations across species. Lastly, robust interactions between the VTC and MTL during face coding were observed, emphasizing coordinated neural processing between these regions. Specifically, VTC axis-coding channels were directly connected to the MTL to provide visual feature information, while MTL region-coding neurons exhibited synchronization with gamma oscillations in the VTC. Together, our findings reveal a computational framework that explains the transition of visual coding from dense, feature-based representations in the VTC to sparse, semantic-based representations in the MTL. This framework provides a mechanistic understanding of the neural processes underlying face recognition and highlights the physiological basis of coordinated processing between these critical brain regions.

B2.4 - Negatively Valenced and High-Arousal News Headlines Drive Preferential Evidence Accumulation and Influence Selection Behavior

Xuanjun Gong[1], Ezgi Ulusoy[2], Elizabeth Riggs[3], Rachael Kee[4], Ziyu Zhao[4], Jason Coronel[5], Allison Eden[2], Amber Boydstun[4], Richard Huskey[4]

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Background and Aims: Citizens in modern democracies are more likely to select negative news compared to positive news. This is called the negativity bias. The negativity bias for news is thought to be evolutionarily and culturally advantageous. This account suggests that negative stimuli, including news, capture our attention. However, there is a substantial gap between stimulus-driven attentional capture and the decision to select and subsequently process news. We address this gap by examining the negativity bias from a value-based decision making framework and summarize five studies that develop and test a computational model to examine how valence and arousal shape news selection.

Methods: In a first study, economic news headlines were generated using ChatGPT 3.0. A total of 208 headlines were scored on valence and arousal using the ANEW dictionary and cross-validated by human annotators (n = 323) on Mturk using the self assessment manikin. The top 56 highest/lowest scoring headlines were selected and used to create four types of headline stimuli: high arousal/positive valence, high arousal/negative valence, low arousal/positive valence, low arousal/negative valence. Subsequently, four identical confirmatory studies were conducted. In studies two – five, participants completed a two-choice decision making experiment. During this experiment, participants were presented with all possible pairings of the news headlines and asked to choose which described a news article they would prefer to read. Selection and reaction time were recorded.

Studies two and three were among undergraduate students from three different universities (n = 357; n = 334), whereas study four was among nationally representative (in terms of age, gender, ethnicity, and political ideology) participants recruited from Prolific (n = 300). Study five was a functional magnetic resonance imaging (fMRI) experiment conducted among young adults

from the university and surrounding community (n = 16 democrats, 14 republicans; right handed; no contraindication to fMRI).

Choice and reaction time data were used to fit a computational hierarchical Bayesian drift diffusion model with headline valence, headline arousal, and political ideology as terms. Functional imaging data were preprocessed using fmriprep and analyzed using nilearn.

Results: results indicate a credible drift rate for negatively valenced and high arousal news headlines. Among college-aged participants, results demonstrate that liberals have the strongest preference for negatively valenced headlines whereas conservatives are approximately equal in their preference. The larger and more representative sample in study four allowed us to further interrogate these findings as moderated by age. results show an overall preference for negative valence and high arousal headlines, with preferential evidence accumulation more similar among conservative and independent relative to liberal participants. Finally, the fMRI data demonstrate that the medial prefrontal, inferior temporal, and posterior parietal cortex appear sensitive to negatively valenced headlines. Arousal was associated with activation in the medial prefrontal cortex and striatum.

Conclusions: Our computational modeling results bridge the gap between stimulus-driven attentional capture and selection by demonstrating that people's negativity bias for news is the result of preferential evidence accumulation, thereby clarifying the negativity bias selection mechanism for news.

B2.5 - The Neural Representation of Social Relationships

Yin Wang[1], Mingzhe Zhang[1], Haroon Popal[2], Xi Cheng[1], Mark Thornton[3], Ingrid Olson[4]

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Background and Aims: Human relationships are central to social cognition, yet the neural mechanisms underlying how individuals represent and navigate the complexity of these relationships remain poorly understood. This study investigates how diverse social relationships are organized in the brain, examining whether they are represented in terms of dimensions, categories, or both.

Methods: Thirty-five participants underwent functional magnetic resonance imaging (fMRI) while completing a task in which they evaluated 76 social relationships based on a variety of theoretical features. In parallel, participants rated these relationships on 30 relationship features derived from 15 existing theories and categorized them using a free-sorting task.

Results: Dimensional reduction through PCA revealed five key relational dimensions: formality, activeness, valence, exchange, and equality (FAVEE). Clustering of the relationships revealed six canonical categories: familial, romantic, hostile, transactional, power, and affiliative relationships. Neural activity patterns during the relationship inference task were then analyzed and found to correspond strongly with both the five relational dimensions and the six relationship categories. Regions involved in social cognition, such as the vmPFC, precuneus, TPJ, STS, and ATL were implicated in representing these dimensions and categories. Notably, the neural representations of the five dimensions and six categories exhibited a high degree of alignment. Furthermore, we applied voxel-wise encoding models and found that the categorical model exhibited broader neural representation across the brain compared to the dimensional model. Model comparison revealed that the FAVEE model, which was derived from the PCA dimensions, explained the neural data more effectively than other existing theoretical models, providing a comprehensive framework for understanding how the brain processes and organizes social relationships.

Conclusions: These results highlight the distributed, network-based nature of social relationship representations and underscore the brain's reliance on both dimensional and categorical structures to represent the complexity of human relationships.

Blitz Talks #3: April 26 1:05-1:50pm

B3.1 - The Effect of Friendship on Temporal and Spatial Alignment of Events in Real-Time Conversation

Sebastian Speer[1], Diana Tamir[1], Lily Tsoi[2], Emily Falk[3], Shannon Burns[4], Laetitia Mwilambwe Tshilobo[1], Christopher Baldassano[5], Caroline Lee[5]

[1]Princeton University, [2]Caldwell University, [3]University of Pennsylvania, [4]Pomona College, [5]Columbia University

Conversations among friends are often more dynamic, enjoyable, and wide-ranging than those between strangers. How do friends do this? Because friends have inside jokes, shared past experiences, and mutual interests, they may start with a shared mental map, allowing them to leap from one topic to another without losing each other. In contrast, strangers begin in separate mental landscapes, so they must tread carefully and coordinate smaller steps to avoid confusion. Here we test this possibility by investigating how friends and strangers represent and move through moments in a conversation. To do so, we scanned dyads using fMRI hyperscanning as they engaged in naturalistic conversation. We used Hyper-Hidden-Markov-Modeling, a computational method that allows us to track how each member of the dyad represents each decoded 'event' in the conversation. We hypothesized that friends would share more common representations, seeing each moment similarly, particularly in mentalizing regions. We hypothesized that these shared representations would promote more wide-ranging, exploratory conversations, whereas strangers' lack of overlapping representations would constrain their topic exploration.

We analyzed fMRI hyperscanning data from dyads (N=30 self-identified friends; N=27 strangers) engaged in a real-time conversation. We explored how an existing social connection influences the processes involved in the representational alignment of conversation events. To this end, we employed a computational method, termed Hyper-Hidden-Markov-Modeling, to project each interaction partner's neural states into a shared latent space and to segment them into meaningful events. This method allowed us to assess both how similarly each dyad represented a given event in latent space. The similarity of an event quantifies how aligned or attuned two people are in their thinking about the conversation, as indicated by how close their neural patterns are in the shared latent space. We then tested how representational alignment related to Objective measures of conversation exploration derived from topic modeling analyses.

H-HMM revealed that friends represented events more similarly in latent neural space. Representational alignment was particularly pronounced for regions in the mentalizing network (MPFC & STS). This higher similarity in event representation was significantly correlated with several linguistic measures of exploration: Dyads whose representation aligned more closely in latent neural space tended to generate more topics, switch between them more often, and jump larger distances in semantic space.

Our study reveals that friendship is associated with more aligned event representations in conversation. As friends navigate from one conversation moment to the next, they represent the conversation content more similarly. This alignment may arise from their shared history, as friends often build upon a repository of common experiences, knowledge, and inside references. This enhanced alignment has direct consequences for the dynamics and the quality of their conversation. If friends see the world more similarly to each other, they can embark on more diverse and far-reaching conversations spanning a broader range of topics, all while staying anchored on common ground.

B3.2 - Neural Evidence of Social Influence and Homophily in an Emerging Community of Adolescent Girls: A Longitudinal fMRI Study

Yixuan Lisa Shen[1], Kiho Sung[2], Yeonjin Choi[2], Joao Guassi Moreira[3], Sunhae Sul[4], Yoosik Youm[2], Carolyn Parkinson[1]

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Background and Aim: Friends are similar to one another, but is that similarity a cause or consequence of friendship? Past cross-sectional social neuroscience research examining intersubject correlations (ISCs) of neural responses to naturalistic stimuli in a friendship network illustrates that socially proximal individuals exhibit more similar neural responses across many brain regions, possibly reflecting shared attention, interpretation, and emotional responses among friends. However, given the cross-sectional nature of past research, it is difficult to ascertain whether the neural similarity observed among friends reflects social influence processes (friends grow similar to one another), homophily (people befriend similar others), or both. Recent research has shown preliminary evidence of neural homophily, such that people with high pre-existing neural similarity are more likely to befriend one another. Using a longitudinal study paradigm, the current study shows, for the first time, whether friends become more neurally similar over time, reflecting the effects of social influence processes, and replicates findings of neural homophily in a non-WEIRD, developmental sample.

Methods: Participants were recruited from a girls high school in South Korea. At the beginning of their first year (t1) and a follow-up about 8 months later (t2), participants completed surveys about their social networks, which were used to characterize in-school sociocentric friendship networks. At both time points, a subset of participants (t1: n = 58; t2: n = 59) completed an fMRI study where they viewed naturalistic video stimuli (the stimuli presented at t1 and t2 were different but matched in content), and their neural time series during movie-viewing were used to conduct ISC analysis.

Results: Social network proximity at t1 predicted an increase in neural similarity from t1 to t2 when controlling for neural similarity at t1, such that people who were close to one another at the beginning of the school year grew more neurally similar over time. Further, neural similarity at t1 predicted social proximity at t2, such that higher neural similarity at baseline predicted

shorter dyadic social distance in the future.

Conclusions: The current study reveals that social influence processes and homophily both contribute to why friends exhibit more similar neural responses to one another. Through social influence processes, friends may grow similar to one another over time, either by influencing one another directly or due to the influence of others around them. At the same time, homophily suggests that people should be more likely to befriend others who share pre-existing similarities because these similarities create opportunities for encounters, facilitate communication, and foster mutual understanding and positive interactions. To our knowledge, this is the first longitudinal study that employed naturalistic fMRI paradigms in conjunction with sociocentric network analysis to study the cause and consequence of friendship, and specifically, to examine the neural manifestation of homophily and social influence. In addition, the current study is distinctive for extending this research to a non-WEIRD and developmental sample.

Funding: This work was supported by the NRF Korea (NRF-2021S1A5A2A03065033) and the Yonsei Signature Program (2023-22-0016).

B3.3 - Common and Distinct Neural Correlates of Social Interaction Perception and Theory of Mind

Zizhuang Miao[1], Heejung Jung[1], Philip Kragel[2], Patrick Sadil[3], Martin Lindquist[3], Tor Wager[1]

[1]Dartmouth College, [2]Emory University, [3]Johns Hopkins University

Background and Aims: Social cognition involves a continuum from perception of agents and their interactions to inferences based on theory of mind (ToM). Despite their frequent co-occurrence in real life, they were predominantly studied in isolation. We aim to better understand the commonality and distinction between social interaction perception and ToM at the behavioral and neural levels.

Methods: Participants (N = 231) rated four text and four audio narratives on the presence of social interactions and their use of ToM. Another group of participants (N = 90) experienced the same eight narratives passively during functional magnetic resonance (fMRI) scanning. We analyzed co-variation between neural activity and time courses of normative social interaction and ToM ratings by voxel-wise general linear models and determined their common and distinct neural correlates using Bayes Factors (with 5 and 1/5 as thresholds).

Results: Social interaction and ToM ratings were only modestly correlated across time (r = .32). At the neural level, social interaction perception and ToM activity maps generalized across text and audio presentation (correlations between unthresholded t maps r = 0.83 and 0.57, respectively). In the same model, when ToM was held constant, merely perceiving social interactions activated all regions canonically associated with ToM under both modalities (FDR q < .01), including temporoparietal junction, superior temporal sulcus, medial prefrontal cortex, and precuneus. ToM activated all these regions as well, suggesting the existence of a shared, modality-general system for social interaction perception and ToM. Furthermore, ToM was uniquely associated with activity in lateral occipitotemporal cortex, left anterior intraparietal sulcus, and right premotor cortex.

Conclusions: These results show that perceiving social interactions automatically engages regions implicated in ToM. In addition, ToM is distinct from social interaction perception in its recruitment of regions associated with multiple higher-level cognitive processes such as action understanding and executive functions. They further imply that both social interaction perception and ToM involve automatic, pre-reflective inferences, while ToM additionally involves controlled, deliberative inferences.

Acknowledgements and Funding: We thank Bogdan Petre, Yaroslav O. Halchenko, David M. Gantz, Sydney L. Shohan, Xinming Xu, Maryam Amini, Bethany J. Hunt, and Eilis I. Murphy for data collection and management. This project was supported by grant NIBIB R01EB026549.

B3.4 - Dissimilarity in Ventral Striatum Response to Socially Rejecting Events Predicts Increased Loneliness in Autistic And Non-Autistic Youth

Kathryn Mcnaughton[1], Sarah Dziura[1], Heather Yarger[1], Elizabeth Redcay[1]

[1]University of Maryland, College Park

Background and Aims: Loneliness substantially impacts well-being, particularly for autistic youth that report higher rates of loneliness compared to non-autistic peers. One factor that influences loneliness is perceiving the world differently from others, such that lonely individuals have more idiosyncratic neural responses compared to non-lonely peers (Baek et al., 2023). While this neural dissimilarity has been previously assessed using naturalistic video stimuli, understanding which specific features of the stimuli drive this relation between neural dissimilarity and loneliness will shed insight on which aspects of the differences in neural processing are most predictive. Here, we test for the presence of specific time periods within naturalistic video stimuli that most strongly predict loneliness in autistic and non-autistic youth.

Methods: Autistic (n=30) and non-autistic (n=81) youth aged 11-14 completed an adapted version of the Loneliness and Social Dissatisfaction Scale (Parker & Asher, 1993), then participated in an MRI scan. During the scan, youth viewed a five-minute socially rich animated clip, Partly Cloudy (Richardson et al., 2018). Preprocessed BOLD time series were extracted from bilateral ventral striatum, in line with the role of reward processing in loneliness. To quantify dynamic fluctuations in neural dissimilarity across the length of the video stimulus, sliding window correlations of 15 TRs (TR=1.25s) were calculated between each potential

pair of participants across the time series. Models were constructed for each window to test relations between loneliness and that window's neural similarity value following an Anna Karenina approach in which lonely participants were predicted to be more neurally idiosyncratic. We implemented these models as multilevel models with crossed random effects, with neural similarity between any given pair of participants in a given window as the outcome, the mean of the pair of participants' loneliness scores as a predictor, and random intercepts for each participant in the pair (Chen et al., 2017). Significant time periods were considered meaningful if they were comprised of 2 or more consecutive significant windows. Analyses were conducted across the full sample, and separately for the autistic and non-autistic groups.

Results: Across the full sample, two time periods were identified in which ventral striatum dissimilarity significantly predicted increased loneliness (ps<0.05). Both time periods, each 30-35 seconds long, corresponded to previously identified mentalizing events within the clip (Richardson et al., 2018), including depictions of social rejection between the characters. When analyses were conducted within the two groups, the analysis for the autistic group replicated one of the two significant time periods, while the analysis for the non-autistic group revealed no significant time periods.

Conclusions: These findings highlight a relation between increased loneliness and idiosyncratic reward processing, specifically for socially rich events involving rejection, and particularly for autistic youth. Future analyses will complement this data-driven approach with independent event coding and continuous participant coding of affective experiences during clip viewing. Through these approaches we aim to further understand the role of reward processing in loneliness and better characterize the neural correlates of loneliness.

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B3.5 - Unraveling the Dynamic Changes of Mind: The Critical Role of the Dorsal Anterior Cingulate Cortex in Predicting Attitude Changes

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Background and Aims: In everyday life, we are often exposed to debates presenting valid arguments on both sides of an issue. While previous research has identified brain regions associated with one-shot attitude changes, little attention has been paid to the neural mechanisms underlying dynamic attitude changes in response to debatable persuasive information. In this study, we used functional magnetic resonance imaging (fMRI) to investigate how the brain processes debatable information and determines whether and how we change our minds. Moreover, understanding whether neural dynamics in the brain can predict attitude changes is both a fascinating scientific question and a promising area for practical application.

Methods: Thirty-seven participants were scanned using fMRI while watching a video of a debate on a specific topic that presented persuasive arguments on both sides. Participants were initially instructed to rate their attitude toward the topic on a 15-point scale ranging from support to opposition. They were then allowed to adjust their attitude at any time during the video if they felt it had shifted (Fig. 1A). The inter-subject similarity (ISS) in neural responses between pairs of participants while viewing the debate and the similarity in their attitude changes throughout the debate were calculated. We applied inter-subject representational similarity analysis (IS-RSA) to identify brain regions coupled with attitude shifts (Fig. 1B). Additionally, multi-voxel patterns within these brain regions and the functional connectivity of the whole brain with seed regions were used to predict the direction of attitude change at each shift point. Attitude changes were classified into four categories: More Support, More Oppose, Less Support, and Less Oppose, and predictions were made using support vector machines (Fig. 1C).

Results: The greater the similarity in attitude changes among participants, the more similar their neural responses in the dorsal anterior cingulate cortex (dACC, $r = 0.23$, $p = 0.012$, $n = 10000$ permutations). Specifically, increased neural activity in the dACC was observed at the time points when participants shifted their attitudes (Fig. 2A). Moreover, multi-voxel patterns in the dACC and the functional connectivity of the dACC seed region with other brain regions were used to predict the direction of attitude changes. Although the multi-voxel pattern prediction did not achieve above-chance accuracy, the whole-brain functional connectivity with the dACC seed region reliably predicted the four categories of attitude changes (More Support, More Oppose, Less Support, and Less Oppose) with an accuracy of 0.46 ($p < 0.001$; chance level = 25%) (Fig. 2B).

Conclusions: Our study demonstrates that when exposed to debatable persuasive information, neural dynamics in the dACC are coupled with changes in attitude. Furthermore, functional connectivity between the dACC and other brain regions reliably predicts the direction of attitude shifts. These findings highlight the role of the dACC in processing persuasive arguments, with its connectivity being crucial for dynamic reassessment and attitude changes in real-time contexts.

Poster Session 1

Thursday, April 24, 2025

3:30 - 5:00pm

P1-A-1 Dynamic Connectivity Brain Patterns of Men Convicted for Intimate Partner Violence Against Women

Sofia Amaoui[1], Oren Contreras-Rodríguez[2], Agar Marín-Morales[3], Cristina Martín-Pérez[4], Carles Biarnes-Duran[5], Elena De La Calle-Vargas[6], Miguel Pérez-García[7], Juan Verdejo-Román[7]

[1]University of Innsbruck, [2]Universitat Autònoma de Barcelona, [3]University of Huelva, [4]University of Valladolid, [5]Medical Imaging Research Group-IDI (IdIBGi) Josep Trueta University Hospital, Girona, Spain, [6]Department of Radiology (IdIBGi), Josep Trueta University Hospital, Girona, Spain, [7]University of Granada

Background and Aims: The alarming incidence and severity of the sequelae of intimate partner violence against women (IPVAW) make it a global concern that demands urgent attention. Within the study of factors that may contribute to IPVAW perpetration, neuroscience plays a key role by offering insights into the brain functioning of men convicted for IPVAW. Recent studies have shown that male perpetrators exhibit specific resting-state functional connectivity (rsFC). However, these studies considered FC to be stationary, while latest research has demonstrated that connectivity fluctuates -changes- over time. In this line, dynamic FC research has identified that functional streams repeatedly converge into specific brain nodes -attractors-, which centralize and distribute information spatially while regulating the brain's temporal dynamics. The aim of this study is to investigate, for the first time, the dynamic rsFC in men convicted for IPVAW, with a particular focus on identifying brain regions that might function as attractors.

Methods: 55 participants underwent an 8-minutes resting-state fMRI examination. Participants were divided into a male perpetrator group (MPG) consisting of 32 men convicted for IPVAW, and a non-offender group (NOG) composed of 43 men with no criminal records. Exclusion criteria included: suffering a neurological disease, antecedents of drug/alcohol dependence, and illiteracy.

Data was preprocessed using CONN toolbox followed by a voxel-resizing of 6mm3. Whole-brain dFC was examined using a graph theory-based dynamic stepwise method: (1) Data was divided into 40s time windows, and Pearson's correlations were computed across the time-series of each voxel in each window resulting in a FC matrix for each window. (2) Variance-stabilizing Fisher's transformations to the coefficients were applied. (3) Within each window, the connectivity steps from each voxel to the rest of the brain were calculated up to 7 steps, and the weighted degree of all stepwise connections per voxel was obtained. This helped identify regions where dFC streams converge. (4) The average of these weighted maps/windows was calculated to create single local and distant dFC maps for each subject, revealing stable regions across time -attractors-. (5) A regression model in SPM12 compared local and distant dFC maps between both groups adjusting for age, motion, and MRI scanner.

Results: Groups were matched in age, level of education and alcohol/drug misuse ($p<.05$). The groups did not differ in local dFC but did differ in distant dFC. Specifically, MPG showed increased distant dFC in two posterior cerebellar regions: left Crus II and bilateral Crus I (Table 1 and Figure 1).

Conclusions: Results support previous research showing that men convicted of IPVAW exhibit specific intrinsic connectivity. Particularly, the finding that the posterior cerebellum acts as a brain attractor in MPG, serving as a hub for temporal dynamic connectivity, is congruent with prior research that has implicated this region in social mentalizing. This research aims to enhance our understanding of the brain processes involved in IPVAW, with the ultimate goal to improve the intervention programs.

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P1-A-2 Balancing Guilt and Costs: The Role of Emotions and Exogenous Constraints for End-of-Life Care

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Background and Aims: End-of-life care is an incredibly difficult experience for patients and their families. The financial costs associated with end-of-life care are substantial, estimated to be $208 billion, and can often place an additional burden on families that are already emotionally drained (Raphael 2001). How do surrogate decision-makers juggle the psychological and financial costs when making these difficult decisions? Building on prior work from psychological game theory, we hypothesize that inelastic spending behavior for end-of-life care can arise from the psychological costs of minimizing anticipated guilt and not wanting to let down their loved ones (Chang et al., 2011). We use a laboratory based harm minimization task to test this hypothesis and additionally evaluate the efficacy of exogenous constraints as a potential policy that might improve financial decision-outcomes for individuals while successfully mitigating anticipated guilt.

Methods: We created a real social situation designed to elicit genuine social emotions, in which subjects are held responsible for deciding how much money to spend to minimize the level of physical pain (i.e., heat) their partner will receive. Exogenous constraints (i.e., multipliers and regulations) were implemented to evaluate whether subjects would respond rationally when making decisions.

Results: Our findings reveal that individuals are strongly motivated by the need to minimize anticipated guilt when making decisions affecting others. Decision-makers reliably and accurately predict their partners' second-order expectations and adjust their decisions accordingly. However, we find that subjects are highly inelastic, demonstrating little behavioral response to increasing cost and regulation. People tend to spend at least 70% of their total endowment, further suggesting that participants' decision-making behavior doesn't change much, even when doing so is financially beneficial. Additionally, we show that although the decision-makers still report feeling a baseline level of about 40% guilt, this was unaffected by the imposition of constraints, indicating that while motivations remained unchanged, constraints helped decision-makers save money and minimally impacted feelings. Finally, forecasting analyses demonstrated that a traditional economic approach to curbing spending behavior would

require raising costs by as much as 128x to reduce spending to 0%.

Conclusions: Our results suggest that in the face of social decision-making contexts, such as end-of-life care, social emotions like guilt play an outsized role, calling for different approaches to improve outcomes for people. Therefore, interventions that take into account both financial and emotional motivations, as well as overall well-being, are essential to help protect individuals from themselves.

P1-A-3 Social Rejection Shapes the Desire for Agency and Social Contact

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[1]Adelphi University, [2]University of California, Los Angeles, [3]University of Denver, [4]Temple University

Background and Aims: Social rejection has significant physical and mental health consequences (Hawkley & Cacioppo, 2010), and early studies indicate shared neural substrates between physical pain and negative feelings associated with social rejection (Eisenberger, 2012). However, the effects of such negative social experiences on decision-making remain underexplored, particularly in the context of online interactions, which are ubiquitous in today's society. While emerging research indicates that rejection impacts learning processes (Babur et al., 2024), here, we sought to examine how online social rejection influences the desire for agency and the motivation to pursue social interactions.

Methods: Across two pre-registered studies (Study 1: osf.io/uazr9, N=84; Study 2: osf.io/c4a59, N = 100) participants engaged in a social rejection task designed to simulate receiving feedback on shared photos via social media. Participants uploaded 32 screenshots of their own Instagram photos to a secure platform and were informed that these photos would be shared with different anonymous "partners" who would provide feedback (i.e., like or dislike) on each photo. In reality, the feedback was pre-programmed to create three social conditions: rejection (70% negative feedback), acceptance (30% negative feedback), and neutral (50% negative feedback). In Study 1 (Dejoie et al., 2024), after every 5 photos that were shared with a partner, participants completed a lottery task (i.e., guessing the value of a card) for a monetary bonus, choosing either to gamble for themselves or defer the decision to a computer. In Study 2 (Dejoie et al., in prep), participants self-identified 10 non-social and 10 social activities they enjoyed before completing the rejection task. During the task, after every 5 photos shared with a partner, participants made a series of choices indicating how much they would be willing to pay to engage in one of their personal social or non-social experiences.

Results: In Study 1 (Dejoie et al., 2024) experiences of rejection increased the perceived value of choice: participants were 47% more likely to want to play for themselves in the lottery task (vs. defer choice to the computer) after experiences of rejection (OR=1.47 [95% CI: 1.2-1.8]. In Study 2, preliminary results show that participants were significantly less willing to spend money on preferred social experiences after rejection (relative to acceptance; t=-7.06, df=97, p<.01, d=.6).

Conclusions: Taken together, our findings provide initial evidence for how social rejection shapes the desire for agency and social contact. These results have implications for understanding how negative online social experiences, such as cyberbullying, may contribute to psychopathologies characterized by altered decision processes. Future computational analyses will estimate participants' point of subjective equivalence for valuing social vs. nonsocial experiences as a function of experienced social feedback. Taken together, these findings will lay the groundwork for neuroimaging studies probing the function of neural circuits supporting these decision processes after social rejection.

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P1-A-5 Neural Correlates of Reciprocal Self-Disclosure and Social Regret

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Background and Aims: Self-disclosure is a well-established mechanism of social bond formation and it involves sharing personal information with others (e.g., Sprecher et al., 2013). However, it is unknown how decisions to disclose dynamically unfold during social interactions. Exchange of information can elicit emotional responses such as regret and shape subsequent decisions to disclose. Indeed, regret is experienced after a missed opportunity and failed attempt to connect with others, suggesting that regret is an important emotion for determining alignment with others, which contributes towards social bond formation. The current preregistered fMRI study seeks to understand the behavioral and neural mechanisms of disclosure decisions, and the role regret may play in such decisions during social interactions.

Methods: In an on-going study, participants (n = 34, 21 female, mean age = 22.7) first answered 60 questions about themselves (questions adapted from prior closeness induction tasks; Aron et al., 1997 and Sedikides et al., 1999). Participants then underwent functional neuroimaging while performing a reciprocal disclosure task where they decided to share or hide their response with an ostensible partner, and then saw their partner's decision and response. In some trials, participants received a preview of their partner's decision (but not the response), during which they were asked to rate how much they regret the choice that they had just made (1 no regret – 5 highly regret).

Results: Preliminary results show that self-reported closeness to partner increased across trials (b=0.016, p<0.001). In the task, partner's predetermined decision to share or hide resulted in a trial being a 'match' trial (i.e., participant and partner both sharing or hiding) or a 'mismatch' trial. Participants experienced greater regret on mismatch than match trials (t(116)=-3.94, p<0.001; Fig.1), whereby participants were more likely to change their subsequent decisions to align with their partner's prior decision following a mismatch than a match trial (b=-0.34, p=0.002). At the neural level, viewing partner's decisions that matched

versus did not match one own's decisions elicited activations in the right dorsolateral prefrontal cortex (dlPFC, x, y, z = 53, 13, 17; z = 4.38; k = 285 voxels).

Conclusions: In sum, decisions to disclose and connect with others are contingent on the mutual exchange of personal information. In particular, misalignment in two people's decisions increases regret and encourages changes in behavior towards alignment. Further, dlPFC may process alignment with others when sharing personal information with one another. One functional role of the dlPFC is regulation, such as emotion and cognitive regulations during social conflict (e.g., Leszkowicz et al., 2017; Seo et al., 2014). Though the dlPFC was not a part of our preregistered hypothesis, one speculation is that aligning and misaligning with others may involve different neural engagement of regulatory processes. Future analysis will examine the neural correlates of rating regret on match versus mismatch trials to further probe this speculation.

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P1-A-6 Stable And Dynamic Neural Representations of Social Closeness During Trust

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Background and Aim: Successfully navigating social interactions requires forming stable and dynamic mappings of one's subjective relationship with other people. For example, stable representations of socially-close versus distant others in the face of transgressions might allow for the preservation of long-term social bonds and the capacity for forgiveness. On the other hand, learning that specific strangers are trustworthy might require flexible updating of one's conceptual mapping of closeness. While past work has shown that social closeness can modulate the magnitude of activation in regions supporting social cognition, it's unknown how decision outcomes change neural geometric mappings. To better understand this mapping, we used representational similarity analysis in a publicly available fMRI dataset of a modified trust game to examine how reciprocity modulates neural representations of social closeness.

Methods: Fifty healthy adults completed a trust game during fMRI scanning. In the task, participants played as investors interacting with three types of partners: an actual friend, a stranger (actor), and the computer (non-social condition). After deciding to invest a high or low reward amount, participants received feedback about whether their partner reciprocated or defected. Reciprocity rates were fixed at 50% for all partners to avoid potential learning effects. We created a conceptual representational dissimilarity matrix (RDM) that assumes a one-unit difference in distance such that friends are closest to participants and computers are most distant to participants (friend < stranger < computer). Neural RDMs were assembled from trial-level activation from 50 regions of interest (ROIs) in a functional parcellation. First, we identified ROIs that generally represented social closeness by comparing patterns of brain activation during outcome receipt to the social closeness RDM. The statistically-significant ROIs from this comparison were examined for stability by comparing an RDM of the brain activation during reciprocated outcomes to an RDM of defected outcomes.

Results: During outcome evaluation, participants' representation of partners corresponded to a conceptual mapping of social closeness in several regions including those associated with social cognition (TPJ, PCC, dmPFC, dlPFC, STS, and MTG). Among these regions, only the TPJ, STS, and MTG exhibited high neural similarity between outcome types (highly stable) after correction for multiple comparisons. Conclusions: : Our findings reveal that neural representations of social closeness are encoded in social cognitive regions such as the TPJ and dmPFC during outcome receipt in the trust game. These representations are stable across reciprocated and defected trials in some regions (e.g., TPJ, STS, and MTG) but not others (e.g., dmPFC, dlPFC), suggesting that some regions represent social closeness in a context-dependent or invariant fashion. Stable representations may serve as a neural scaffold for maintaining long-term social bonds, even in the face of transgressions, while more flexible regions may allow for recalibrating trust or expectations in response to social feedback. This offers a framework for understanding how neural architecture supports adaptive social behavior.

P1-A-7 The Neural Impact of Continuous Ratings in a Naturalistic Video Paradigm

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Background and Aims: Understanding how we dynamically evaluate information and events in our environment is critical for advancing naturalistic decision-making neuroscience. Continuous rating, or expressive engagement, of complex stimuli has long been used to capture nuanced decision changes outside of the scanner. However, expressive engagement has largely been avoided in neuroimaging due to concerns that it may alter natural cognitive and emotional processes. This study examined how continuously rating subjective evaluations (expressive engagement) affects neural activity, compared to considering the same evaluation without rating (reflective engagement). We aimed to identify neural differences in attention, cognitive processing, and emotional responses during both processes.

Methods: Participants (N=35) underwent fMRI while watching a murder mystery episode in two sequential halves (duration = 22m17s). One half was rated continuously for certainty regarding a central character's guilt or innocence using a 41-point scale visualized below the video. The other half was viewed while reflecting upon the same prompt, but without the subject providing explicit ratings. Rated and unrated halves were counterbalanced across subjects. Post-viewing tasks included free recall of the stimulus and a 13-dimension socioemotional character evaluation for four of the main characters. Differences in neural activation were analyzed using parametric modulation and univariate contrasts in FSL, as well as inter-subject correlations (ISC) conducted with nltools. Schaefer-Kong cortical parcellations were applied to examine the functional networks recruited by each process.

Results: Expressive engagement was associated with increased activity in attentional (anterior insula, dorsal ACC) and sensory integration regions (intraparietal sulcus, occipital cortex). Reflective engagement elicited greater activation in default mode network areas (precuneus, temporoparietal junction). ISC revealed enhanced neural synchrony in attentional regions during expressive rating and in default mode regions during reflective viewing. Despite these neural differences, expressive and reflective conditions showed no significant variation in scene recall or multidimensional character assessments.

Conclusions: We found that continuous rating differentially engages attentional and sensory networks but did not find evidence of disruption in emotional processing or higher-order cognition networks. These findings highlight the utility of real-time self-reporting in naturalistic paradigms, demonstrating its capacity to capture representations of dynamic decision-making while preserving aspects of neural and experiential fidelity.

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P1-A-8 Behavioral and Neurophysiological Correlates of Source Credibility for Medical Information

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Background and Aims: Source credibility often combines perceived expertise and trustworthiness in information sources. While expertise reflects ability to make accurate statements, trustworthiness represents perceived sincerity. Our study investigates how medical doctors' expertise and trustworthiness affect their persuasiveness. We exposed participants to medical information with opinions from fictional doctors having varying experience and patient ratings. We hypothesized that higher expertise and ratings would influence participants' evaluation of medical statements. At the neurophysiological level, we expected that a significant discrepancy between the participant's initial statement's assessment and the hint from the doctor will trigger stronger feedback-related negativity (FRN).

Methods: In the pilot study, 12 participants aged 18-35 years (M = 22.7, SD = 2.6) with no medical Background were exposed to medical statements followed by an opinion of a fictional doctor with different working experience and patient ratings. Participants observed 120 medical statements (correct or false) about GMOs, vitamins, vaccines, and other health-related topics. They rated how much they agree with the medical statements using a 7-point Likert scale. They observed a profile of a fictional medical doctor and his opinion on whether the medical information was correct or false. Profiles were presented as cards displaying initials, years of working experience (high: 18-22 years; low: 1-5 years), and patients ratings (high: 4-5 stars; low: 1-2 stars), with medium levels serving as a control condition. At the end of each trial, participants were able to re-evaluate medical statements.

Results: Data met normality assumptions according to the Shapiro-Wilk test ($p > 0.75$) and sphericity requirements (Mauchly's test: $W = 0.564$, $p = 0.352$). One-way ANOVA revealed a significant difference between the persuasive effects in favour of high-expertised and high-rated doctors ($F(3,33) = 3.31$, $\eta 2 = 0.122$, $p = 0.031$).

Paired t-tests revealed that patients ratings significantly affected opinion changes only for medical doctors with low professional experience ($M = 0.3$, $t = 2.531$, $p = 0.014$), while no significant effect of patients ratings was found for doctors with high professional experience ($M = 0.224$, $t = 1.337$, $p = 0.104$). Similarly, while high-experience doctors' ratings had no significant effect on participants' opinion changes ($M = 0.126$, $t = 0.755$, $p = 0.233$), low-experience doctors showed a trending effect of ratings on statement reevaluation ($M = 0.203$, $t = 1.683$, $p = 0.06$). These findings suggest that ratings play a more crucial role in influencing opinion changes when doctor's experience is low. We are analyzing EEG data, the ERP results will be presented at the conference.

Conclusions: Our pilot results confirm that higher source credibility leads to greater persuasiveness: interestingly, higher patients' ratings significantly affected persuasiveness of medical doctors with low professional expertise but not of medical doctors with high professional expertise. Our final results will incorporate ERP correlates of the processing of medical doctors' hints with high/low patients' ratings and high/low professional experience.

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P1-A-9 The Computational Substrate and Dynamic Inter-Brain Synchrony in Bribery: An fNIRS-based Hyperscanning Study

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Background and Aims: Bribery represents one of the most typical forms of corruption, often occurring in interpersonal contexts that require the involvement of at least two individuals to reach a successful bribery deal. While previous studies have focused on a single-person aspect, the collaborative nature and its underlying computational and neurobiological foundations remain largely unexplored. Therefore, the present study combined a novel behavioral task, computational modeling and fNIRS to investigate the cognitive computational mechanisms and dynamic inter-brain synchrony during bribery decision-making.

Methods: We recruited 50 pairs of healthy university students and randomly assigned each pair to the roles player and judge who were unfamiliar with each other. The player completed a "coin-guessing" task in which they could decide to propose a pre-defined offer to influence the judge's arbitration for additional profits, either via cheating (Bribe condition) or honest reporting (Control condition). The judge witnessed the player's performance and had absolute authority to arbitrate the player's performance, thus determining the final payoffs. The player's remaining gain from the offer and the offer proportion

(i.e., the shared amount) in each round were parametrically manipulated, allowing the use of computational modeling. Brain activities in the bilateral prefrontal cortex (PFC) and the right temporo-parietal junction (TPJ) were recorded using fNIRS-based hyperscanning throughout the experiment.

Results: The best-fitting model, identified by the Bayesian model comparison, showed that both parties weighed their own and others' benefits and the moral cost, placing different weights on these components during decision-making. Multivariate analyses on inter-brain synchrony (IBS) during the decision phase (0~8s), measured by wavelet transform coherence (WTC), revealed that the contextual information (Bribe vs. Control) can be decoded by IBS in the right superior PFC in the early stage of decision-making (1~2s). Moreover, IBS patterns in the PFC specifically represented the player's remaining gain from the bribe offer, while those in the right TPJ represented the offer proportion, with the former occurring earlier. Furthermore, IBS patterns representing mutual benefits or moral costs (indexed by parameters from the best-fitting model) across dyads could predict the mean success rate of bribery ($r = 0.81$), significantly outperforming its prediction in the Control condition ($r = 0.32$). Exploratory analyses showed that the IBS feature weights representing the moral cost were significantly greater than those representing monetary profits across dyads, highlighting the critical role of moral concern in reaching corruption.

Conclusions: Our findings provide preliminarily evidence that delineates the computational mechanisms underlying bribery decision-making and unveils the pivotal contributions of IBS dynamics in frontoparietal areas in representing relevant information and predicting the success rate of corruption. These findings advance our understanding of the collaborative nature of interpersonal corruption.

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P1-A-10 Actively Participating in, Compared to Passively Viewing, an Interaction Shifts Judgments of Socialness

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Objective: Recognizing social interactions is the first step in the foundational human capacity for social cognition. While most studies investigate social signal detection when participants are passive viewers, how does social perception change when we are actively participating in the interaction? In this study, we aim to examine the possible differences in social perception between these two perspectives. Specifically, we test whether actively engaging in an interaction, compared to passively viewing one, changes 1) the degree to which participants tend to view an agents' movements as social, and 2) the speed and confidence with which they make these socialness judgments.

Methods: Here, we capitalized on the fact that humans are primed to perceive social interactions even in simple animations of basic shapes. We set up a simple visual scene composed of two agents (a black and gray dot) in which one dot could be chasing the other or they could be moving independently. We parametrically manipulated chase-directness from 0 (no contingent motion) to 1 (one dot heading directly towards the other). On each trial, participants ($n = 114$) had 6 seconds to either watch a pre-generated animation of the two dots moving on screen (passive-viewing) or control the potentially chased dot with their mouse (actively-participating) and indicate whether one dot was chasing the other, or whether they were moving independently by pressing a keyboard. The key press would end the trial, and immediately afterward, participants rated their confidence in their decision using a continuous slider. We used logistic regression to model participants' decisions as a function of chase directness. This allowed us to calculate each participant's point of subjective equality (PSE), representing how much evidence (how direct the chase should be) they needed to switch their percepts from non-social to social.

Result: Compared to the passive viewing condition, participants' PSE was significantly lower when they were actively participating in an interaction ($t(113) = -4.65$, $p < .001$; Figure 1a). In other words, even when motion cues were more ambiguous (i.e. less direct chase), participants were more likely to perceive a scene as social if they were actively participating in it, suggesting that first-person involvement increases participants' sensitivity to social information. Overall, actively participating in the scene made participants more confident in their judgments of socialness, particularly at the extreme high and low levels of chase directness, where the presence/absence of a social interaction should be more obvious (Figure 1b). Conversely, reaction times were overall longer in the interactive condition, particularly at intermediate levels of directness (Figure 1c), suggesting that actively participating in an interaction—especially an ambiguous one—may prompt more cognitive processing, such as more active information seeking.

Conclusions: Using parametrically controllable stimuli and psychophysics-inspired modeling, we provide a quantitative approach for studying the possible difference in social interaction perception when humans are inside versus outside an interaction. Our findings demonstrate the importance of studying social perception from different perspectives and highlight the role that active participation plays in modulating perceptual sensitivity, possible by recruiting more cognitive resources, particularly in ambiguous situations.

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P1-A-11 From Family to Friends: How the Adolescent-Mother Relationship Shapes Neural Responses to Peer Influence in Young Adulthood

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Background and Aims: :

Adolescence is a period of heightened sensitivity to social input, particularly from peers. There is a normative shift in which adolescents become increasingly sensitive to social information from peers relative to parents. However, parents (with most focus on mothers) still remain a primary agent of socialization, shaping adolescents' behavior and neurobiological functioning. Further still, adolescents vary in their behavioral sensitivity to social information with aspects of the adolescent-maternal relationship identified as a potential source of individual differences. Two salient aspects of the maternal-adolescent relationship are levels of conflict and perceived quality of the relationship. Yet, little is known about subsequent underlying neural mechanisms that may relate to these earlier sources of social influence. The present study tested the effects of maternal-adolescent relationship conflict and quality throughout adolescence on young adults' neural response to peer influence, derived from others' preferences.

Methods: Participants were 43 young adults (22 females, Mage = 19.2 SD = 0.54) recruited from a 15-year longitudinal study of Mexican-origin youth. Using an adapted social influence task, participants viewed a series of 20 abstract symbols they were told 200 similarly-aged peers rated as being "popular" or "unpopular." Then, while undergoing fMRI, participants completed two runs of 90 trials in which they viewed multiple presentations of the 20 previously socially-tagged symbols (instantiated to be either popular or unpopular) as well as 10 novel symbols (no prior social information), one symbol at a time. Self-reported adolescent-maternal conflict and relationship quality were assessed from ages 10-16 using the Parent-Adolescent Conflict scale and Relationship Quality with Mother Scale. Analyses included mean scores across these ages.

Results: Higher adolescent-maternal conflict across adolescence (ages 10-16) was associated with greater neural activity in the left insula ($t = 3.81$, $p < .05$) and right anterior cingulate cortex (ACC; $t = 2.98$, $p < .05$) when young adults viewed socially tagged vs. novel symbols. Higher adolescent-maternal conflict was also associated with greater activation of the right caudate ($t = 2.44$, $p < .05$) when young adults viewed popular vs. unpopular symbols. results also indicated that higher adolescent-maternal relationship quality was associated with less activation to socially tagged vs. novel symbols in salience (bilateral ACC, $t = -4.05$, $p < .05$) and reward (caudate, $t = -4.47$, $p < .05$) regions.

Conclusions: These results suggest that aspects of the adolescent-mother relationship relate to neural sensitivity to peer influence in brain regions involved in salience detection and reward processing. Specifically, experiencing more conflict with one's mother during adolescence may sensitize the young adult brain to information from peers, whereas having a more satisfying relationship with one's mother may buffer this sensitivity. This work demonstrates the effects of earlier parental socialization experiences on subsequent neural responses in young adulthood. More fully understanding the range of social factors that shape underlying neurobiological responses to peers has the potential to inform interventions aimed at mitigating risky behaviors related to negative peer influences.

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P1-A-12 Is Friendship in the Cards? How Adolescent Brains Make Quantity Decisions About Involving Friendship

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Background and Aims: : Social connectedness is a major part of life, with shifting dynamics and importance during adolescence. Within everyday life, we are often confronted with decisions to be made in social contexts, yet there is limited research that disentangles mechanisms of social decisions involving quantity– for instance, how many friends you would want at a certain event or how long you would want to spend with friends. Our Objective was to explore how decisions made within social contexts vary based upon quantity (i.e., size of social network, duration of social experiences) using frontal alpha asymmetry as an electrophysiological correlate.

Methods: Adults (aged 18-35 years, n= 21) and adolescents (aged 12-17 years, n= 17; data collection ongoing) completed a novel "Fortune Teller" task during EEG acquisition. Participants were presented with a social activity and a constraint that varied by social group size or duration, before being asked to choose between two options that were either a small or large option (see examples in Figure 1). In this way, when participants are presented with a group size constraint, they decide about duration and following a duration constraint, they decide about group size.

Results: First, to evaluate behavioral decisions, participant choices were averaged based on constraint to determine individual differences in preference towards certain decisions: (1) low social option, (2) high social option, (3) large group preference, (4) long duration preference. Although interaction between decision preference and group was not significant, $F(3, 108) = 0.93$, $p = .42$, planned comparisons indicated that youth were more likely to select low social quantity than high social quantity and large group preference, $p < .05$, FDR-corrected (Figure 2), with a trend of selecting long duration preference over high social quantity, $p = .07$. There was no significant effect in adult decision category, $p > .05$.

Second, to evaluate brain responses, frontal alpha asymmetry (FAA) was calculated by subtracting the natural log-transformed alpha of the left frontal cluster of electrodes from the right. There was no significant effect of group, $F(1,36) = 0.94$, $p = 0.34$ or condition, $F(1, 36) = 3.65$, $p = 0.064$. Although further examination of the data revealed that there was significantly more FAA variability in the adolescent group compared to the adult group (Levene's Test: $p = 0.035$; see Figure 3), a model controlling for this variability revealed no main effects of group, $F(1, 36) = 1.04$, $p = 0.314$ or condition, $F(1,36) = 0.19$, $p = 0.67$.

Conclusions: Our preliminary results indicate that adolescent participants have a higher preference for small group decisions. Continued data collection and subsequent analyses will aim to further explore how brain responses may map onto quantity processing in social contexts.

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P1-A-13 Comparison of Source and ERPS Across Low and High-Reward Responders

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Background and Aims: Individual variability in neural reward processing is an area of interest among researchers because of its implications for decision-making, motivation, and affective liking. The reward positivity (RewP) is an event-related potential (ERP) measured by the electroencephalography (EEG). It is characterized by a positive amplitude approximately 250-350 milliseconds after receiving a reward (e.g., gain in money) and is thought to reflect reward responsivity. Previous research shows that a reduced neural response to reward is associated with major depressive disorder, whereas an elevated neural response to reward has been linked to mania in bipolar disorder. Despite this, little research has directly compared the neural time course and neural generators underlying reward reactivity between low and high-reward responders. Therefore, the present study aims to assess the neural time course underlying reward feedback (P2, RewP, P3) and neural generators of reward-related electrocortical activity across low and high-reward responders.

Methods: Data have been collected on 32 college students, with a full sample goal of N = 60 by April 2025. Participants complete a Doors Task while brain activity is recorded using a 256 High-Density EEG system. The Doors task is a simple guessing game in which participants are presented with two doors on the screen and prompted to choose one. Participants are told that they will win or lose points depending on their choice. They are then presented with a green "WIN" or red "LOSE" statement. At the end of the task, participants are informed of how they performed by the number of points earned. Participants then complete the Reward Responsiveness Scale.

Analysis Plans: Participants will be split into low and high reward responders based on their Reward Responsiveness Scale scores. The ERPs will be extracted from the frontocentral electrode sites at approximately 200, 300, and 400 ms for the P2, RewP, and P3 components dependent on visual confirmation of peaks. Mixed-effects analyses of variance will be run to assess the effects of reward responsiveness (low vs high) and feedback (win vs loss) on P2, RewP, and P3 amplitudes. Additionally, source localization analysis will be conducted to identify underlying differences across these time points.

General Implications: We expect greater amplitudes for win trials across the P2, RewP, and P3 ERPs for high-reward responders. Additionally, we anticipate that the RewP source will be more robust among those in the high-reward responsiveness group than those in the low-reward responsiveness group. This analysis has implications ranging from the everyday impact of reward responsiveness, such as decision-making and reinforcement learning, to clinical insights related to Major Depressive Disorder and Bipolar Disorder.

P1-A-14 Reducing Financial Misreporting Behavior with Noninvasive Brain Stimulation: The Moderating Effect of Moral Judgment

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Background and Aims: This study explores the neural underpinnings of financial misreporting, examining how moral judgment influences deceptive behavior. The research focuses on two critical brain regions: the right temporoparietal junction (rTPJ) and the right dorsolateral prefrontal cortex (rDLPFC), both associated with moral reasoning and decision-making. By investigating these regions, we aim to uncover their specific roles in financial misreporting behavior and how they interact with individuals' levels of moral judgment.

Methods: Using transcranial direct current stimulation (tDCS), we modulated neural activity in the rTPJ and rDLPFC to assess their effects on financial misreporting during a profit reporting task. Participants' moral judgment levels were measured prior to the task, and the influence of tDCS on misreporting behavior was evaluated, with separate analyses based on individuals' moral judgment.

Results: The findings revealed that tDCS stimulation in both rDLPFC and rTPJ decreased financial misreporting. However, the effects varied depending on participants' moral judgment levels. Increased rDLPFC activity significantly reduced misreporting among individuals with lower moral judgment, while those with higher moral judgment showed no notable change. In contrast, increased rTPJ activity reduced misreporting for participants with higher moral judgment levels, whereas those with lower moral judgment displayed consistent behavior regardless of rTPJ stimulation.

Conclusions: These results highlight the differentiated roles of rDLPFC and rTPJ in deceptive financial reporting, demonstrating that moral judgment moderates the effects of brain stimulation on ethical behavior. The study suggests that enhancing activity in targeted brain areas can reduce misreporting behaviors, offering potential avenues for ethical interventions in contexts where financial misreporting is a concern.

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P1-A-16 The Role of Social Norms on Assisted Dying Decisions

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Background and Aims: Medical assistance in dying (MAiD) is increasingly becoming a legal option, reflecting a societal shift in social norms toward respecting patient autonomy. In the United States, 11 states have enacted MAiD legislation, with 71% of Americans supporting the right to die for mentally capable adults experiencing unbearable pain. However, healthcare professionals face profound ethical and emotional challenges in MAiD decisions, balancing their duty to preserve life with respecting autonomy. The study examined how healthcare professionals make decisions about hypothetical end-of-life scenarios by measuring the neural and behavioral responses associated with normative and non-normative MAiD situations in Australia.

Methods: 59 students (30 Male, 28 Female, 1 Non-binary; Mage = 24 years, SD = 3.71) from the health science department at the University of Melbourne were recruited to participate in an fMRI study. Before scanning, participants completed surveys assessing their dispositional empathy (cognitive and emotional components) and their attitudes toward assisted dying through various life-and-death scenarios. During scanning, participants were presented with two different types of scenarios (normative and non-normative) related to MAiD. Normative scenarios follow a typical framework designed to meet all criteria in the Australian States where the services are legal, while nonnormative scenarios occur when some legal criteria for suitability are met but not others. Following each scenario, a yes/no question and a 1-9 confidence scale were presented.

Result: Brain response in the ventral striatum during all decisions was associated with attitudes towards assisted dying – participants with more negative attitudes towards assisted dying show below-baseline VS activity while those with more positive attitudes are nearer to baseline. Thus, VS deactivation appears to reflect the displeasure that those who generally oppose assisted dying feel when evaluating the scenarios. A similar correlation was observed between cognitive empathy and activity in VS – individuals who have difficulty understanding others' mental state experiences are more likely to show deactivation in the reward system when engaging in decision-making about assisted dying, while those with high levels of cognitive empathy can better understand the beneficial aspects of this choice for the affected patients.

Conclusions: The ventral striatum appears to index decision-makers' general attitudes towards assisted dying. This result provides valuable grounding for future studies. For instance, it can be hypothesized that the striatal response to assisted dying requests could vary based on the gender or race of the hypothetical patient, and that this could predict disparities in real-world decision-making that people may not want to admit to in a hypothetical behavioral scenario.

P1-A-17 Remembering with Emotion: Autobiographical Memory Sentiment in Real-World Settings

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Background and Aims: Autobiographical memory creates the scaffolding from which our schemas are formed. Emotional experiences and surprising events (i.e. prediction errors [PEs]) modulate the richness and content of our memory. Furthermore, emotional experiences may impact subsequent memory differently depending on their temporal dynamics (i.e. initial reactivity versus lasting affective impact). Additionally, the type of surprise – measured either as deviation from one's own expectations (a subjective PE) or deviation from the class performance (an expected value prediction error [EVPE])–may differentially effect memory. The present study tested the effects of emotion and surprise on naturalistic autobiographical memory, using Chemistry midterm exam grades, as a personally meaningful, emotionally salient, and ecologically valid event.

Methods: Three cohorts (fall 2022, n = 273; fall 2023, n = 232; fall 2024, n = 224), students predicted exam grades after exams, but prior to receiving their grade. Before viewing their exam grade, participants were presented with the class average on the exam (the 'expected value'). Participants provided frequent emotion ratings after viewing their grade. One week later, participants submitted an audio recording recalling the moment they saw their grade in as much detail as possible. We performed a sentiment analysis using language and prosody to determine affective tone during recall. We used mixed-effects models to examine how experienced emotion over time influences the sentiment of memory and how surprise impacts the sentiment of memory as a function of the type of surprise (subjective PE or EVPE).

Results: The emotional content of memory–its sentiment–was predicted by the intensity of emotion one experienced right after receiving their exam grade (study 1: $t=14.572, p<.001$; study 2: $t=10.751, p<.001$). This effect was primarily driven by the initial emotional reactivity (study 1: $t=12.281, p<.001$; study 2: $t=7.434, p<.001$) rather than sustained emotional experience hours later (study 1: $t=0.275, p=.784$; study 2: $t=2.686, p=.008$). Both the subjective PE and EVPE both predicted emotional content of memory; but EVPE ($t=-9.939, p<.001$) had a much larger impact on memory than subjective PE ($t=-3.821, p<.001$).

Conclusions: The modulating role of time on the relationship between momentary affective experience and emotional content of memory suggests that the initial reactivity is more influential than the lasting affective impact in shaping memory. Additionally, the stronger predictive power of EVPE on memory sentiment compared to subjective PE indicates that social comparisons are more strongly encoded into emotional memory than deviations from internal expectations.

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P1-B-1 Temporal Dynamics of Negative Emotion and Cognitive Reappraisal in the Amygdala

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The amygdala plays a central role in generating negative affect and is influenced by both emotion regulation strategies and pharmacological interventions. However, the temporal dynamics of affective responses within the amygdala remain poorly understood. While electroencephalography (EEG) has limited utility for studying deep brain structures, most functional Magnetic Resonance Imaging (fMRI) research focuses on modeling the amplitude of the amygdala's hemodynamic response over fixed intervals. This approach restricts a comprehensive investigation of the amygdala's dynamic response to affective stimuli and related interventions.

In this study, we utilized the Finite Impulse Response (FIR) model, which offers a flexible framework for assessing hemodynamic changes, to examine the amygdala's response during an emotional picture-viewing and regulation paradigm. Using a well-powered dataset of 358 participants, we addressed three key questions: 1). Does the amygdala primarily respond to the onset of negative stimuli through a rapid subcortical alert pathway, or does it sustain vigilance in the presence of continuous stimuli? 2). Can cognitive reappraisal modulate the temporal dynamics of the amygdala's response? 3). Do temporal dynamics vary across amygdala subregions, and are these differences associated with its anatomical divisions?

Our findings revealed: 1). The amygdala exhibits limited activation during the initial cue phases but shows sustained activation during the middle and late stages of stimulus presentation. 2).No significant regulatory effects were observed across the temporal series for amygdala subregions during cognitive reappraisal. 3). Distinct temporal profiles were noted among the amygdala subregions, which could be attributed to their varied roles in affective processing. The LB and SF subregions of the amygdala appear to be more active at a perceptual level, while the CM subregion may participate in a more nuanced evaluative capacity.

These results highlight the heterogeneous temporal dynamics within the amygdala and underscore the importance of considering temporal dynamics in future investigations of its neural mechanisms.

P1-B-2 Emotion Regulation Differences Between Athletes and Non-Athletes are Highlighted by Biological Signals of Cognitive Control

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Background: Athletic success depends not only on physical talent but also on psychological factors such as emotional well-being and effective emotion regulation (ER). Emotion regulation, including strategies like cognitive reappraisal and expressive suppression, is vital for managing emotional experiences. Recent interest has grown in understanding how ER contributes to athletes' performance and mental health. This study explores differences in ER abilities between college athletes and non-athletes by examining both behavioral and neurobiological aspects.

To investigate differences in emotion regulation (ER) strategies and associated neurobiological markers between college athletes and non-athletes, focusing on cognitive reappraisal and expressive suppression.

Methods: College athletes and non-athletes participated in an ER task where they were instructed to either suppress or reappraise negative images. We assessed habitual use of ER strategies, emotion ratings during the task, and neurobiological markers, including late positive potential (LPP) and frontal midline theta power.

Results: Athletes used cognitive reappraisal more frequently than non-athletes. During cognitive reappraisal, athletes rated negative images as less negative, indicating more effective emotional modulation. No significant group differences were found in LPP amplitudes. However, athletes exhibited significantly higher frontal midline theta power during cognitive reappraisal compared to non-athletes.

Conclusions: The results suggest that athletes' enhanced cognitive control, potentially due to athletic training, may improve their emotion regulation abilities.

P1-B-3 Eyes on VR: Unpacking the Causal Chain Between Exposure, Reception, and Retention for Emotional Billboard Messages

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Background and Aims: Individuals encounter numerous messages daily, yet only a select few capture their attention and even fewer are retained in memory. Our study employs a "VR-Billboard-Paradigm" (Anonymous, 2023) that integrates VR with eye-tracking in a driving simulation to manipulate and study message characteristics and their effects on visual attention and memory. We focus on how billboard emotionality affect viewer engagement and memory retention, maintaining high experimental control and ecological validity.

In environments like highways, overt visual attention – such as fixating on a billboard while driving – serves as an initial gatekeeper for message effects by linking exposure to message reception (Geisler & Cormack, 2011; Potter, 2008). Such attention identifies which messages are noticed and processed, with emotionally salient messages significantly capturing attention (Calvo & Lang, 2004; Schupp et al., 2006). Conversely, demanding tasks divert attention, affecting how messages are processed and retained (Chaiken, 1980; Fisher et al., 2023; Kranzler et al., 2019; Lang, 2000).

This study aims to explore the dynamic interplay of message characteristics and environmental demands on attention, reception, and retention in VR settings. By integrating eye-tracking, we seek to precisely quantify the exposure-reception-retention chain (Duchowski, 2017), offering valuable insights for optimizing communication strategies across fields such as health, politics, and advertising.

Method*:* Forty participants from a university pool were immersed in a photorealistic VR highway environment containing 20 billboards, designed with varying emotional intensities, using a HP-Reverb-G2-Omnicept VR headset. We manipulated billboard emotionality and participants' attention (free-viewing vs. trash counting) to examine effects on message retention (see Figure 1). Eye-tracking data captured actual exposure and attention metrics, and memory retention was evaluated through subsequent recall and recognition tasks.

Results: Exposure directly influences subsequent effects, with heightened attention enhancing memory recall and recognition. Emotionally intense messages led to longer gaze durations and improved retention. Distractions, particularly in a trash counting condition, significantly reduced the likelihood of message exposure and subsequent memory performance. Manipulating emotional content and minimizing distractions were key to improving retention, with participants in a free-viewing condition showing superior memory performance. These findings highlight the critical roles of attentional focus and emotional intensity in enhancing message retention in VR environments, emphasizing the importance of engagement and emotional content for effective communication.

Conclusions: This study examines the nexus between message exposure, reception, and retention. By controlling billboard presentations and tracking eye movements, we can precisely measure viewer engagement with messages. Subsequent memory tests assess the short-term effects of these messages, linking the emotional intensity of billboards to cognitive engagement. This integrated approach allows us to trace the causal pathway from message characteristics (emotionality) to neurocognitive engagement with messages within a realistic settings.

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P1-B-4 Brain Network Dynamics Capture Fluctuations in Attention During Tasks and Narratives

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Background and Aims: The ability to maintain attention is essential to accomplishing a multitude of daily tasks such as understanding narratives. However, the targets of sustained attention—what and how information is attended—differ across contexts. Are the same neural mechanisms that predict Objective measures of task-based attention also related to subjective evaluations of attentional engagement to narratives? Here, we investigate the brain network dynamics that underlie attentional fluctuations in a controlled task context. We then ask whether these task networks also capture changes in subjective engagement during movie watching and story listening.

Methods: In a two-session fMRI study, participants performed a continuous performance task in which streams of trial-unique sounds and images were presented simultaneously. They were instructed to attend to either images or sounds and press a button when the relevant item belonged to a frequent (90%) but not infrequent (10%) category. To isolate brain networks tracking attention dynamics, we calculated edge co-fluctuation time series which quantify moment-to-moment changes in functional relationships in the brain. Neural data were parcellated into 400 cortical and 32 subcortical regions. Edge co-fluctuation time series were calculated as the product of the z-scored time series for all pairs of brain regions. We fit general linear models to identify which edges varied with attentional lapses, task errors.

We then tested whether co-fluctuation strength in these edges also captured changes in subjective engagement during a naturalistic context. In addition to the continuous performance task, participants viewed four naturalistic stimuli in the scanner: two audiovisual movies, one silent movie, and one podcast. Following the scan, participants provided moment-to-moment reports of engagement throughout each narrative using a slider bar. We correlated co-fluctuation strength in edges related to both auditory and visual attentional lapses with the mean time course of narrative engagement.

Results: Analyses revealed edges whose dynamics predicted visual and auditory attention lapses, as well as edges common to both types of errors. A network of 1849 and 2401 edges were positively and negatively related to auditory sustained attention fluctuations, respectively. In visual runs, 5465 edges positively and 6678 edges negatively fluctuated with sustained attention. Of these, 157 positive edges and 245 negative edges were common to both modalities (overlap significant, ps<.001). Co-fluctuation strength in edges related to auditory and visual sustained attention positively predicted changes in engagement in all narratives (Pearson's rs=.014-.055, all ps<.08), relative to a phase-randomized null. This suggests that edge co-fluctuation networks capture context-general variability in attentional state. Predictions from edges related to both auditory and visual attentional lapses were more reliable than edges identified in only one task modality (Pearson's rs=-.028-.038).

Conclusions: results suggest that moment-to-moment changes in sustained attention are supported by modality-general networks. Interestingly, we show that edge co-fluctuation networks capture both Objective and subjective fluctuations in attentional state during tasks and narratives.

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P1-B-5 Human vs AI Emotion Classification of Diverse Faces

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Background and Aims: With the recent explosion of artificial intelligence (AI) in everyday life, questions have emerged about the abilities of AI to handle underrepresented groups. This study combines two recently developed resources – the DiverseFACES data set (Gonzalez & Seaman 2024) and Py-Feat (Cheong et al., 2023) – to compare human and AI emotion classification of images from underrepresented racial and age groups.

Methods: The DiverseFACES dataset consists of 432 images from 18 Black and 18 Hispanic models across three age groups (young, middle-aged, and older). Each model contributed 12 images—two for each of six target (intended) emotions (anger, disgust, fear, happy, neutral, sad). These images were classified into primary emotion shown by online raters (N =144) who were evenly split across three racial (Black, Hispanic, White) and three age (younger, middle-age, and older) groups. Each image was classified an average of 12 times, and the average emotion identification accuracy for the target emotion was calculated across participants for each image (average human rating accuracy).

These images were then processed using Py-Feat, an AI-driven tool designed to make facial expression analyses more accessible to researchers. For each image, Py-Feat's emotion detector model generated probabilities (0–1) indicating the likelihood of each emotion's presence. The probability assigned to the target emotion was used in the analysis (AI-generated probability).

We assessed the relationship between average human rating accuracy and AI-generated probability for the target emotion, and we compared average human rating accuracy to the AI-generated probability for the target emotion.

Results: Correlation analyses revealed a significant moderate positive relationship between human accuracy and AI probability ($r=.53$, $p<.001$). An independent samples t-test revealed a significant difference in accuracy between human rating accuracy and AI probability ($t(779.15)=4.09$, $p<.001$), such that humans ($M=.698$) were more accurate than AI ($M=.602$).

Conclusions: While neither AI nor humans achieve perfect accuracy in emotion classification, the results suggest that AI lags behind human performance, particularly for diverse racial and age groups. Improving AI's ability to recognize emotions in these populations is crucial for its broader application in real-world settings. Moving forward, we are expanding the DiverseFACES dataset to include Asian populations and will replicate this study with the newly added images.

A key limitation of this study is that human raters selected a single primary emotion for each image, while the AI provided probabilities for multiple emotions. This difference in approach means the AI may more accurately reflect the complexity of emotional expressions, as faces often display combinations of emotions. In such cases, a lower probability assigned by the AI to the target emotion might actually represent a more accurate assessment of the range of emotions being expressed.

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P1-B-6 Affect-Rich Decisions for Self vs. Others Across the Lifespan

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Background and Aims: While most of the laboratory-based research on risky decision making is in the financial domain, people make important decisions in other domains—for example, medicine. These decisions often elicit a greater level of emotion and have been referred to as "affect-rich," and can be compared to those that elicit less emotion, or "affect-poor" choices, such as monetary decisions. Substantial evidence shows that people rely on different choice strategies for affect-rich and affect-poor outcomes, affecting decision quality and risk preferences, (Pachur et al., 2014; Suter et al., 2015; 2016; Lejarraga, 2016). One study by Popovic and colleagues (2019) found that this "affect-gap" of risky choice appears also when making decisions for socially distant others, tested in college students making decisions for an unspecified classmate. In Study 1, we attempt to replicate the previous findings in a new sample of college students using a modified (i.e., not student-specific) task designed for use across the adult lifespan. In Study 2, we use the modified task to compare affect-rich and affect-poor choices for the self, compared to others, in participants across adulthood and into older age. In both studies, we add a 'close other' condition where participants make both types of decisions for an age-matched loved one.

Methods: In Study 1, participants (N = 120 college students) are randomly assigned to make affect-rich and affect-poor choices for themselves, on behalf of an acquaintance (e.g., a neighbor who they don't know well), or on behalf of a loved one (e.g., sibling, friend). In the affect-rich condition, participants make medical-related decisions, choosing between two medicines that each cause a side effect with some probability. In the affect-poor condition, participants make monetary decisions, choosing between two options that would lead to a specific parking fine to be paid with some probability. In Study 2, participants across the lifespan (N = 180, ages 25-85) will complete the same tasks for themselves, a distant other, or a close other.

Results: In Study 1, we expect to replicate the findings by Popovic et al. (2019) that the affect gap is similar for decisions made for oneself and socially distant others. We predict the affect gap for close others may be similar or even larger. In Study 2, we predict the affect gap will be similar across adulthood. However, given the prioritization of social goals in older age, decisions for others may yield differential affect gap.

Conclusions: This work will contribute to a better understanding of how people across adulthood make important decisions about health and finances for themselves and others.

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P1-B-7 Euphemisms Attenuate Neural Processing of Norm Violations

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This study investigates the neurocognitive processes underpinning the perception and evaluation of euphemized norm violations, which are often employed to obscure or soften the severity of unethical actions. By employing event-related potentials (ERPs) captured through EEG recordings, we explored how euphemistic language framing influences both behavioral responses and brain activity. Our primary hypotheses were that euphemisms reduce perceived severity of norm violations (H1) and elicit distinct neural patterns compared to non-euphemized language (H2). Furthermore, we examined the moderating effect of individual differences in Need for Cognition (NFC) on these processes (H3). Participants read vignettes describing norm violations presented either with euphemistic or non-euphemized language. Behavioral findings confirmed H1: norm violations described using euphemisms were perceived as less severe compared to non-euphemized descriptions. Significant differences emerged in ERP components associated with semantic processing and moral evaluation. Specifically, non-euphemized norm violations evoked stronger P600 responses, indicative of more intensive cognitive and moral processing, validating H2. However, contrary to H3, no significant correlation was observed between NFC scores and P600 responses or behavioral severity ratings, though some early-stage (P300) effects did correlate with NFC. The study suggests that P600 reflects a dynamic cognitive mechanism for integrating complex normative contexts, highlighting its role in evaluative reappraisal beyond immediate conflict detection. Our findings hold implications for understanding media manipulation strategies and the cognitive mechanisms that underlie moral decision-making.

P1-B-8 Multivariate Pattern Analysis of Inter-Network Connectivity Distinguishes Between Reappraisal and Passive Viewing of Emotional Scenes

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Background and Aims: Down-regulation using reappraisal is typically associated with negative connectivity between prefrontal areas such as the dlPFC and salient areas like the insula and the amygdala. The former areas are associated with cognitive networks such as the frontoparietal networks and the attentional control network (ACN), while the latter is associated with emotional networks such as the salience network (SN) and the limbic network. In addition, the default mode network (DMN) has been shown to contribute to emotion regulation. The purpose of this study was to determine using multivariate pattern analysis (MVPA) if inter-network functional connectivity could predict whether a person was reappraising or passively viewing a negative image.

Methods: Thirty-one participants completed an MRI task in which they viewed and reappraised series of images. Using independent component derived networks and dual regression, we determined functional connectivity between each network during the reappraisal and viewing tasks.

Results: A univariate analysis determined that connections between aspects of the DMN and ACN differed between reappraisal and view conditions. The MVPA determined that whether someone was reappraising or viewing an image could be predicted better than task, with connections involving the above networks being reliable contributors to the model.

Conclusions: These findings support the idea that multiple networks contribute to the emotion regulation process.

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P1-B-9 Evidence For Particularly Idiosyncratic Interpretations of Naturalistic Social and Affective Stimuli in Schizophrenia

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Background and Aims: Recent neuroimaging studies have linked both subjective and Objective measures of social disconnection to idiosyncratic neural responses to naturalistic stimuli (e.g., audiovisual movies). Preliminary evidence suggests that patients with schizophrenia, which is characterized by social disconnection and disorganized thought patterns, also exhibit idiosyncratic neural responses to naturalistic stimuli. Taken together, these results suggest that patients with schizophrenia, particularly those experiencing or at risk for social disconnection, might interpret and later remember content in a way that diverges from how others interpret and remember that same content. However, this possibility has not been tested directly, as past work in this vein has focused only on normativity of neural responses. To address this gap in understanding, this study examines the relationship between verbal recollections of naturalistic socially- and affectively-relevant stimuli and measures of loneliness and social connectedness to further elucidate the cognitive processes underlying social disconnection in schizophrenia.

Methods: Participants viewed socially and affectively relevant videos during fMRI scans and provided verbal recollections afterwards. These recollections were then analyzed using Linguistic Inquiry and Word Count (LIWC) software to assess a ffective and social responses. For both schizophrenia patients (SZ, n = 60) and healthy controls (HC, n = 57), we hypothesized that increased idiosyncrasy in participants' verbal recollections would correlate with higher loneliness and lower social connectedness. Furthermore, we hypothesized that participants in the SZ group would have higher idiosyncrasy, higher loneliness, and lower social connectedness compared to the HC group.

Results: Overall idiosyncrasy scores were calculated as the sum of the deviation from the group mean for LIWC-derived

variables for each participant. The resultsindicated that SZ participants had significantly more idiosyncratic recollections than the HC group. In addition, SZ participants reported significantly higher loneliness and lower social connectedness compared to HC participants. However, no significant relationship was found between idiosyncrasy scores and loneliness or social connectedness in either group.

Conclusions: Subsequent analyses will extend this approach to include other methods of assessing semantic idiosyncrasy and to examine relationships between semantic and neural idiosyncrasy scores. Additionally, the association between changes in neural response normativity and changes in the social and affective content in the stimuli over the course of the study may assist in identifying specific elements which contribute to idiosyncratic interpretations and memories. Overall, our findings suggest that idiosyncratic processing and recollection of naturalistic stimuli may reflect social cognitive differences in schizophrenia, offering potential insights into the neural basis of social disconnection in this population.

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P1-B-10 Amygdala Habituation Patterns in Neuroticism

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Background and Aims: Neuroticism is a key personality trait with known links to internalizing disorders. Dysfunctional amygdala has been proposed as a critical neurobiological mechanism underlying neuroticism, but inconsistent findings in the existing literature underscore the need for further research. Habituation is defined as a response decrement to repeated stimuli and is an important aspect of the amygdala function. Based on previous studies suggesting that amygdala habituation is a reliable fMRI phenotype, we aim to investigate whether trait neuroticism modulates amygdala habituation patterns to repeated facial expressions of emotion.

Methods: We hypothesized that amygdala habituation patterns would systematically vary as a function of neuroticism. Individuals with low neuroticism are expected to show decreased blood oxygen level dependent (BOLD) responses, while those with high neuroticism exhibit sustained or fluctuating activation in the amygdala. Using functional magnetic resonance imaging (fMRI) data (n = 80) from a widely used emotional face-matching task, we will first apply a general linear model (GLM) to analyze responses to repeated face and shape stimuli. For each participant, we will measure amygdala BOLD response intensity for each face block and model how these responses change over time. If a decreasing trend in BOLD responses is observed, we will calculate the slope of this decline. Additionally, we will examine whether these patterns differ based on the category of the expressed emotion – specifically for fearful faces. Regression analyses will then be conducted to determine whether neuroticism and related self-reported anxiety predicts amygdala habituation scores.

Analysis Plan: Temporal signal-to-noise ratio of the amygdala will be calculated to ensure that the BOLD signal is sufficiently reliable for use in the analysis. To define the a priori region of interest (ROI), first- and second-level GLMs will be applied to model the hemodynamic responses to the face and shape conditions. Significantly activated voxels in the face condition (faces > shapes) will be identified at the whole-brain level with a threshold of $p < 0.05$ (family-wise error-corrected for multiple comparisons). Voxels within the atlas-based anatomical definition of the amygdala that meet this criterion will be applied to each participant's first-level GLMs to extract mean beta values for the eight face blocks. Then, we will assess the link between amygdala activation changes with neuroticism scores by performing regression analyses.

Significance: Identifying a reliable fMRI-based endophenotype for neuroticism can enhance our understanding of the neural mechanisms underlying psychopathology, offering valuable insights for preventing disorders and improving treatments. More broadly, we aim to demonstrate that amygdala habituation patterns present a promising alternative to averaging amygdala BOLD responses in predicting psychopathology.

P1-B-11 Investigating Empathic Pupillary Dilation Reflexes to Authentic Facial Expressions of Pain

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Background and Aims: A growing body of literature shows shared neural systems between self and other representations in emotion[10], pain experience[8], and motor movements[3]. These findings extend to infant[6], clinical[2], and healthy populations[7]. Particularly with pain experience, there is literature suggesting common and distinct neural subpopulations between self-perceptions of pain and pain in others[1,4,7,8,9]. Previous studies show that pain experience in oneself can elicit a pupillary dilation reflex[11]. Therefore, we sought to test if this pupillary dilation reflex extends to perceptions of pain in others. Using pupil size as a marker for arousal, we hypothesized that: 1) pupil dilation will be associated with recognizing pain or no pain in other's facial expressions and 2) pupil dilation will be associated with greater pain intensities recognized in others.

Methods: Forty-seven healthy participants viewed videos of target faces as they experienced painful and non-painful thermal stimulation on the left forearm. Twenty-three participants received feedback after every trial about the target's self-reported pain experience, and the remaining twenty-four received no feedback. In the pain-no-pain task, participants were asked to identify if a target was in pain or no pain. In the pain intensity task, participants were asked to evaluate how much pain the target was experiencing on a scale of 0-100. For all participants, pupil size was measured using an eye tracking camera during the experiment. We had useable pupillometry data from 33 participants in the pain-no pain task and 36 participants in the pain intensity task. Eye blinks were interpolated and then manually cleaned from the data during the duration of each video.

We used linear mixed models to account for dynamic relationships between trial-by-trial mean pupil size and pain assessment decisions while determining whether this relationship varied across groups in each task. Pupil dilation was treated as a dependent variable in all models.

Results: Multilevel models showed that pain assessment was positively associated with pupil dilation in both tasks. In the Pain-No Pain task, participants showed greater pupil dilation when they perceived pain in others versus when they did not perceive pain (Beta = 53.86, p = 0.002). Likewise, in the Pain Intensity Task, there was a positive association between perceived pain intensity and pupil dilation (Beta = 1.01, p < 0.001). There was no effect of Group on pupil dilation in either task, nor interactions between Group and pain assessment (all p's > 0.3).

Conclusions: Pupil dilation was sensitive to the perception of pain in others. Furthermore, greater perceived pain intensities in others were followed by larger pupil diameters. Potentially, this relationship could signal that greater attention is paid to people who are perceived to be in pain and in greater amounts of pain. Furthermore, these findings support the growing evidence that there is overlap in neural correlates between self-perceptions of pain and pain perceived in others.

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P1-B-12 Resting State Functional Connectome-Based Prediction of Valence Bias

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Background and Aims: Valence Bias (VB) refers to a behavioral tendency to interpret emotionally ambiguous stimuli, such as surprised faces, as negative. As this tendency is known to remain stable over time, we used connectome-based predictive modeling (CPM) to investigate whether resting state functional connectivity can predict the trait-like individual differences in VB. CPM is a data-driven protocol for developing predictive models of brain-behavior relationships from connectivity data using cross-validation.

Methods: A total of 108 participants (44 females; mean age = 23.8 years, SD = 2.7 years) rated 170 multi-racial and 74 Korean Surprised faces using a two-alternative forced-choice valence task (i.e., positive or negative). VB was defined as the proportion of faces rated as negative, with values closer to 1 indicating a stronger tendency to rate faces as negative. Additionally, self-reported measures of trait anxiety and intolerance to uncertainty data were collected. Resting state functional magnetic resonance images (fMRI) from a total of 91 participants were included in the CPM analysis. Gender and trait anxiety were entered as covariates. Leave-one-out cross-validation (LOOCV) was employed, and procedure for each iteration adhered to the standard conventions of CPM. Specifically, Pearson correlation coefficients were computed to identify the predictive edges most significantly correlated with VB scores in the training set, then this network model was tested using the held-out sample. This procedure was repeated for 91 iterations, as every participant was to be used once as the testing set sample.

Results: CPM results showed that, when controlling for the effects of gender and trait anxiety, LOOCV revealed a positive network model that significantly predicted VB scores (r = 0.3, p = 0.004). Permutation tests validated the results for the positive network (p = 0.007). Unpacking this network model at the edge level, the amygdala showed connections to Brodmann Area (BA) 8 (Front Eye Fields) and BA 32 (dorsal anterior cingulate cortex). At the macro-scale network level, edges between the medial frontal network and cerebellum network, edges within visual I network, and edges between visual association network and visual II network were identified as the most important contributor to the positive network model of VB. On the behavioral level, no significant correlations were found between VB and trait anxiety or intolerance to uncertainty.

Conclusions: Using CPM, we identified a positive network model that predicted individual differences in VB. The edges between the amygdala and BA 8/32 were particularly robust, with the strength of these connections being predictive of the behavioral tendency to perceive emotionally ambiguous stimuli as being more negative. Our findings offer further insights into the neural underpinnings of VB, which is known to have implications for well-being through its associations with loneliness and stress.

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P1-B-13 For Better or Worse: How Neural Self-Partner Representation Similarity during Social Feedback Relates to Romantic Relationship Satisfaction and Depression

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Background and Aims: According to the self-expansion model, individuals in romantic relationships experience a merging of identities with their partners, perceiving the romantic partner as an extension of the self. This phenomenon, known as "self-other overlap," encompasses two distinct dimensions: perceived closeness and overlapping representations between the self and the partner. Previous empirical research on self-other overlap has primarily focused on the relationship between self-reported perceived closeness and relationship satisfaction. This study seeks to expand on prior research by investigating the link and underlying mechanisms between overlapping self-partner representations—particularly at the neural level—and romantic relationship outcomes (e.g., relationship satisfaction) as well as broader well-being outcomes (e.g., depressive symptoms). Furthermore, this study examines whether these relationships vary depending on situational valence (e.g., positive versus negative events) and gender. By addressing these gaps, the study aims to enhance our understanding of how self-other overlap relates to romantic relationships and mental health.

Methods: Ninety romantic couples underwent functional magnetic resonance imaging scans while processing positive and negative social feedback directed at themselves and their partners. Participants also completed daily diaries prior to the scans, reporting on affect and support provision, as well as assessments of relationship satisfaction and depression on the day of the scan and six months later. Representational similarity analysis and actor-partner interdependence modeling were employed to investigate the relationships between self-partner representational similarity (self-partner RS) in the ventromedial prefrontal cortex (VMPFC)—a brain region involved in self-referential processing—and both self- and partner-reported relationship satisfaction and depression. Actor-partner interdependence mediation modeling was further utilized to examine the mediating roles of daily support provision and affect.

Results: During positive feedback, self-partner RS in the VMPFC was positively associated with both self- and partner-reported current relationship satisfaction. During negative feedback, self-partner RS in the VMPFC was positively associated with partner-reported current relationship satisfaction, and indirectly linked to subsequent relationship satisfaction for both partners through daily support provision. However, self-partner RS in the VMPFC during negative feedback was also positively associated with self- and partner-reported subsequent depression, mediated by daily affect. Additionally, the associations were primarily observed between men's self-partner RS in the VMPFC and both partners' relationship satisfaction.

Conclusions: These findings suggest that self-other overlap may not always link to positive outcomes. Heightened self-partner representational similarity during negative feedback appears to be a double-edged sword: while it is associated with increased relationship satisfaction through daily support provision, it is also related to heightened risk for depression through daily affect. Understanding this balance is crucial for fostering healthy boundaries and promoting well-being in romantic relationships.

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P1-B-14 Behavioral and Neural Patterns of Predicting Emotion Transitions: The Moderating Role of Loneliness

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Background and Aims: Success in the social world relies on understanding and predicting others' thoughts and behaviors. Loneliness has been linked with challenges in these areas, including difficulties in accurately predicting others' emotional transitions and exhibiting distinct neural patterns when processing social information. These challenges may stem from the negative expectations that lonely individuals often hold about social interactions, perceiving others as more unfair and untrustworthy. This negativity bias may further influence how lonely individuals anchor their predictions of others' emotions to their own emotional experiences, potentially distorting perceptions of emotional transitions, with such biases likely shaped by the valence of the emotions that are being transitioned to and from. Here, we investigate whether loneliness is associated with idiosyncratic patterns in how individuals predict emotional transitions in themselves and others. Specifically, we explore 1) whether loneliness affects the clustering of neural and behavioral responses, leading to greater idiosyncrasy in lonely individuals' predictions of their own and others' emotional transition likelihoods, and 2) whether valence influences these patterns, with loneliness contributing to distinct representations of transitions based on emotional valence.

Methods: To explore these questions, we recruited 67 undergraduate students who underwent fMRI while rating the likelihood of transitioning between pairs of emotional states (anxious, calm, happy, irritable, sad, alert, sluggish). Participants evaluated these transitions for themselves and a typical college student at their university. Neural activity was recorded during the task. We employed intersubject representational similarity analysis (IS-RSA) to examine how loneliness influences the mental representation of emotional transitions. Specifically, we tested whether loneliness is linked to greater idiosyncrasy in neural and behavioral responses, and whether these effects vary by valence. Behavioral data were further analyzed using linear mixed models to assess whether valence moderates differences in perceptions of emotional transitions between lonely and non-lonely individuals.

Results: Preliminary behavioral data indicate that lonely individuals perceive themselves and others as more likely to move to negative emotional states. Specifically, they are more likely to predict themselves moving from positive to negative states and more likely to persist in negative states compared to non-lonely individuals (Figure 1A). Lonely people also view others as less likely to persist in positive states compared to non-lonely individuals (Figure 1B). These findings suggest that loneliness influences the way individuals conceptualize emotional stability and change, potentially contributing to challenges in maintaining social connections. fMRI data will be analyzed according to the methods outlined above. Neural data is currently being preprocessed, and will be analyzed in the first months of 2025, before SANS.

Conclusion: This study investigates whether loneliness is associated with distinct biases in how individuals perceive emotional transitions. These biases could contribute to challenges in social interactions for lonely individuals, reinforcing loneliness's isolating effects.

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P1-B-15 Perturbing the Anterior Nucleus of the Thalamus in Musical Emotive Perception Using Low-intensity Focused Ultrasound

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Background and Aims: The anterior nucleus of the thalamus (ANT) is increasingly recognized as a relay station in emotional regulation, connected to regions such as the orbital frontal cortex and anterior cingulate cortex. For example, studies in epilepsy patients using deep brain stimulation have demonstrated that ANT may impact mood and contributes to the attentional capture of emotional stimuli. However, the role of the ANT in emotional perception remains unclear. Recent advances in non-invasive methods, such as low intensity focused ultrasound (LIFU), have now enabled the causal stimulation mapping of subcortical structures in healthy individuals. Here, we present preliminary findings of the effects of ANT LIFU stimulation on instrumental musical perception, while also measuring resting state electrophysiologic changes using magnetoencephalography (MEG).

Methods: Four healthy subjects (3 male and 1 female; 24-60 years old) underwent non-invasive LIFU stimulation. LIFU stimulation was delivered using an ATTN 201 device, using the following stimulation paradigm: 25 Hz pulse repetition frequency, 8% duty cycle and 2 min on/ 30s off targeting pressures ~0.6 MPa. Song clips were composed, recorded, and crowd-sourced to capture consensus sentiments of arousal and mood valence. Ten songs were selected to span the full spectrum of arousal and mood responses. Baseline resting-state MEG and self-reported arousal and mood ratings of each song were captured prior to stimulation and starting at 20 minutes post-stimulation to record offline effects.

Results: Across four participants, ANT LIFU stimulation gave rise to a spectral shift with increased alpha and gamma frequencies, most prominently over the prefrontal cortex, as compared to unfocused stimulation. Diffuse reductions were observed across the brain network in the delta frequency. Behaviorally, in one of four subjects, statistically significant increases in mood and arousal were observed across ten songs. The modulation of mood in this individual was observed to be context-specific: low-mood songs yielded increased mood modulation, whereas high mood songs yielded decreased mood modulation with ANT LIFU stimulation.

Conclusions: Our preliminary findings support a role for ANT in emotional perception of music. ANT LIFU stimulation was associated with changes in emotional responses to music in one of four participants, with effects dependent on the emotional sentiment of songs. Causal mapping using non-invasive stimulation methods, including LIFU, may be an effective way to probe the role of subcortical structures in complex human behaviors, and ongoing efforts to probe the role of the ANT in emotional perception are underway.

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P1-B-16 The Impact of Joint Trajectories of Peer Victimization and Perpetration on Structural Brain Development in Early Adolescence

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Background and Aims: Negative peer interactions, such as victimization and perpetration, are linked to maladaptive psychosocial outcomes in youth. Emerging evidence suggests these interactions may also influence brain structure and function, yet longitudinal studies are limited. This study examines the effect of peer victimization and perpetration trajectories on cortical thickness development over three years in early adolescence, focusing on brain regions involved in self-referential and social cognition, emotional processing, and social decision-making. We hypothesized accelerated brain development (i.e., cortical thinning) in the following order: stably high, increasing, decreasing, and stably low victimization-perpetration trajectories. Differential effects by biological sex and racial minority status were explored.

Methods: Using the Adolescent Brain Cognitive Development dataset, we analyzed data from three waves of the Peer Experiences Questionnaire (waves 2, 3, and 4; ages 11-14) and two waves of cortical thickness measurements (waves 2 and 4). Our analyses included 8,792 adolescents with at least two waves of peer experiences and cortical thickness data. Joint trajectories of peer victimization and perpetration across three waves were identified using k-means longitudinal clustering (R package "kml3d"). Linear mixed-effects modeling was used to assess how cortical thickness changes varied by victimization-perpetration trajectory type, race, sex, with baseline age as a covariate.

Results: While the 2-cluster solution demonstrated the best model fit, a 4-cluster solution was chosen due to its sufficiently robust classification accuracy (posterior probability global index: 0.92) and its nuanced identification of developmental trajectories, which enhances both interpretative depth and practical applicability. The four identified trajectories were: stably high (4.45%), increasing (23.8%), decreasing (10.3%), and stably low (61.5%) trajectories. Mixed-effects modeling revealed that stably high (vs. stably low) trajectories were associated with accelerated Precuneus development in white boys, but slowed Precuneus development in white girls. Trend-level effects (not surviving multiple comparison correction) included the findings demonstrating that increasing (vs. stably low) trajectories were linked to slowed medial orbitofrontal cortex development in non-white boys and accelerated lateral orbitofrontal cortex development in non-white girls.

Conclusions: Victimization-perpetration trajectories were found to be intricately linked to structural brain development, with effects varying by brain regions, trajectory types, biological sex, and race. Specifically, stably high trajectories were associated with the development of brain regions involved in self-referential and social cognition in white adolescents, while changing trajectories influenced regions tied to social decision making in non-white adolescents. Moreover, the direction or presence of these effects differed by biological sex. These findings underscore the need for targeted interventions to support healthy neurocognitive development in adolescents affected by sustained or dynamic negative peer interactions, with strategies tailored

to the unique needs of different racial and sex groups.

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P1-B-17 Thirsty for Likes: Greater Neural Value in Relation to Positive Feedback Is Associated with Adolescents' Lower Perceptions of Connectedness

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Background: It has been argued that social media may be an important source of social connection for adolescents. One important question is whether neural reactivity to certain social media features, such as peer feedback, can help us better predict the conditions that may lead to greater social connectedness and ultimately well-being. The current study aims to explore the relationship between activity in valuation regions of the brain when receiving peer feedback and self-reported feelings of social connectedness in relation to social media use.

Methods: Fifty-two adolescents aged 13-15 participated in an fMRI study at a large Midwestern university. Prior to the scan, participants submitted twenty-five images with related captions that were turned into Instagram-like posts. Participants then completed a one-hour scanning protocol during which they received positive (three or four stars) or negative (one or two stars) feedback on said posts from anonymous peers. Before and after the scan, participants responded to a series of surveys. The region of interest was pulled from Neurosynth based on the key term "value."

Results: We examined the relationship between perceived social connectedness and neural activity in the valuation network during exposure to positive peer feedback, while controlling for frequency of social media use, introversion, and positive interactions with peers. Results indicated that activity in the value network when receiving positive feedback to one's own social media posts (as opposed to baseline activity) was negatively associated with perceived social connectedness ($t(47) = ¬¬¬ 2.653$, $p = 0.01$); the same applied to introvertedness ($t(47) = -3.242$, $p = 0.002$). However, the frequency of social media use was positively associated with social connectedness ($t(47) = 2.984$, $p = 0.005$), and indeed the interaction of frequency of use and neural activity in the value network was also positively associated with social connectedness ($t(47) = 2.603$, $p = 0.01$). Positive interactions with peers, finally, were not significantly associated with perceived social connectedness ($t(47) = 0.007$, $p = 0.99$).

Discussion: The study aimed to determine whether neural reactivity to social media feedback might be associated with adolescents' feelings of social connection while using social media. Because social media connectedness was measured before the fMRI experiment, the Results do not indicate a causal relationship, but rather suggest that increased value associated with the experience of receiving positive feedback tracks with a lower (rather than higher) sense of connection to others on social media. This relationship, however, was positive for those high in frequency of social media use, suggesting that it might be the most disconnected who associate the greatest neural value with positive feedback. These Results offer preliminary evidence concerning the role that an fMRI social media feedback task could play in helping us predict adolescents' well-being in relation to social media.

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P1-B-18 Associations Between Representational Similarity in Emotion Concepts and Empathic Accuracy

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Background and Aims: "Walking a mile in another person's shoes" is a common idiom referring to the concept of empathy, but why do some people have an easier time on this walk than others? Recent work has identified that less lonely and more socially adept individuals tend to decode complex social information more similarly to the average of their respective group (Baek et al., 2022; Baek et al., 2023). While the mechanisms behind this process remain unclear, we hypothesize that language is a crucial psychological tool supporting communication of our internal states (e.g., thoughts, emotions) to others and comprehension of others' internal states (Jackson et al., 2021; Lindquist et al., 2015). In this project, we test a potential mechanism for this decoding process – that individuals who are closer to the average in semantic projection of emotional words to dimensional features are more successful at understanding what another person is feeling (i.e., empathic accuracy).

Methods: We aim to recruit 50 participants (ages 18 – 35) to complete an empathic accuracy (EA) task (Ong et al., 2021; Zaki et al., 2009) and affective dimensions (AD) experimental task (Grand et al., 2022). In the EA task, participants will watch 6 videos (Mlength = 1 minute, 23 seconds; SDlength = 31.1 seconds) of a person telling a personal history story. The content of the stories vary in valence (2 each of negative, neutral, and positive videos) and video presentation order will be randomized. While watching, participants will be asked to continuously rate how negative (1) or positive (5) they believe the person in the video is feeling as they tell the story. In the AD task, participants will rate 12 emotion words along multiple dimensional scales that have been used in previous work (Grand et al., 2022; Cowen & Keltner, 2017) such as size, valence, and temperature (from 0 to 100) with the goal of extracting scale-specific aspects of conceptual knowledge for each emotion word. All participants will rate the Ekman six basic emotions (happiness, sadness, anger, surprise, disgust, fear; Ekman & Friesen, 1971) and six additional emotion words randomly selected from a list of 44 words (Jackson et al., 2019; Cowen & Keltner, 2017). Using this approach, we can calculate both individual- and group-level semantic projections of emotional concepts, and determine how far an individual is from the group average.

Results: Our focal analysis will explore the relationship between the semantic projection of emotion concepts and empathic accuracy using intersubject representational similarity (IS-RSA). We hypothesize that participants who represent emotion words more similarly to the group average will be more empathically accurate. We will also conduct an exploratory analysis to examine which feature subspaces or combinations of subspaces better connect or distinguish emotion word representation similarities across participants using decompositional approaches (e.g., principal components analysis).

Conclusions: We hope these findings will better our understanding of individual representations of emotional language and how similarity in these representations is associated with empathic accuracy. Ultimately, this project may inform future research examining the neural mechanisms supporting emotional language, interpersonal emotion comprehension, and fostering social connection.

P1-B-19 Language-Informed Neural Networks Predict Brain Responses to Emotional Experiences

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Background and Aims: Artificial neural networks (ANNs) have proven useful for modeling how the brain encodes the external environment, capturing both low-level and abstract levels of representation. Previous studies have shown that models trained exclusively on visual stimuli predict activity in high-level visual regions. More recently, vision-language models such as CLIP have been shown to outperform vision transformers in association cortices, including regions involved in multimodal integration and abstract representation (Wang et al., 2023). However, it remains unclear how these models perform in emotionally rich, dynamic contexts and whether their pretraining helps encode consistent, context-sensitive emotion-related representations. Using the EmoFilm dataset—a collection of film clips curated to evoke diverse emotional responses—this study evaluates the performance of vision-language (CLIP, BLIP) and purely visual models (AlexNet, ResNet50, EmoNet) in predicting brain activity across visual regions involved in socio-emotional processing. We also tested how well these models generalize across movies and predict continuous emotion ratings, hypothesizing that language-informed models would better detect abstract representations that generalize across contexts.

Methods: We fit encoding models to predict voxel-wise fMRI responses during movie viewing using features extracted from AlexNet, ResNet50, EmoNet, CLIP, and BLIP. Features were temporally aligned with fMRI data via resampling and convolution with a hemodynamic response. Focusing on brain regions involved in socioemotional processing, multivoxel estimation was fit with partial least squares regression models separately in the amygdala, posterior superior temporal sulcus (pSTS), ventral visual cortex (VVC), and higher-order association areas. Generalization performance was estimated using leave-one-run-out cross-validation, such that responses to independent videos were used for evaluation. A repeated-measures ANOVA assessed the main effects of model and region, as well as their interaction.

Results: The ANOVA revealed a significant model × region interaction ($F(12, 288) = 4.577$, $p < 0.0001$). Post-hoc analyses showed that language-informed models (CLIP, BLIP) significantly outperformed purely visual models (AlexNet, ResNet50, EmoNet) in the ventral visual cortex (e.g., VVC) and higher-order association cortices (e.g., IPS, VMV). Differences in the VVC ranged from 0.0228 to 0.0369 ($p = 0.0002$ to $p = 0.0275$), while differences in higher-order areas ranged from 0.0224 to 0.0298 ($p = 0.0000$ to $p = 0.0078$). Additionally, a small but significant difference of 0.0080 was observed in the amygdala ($p = 0.0486$). Model performance remained comparable in the pSTS.

Conclusions: This study demonstrates that language-informed ANNs (CLIP, BLIP) outperform purely visual models in predicting brain activity in higher-order cortical areas, supporting the role of language-informed pretraining in stabilizing abstract, emotion-related representations. These findings extend prior research by leveraging dynamic, emotionally rich stimuli to underscore the advantages of language-informed representations in brain encoding and emotion prediction tasks. By highlighting the contributions of language-based pretraining, this work emphasizes the importance of integrating multimodal sources of information in models designed to capture complex human experiences.

P1-C-20 Spreading our Stories: Others' Personal Narratives Change our Own

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Background and Aims: From consuming fiction to spreading gossip, stories are a prominent mode of human expression – a potential reason why we incorporate narratives in our everyday conversations. A growing body of research focuses on how people represent and spread narratives, yet less is known about how the stories we hear impact our own identity. This gap is surprising, given that a listener perceives a storyteller's narrative through their own, personal lens. Here we ask what behaviours drive changes in the narrations of personal events when exposed to someone else's accounts.

Methods: In our study, an online pool of participants (expected N=400) completed three phases. First, the participants narrate a personal memory of a time they faced hardship. Next, they read one of the three personal narratives from another person – each version presents the same story with an optimistic, tragic, or stable negative arc. The third phase is completed 24 hours after the first two where the participants recall their original personal memory again.

Results: We plan to employ large language models to analyze the language use, the semantics, and the structure of the narratives. At the group level, we hypothesize that participants will adopt the narrative arc of the other person's memory. However, this effect may be modulated by the self-reported perceptions of the stories or the story-sharer, which are analyses where the tonal and structural changes in the participants' personal narratives may be assessed using Bayesian models.

Here, one possibility is that the similarity between the participants and the story-sharer may reflect a change in their personal narratives, e.g. a greater integration of narratives for greater similarity. On the other hand, the arc of the shared story may modulate the change in participants' personal narratives, e.g. arcs with positive endings may be more contagious.

Conclusions: Previous research has focused on exploring mechanisms by which stories, both in fiction and real-life, are integrated into our memories. Our study aims to explore how some of these mechanisms, social or cognitive, generate changes in one's own personal narratives. By focusing on real-life narratives, we study the contaminative effects of narratives in our everyday lives and conversations. Taken altogether, this study aims to understand the implicit cognitive effects of personal stories, and of storytelling more broadly.

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P1-C-21 A Neural Signature of the Bias Towards Self-Focus

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Background and Aims: People are remarkably self-focused, disproportionately choosing to think about themselves relative to other topics. Self-focus can be adaptive, helping individuals fulfill their needs. It can also go haywire, with maladaptive self-focus a risk and maintenance factor for internalizing disorders like depression. Yet, the drive to focus on the self remains to be fully characterized. We discovered a brain state that when spontaneously brought online during a quick mental break predicts the desire to focus on oneself just a few seconds later.

Methods: In Study 1, we identified a default network neural signature from pre-trial activity that predicts multiple indicators of self-focus within our sample. In Study 2, we applied our neural signature to independent resting-state data from the Human Connectome project.

Results: In Study 1, multi-voxel pattern analysis revealed that spatial patterns in the default network core subsystem are able to predict a subsequent choice to focus on the self (vs. others) with 83% accuracy ($p<.001$). We named this pattern the "pre-self" pattern and investigated its ability to predict self focus in other contexts. First, we applied it to a baseline resting state scan and found it's presence significantly predicted self-reported self-focus ($\beta=.19$, $t(105.1)=2.03$, $p=0.045$) as well as the presence of an active self reflection neural pattern 8 seconds later ($\beta=0.16$, $t(14310)=4.55$, $p<0.001$). Then in Study 2, we found that individuals who score high on internalizing, a form of maladaptive self-focus, similarly move in-and-out of this pattern during rest ($r=0.01$, $p<0.001$), suggesting a systematic trajectory towards self-focused thought.

Conclusions: We identified a default network neural signature from pre-trial activity that predicts 1) multiple indicators of self-focus within our sample and 2) internalizing symptoms in a separate sample from the HCP. This is the first work to "decode" the bias to focus on the self and paves the way towards stopping maladaptive self-focus in its course.

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P1-C-22 Trait Learning Promotes More Flexible Social Choice Than Reward Learning Across Relevant Dimensions

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Background and Aims: People learn about their social world both by learning about traits that others possess (e.g., "they are generous") and by learning reward-based associations (e.g., "they lead to rewards"). Each of these forms of learning reflects a distinct process that is encoded separately in the brain; both involve activity of the ventral striatum, but trait learning is uniquely associated with activity in a broader set of regions involved in updating knowledge about other people (the right temporoparietal junction, precuneus, left ventrolateral prefrontal cortex, bilateral inferior parietal lobule, and posterior cingulate cortex) (Hackel, et al., 2015; Mende-Siedlecki et al., 2013; Amodio, 2019). These four studies aimed to understand the comparative context sensitivity of each of these systems. We tested the hypothesis that, when making social decisions, people's reliance on trait impressions is context-sensitive, while their reliance on reward learning is relatively context-neutral, reflecting a general affective positivity. In other words, after learning an individual is generous, people might favor interacting with that individual specifically in contexts in which generosity is relevant. In contrast, people might generally feel positive toward rewarding individuals across contexts, regardless of similarity to the original learning context (in terms of perceptual similarity, generosity-relevance, self-relevance, and economic reward relevance).

Methods: In each study, participants learned about four targets in a sharing game. These targets independently varied in how rewarding they were to the participant (the absolute amount of money they provided) and how generous they were (the proportion of available money they shared). Later, participants made decisions about these targets in different contexts that varied in their generosity relevance (Studies 1-4), perceptual relevance (Study 2), self-relevance (Studies 3-4), and economic reward relevance (Study 4).

Results: Participants used generosity more context-dependently than reward information overall, demonstrating a preference for generous partners more in contexts relevant to generosity than in other contexts. Reward showed significantly weaker context-sensitivity than generosity, such that participants generally preferred previously rewarding partners to a similar degree across a broad range of scenarios. These Results demonstrate that the use of generosity-based information in decision-making depends more on context than the use of reward-based information.

Conclusions: Findings across four studies support the Conclusion that people weigh trait information more heavily in contexts relevant to the trait in question but make choices based on reward learning to a smaller but more consistent extent across

contexts. The Results suggest there may be a general positive affective influence of rewarding outcomes in decision-making that leads people to ascribe positive traits to and feel more consistently drawn to previously-rewarding individuals. People may also feel rewarded by generous individuals such that they elicit these same general positive feelings. Beyond that, however, people may also be more likely to use the additional semantic knowledge associated with generosity only in contexts in which generosity is relevant.

P1-C-23 The Relative Contributions of Contexts and Traits to Learning Social Networks

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Background: Observing social interactions within networks helps us understand people. It is known that we form mental representations of these networks, but social interactions are multidimensional, influencing memory in diverse ways. This study explores the different contributions of contexts and personality traits in learning social networks. More specifically, we were interested whether the structure of recalled networks is more influenced by trait valence or contextual details. We designed two pre-registered experiments with varying network complexities to examine how shared contexts and personality traits affect memories for social network relationships.

Methods: 196 healthy volunteers (Experiment 1: N=116; Experiment 2: N=80) completed an online task to test their memory for fictitious students' relationships based on their known friendships, shared contexts (university club), and shared personality traits (e.g., "John and Jane met at the cooking club and are smiley"). Traits and contexts were evenly separated by valence and physicality respectively according to global vector representations. Experiment 1 involved encoding a single 8-student ring network, while Experiment 2 used a 9-student network of two 4-student rings connected by a bridge student. Each connection featured a friendship, context, and trait. Experiments included three encoding blocks, followed by a drag-and-drop task where participants positioned students by friendship likelihood. Then, a three-alternative forced-choice test assessed recall of friendships, traits, and contexts in two blocks with counterbalanced trials. One ANOVA analyzed recall differences for context, traits, and friendships, while a second ANOVA tested the correlation between trait/context recall and friendship recall. A linear mixed-effects model examined how trait valence impacted friendship recall, and in Experiment 2, the impact of network centrality on recall was also modeled. Lastly, drag-and-drop biases were assessed through computational modeling and correlated with recall Results.

Results: Context recall exceeded average recall in both experiments and accounted for more variance in friendship recall than trait recall. In Experiment 1, participants recalled friends with positive traits more than those with negative traits. In Experiment 2, participants better recalled positive traits when controlling for centrality, but recalled central students with negative traits better. Participants were above chance in first-degree associations during drag-and-drop tasks. Friendship recall negatively correlated with negative valence drag-and-drop biases in Experiment 1, while in Experiment 2, negative valence biases interacted with centrality biases in predicting friendship recall.

Discussion/Conclusion: Our observation of enhanced context recall hints at a preference for using context as a scaffold for social network memory. In parallel, finding an inhibitory effect of a person's negative traits on their recallability builds on prior literature studying the disruptive effects of negative content in episodic memory. In sum, our findings highlight a robust influence of contextual memory, independent of the complexity of the social network being learned, and that trait memory, particularly negative traits, are more strongly influenced by social network complexity,

P1-C-25 Neural Correlates of Learning and Choice from Familiar Social Roles

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Background and Aims: How do people generalize rewarding experiences in social interactions? People often use "cognitive maps" to recognize how different entities relate to one another, allowing them to generalize knowledge across entities that occupy the same role, such as two bus lines that lead to the same destination. This process requires effortful model-based planning. Yet, people effortlessly recognize familiar abstract social roles and may associate roles that reflect familiar concepts (e.g., helper and helpee) with model-free reward (Hackel & Kalkstein, 2023). In turn, people can easily generalize rewarding experiences to new individuals categorized as a "helper." Here, we investigate the neural bases of this learning mechanism. Although past work has linked cognitive maps to regions including the hippocampus (Wang et al., 2020), abstract social concepts have been linked to anterior temporal lobe (ATL) (Zahn et al., 2009). Accordingly, the ATL may support flexible reinforcement learning in social interactions, allowing people to pair social concepts with model-free reward and generalize without effortful reasoning.

Methods: We recruited 42 paid volunteers, who underwent fMRI while completing a reinforcement learning task that involves choosing characters that lead to varying amounts of monetary reward. Characters were linked to different roles in task structure, allowing subjects to use a cognitive map to make choices in a goal-directed manner. At the same time, characters also reflected familiar social roles of "helper" or "helpee," allowing subjects to associate social roles with reward. We plan to use a computational neuroimaging approach to identify the neural correlates of learning and choice from social roles. Specifically, we will use a computational model to calculate prediction errors and choice values corresponding to role-based learning, which we will use as parametric modulators in a general linear model (GLM). We hypothesize that BOLD responses linked to role-based learning will correlate with regions involved in social conceptual knowledge, such as ATL. We will further examine voxel patterns that reflect cognitive maps of task structure versus social roles during learning. We hypothesize that voxel patterns in ATL will reflect the social role structure of the task during choice.

Conclusions: This work will shed light on how social knowledge simplifies and guides reward learning about others, identifying a novel role for social concepts in guiding reinforcement learning beyond traditional model-based and model-free learning. More generally, we will demonstrate how simple reward associations interact with conceptual knowledge to give rise to complex social behavior.

P1-C-26 Help Me Help You: Increased Neural Activity in Response To Positive Peer Feedback Predicts Altruistic Behaviors

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Background: Adolescence is a key time for identity and social development, and a period of heightened reward sensitivity. Posting on social media invites peers to engage with personal content, which in turn provides information to the poster about how others perceive them. Participation in prosocial behaviors helps adolescents develop skills in community connection (Lerner, 2004) and teaches how to influence social contexts (Ozer et al., 2013). However, engaging in prosocial behaviors may be a way of obtaining extrinsic praise for participating in socially acceptable activities. The current study aims to understand how neural responses social feedback may predict reasons for engaging in prosocial behaviors. We hypothesized that increased activity in (1) self-relevance and (2) value regions of interest in response to (a) positive peer feedback and (b) negative peer feedback will negatively predict altruistic prosocial behavior.

Methods: Fifty-three adolescent participants aged 13-15 (M=13.91, SD=.65) were recruited as part of an on-going 2-year longitudinal study. Participants completed a one-hour fMRI scanning protocol comprised of three tasks relating to social media. In the second of these tasks, participants were exposed to peer feedback on the participant's own social media posts. After exiting the fMRI scanner at the end of the scanning protocol, participants responded to a computer-based survey which included measures of reasons if one engages in altruistic behaviors (ex: "I think that one of the best things about helping others is that it makes me look good"). Responses were reverse coded so that higher responses indicate engaging in prosocial behaviors for altruistic reasons.

Results: Results show that activity in value ($t(51)=-2.32$, $p=.024$) and self-relevance ($t(51)=-2.10$, $p=.041$) networks in response to positive peer feedback on personal social media posts are negatively associated with participating in prosocial behaviors for altruistic reasons. Value ($t(51)=-1.79$, $p=.079$) and self-relevance ($t(51)=-1.56$, $p=.126$) network activity in response to negative peer feedback also trended towards a negative association for altruistic behaviors, however, neither result was significant.

Discussion: This study aimed to determine whether adolescent neural responses to peer feedback would predict reasons for engaging in prosocial behaviors. The findings suggest that individuals who value positive feedback on personal actions – in this case, "posting" social media images – are more likely to engage in prosocial behaviors for egotistical reasons rather than altruistic reasons. By analyzing how individuals respond to simulated social feedback, we are better able to understand the underlying mechanisms associated with engaging in outward facing behaviors, thus avoiding response bias present in self-report measures addressing socially undesirable reasons for engaging in prosocial behaviors. These findings may also suggest egotistical appeals, at least in those who value positive social feedback, may be one strategy to promote prosocial behaviors among adolescents.

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P1-C-27 Converging misalignment: Neural and Semantic Insights About Same- vs. Mixed-Gender Communication Accommodation

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Convergence (or "synchrony") has been studied in various theoretical frameworks (e.g. Communication Accommodation Theory (Soliz et al., 2021)). Convergence serves cognitive functions such as facilitating mutual comprehension (Pickering & Garrod, 2004), and affective functions, such as marking social proximity between speakers (Soliz et al., 2021). Cross-brain convergence (also called "neural synchrony") serves as a neural marker, where the coupling of people's separate neurocognitive systems indicates when people are "on the same page" (Burns & Lieberman, 2019). Existing work rarely examined convergence across modalities, but cross-examinations contribute insights to how people process information internally and engage in conversations externally.

This study examines the neural and semantic convergence of get-to-know-you conversations (Fig. 1) in 70 stranger dyads, consisting of 44 same-gender dyads and 26 mixed-gender dyads. During conversations, functional near-infrared spectroscopy (fNIRS) is used to capture neural activities in cortical networks implicated in social interactions (Fig. 2). Every session lasts for 20 minutes without the presence of experimenters, allowing a natural conversation flow.

Neural analysis includes pre-processing fNIRS data, dividing networks of interest (e.g. default mode network (DMN)) based on Yeo et al. (2011) brain network parcellation, and conducting neural synchrony analysis using Pearson's correlations within each network.

Semantic analysis utilizes the convergence-entropy framework (Rosen & Dale, 2023) to estimate conceptual similarity in interactions. In this approach, a transformer word-vector model simulates a repeated-measures experiment, where a hypothetical coder assesses whether one speaker's linguistic output aligns conceptually with another's. The result of the simulated experiment is estimated using a transformer, word-vector model (Equation 1), where x and y represent two utterances composed of token sets $i \in x$ as x and $j \in y$ as y, and corresponding word vectors for tokens, Ex and Ey. The output measurement

evaluates how much additional, unpredictable information exists in utterance x after reading utterance y, reflecting the degree of convergence between speakers.

Neural Results indicate that DMN synchrony predicts dyadic connection for same-gender dyads ($\rho = 0.31$, $p = 0.0466$), but not mixed-gender dyads ($\rho = 0.07$, $p > 0.05$). DMN synchrony also predicts future relationship potential for same-gender dyads ($\rho = 0.47$, $p = 0.0015$), but not mixed-gender dyads ($\rho = 0.16$, $p > 0.05$). Semantic Results indicate that mixed-gender dyads predict a decrease in convergence-entropy, suggesting that such dyads converge with one another greater than same-gender dyads (−.033, $Z = -2.11$, $p = .035$). We also find significant effects for individual speakers (speaker 1: −0.000947, $Z = -2.24$, $p = .025$; speaker 2: −0.00157, $Z = -3.72$, $p = 0.0002$) (Table 1).

This mismatch between neural synchrony and lexico-semantic convergence poses interesting implications for studying convergence as a dynamic process. Further cross-modality analysis will be undertaken to enhance our understanding of the mechanism underlying interpersonal connection.

P1-C-28 Self-Other Blurring: Self-Referential Facial Dynamics Representation

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Facial expressions are a powerful way to convey high-dimensional, dynamic information, transmitting a wealth of emotions and intentions. Their mimicry is related to positive interactions, as it increases perceived similarity. Homophilia – the notion that people prefer similar others – is widely supported. However, it remains unclear whether the resemblance in one's unique facial expression patterns – the dynamic way in which an individual's facial muscles move – is encoded regardless of mimicry, and if so, what impact this might have. If it is encoded, from the point of view of homophilia, one would expect a preference towards others with facial expressions resembling the self-facial expression dynamics. People are not familiar with their own facial expressions during real-life face-to-face interactions, since they do not see themselves. Strikingly, after a 5-minute interaction with a stranger, the stranger is likely to be more familiar with the appearance of the interlocutor's facial expressions than the interlocutor is. While people do not see their face, they control and feel their facial movement. Here we will examine whether an internal transformation into a visual representation exists, allowing people to assess the specific dynamics of their own facial expressions compared to those of others. Leveraging advanced video processing AI tools, we will decouple participants' facial features from their facial dynamics by projecting the dynamics of the participants' expressions onto still images of strangers. This technique enables the creation of realistic human characters that appear authentic. We will create two conditions: one of strangers with the actual dynamics of the participants' facial expressions (the specific way they smile) and a control condition with the dynamics of others' facial expressions (the way others smile). We will test whether observers will engage preferentially with individuals that share their own facial expression dynamics more than those of others. Concretely, we will use video ratings to examine whether there is an implicit self-other comparison of the facial dynamics, such that others with self-facial dynamics are perceived as easier to emotionally understand, more familiar, more similar, and more likable. Using an old/new recognition task, we will test if there is also memory advantage for others with the self-facial dynamics. Lastly, we will examine whether observing someone with the dynamics of one's own facial expressions elicits distinct brain activity compared to observing the dynamics of others' expressions. Altogether, this would suggest that the brain supports a self-facial dynamics representation that influences the processing and perceptions of others through self-referenced comparisons.

P1-C-29 Neural Signatures of Filler Word Perception and Production

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Background and Aims: Filler words (e.g., "um," "uh," "like," "well," "y'know") are nonsensical utterances that frequently interrupt fluent speech, often during pauses of hesitation. While prior research suggests these words may serve as personality markers and affect audience perception of speakers, their neural basis remains poorly understood. This project aimed to characterize the neural signatures underlying filler word production and perception.

Methods: We analyzed local field potential (LFP) recordings from stereotactic EEG (sEEG) depth electrodes in 12 patients with intractable epilepsy during natural conversations. Neural activity was examined across five frequency bands (alpha, beta, low gamma, mid-gamma, high gamma) in 1,753 bipolar-referenced channels spanning 38 brain areas. Statistical analyses included one-way analysis of variance (ANOVA), t-tests, and chi-square proportion tests to compare neural activity during filler words versus fluent speech across four conditions: before and after the onset of spoken filler words (SB, SA) and perceived filler words (i.e., filler words listened to by the patient) (LB, LA).

Results: Neural responses showed significant hemispheric lateralization, with the left hemisphere demonstrating stronger involvement in both perception ($p<0.001$) and production ($p=0.001$). Perception of filler words elicited significantly greater neural responses than production ($p<0.001$), particularly in the left hemisphere. The precentral gyrus (PCG) and inferior frontal gyrus (IFG) showed significant responses specifically to perceived filler words, with notable mid-gamma band activity ($p<0.05$ for LB vs LA comparison). One-way ANOVA revealed significant frequency band dependence, with perception ($p<0.001$) showing stronger dependence than production ($p=0.003$). Preliminary analysis showed that the left thalamus seemed to exhibit a significantly stronger response to filler word production compared to the right thalamus ($p=0.006$). Preliminary heatmap analysis indicated power increases across the majority of channels during filler word processing.

Conclusions: Our findings reveal possible neural signatures for filler word perception and production, with stronger responses during perception. Regarding filler word perception, the involvement of the IFG's pars triangularis and pars orbitalis regions,

associated with language processing and social cognition, alongside the PCG, associated with the mirror neuron system, suggests filler words may serve a crucial social-cognitive function in conversation beyond mere speech interruption. Namely, we theorize that perceiving the filler words of another speaker serves to indicate to the subject not to interrupt the speaker, as they are simply pausing to think and will subsequently continue speaking. The engagement of these regions may point to the potential role of filler words in understanding the intentions and actions of others during natural conversation. Future work will focus on exploring correlations between neural activity during filler words and subsequent speech using large language model embeddings.

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P1-C-30 'Eye' Can See Your Relationships: The Neurocomputational Mechanisms in Social Relationship Perception

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Background and Aims: Humans possess an impressive ability to understand social relationships. We can form a stable judgment even with a brief glance of people interacting. During this short period, individuals not only collect simple social features like intimacy but also engage in top-down social inference based on prior relational knowledge. An important unanswered question is how and why this intricate mental process affects the way people perceive human relationships. Here, we conducted 4 studies that aims to investigate the neurocomputational of basic social features and higher-level conceptual knowledge of individuals' perceptual processes.

Methods: In study 1, each participant (N = 50) completed four tasks while watching social relationship images: free-viewing task, relationship judgment task, closeness and equality evaluating task. We also collected each participant's eye-movement and relational knowledge data. In study 2, we collected fMRI and eye-tracking data simultaneously (N = 40) using a similar paradigm to study 1. In study 3, we adapted the paradigm from Study 1 to investigate the development of social knowledge inference in infants (N = 20), children with autism (N = 50), and typically developing children (N = 50). In study 4, we collected eye-tracking data from macaques (N = 2) as they freely observed inter-personal relationships images and inter-macaque relationships images.

Results: Study 1 demonstrate that both the bottom-up social features and top-down social knowledge of human relationships impact individuals' gaze patterns. The influence of social features on perception is automatic and intuitive, whereas knowledge affects perception only when individuals actively engage with it. In study 2, we applied GLM, RSA and decoding methods to identify brain regions involved in processing different aspects of interpersonal relationships. For instance, brain regions such as the IPL represented equality, the insula represented closeness, and the ATL reflected prior relational knowledge. Eye movement control was associated with the FEF. Furthermore, using PPI and DCM, we found that the pSTS acts as a central hub for processing social information. The functional connectivity between pSTS and specific brain areas increases when individuals access different aspects of social knowledge, facilitating the transmission of information to the FEF for eye movement control. In study 3, our findings showed that as social knowledge accumulates (Infant-Autism-Typical Development-Adult), its top-down influence on eye movement patterns gradually increases. In study 4, we found that macaques' social knowledge significantly predicted their gaze patterns when observing inter-macaque relationships, but not when viewing inter-personal relationships. This result underscores the specificity of prior knowledge in influencing eye movement patterns.

Conclusions: In summary, our Results offer insights into whether, how, and why social features and conceptual knowledge jointly shape perception. Past research focused on physical features, basic cognitive abilities (such as attention), or simple social attributes (like faces) influencing eye perception. Our study not only shows that social cognition in human relationships significantly influences perceptual patterns but also investigates its neurocomputational mechanisms, exploring associated developmental and pathological implications.

P1-D-32 Neural Modulation of Intranasal Oxytocin on Emotional Expressions of Ingroup Members in Individuals with Psychopathic Traits

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Objective: Intranasal oxytocin (OT) has been shown to modulate amygdala-mediated social-affective processing in non-psychopathic populations, yet its impact on neural responses in individuals with psychopathic traits remains unclear. The primary Objective of this planned study is to determine whether intranasal oxytocin (OT) can selectively increase basolateral amygdala (BLA) activity, when participants with varying levels of psychopathic traits view emotional facial expressions of novel "ingroup" members, created via a minimal group paradigm. We aim to test two competing hypotheses: (1) that OT enhances BLA responsivity for ingroup faces among individuals with lower-to-moderate psychopathic traits, and (2) that individuals with higher psychopathic traits show no such enhancement, reflecting core affective deficits resistant to OT.

Methods: We plan to recruit 120 adult male participants, each completing the Triarchic Psychopathy Measure (TriPM) to measure self-reported levels of psychopathic traits. Participants will be randomly assigned to receive either OT or placebo in a double-blind, placebo-controlled design. A minimal group paradigm will be used to assign participants to novel ingroup and outgroup categories. During fMRI data collection, participants will view emotional facial expressions (fear, happiness, anger, etc.) belonging to both ingroup and outgroup members. BLA activity will be measured as the primary neural outcome.

Data Analysis Plans

1. Primary Analysis: We will run a mixed-effects model comparing BLA activation between OT and placebo groups, with ingroup vs. outgroup faces as a within-subject factor. TriPM scores will be incorporated as a continuous moderator to assess whether psychopathic trait level influences the effect of OT on BLA activity.
2. Follow-Up Analyses:
   - We will perform correlation/regression analyses examining the relationship between TriPM subscales and neural activation differences (OT vs. placebo).
   - Exploratory analyses will assess whether any effects of OT on BLA activity are emotion-specific (e.g., differential effects for fear vs. happy faces) as well as effects on other regions implicated in social emotion processing.
3. Preregistration: These hypotheses and Analysis Plans will be formally preregistered on the Open Science Framework (OSF) prior to data analysis.

Implications: Should OT selectively enhance BLA responses to ingroup emotional faces in participants with lower-to-moderate psychopathic traits, it would suggest that certain neurobiological mechanisms related to social salience can be modulated even in populations at risk for callous or antisocial behavior. Conversely, if individuals with higher psychopathic traits remain unresponsive to OT, findings would underscore the need for alternative or additional interventions targeting core affective deficits in psychopathy.

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P1-D-33 Identifying Ethologically Relevant Neurobehavioral Biomarkers of Emotional State

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Background and Aims: Affective disorders are the most common subset of psychiatric conditions. Major depressive disorder (MDD), in particular, affects over 120 million people worldwide and is the leading cause of disability as well as death from suicide. Emotion dysregulation is the hallmark of depression and other affective disorders, so developing tools for Objective, quantitative characterization of the temporal, behavioral, and neural dynamics underlying emotional state change is critical for properly diagnosing and treating these debilitating conditions.

Methods: We analyzed continuous, synchronized audio, video, and neural recordings during naturalistic conversations in human neurosurgical patients implanted with both stereo-EEG (sEEG) and deep brain stimulation (DBS) electrodes as part of a clinical trial (NCT03437928) for treatment-resistant depression (TRD). We then developed a pipeline for automated transcription with diarization and utterance-level timestamps of audio recordings and used natural language processing (NLP) tools to identify emotional state change points. Pre-trained affective computing models were then used for extraction of linguistic, acoustic, and kinesic features associated with emotional state change. These behavioral features were then correlated to measures of self-reported affect, as well as brain-wide features of concurrent spontaneous neural activity. Finally, we used a multi-modal intermediate fusion model to investigate whether cross-modal features can better predict self-reported affect and neural activity, than any single modality alone.

Results: Both content-relevant (linguistic, semantic) and content-irrelevant (acoustic, kinesic) features of emotional state change in naturalistic behavior were correlated with asynchronous self-reported affect, as well as with brain-wide neural features previously found to be associated with mood. Convergence points across multiple modalities showed a stronger correlation with self-reported affect than any single modality alone. Cross-modal behavioral features associated with positive emotional state also showed a positive correlation with high-gamma activity in limbic regions.

Conclusions: Naturalistic conversations provide a wealth of Objective, quantifiable behavioral data that is highly temporally resolved and closely aligned with underlying neural activity. By relating semantic features from "what" is expressed, as well as acoustic and kinesic features from "how" it is expressed, to simultaneous neural activity, we can build multi-modal models for more effective diagnosis, assessment, and treatment of affective disorders.

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P1-D-34 The Relationship Between Verbal and Non-Verbal Imitative Learning, Gesture Production, and Social Communication in Children with Autism Spectrum Disorders

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Background and Aims: Autism Spectrum Disorders (ASD) is a neurodevelopmental condition characterized by social communication (SC) impairments. Recent evidence has revealed a potential relationship between motor development, imitative learning, and SC, supported by observations of impaired gesture production and imitation in individuals with ASD.

Thus, this study aimed to investigate the relationship between complex gesture, imitative learning, and SC impairments present in children with ASD.

Methods: Participants included 8–12-year-old English-speaking children diagnosed with either comorbid ASD+ADHD (n=72), ASD-only (n=72), or ADHD-only (n=38), and typically developing (TD; n=125). Participants completed a version of the Florida Apraxia Battery, modified for children (PRAXIS), which assesses accuracy of transitive (involving a tool), intransitive-meaningful (communicative/no tool), and intransitive-meaningless gestures under different 3 different conditions (to-command, to-imitation, with-tool use). SC was assessed using the parent-reported Social Responsiveness Scale (SRS).

Results: Four-group, between-subjects ANOVAs revealed a consistent pattern across PRAXIS conditions and movement types, with post-hocs revealing that children with ASD, both those with ASD+ADHD and with ASD-only, showed significantly worse PRAXIS (more movement errors) compared to both ADHD-only (ps<.001-.037) and TD children (ps<.001), with moderate-to-large effect sizes (ds=.59-1.66). Further, post-hoc comparisons of ASD groups revealed that children with ASD+ADHD showed significantly worse PRAXIS compared to ASD-only (ps<.001) with marginal effect sizes (ds=.19-.61). Pearson's correlations including all participants revealed significant correlations of PRAXIS performance with SRS Total t-score (higher scores=more social impairment) and PRAXIS total errors (r=.361, p<.001).

Conclusions: These findings emphasize that children with ASD, regardless of the presence of comorbid ADHD, show significantly impaired praxis compared to TD children as well as those with ADHD-only. However, Results suggest that among children with ASD, the presence of comorbid ADHD confers additional praxis impairment. Across all children, impaired praxis was related to higher parent ratings of SC impairment, proposing a clear association between praxis and SC development.

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P1-D-35 Maternal Depression and Neural Synchrony: Investigating the Impact of Depressive Symptoms on Mother-Child Brain Connectivity During Face-to-Face Interactions

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Background and Aims: Parent-child synchrony is defined as the alignment of behavior, affect, and/or physiological states between a parent and their child during a joint experience[3]. Strong parent-child behavioral and affective synchrony, especially mother-child synchrony, has been associated with beneficial outcomes for child social and emotional development[2,4,5,6,10,13]. Recently, there has been a growing interest in studying parent-child synchrony at a neural level and examining its role in child development[1]. Parent-child neural synchrony refers to coordinated brain activity—such as simultaneous activation of the same or different brain regions—between a parent and their child during a joint experience. Mother-child neural synchrony is associated with healthy development of child emotion regulation, which is developing rapidly during the toddler years[14,19, 20]. Maternal depression may disrupt mother-child synchrony, with research showing that mother-child dyads with depressed mothers exhibited lower levels of observed behavioral synchrony, including lower levels of synchronous gaze and touch[9], positive affect[11], and reciprocity[18]. Given known associations of depression with altered brain function in affective systems[12,16,22], this study aims to examine if maternal depression may also be associated with disruptions in mother-child neural synchrony.

Methods: We examined neural synchrony in 91 mother-toddler dyads (M age=26.6 months, SD=10 months; 52% female) using functional near-infrared spectroscopy (fNIRS) during a 3-minute face-to-face (FTF) play interaction in the lab, designed to mimic natural play. The fNIRS caps' sources and detectors were set up to measure the prefrontal cortex and the temporoparietal junction. Mothers completed the Center for Epidemiologic Studies Depression Scale (CES-D) to assess current depressive symptoms. A fixed effects model using NIRS AnalyzIR was conducted to evaluate the association between CES-D and neural concordance across mother-child brain channels during the FTF task, controlling for child age.

Results: As hypothesized, our findings revealed a significant negative association between maternal depressive symptoms and neural synchrony, specifically in coupling between the mother's right dorsolateral prefrontal cortex (dlPFC) and the child's left superior temporal gyrus (STG), (t=-3.06, q=0.017).

Conclusions: These findings suggest that maternal depression may disrupt neural concordance in brain regions involved in emotion regulation and social processing. In adults, the right dlPFC plays a critical role in regulating emotions through mechanisms such as reappraisal and suppression7,8,17, while the STG in children is essential for emotion recognition, perception, and imitative behavior15,21. Results suggest that mothers coping with higher levels of depression may have greater difficulty regulating their emotions during moments in which their toddler children are processing and imitating their mothers' emotional behavior. Future work will focus on exploring potential factors that may buffer the impact of depression on mother-child neural synchrony. Findings reinforce the importance of addressing maternal depression to understand the nuances of parent-child interaction.

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P1-D-36 Cognitive Mechanisms of Feedback-seeking along Internalizing Symptoms

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Background and Aims: Socially anxious individuals exhibit several biases pertaining to self-referential social information. When seeking and processing feedback about themselves from others, they can show an intense fear of negative evaluation, engage in excessive reassurance-seeking and (paradoxically) negative feedback-seeking from close others. They also exhibit an aversion to positive social evaluation, with increased anxiety upon receiving positive as compared to "absence of negative" feedback. Here, we aim to systematically quantify how different factors, such as performance confidence, and feedback valence and directness, uniquely contribute to feedback-seeking decisions, and how these effects vary along social anxiety and other internalizing symptoms.

Methods: Participants (N = 95, Prolific) performed a perceptual decision-making task, rated their performance confidence after each choice, then decided whether to seek (or avoid) feedback from one of two "feedback-givers" who differed in how they phrased their feedback, being "direct" and "indirect" in their communication respectively. Self-report social anxiety, trait anxiety and depression scores were also collected. Using generalized linear mixed effects models, we examined how task difficulty, confidence in task performance, and the type of feedback were related to the decision to seek (or avoid) feedback, as well as how this relation differed based on internalizing symptoms.

Results: We found that, on average, individuals with higher levels of social anxiety sought less feedback about their task performance, while social anxiety was not associated with lower (or higher) performance confidence. Additionally, while anxiety-depression symptoms were not associated with the overall tendency to seek feedback, they were correlated with the effect of confidence on feedback-seeking. Specifically, individuals sought more feedback when they were unsure of their performance, but those with high anxiety-depression scores failed to show this effect, possibly as a means to avoid negative feedback.

Conclusion: Overall, we observed reduced feedback-seeking in social anxiety. Importantly, this avoidance of self-evaluative feedback was not due to lower confidence in one's performance. We also found a selective avoidance of negative feedback in generalized anxiety-depression. Our findings contribute to a better understanding of the cognitive mechanisms leading to individual differences in self-evaluative social feedback-seeking. In future work, we hope to address the lack of feedback-type (direct vs. indirect) preferences, better dissociate the preference for positive versus confirmatory feedback, and expand our framework to test the role of feedback instrumentality in the decision to seek feedback.

P1-D-37 Diverse Approaches to Sentiment Analysis Reliably Reflect and Explain Symptom Changes in Psychotherapy

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Psychopathology is often characterized by intense negative emotions, but the dynamics between clients and therapists in expressing these emotions through language remain poorly understood. Sentiment, or the emotional tone of language, has been linked to affective states and wellbeing, suggesting it could serve as a marker of psychopathology and therapeutic progress. However, the versatility of different approaches to measuring sentiment makes it unclear which Methods are best for tracking affect and symptoms in therapy. This study examined whether changes in client sentiment, therapist sentiment, or their divergence tracked clients' internalizing symptoms using a large dataset of text-based psychotherapeutic exchanges. We compared 11 commonly used sentiment analysis measures across exploratory (N=3,729) and validation (N=2,500) datasets. Both client and therapist unidimensional sentiment became more positive over time, mediating the link between time in therapy and decreased internalizing symptoms. Unidimensional sentiment divergence increased over time, with therapists becoming more positive than clients; higher divergence was associated with increased symptoms between subjects but decreased symptoms within subjects. We observed that positive sentiment dynamics were more closely linked to psychopathology, with positive sentiment divergence mediating symptom reduction within subjects. While most sentiment measures yielded replicable Results, we also observed systematic differences among them. These findings suggest that language sentiment can be a marker of internalizing symptoms and therapeutic progress, and future research should refine sentiment analysis to better understand which aspects of sentiment are the most predictive of successful therapeutic outcomes.

P1-D-38 Efficacy of Non-Invasive Brain Stimulation (NIBS) Combined with Evidence-Based Psychotherapy for Psychiatric and Neurodevelopmental Disorders: A Meta-Analysis

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Background and Aims: Psychotherapy is often a first-line treatment for psychiatric and neurodevelopmental disorders but can have large individual variations in efficacy. For example, about 1 in 3 patients with major depressive disorder respond to standard psychotherapy (Kolovos et al, 2017). Thus, there is a need to augment standard practices, and one emerging approach is to combine therapy with noninvasive brain stimulation (NIBS). The synergistic interaction of NIBS with psychotherapy has gained traction, and while reviews on this topic demonstrate preliminary efficacy, they are missing detailed Methodological analyses, such as the optimal timing of NIBS (pre, post, or during) in regard to therapy (He et al., 2022; Tatti et al., 2022). Thus, we are conducting a meta-analysis on the combined use of evidence-based psychotherapy and NIBS to treat psychiatric and neurodevelopmental disorders to better inform future study designs.

Methods: We included RCTs in which the control condition was sham NIBS combined with psychotherapy in patients with psychiatric or neurodevelopmental disorders. A literature search from 6 databases resulted in 1,542 papers. Two investigators

independently screened abstracts and titles from the initial search. Full text screening was then performed on the remaining 482 papers, resulting in 40 papers. None of these 40 papers included neurodevelopmental disorders, likely due to recent FDA-clearance for these disorders. Three investigators with clinical Backgrounds conducted full text screenings for evidence-based therapy and excluded 14 more papers. Two investigators assessed the risk of bias in each study following Cochrane guidelines (Higgins et al., 2011) and showed an overall low risk of bias across studies. Another two investigators are finalizing extraction of relevant data from the eligible studies: study design, demographics, clinical characteristics, measures of cognitive functioning, and quality of life.

Results: Of the 26 papers currently included, preliminary Results show: average sample size = 51.2, age = 41.0, 15 TMS studies and 11 tDCS studies, and disorders treated include OCD, depression, anxiety, addiction, PTSD, and pain. Our primary outcome will be the change in primary clinical symptoms reported before and after treatment, and secondary outcomes will be social and occupational functioning and quality of life. The mean difference in clinical outcomes will be computed between the active and sham NIBS combined with psychotherapy, and a random-effects model will be used for pooling the effect sizes across studies. We hypothesize that clinical symptoms, measures of functioning and quality of life will significantly improve for participants receiving the active NIBS, that the number of combined NIBS and therapy treatment sessions will be positively correlated with symptom improvement, and that NIBS both pre-therapy and during therapy will be more effective than post-therapy.

Conclusions: We believe our findings will inform methodological approaches for future studies exploring combined NIBS and psychotherapy, specifically in terms of adherence to psychotherapy paradigms, NIBS timing, and elucidating populations that have not yet been investigated. These combined treatments have the possibility to be effective across patient populations, but this cannot be done without thorough guidelines to create reproducible, valid studies that advance the field towards an understanding of these multimodal therapies.

P1-D-39 Increased Gray Matter Density in the Precuneus Amongst Female Survivors of Intimate Partner Violence With Traumatic Brain Injury

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Background and Aims: Intimate partner violence (IPV) against women represents a serious and prevalent societal problem. Worldwide, one out of three women report to have experienced some form of physical and/or sexual violence by their partner or former partner during their lifetime (World Health Organization, 2023). IPV frequently co-occurs with (mild) traumatic brain injuries (TBIs), even though they frequently go undiagnosed. The negative effects of IPV and TBI on the health of these female survivors is widespread and includes both implications on their physical and mental health. Nevertheless, these issues often receive inadequate treatment, since our understanding of the neurobiological consequence of head trauma and IPV remains limited. Therefore, this study aims to investigate the gray matter structural brain differences in a group of female survivors of intimate partner violence with TBI through voxel-based-morphometry (VBM).

Methods: Twenty-six female survivors of IPV with TBI (mean age = 41.88, SD = 11.25) and thirty-two healthy controls (mean age = 42.63, SD = 14.31) underwent structural Magnetic Resonance Imaging (MRI). Structural brain scans were acquired using a T1-weighted 3D turbo-gradient-echo sequence (repetition time = 2.3s, echo time = 3.1ms, field of view = 256x256, and voxel size of 0.8 mm^3). Image preprocessing and analysis were performed using the Computational Anatomy Toolbox 12 (CAT12) implemented in Matlab. The quality of the acquired images was visually assessed, followed by segmentation into gray matter, white matter, and cerebrospinal fluid (CSF). A group template was created using the DARTEL procedure, onto which individual images were transformed and normalized. Sample homogeneity was assessed to ensure consistency of voxel volumes. Subsequently, all images were smoothed using a Gaussian kernel with a size of 8.8.8 mm. Group comparisons were conducted using Voxel Based Morphometry. A two sample t-test was performed with adjustments made for Total Intracranial Volume (TIV) and level of education.

Results: IPV survivors showed a significant increase in gray matter density compared to the control group in a cluster that partially overlaps with the anterior part of the precuneus, the lower section of the precentral gyrus and the posterior cingulate cortex.

Conclusions: The present study contributes to the understanding of the neurobiological effects of IPV and TBI on brain structure. Our findings indicate a significant increase in gray matter intensity within the precuneus among IPV survivors. The precuneus is a highly interconnected brain region involved in a variety of emotional and cognitive processes, including self-referential processing, episodic memory retrieval and attention and consciousness. Besides, the precuneus is a key node of the Default Mode Network (DMN), a brain network that is involved in internally directed cognition. These Results underscore the need for targeted interventions aimed at mitigating the adverse neurological consequences of IPV. Future research should shed light on the implication of this result and investigate whether these observed differences in gray matter intensity may be associated with negative health and neuropsychological outcomes.

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P1-E-40 Reduced Functional Efficiency Within the Working Memory Network in Adolescents Predicts Cannabis Initiation Four Years Later While Cannabis Use Does Not Lead to Future Changes in Working Memory Activation

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The bulk of imaging studies on the relationship between neural activity during working memory and cannabis use have been cross-sectional, leaving questions about whether brain activity differences between cannabis users and non-users reflect pre-existing vulnerabilities (vulnerability model) or result from neuroadaptive changes due to cannabis exposure (toxicity /neuroadaptation model). The present work takes advantage of a longitudinal sample to (1) determine if neural activity in working memory-related ROIs at baseline predicts cannabis initiation four years later (vulnerability model) and (2) determine if cannabis use over this period predicts changes over time in working memory-related neural activity (neuroadaptation model). At time point 1, the study sample was 177 adolescents (100 females) from the Adolescent Health and Development in Context (AHDC) study, with an initial average age of 15.98 years (SD = 2.06). For the cross-sectional analysis at time point 1, a standard fMRI GLM model was used with group-level models (2-Back vs. 0-back) to generate differentiated activation clusters (voxel-wise uncorrected p < 1x10-13) for which a 6mm sphere around each peak voxel was generated (n=14). After FDR correction, any lifetime cannabis use positively correlated with neural activity in the left superior medial gyrus (r = .27, p = .005), inferior parietal lobule (r = .22, p = .019), insula/inferior frontal gyrus (r = .23, p = .019), and right middle frontal gyrus (r = .20, p = .022). For aim 1 (vulnerability model), logistic regression analyses among youth who had never used cannabis at baseline (n=109) assessed if neural activity in these 4 ROIs predicted cannabis initiation four years later, controlling for working memory performance as well as alcohol/cigarette use, household income, sex, age, and race. At follow-up (mean age = 19.93 years), 36 participants had initiated cannabis use, while 73 had not. Increased activation in the left superior medial gyrus (OR = 2.23, CI = 1.09–5.33, p = .044), left inferior parietal lobule (OR = 3.79, CI = 1.65–10.41, p = .004), left insula/inferior frontal gyrus (OR = 1.80, CI = 0.65–7.36, p = .020), and right middle frontal gyrus (OR = 3.20, CI = 1.40–8.64, p = .011) predicted cannabis initiation 4 years later. Comparable Results (all p's < .05) for these 4 ROIs were obtained when using a measure of cannabis use in the last 12 months. These Results provide robust evidence for the predictive role of neural activation in these regions on future cannabis initiation when controlling for behavioral performance. For aim 2 (neuroadaptation model), multiple linear regression analyses were conducted for those who had neuroimaging data at both time points (n = 63) using the same ROIs, controlling for baseline activity and the same covariates. Neither a lifetime history of cannabis use nor cannabis use in the last 12 months predicted altered brain functioning over time in these ROIs (all p's > .29). These Results indicate that cannabis use may not result in significant changes in brain functioning within the observed timeframe. However, heightened activation for the same level of behavioral performance in specific brain regions during the N-Back task may indicate increased susceptibility to cannabis initiation, independent of other risk factors. This research is important for distinguishing risk factors from the outcomes of substance use.

P1-E-41 Predicting Longitudinal Anxiety in Adolescents Using Mixed Effects Random Forest Regression

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Background and Aims: Many psychiatric disorders emerge during adolescence, with anxiety being the most common—affecting as many as 1 in 3 youths (Beesdo et al., 2009; Kessler et al., 2005). Understanding the factors that shape the persistence and remittance of anxiety across development remains limited. Using machine learning methods with longitudinal behavioral, clinical, and fMRI data from adolescents, we took a data-driven approach to investigate whether we could predict anxiety symptoms years later. We hypothesized that we could predict future anxiety symptoms with high precision, and that functional connectivity of brain regions previously shown to be implicated in anxiety (e.g., amygdala, hippocampus, insula, dorsal anterior cingulate cortex, medial prefrontal cortex (mPFC), and the default-mode network) would be of highest importance in the model.

Methods: 132 adolescent participants ages 9-14 completed the Development of Anxiety in Youth Study (Galván & Peris, 2020), a prospective longitudinal study that occurred annually for 3 years. Participants completed a resting state fMRI scan, the Screen for Child Anxiety Related Disorders (SCARED) child report version (Birmaher et al., 1997), and demographic questionnaires at each visit. Using the resting state data, we computed a functional connectivity matrix between a subset of 53 ROIs from a functionally-defined atlas (Seitzman et al., 2020), which were selected based on a recent meta-analysis of machine learning studies of anxiety disorders (Rezaei et al., 2023). We submitted scaled data to a stochastic mixed effects random forest regression analysis (sMERF) implemented in R using the LongituRF package (Capitaine et al., 2021). The predictors consisted of 1086 variables including functional connectivity values and demographic variables (i.e., age, sex at birth, race, ethnicity, family income, and IQ); and the outcome of interest was SCARED total score. We used 80% of the data for training, and the other 20% for testing the model. Prediction errors were calculated as root mean square error with 25 training/test set random splits.

Results: Prediction of future anxiety symptoms using sMERF yielded a root mean square error of 0.97. The top 5 variables that yielded the highest relative importance (i.e., highest predictive value) in the model included (in order of relative importance) were functional connectivity of: (1) the right posterior cingulate cortex and the right orbitofrontal cortex; (2) the left mPFC and the right mPFC; (3) the right insula and the right cerebellum; (4) the left insula and the right cerebellum; and (5) the right superior parietal lobe and the left cerebellum.

Conclusions: Results from the present study suggest that resting functional connectivity between regions often overlooked in studies of anxiety—such as the cerebellum and the superior parietal lobe—as well as regions often included in studies of anxiety—such as the insula and mPFC—may play a large role in predicting anxiety symptoms over time. Increasing our

understanding of factors that shape the persistence and remittance of anxiety across development is crucial for identifying new targets for interventions for youth struggling with anxiety.

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P1-E-42 The Use of Atypical Functional Connectivity in Autism Spectrum Disorder Risk Prediction

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Background and Aims: Autism Spectrum Disorder (ASD) is a highly heterogeneous neurodevelopmental disorder characterized by impairments in social cognition and restrictive, repetitive behaviors. No reliable biomarkers currently exist, making ASD diagnosis purely dependent upon behavioral criteria. This study aims to predict ASD risk using functional connectivity (FC), or intrinsic temporal correlations between brain regions. We hypothesize that FC measured in electroencephalography (EEG) data during early infancy can be used to predict risk of ASD as assessed around two years of age using multivariate machine learning methods. Our population of interest is preterm infants due to their increased risk of neurodevelopmental disorders such as ASD (7% prevalence compared to 1.5% in all infants in the US).

Methods: Spontaneous EEG data has been collected during rest in preterm infants between 0-2 months, and the Autism Diagnosis Observation Schedule – Toddler Module (ADOS-T) is being used to assess ASD symptoms in the same infants around two years of corrected age (n to date = 45, n expected = 80). ADOS-T Results are numerical scores that are thresholded into severity levels. FC is measured in the alpha band due to its association with long-range connectivity and sensitivity to changes in early neural development. The alpha band, normally 6-12 Hz, is defined as 3-9 Hz here due to the extremely young age of the infants. We previously demonstrated that magnitude-squared coherence, a linear measure of FC that calculates the similarity of frequency between two signals, was significantly greater in preterm infants with low concern for ASD (n=7) than those with high concern (n=10). Having established a difference between risk groups at this age range, we intend to calculate phase coherence (PC), the similarity in oscillations of different brain waves, and multiscale entropy (MSE), a measure of neural variability and complexity, across the brain in the alpha band to better capture the nonlinear dynamics of brain function.

Expected Results: Various machine learning models exist for multivariate analysis, and we intend to test and compare multiple models. We specifically plan to test support vector machines (SVM) and support vector regression (SVR) models due to their robustness to smaller sample sizes and efficacy with high dimensional data. SVM will be used to classify subjects into groups of low, medium, and high ASD symptom severity and the predictive ability will be assessed using measures such as accuracy and AUC-ROC. SVR will be used to predict ADOS-T numerical scores and will assess predictive ability using measures such as mean absolute error, root mean squared error, and R2. We expect that the FC measures from infancy will be predictive of ASD symptom severity.

Conclusions: This work characterizes PC and MSE in the alpha band as potential biomarkers for ASD in early infancy and will demonstrate a potential application of multivariate machine learning based diagnostic methods. Successful predictive modeling based on EEG data from such young infants will show promise for the discovery and definition of biomarkers to facilitate earlier diagnosis. Intervention during the stage of maximal neural plasticity will encourage optimal outcomes for long-term social development in children with ASD.

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P1-F-43 Selective Representation of Inter-Individual Differences in Corrupt Behaviors through Negative Collaboration Networks

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Background and Aim: Corruption is generally regarded as a form of illegal or unethical behavior that leads to severe and widespread economic and social consequences. Substantial evidence suggests that corrupt behaviors, such as bribery, often arise within complex interpersonal relationships. However, empirical research on how interpersonal relationship in real-world contexts affect corrupt behaviors remains limited. To address this gap, we performed an online study based on real-world social networks, incorporating incentivized behavioral tasks that simulate bribery-related situations, along with social network analyses.

Methods: This study recruited first-year undergraduates from three classes in different majors (N = 266) as participants. They were asked to nominate peers based on six different types of interpersonal relationships (close friends, daily interactions, personal life sharing, gossip sharing, positive cooperation and negative cooperation), and then to complete a batch of bribery tasks measuring their corrupt behavior responses. The bribery tasks required participants to assume the roles of briber or referee in an exam scenario where the referee could manipulate the prize rewards. In half of the tasks, achieving a bribery deal resulted in financial losses to an uninvolved third party, creating a total of four bribery tasks. Additionally, four control behavioral tasks assessing other moral (i.e., donation, third-party punishment) and amoral tendencies (i.e., trust, risk-taking) were included to evaluate the specificity of social network indices in representing corrupt behaviors.Our primary analyses aimed to identify the association between different types of interpersonal relationships and corrupt behaviors across individuals. To this end, we first calculated key social network indices (i.e., in-degree centrality, eigenvector centrality, betweenness) for each individual using graph theory. Next, we examined how individual differences in corrupt behaviors patterns were represented by the network indices across different types of interpersonal relationships by combining inter-subject representational similarity analysis (IS-RSA) with a mixed-effect regression model. In particular, we constructed a representational dissimilarity matrix (RDM)

involving corrupt behaviors (i.e., four choices) and RDMs involving three network indices across six networks. We then applied a mixed-effects regression model on the behavioral RDM with six network RDMs as regressors while controling for participant-level effects.

Results: IS-RSA-based regression revealed that inter-individual variations in corrupt behaviors were selectively represented by the indices patterns of negative cooperation network across participants, while no such association was obeserved in control behaviors. Additional regression analyses further confirmed the unique contribution of these indices patterns in predicting the general preference of engaging corrupt behaviors.

Conclusions: Our study identified a negative cooperation network that is particularly susceptible to corrupt behavior, thereby deepening our understanding of the complex interplay between real-world interpersonal relationship and corruption. These findings also highlight the potential of leveraging specific social network structures to target key individuals or relationships that propagate unethical behaviors, offering valuable insights for developing strategies to prevent and intervene in corrupt practices rooted within social networks.

P1-F-44 Examining Functions of Prefrontal Regions within Parallel 'Social' and 'Control' Networks

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Background and Aims: Human prefrontal cortex (PFC) is heterogenous, and the extent to which PFC regions support domain-flexible cognitive control or more domain-specialized functions remains debated. A helpful observation is that side-by-side PFC regions show distinct profiles of anatomical projections. Growing evidence supports that dissociable regions of PFC gain functional properties in alignment with the distributed networks to which they are linked. While large swaths of PFC can be attributed to 'control' networks, even within dorsolateral PFC, we recently found that a region of a hippocampal-linked network preferentially responds to mental scene construction demands, supporting domain-specialization. Here, we aim to expand our analyses by testing for potential functional dissociation between PFC regions of two juxtaposed networks: a domain-specialized network broadly recruited by theory-of-mind (ToM) tasks (here called a 'social' network), and a domain-flexible network recruited by tasks pitting harder against easier conditions ('control' network). In our planned analyses, we will test the hypothesis that PFC regions of the 'social' and 'control' networks will show a double-dissociation, with 'social' regions preferentially recruited by ToM tasks and 'control' regions by tasks varying working memory load.

Methods, Analysis Plan & Implications: Using precision functional mapping and a multi-session hierarchical Bayesian model, we previously estimated networks within each of 13 repeatedly scanned individuals (8-11 sessions each). Networks were estimated using resting-state fixation data (16-24 runs per individual). Using these parcellations, we will identify nearby PFC regions of the 'social' and 'control' networks. Independent task data will then allow for exploring the response properties of these PFC regions in relation to ToM contrasts (from False Belief and Emotional/Physical Pain paradigms, 8 total runs) and working memory contrasts (from an N-Back task, comparing 2-Back to 0-Back load across face, scene, letter and word stimulus categories, 8 total runs).

In addition, for the ToM tasks, ratings of trial-level properties from independent online participants (N=131) will allow for probing and accounting for potential difficulty confounds. Overall, we predict that PFC regions of the 'social' network will show preferential recruitment by ToM contrasts, and PFC regions of the 'control' network by N-Back load effect contrasts.

Our findings will inform ongoing work testing the functional roles of spatially nearby regions in PFC associated with distinct, distributed association networks. Results promise to build understanding of how human PFC supports diverse aspects of higher order cognition.

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P1-F-45 Multivariate Associations Between Social Environment and Functional Connectivity in Older Adults

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Background: Older adults' social environments (e.g., social support and social connections) can delay the progression of cognitive decline and mitigate loneliness. Though behavioral research has implicated social cognition as a key mechanism by which this occurs, the neural mechanisms underlying it have not been well-characterized.

Methods: We collected well-validated measures of perceived social support and loneliness, a comprehensive social network interview that captured its structure and function, and resting state fMRI (rs-fMRI) data from 104 cognitively normal older adults (mean age = 73.45 ± 6.48; see Figure 1a for correlations between social measures). The rs-fMRI data was pre-processed according to standard protocol and parcellated into the Schaefer 200 atlas. We focused on three systems known to be important for social cognition and behavior: Default Mode Network (DMN), Dorsal Attention Network (DAN) and Salience/Ventral Attention Network (SalVAN), computing functional connectivity (FC) within and between these systems using the Pearson correlation. We assessed the relationship between the social measures and FC of three systems using Partial Least Squares (PLS) analysis – a multivariate statistical technique that identifies orthogonal latent variables which maximize the covariance between data sources. We used 10,000 permutation tests to determine the statistical significance of the latent variables and 1,000

bootstrapped resampling to compute the effect sizes. Our first PLS analysis examines the coarser associations between composite measures of social support and loneliness, while the second PLS clarifies associations between individual measures and social network properties. Finally, we examine the cognitive and mental health outcomes of these associations using path analysis.

Results: The first latent variable (LV1) of the composite social measures and FC explained 65% of the covariance (p = 0.04; see Figure 1b for weights on LV1 for social measures and FC). More social support—and less loneliness—was associated with less within-system FC, less FC between DAN and SalVAN, and more FC between DMN and both DAN and SalVAN. We then examined whether these associations were distinguishable when including properties of the social network, a consequential question given heterogeneous findings in the literature about the relationship between social network structure and function and loneliness. We performed PLS using 16 social measures (5 network properties as well as the perceived support measures and loneliness items). The first latent variable (LV1) explained 39% of covariance (p = 0.02; see Figure 1c for weights on LV1 for social measures and FC). Again, we find that more social support—and less loneliness—as well as denser, more supportive, and closer social networks were associated with less FC within systems, less FC between DAN and SalVAN, and more FC between DMN and both DAN and SalVAN. Path models examining the relationship between social environment, FC, and perceived cognitive and mental health (e.g., stress, depression, anxiety) will also be discussed (see Figure 1d for scores on these outcomes).

Conclusions: Altogether, these Results emphasize the pervasive influence of the social environment on the brain in healthy aging and clarify outcomes associated with this influence.

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P1-F-46 Neural Similarity at Resting fMRI Predicts Future Social Distance in the Social Network of an Entire High School

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Background and Aims: Recent evidence that utilized both human social networks and fMRI data suggest that, in social networks, people are more likely to be closer to others who have similar neural representations to themselves. However, it is unclear if people become closer in social networks (i.e., friends or friends of friends) due to their neural similarity (homophily hypothesis) or conversely, if people who make social connections become similar (social influence hypothesis). To identify causal direction between neural similarity and social network formation, we tested if brain functional connectivity at rest predicts future social distance in social networks.

Methods: We analyzed data from the Korean Study of Adolescent Health (KSAH) to test our hypotheses. At Time 1 (T1), 141 first-year high school girls in South Korea participated in a social network survey, identifying up to seven individuals with whom they discussed important matters. School-level social networks were constructed based on nominations restricted to within-school ties. Among these, 58 participants were enrolled in a brain MRI study, which included a resting-state fMRI session. Approximately eight months later (T2), participants completed the same social network survey, enabling the reconstruction of T2 school-level networks and calculation of pairwise social distances. The final analytical sample included 55 participants with both T1 brain fMRI and T2 social network data, yielding 1,485 dyads and their social distances for analysis. To exclude possible confounders, we obtained the residual of social distance using a linear regression model that includes attended middle school, class in the high school, age difference, and the Big 5 personalities as predictors. Neural similarity was assessed by calculating the absolute differences in ROI-to-ROI correlation matrices extracted using the Power atlas (264 ROIs, 236 associated with 13 functional brain networks). Using CONN software, we vectorized these matrices to derive neural similarity measures. To predict the residual of social distance from neural similarity, partial least squares regression was applied, validated through 10-fold cross-validation.

Results: The result shows that the predicted social distance from resting-state fMRI and the residual of social distance (i.e., actual social network proximity after controlling for possible confounders) are strongly correlated (r = .60).

Conclusions: The finding confirms that neural similarity at rest predicts future social distance in a social network of one entire high school students, extending previous evidence between neural similarity and social distance in a social network by utilizing a unique panel dataset of social network and brain fMRI that follows the same participants over time.

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P1-F-47 Shared And Distinct Reward-Related Neural Mechanisms of Internalizing and Externalizing Symptoms in Preadolescence: Findings from the ABCD Study

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Background and Aims: Internalizing and externalizing symptoms frequently co-occur in youth. Altered reward processing is implicated in both internalizing and externalizing psychopathology. However, few studies have examined neural reward mechanisms in relation to internalizing-externalizing comorbidity (shared) and both phenotypes uniquely (distinct). The present study aims to identify shared and distinct neural reward mechanisms in preadolescents with varying internalizing and externalizing symptoms. We have three hypotheses. First, greater internalizing symptoms will be uniquely associated with blunted striatal activation during reward anticipation and receipt of rewards. Second, greater externalizing symptoms will be uniquely associated with heightened striatal activation during reward anticipation. Third, altered prefrontal activation during reward anticipation and feedback will be associated with interactions between internalizing and externalizing symptoms.

Methods: Participants (N=5917; Mean Age = 9.96 years, SD = 0.63; 49.3% Female) were drawn from the baseline sample in the Adolescent Brain Cognitive Development study. Preadolescents completed the Monetary Incentive Delay task during fMRI acquisition. In the anticipation period of the task, participants were presented with a cue indicating whether they could win money, lose money, or complete the trial with no money at stake (i.e., reward, loss, or neutral trials). In the feedback period, participants were informed of their performance (i.e., hit or miss). Parents reported their children's internalizing and externalizing symptoms using the Child Behavioral Checklist.

Analysis Plans: ANCOVAs will examine interactions among internalizing symptoms, externalizing symptoms, and task conditions for reward anticipation (reward, loss, neutral) and performance (reward hit, reward miss, loss hit, loss miss, neutral hit, neutral miss). Analyses will reveal associations between neural patterns and internalizing controlling for externalizing symptoms, externalizing controlling for internalizing symptoms, and interactions between both phenotypes.

Implications: Findings will provide novel evidence for neural reward alterations as substrates of internalizing symptoms, externalizing symptoms, and their comorbidity. Adopting a transdiagnostic approach to differentiating neural mechanisms of co-occurring symptoms, this study may inform more precise intervention efforts in youth with internalizing and externalizing psychopathology.

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P1-G-48 A Computational Account of Individual Differences in Learning from Social Rejection and Acceptance

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Background and Aims: Rejection hurts, but it can be informative: experiences of acceptance and rejection may guide people in choosing which partners to connect with or let go. In prior work, we identified two distinct learning computations guiding partner choice: Participants learned to choose partners by updating their beliefs about how much their interaction partners valued them (relational value) and by the rewarding interaction outcomes they offered. These processes were distinctly represented in the brain: learning from relational value was linked to a social rejection network (dorsal and ventral anterior cingulate cortex, ventrolateral prefrontal cortex, anterior insula) and learning from outcomes was linked to regions involved in reward-based reinforcement (ventral striatum). Yet, different individuals individuals may rely on these computations to different extents. In our current study, we aim to explore the individual differences associated with learning from social rejection. We aim to fit computational models taking individual differences and learning biases into account and model how individuals learn from social rejection and acceptance. Using these models and individual difference measures in conjunction, we aim to identify computational phenotypes in our sample. Specifically, we aim to test whether participants who exhibit similar choice patterns are also similar in their measures of well-being.

Methods: Participants (N=224) repeatedly tried to match with others in a social game. Feedback showed whether they matched (rewarding outcome) and how much the other person wanted to interact with them (relational value). This approach allowed us to disentangle the two computations and observe choice when signals conflicted, such as making a team but being picked last (rewarding outcome, low relational value) and being rejected from a job as a close contender (rejection outcome, high relational value).

Analysis Plans: We'll fit a Bayesian cognitive model with both reward and relational value modeling participants' choice as a baseline and expanded models with additional parameters accounting for individual differences and biases in learning (e.g. learning speeds from positive and negative feedback, negativity bias in interpreting ambiguous signals). Using hierarchical bayesian inference, we'll identify the model that best fits participants' choice data and estimate model parameters. Using intersubject correlation on participants' model parameters and questionnaire data, we'll test whether similarity in subjects' computational parameters predicts similarity in scores of well-being and mental health.

Implications: While our prior work dissociated neurocomputational bases of learning in adaptive social behavior, the present study aims to expand this to maladaptive social behaviors as well. Computational phenotyping provides unique insights by identifying clusters of subjects based on similarities in their choice patterns. Using individual difference measures allows us to see whether variabilities in different clusters can be explained by variabilities in well-being, personality, and mental health. Identifying how individuals perceive signals in social interactions and update their beliefs in light of such differences is an important step in characterizing social behavior across diverse and various populations, which can pave the way for more healthy social decision-making interventions.

Acknowledgements: Pre-registration. Data is being analyzed.

P1-G-49 Neural Synchrony as a Predictor of Empathic Accuracy in Social Interactions

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Background and Aims: This study investigates the relationship between neural synchrony and empathic accuracy, focusing on whether neural synchrony can predict empathic accuracy in social contexts. Specifically, we aim to assess if higher neural synchrony between listeners and storytellers correlates with two other metrics of empathic accuracy: continuous affect ratings and self-reported empathic responses. Establishing this relationship would suggest that these measures validly assess a shared construct of empathic accuracy and offer insights into how neural synchrony mediates empathic responses during social interactions.

Methods: Using Functional Near-Infrared Spectroscopy (fNIRS), we will measure brain activity in participants acting as listeners, who will view videos of previously recorded storytellers sharing personal life events. While watching, listeners will provide moment-to-moment affect ratings using CARMA (Continuous Affect Rating and Media Annotation), allowing us to capture their real-time emotional alignment with the storytellers. Additionally, listeners will complete self-report measures regarding their perception of the storytellers' emotions. We hypothesize that greater neural synchrony between storytellers and listeners will correlate with more accurate continuous affect ratings and self-reported empathy, thereby validating neural synchrony as a metric for empathic accuracy. Data collection involves an initial set of storytellers (N=14) whose brain activity and continuous affect ratings were recorded during storytelling. Listener data (N=120) is currently being gathered. To analyze the fNIRS data, we will conduct a Pearson's Correlation of time courses across shared brain regions between speaker and listener. By correlating these time series, we can observe moment-to-moment alignment in brain activity, resulting in a metric that quantifies the degree of neural synchrony for each listener-speaker pair.

Anticipated Results & Conclusions: Once neural synchrony metrics are determined, we will run a linear regression to assess whether neural synchrony significantly predicts continuous affect ratings and self-reported empathy scores. This analysis will help establish the predictive power of neural synchrony and quantify its contribution to empathic responses. Our findings may provide evidence that empathic accuracy is, in part, driven by neural synchrony, enhancing our understanding of social cognition and the neural mechanisms underlying empathy.

P1-G-50 Discerning Emotional Expressions and Racial/Ethnic Identity of Black/African American and Hispanic/Latine Faces

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Background and Aims: Facial stimuli are ubiquitous in psychological and neuroscientific research. Biases like own-age bias and own-race bias can affect facial recognition, possibly skewing Results in studies using stimuli with a limited age range or that are mono-racial. The FACES database (Ebner et al., 2010) features younger, middle-aged, and older adults displaying six emotional expressions (Neutral, Anger, Disgust, Fear, Happiness, and Sadness). Though this database offers researchers facial stimuli to mitigate own-age bias, FACES lacks racial/ethnic diversity, and studies using this database may be confounded by own-race bias. A lack of racial diversity in stimuli could lead to nongeneralizable or inaccurate Results, particularly for communities of color. To address this, we created Diverse FACES, starting with the two largest racial minority groups in the U.S.

Methods: Replicating FACES, we photographed Black/African American and Hispanic/Latine (N=36) community members aged 25-85, displaying the same six facial expressions. Online survey panels used five criteria to validate the top two expressions for each emotion for each model.

Results: Our findings indicate Happiness is the easiest of the expressions to identify; whereas, Sadness is the most difficult. We also found Black/African American models were more accurately racially/ethnically identified compared to the Hispanic/Latine models. This could be because Hispanic/Latine is an ethnicity spanning multiple races, resulting in a greater possibility of our models not fitting into a phenoprototype.

Conclusions: Diverse FACES complements FACES, offering a diverse set of facial stimuli covering the lifespan. These images are available on Open Science Framework for research use. We've also begun photographing South, East, and Southeast Asian community members for further inclusivity.

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P1-G-51 Investigating Prefrontal Activation Among Social Media Users: A Functional Near-infrared Spectroscopy (fNIRS) Study

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Background and Aims: Social media apps have become ubiquitous in daily life, especially among youth and young adults. In some cases, these apps may afford some social benefits. Still, patterns of excessive social media use (SMU) are associated with attentional deficits, including those associated with attention-deficit/hyperactivity disorder (ADHD). Excessive SMU and ADHD share similar cognitive and behavioral features, including impairments in attention, reward processing, and cognitive control. Neuroimaging studies of excessive SMU have also demonstrated altered patterns within and between attention networks (ventral attention network [VAN] and dorsal attention network [DAN]), the default mode network (DMN), and the frontoparietal network (FPN), a similar pattern observed among those with attention-related deficits. However, more research is needed to understand the role of SMU and its impacts on neural mechanisms of attentional control and self-regulation.

This study investigates the associations between social media use, attentional and executive control, and processes using fNIRS. Specifically, we will conduct preregistered analyses (https://osf.io/gac8q) to test the following hypotheses: H1 & H2) SMU will be associated with poorer performance in sustained attention & inhibitory control tasks, with high social media users exhibiting poorer performance compared with low users. High social media users will also have altered resting state activity (H3) and task-based neural activity in the prefrontal cortex (PFC) during sustained attention and inhibitory tasks compared to low social media users (H4 & H5).

Methods: We aim to recruit 80 young adults (aged 18-25) who will complete a self-report questionnaire assessing ADHD traits and social media use, including social media screen time and problematic social media use. Following this, participants' brain

activity will be recorded using fNIRS at rest and during the sustained attention response (SART) and Numeric Stroop tasks. Our Analysis Plan includes examining activation in the prefrontal cortex, specifically the dorsolateral prefrontal cortex, frontal polar, and frontal eye fields. Exploratory analyses will also investigate connectivity for each combination of nodes (fNIRS channels) to examine connectivity between areas associated with functional networks (e.g., FPN to VAN). Correlation coefficients reflecting connectivity between channels will be estimated and converted to Fisher-z-scores. To address our hypotheses, we will run a series of multiple regression models with SMU variables as predictors and neural activity at rest and during attentional and inhibitory control tasks as outcomes.

Results/Conclusions: We hope these findings will elucidate social media's role in attention-related problems and identify shared neural mechanisms that underlie these problems.

Acknowledgements and Funding: This study is supported by faculty startup funds awarded to the PI (Lopez).

P1-G-52 What Drives Idiosyncratic Neural Processing in Loneliness?: Examining Neural Responses to Uncertain and Challenging Media Narratives

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Objective: Prior work has shown that loneliness is linked with idiosyncratic processing of popular media (Baek et al., 2023; Broom et al., 2024). We test whether this effect is most pronounced during specific moments. The emotional flow (Nabi & Green, 2015) and cognitive interpretation (Zacks & Magliano, 2011) of narratives are a time-locked process, and one that involves several brain regions relevant to social information and calculated prediction processes at different points in the story (Bente et al., 2022; Grady et al., 2022). We therefore test whether lonely individuals' neural idiosyncrasy is more pronounced when the media narratives evoke emotional and intellectual uncertainty or challenge. We hypothesize that lonely individuals will exhibit more idiosyncratic neural responses (compared to non-lonely individuals) during particular moments in the narrative that evoke high intellectual [H1] and emotional challenge [H2] (Bartsch & Hartmann, 2017), and intellectual [H3] and emotional uncertainty [H4] (Doust, 2015, 2017).

Methods: This study uses neuroimaging data collected in another project (N=76; redacted for blind review, 2023). Participants' neural responses were captured while they watched two video clips, an episode from "Nathan For You" ("Gas Station Rebate") and an episode from "Love, Death, and Robots" ("Zima Blue"). Both films are short narratives with unexpected twists and plot reveals at multiple points.

The dependent variable will consist of individuals' neural similarity with other individuals, which will be measured by inter-subject correlations (ISCs) for each region in the brain defined by the Shaefer 200 parcellation atlas (Schaefer et al., 2018) and the Harvard-Oxford subcortical atlas (Desikan et al., 2006), with specific areas of the Default Mode Network (DMN) as regions of interest.

Given our interest in moments of high challenge and uncertainty, both films are segmented and then content analyzed. Initial segmentation involved three researchers independently splitting the films based on event segmentation definitions (Zacks & Swallow, 2007) to identify key boundary events. Film scenes are currently being rated on emotional/intellectual challenge and emotional/intellectual uncertainty by independent coders (N = ~600) blind to the study's premise.

Analysis Plans: Upon the collection of subjective ratings, we will compare brain activity across these scenes. We will calculate ISCs at the unit of each scene in the content, which will allow us to test whether lonely individuals show greater neural idiosyncrasy (i.e., less neural similarity) in response to scenes that have high challenge and uncertainty. We will then fit linear mixed-effect models to predict dyad-level neural similarity from the dyad-level loneliness variable, with an interaction term differing based on the goals of each hypothesis. Specifically, the interaction terms will consist of the binary intellectual challenge variable [H1], emotional challenge variable [H2] intellectual uncertainty variable [H3], and emotional uncertainty variable [H4].

Study Implications: This study will allow us to disentangle the source of idiosyncratic neural responses observed in lonely individuals. By correlating media narrative content and the idiosyncrasy, the study will provide insights into how loneliness shape one's emotional and cognitive processing of the world.

P1-G-54 Assessing Artificial Intelligence Software for Pain Quantification Based on Facial Expression

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Background: Previous research on pain recognition and bias indicates that humans often display bias when evaluating the pain experiences of others. Factors such as the appraisee's racial identity and biological sex can significantly influence the appraiser's assessment. Artificial Intelligence (AI) software has the potential to detect facial features independent of race and sex. However, the AI bias risk persists as it is developed by humans and historically trained on homogenous samples with similar demographic profiles.

The current study aimed to investigate whether bias remains in AI software regarding its ability to differentiate between painful and non-painful expressions based on race or sex. Previous research on pain-induced facial expressions suggests a method for quantifying individual pain levels through facial muscle movement intensity, using the Prkachin and Solomon Pain Intensity (PSPI) metric, which calculates a weighted combination of facial features based on the Facial Action Coding System.

We utilized AI to analyze facial data from an empirical study that examined biobehavioral and sociocultural influences on pain expression and assessment. This analysis aimed to determine the relationship between PSPI and AI software in recognizing

Painful and Not-painful expressions and assess whether sociodemographic factors influence facial expressions of pain.

With the increasing use of telemedicine in healthcare, developing an unbiased, AI-based pain recognition tool could enhance the precision and accuracy of pain diagnoses.

Methods: In our study, 106 individuals received 10-second thermal stimuli at varying temperatures while their facial expressions were recorded using a head-mounted camera. We obtained usable data from 95 participants (58 females, 37 males). After each trial, participants rated the stimulation as either Painful or Not-Painful.

We created video clips from the heat stimulation periods and used commercially available AI software, iMotions, to track facial movement coordinates and assess muscle activation intensity at every time point during stimulation.

For each trial and participant, we calculated PSPI over time and then computed the average PSPI per trial. We calculated the mean PSPI separately for painful and non-painful trials.

Results: We conducted a 2 (Race, Sex) x 1 (Pain) mixed ANOVA to determine whether Average PSPI varied based on pain, race, sex, and their interactions. Our analysis focuses on responses from White participants (N=58, 34 females, 24 males), Black participants (N=27, 17 females, 10 males), and Hispanic/Latinx participants (N=10, 7 females, 3 males).

We observed a significant main effect of pain ($F(1,86) = 5.337$, $p < 0.001$, $\eta^2 \approx 0.005$), such that Average PSPI was higher on Painful trials (M = 17.6, SD = 18.8) compared to Not-painful trials (M = 13.1, SD = 15.5). There were no significant main effects for Sex or Race, nor any interactions with Sex or Race (all p's> 0.1).

Conclusions: Our Results demonstrate that the combination of PSPI and AI software is a viable tool for recognizing painful facial expressions without bias related to race or sex. Future studies should further explore these findings to enhance the robustness of AI applications in recognizing facial expressions of Pain and No-pain.

P1-G-55 Modeling Social Attributes of Dynamic Faces With Deep Neural Networks

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Background and Aims: Humans spontaneously infer social attributes like trustworthiness from faces, with these decisions significantly influencing real-world decisions such as voting behaviors. While deep neural networks (DNNs) outperform humans in face identity recognition, it is unclear if DNNs can replicate human-like social attribute judgments. Previous research suggests that human social judgments rely heavily on categorical identity features like age, which DNNs excel at recognizing. This study aims to investigate whether DNN representations align with human perceptions of social attributes, particularly in dynamic, naturalistic settings using video stimuli.

Methods: We conducted a behavioral experiment with 12 university students. Participants completed a behavioral face trustworthiness arrangement task, clustering four-second video clips of 707 unique faces across 12 trials (~59 clips per trial). Thumbnails of the video clips were displayed outside a circle, which can be triggered to show the dynamic and a larger display of the clips. Participants were instructed to arrange the thumbnails within the circle based on the similarity of perceived trustworthiness. Behavioral representational dissimilarity matrices (RDMs) were then constructed based on the Euclidean distances between stimulus pairs. Similarly, RDMs were constructed using embeddings from five DNNs: three face-trained (ArcFace, AlexNet, VGG16) and two object-trained models (AlexNet and VGG16). Next, representational similarity analysis (RSA) was employed to compare the behavioral and DNN RDMs.

Results: Analysis revealed high reliability of RDMs based on participants' trustworthiness judgments, indicating consistent patterns in human trustworthiness perception from dynamic faces ($\alpha = .69$). However, almost no correlation was found between human behavioral RDMs and those derived from any of the DNNs ($r = .03$). This suggests that while humans exhibit shared, reliable patterns in trustworthiness judgments, current DNN architectures fail to capture these patterns to extract similar social attribute information, regardless of training domain (face or object).

Conclusions: Our findings highlight a critical disconnect between human social attribute judgments and DNN representations in dynamic and naturalistic settings, even with advanced face-trained networks. These Results reveal a fundamental limitation that DNNs, while adept at identity recognition, do not currently replicate human-like social inferences. This has significant implications for the ethical use of AI in domains requiring social attribute assessments, such as hiring or law enforcement, and highlights the need for models that incorporate human-like cognitive frameworks. Future work is needed to investigate the features humans use to make consistent social attribute judgments, but are currently missing in DNNs.

Acknowledgements and Funding: This work is supported by startup funds provided by the School of Behavioral and Brain Sciences at the University of Texas at Dallas.

P1-G-57 Probing Facial Emotion Processing in the Superior Temporal Sulcus with ANN-Based Encoding Models

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Background and Aims: The superior temporal sulcus (STS) is implicated in emotion recognition, but the specific mechanisms of facial expression processing remain opaque. While emotion category information from multiple sensory modalities has been decoded from STS (Peelen et al., 2010), it is not clear how categories are abstracted from different sensory inputs, including language. One promising approach for understanding sensory processing is to model sensory pathways with artificial neural networks (ANNs) that map on to human brain function. This approach has generated insights into brain mechanisms for object recognition and facial identity, but has not yet been applied to facial emotion recognition. Here we benchmark a range of existing

visual ANNs for their ability to explain emotion perception in STS.

Methods: We analyze an fMRI dataset in which participants viewed more than 1,000 short clips of natural facial expressions (Chen et al., 2024). We collated all images from the clips and applied ANNs that ranged in exposure to emotional faces and language (AlexNet, Krizhevsky et al., 2017; EmoNet, Kragel et al. 2019; ViT, Dosovitskiy et al, 2021; EmoFAN, Toisoul et al. 2021; CLIP, Radford et al., 2021). This allowed us to extract representations that might be encoded in STS. We tested the ability of each model to classify facial emotion category. In preregistered analyses, we will create encoding models using representations from each ANN and compare their ability to predict BOLD activity in STS.

Preliminary Results: Representations from each of the visual models showed comparable performance at classifying the category of emotional facial expressions (accuracy for AlexNet = .49, EmoNet = .51, ViT = .50, EmoFAN = .41; linear decoding from the penultimate layer of each model). Given evidence that STS represents facial emotion, we predict that models trained on emotional faces (EmoFAN, EmoNet) will outperform those that have been trained only on objects (ViT). In addition, given that STS is involved in language processing, we predict that models that have been trained with contrastive language learning will outperform a model with the same architecture but no language training.

Implications: Representations from a range of purely visual ANNs similarly predict facial emotion category. The ANNs evaluated differ in terms of architecture, Objective, and training data. Comparing ANNs that vary along one of these dimensions will allow us to meaningfully infer what better characterizes brain responses to facial emotion. Assessing the impact of emotion training will illuminate the degree of emotion-specificity across the STS, and comparing models in terms of language experience will shed light on whether STS representations of facial emotion are influenced by language.

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P1-G-58 Dyadic Engagement and Approachability Predicts Infant Neural Response to Social Touch

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Background and Aims: In infancy, social (i.e. non-sexual, pleasant, affiliative touch) is used for preverbal communication, emotional expression, and homeostatic regulation. Gentle stroking at a rate of 3cm/s elicits the social context of touch, as it is the default stroking rate when mothers sooth their infants, and is associated with greater neural activity in subcortical regions associated with emotional and sensory processing. Conversely, administering this same touch through a plastic film reduces the positive emotional valence associated with this tactile experience in adults. This allows for a controlled social and nonsocial touch paradigm to elucidate differential neural processing of the social context of touch, specifically within the realm of infant temperament and engagement with their caregiver.

Methods: Eighteen infants ages 0-4 months participated in a study to assess neural correlates of social processing. Infants underwent functional magnetic resonance imaging where they completed a 2x2 block design (condition: social vs nonsocial x context: auditory vs tactile). This abstract focuses on the social tactile (3cm/s stroking on the left shin) and nonsocial tactile (3cm/s stroking to a plastic film placed on the left shin) conditions. Data preprocessing included motion artifact correction, slice time correction, spatial smoothing, high-pass filtering, and registration to standard space in Fmriprep. Whole-brain analysis examined activation in response to social vs nonsocial stimuli. Infant behavior was evaluated with the Infant Behavior Questionnaire Revised (IBQ-R), focusing on the infant approach subscale. Additionally, a five-minute video recording of a parent-infant feeding interaction was behaviorally coded for low and high levels of dyadic engagement. We ran three general linear models in nilearn: the first assesses the main response of social compared to nonsocial touch, while the second and third assess infant temperament (i.e. approach subscales of the IBQ-R) and levels of engagement as predictors of infants' neurological response to social tactile information, respectively.

Results: We found the main preferential effect of social touch was activation in the right postcentral gyrus, right supramarginal gyrus, left middle cingulate gyrus, right rolandic operculum, and left rolandic operculum. In contrast, the main effect of nonsocial touch includes activation in the left calcarine cortex, right cuneus, left superior occipital gyrus, and left superior parietal gyrus. Furthermore, infants who showed higher levels of engagement exhibited increased neural response in the left rolandic operculum during social touch, while greater parent-reported approachability was positively associated with increased neural response in the postcentral gyrus.

Conclusion: This study is the first to differentiate social from nonsocial touch using a validated control condition, highlighting the clinical significance of neurological markers of social processing. Researching neural and behavioral pathways involved in social tactile processing underscores the biological foundations of skin-to-skin contact as an early intervention, paving way for more precise care for infants. These findings could potentially serve as biomarkers for social-deficit disorders, facilitate earlier diagnoses, and enhance opportunities for early interventions.

Acknowledgements and Funding: UVA Brain Institute and the American Psychological Foundation.

P1-G-59 Gesture-Based Instruction Enhances Neural Synchrony and Predicts Children's Mathematical Learning

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Background and Aims: The hand-movements teachers produce during a lesson can promote learning mathematics, but not all hand-movements are equally effective. For example, in solving the problem 4+2+5=_+5, gesture-based instruction, where the teacher forms a V-shaped hand under the 4 and 2 and then points to the blank (the "grouping strategy"), promotes learning more than action-based instruction, where the same strategy is instantiated by physically manipulating magnetic numbers

(e.g., picking up the 4 and 2 and placing them in the blank). This study uses fNIRS to identify the neural processes that differentiate children's responses to gesture-based versus action-based instruction. By examining how these processes relate to learning outcomes, we seek to characterize how different forms of instructional hand movements support mathematical cognition in children.

Methods: 80 children (aged 8–10 years) participated in a math lesson while undergoing fNIRS. They completed a pretest solving mathematical equivalence problems (a+b+c=_+c). Children were randomly assigned to either the gesture (n = 40) or action (n = 40) condition. In the gesture condition, children watched 6 training videos where an instructor gestured the grouping strategy while solving the problem. In the action condition, children watched 6 training videos where the instructor moved magnetic number tiles instead of gesturing. Both conditions included 6 control videos with no hand movements and were randomly interleaved with the training videos. Participants then completed a posttest with different numbers. For each video type, we computed the intersubject correlation (ISC) between each participant and all other participants as a measure of neural synchrony. In each condition, we contrasted the ISC in the training videos and the control videos to assess neural synchrony specific to each type of instruction. We then computed the difference in ISC between gesture and action conditions (gesture > control vs. action > control) to identify brain areas where synchrony differed between the conditions. Finally, we assessed whether ISC in each condition predicted the improvement in scores from pretest to posttest.

Results: ISC during the training videos was significantly higher in participants in the gesture condition than those in the action condition the right temporoparietal junction (rTPJ) ($r = 0.17$, $p < 0.001$, $q = 0.008$), right angular gyrus ($r = 0.19$, $p = 0.001$, $q = 0.024$) and right motor area ($r = 0.13$, $p < 0.001$, $q = 0.012$). No brain regions were identified in the reverse contrast. Of the three regions, ISC in the rTPJ during gesture videos positively correlated with improvement scores ($r = 0.44$, $p = 0.003$, $q = 0.026$), but not during action videos (all $p > 0.05$).

Conclusion: Our Results suggest that gestures foster shared neural representations across individuals more effectively than actions. The engagement of the rTPJ, a region implicated in theory of mind and perspective-taking, may reflect children's recognition of gestures as communicative acts. This may in turn prompt them to actively interpret the instructor's intent, enhancing understanding and improving learning. These Results underscore the importance of leveraging gestures to optimize learning and provide a neural basis for the efficacy of gesture-based teaching strategies in education.

P1-G-60 The Moderating Effect of the Oxytocinergic System on the Relationship Between an Infants' Environment and the Neural Correlates of Social Tactile Processing

Cabell Williams[1], Macie Tran[1], Madelyn Nance[1], Kevin Pelphrey[1], James Morris[1], Meghan Puglia[1]
[1]*University of Virginia*

Background and Aims: The Social Salience Hypothesis posits that oxytocin orients attention to external social cues, but that it is dependent on individual differences. One potential difference is the epigenetic expression of the oxytocin receptor gene (OXTR). Studies have found that parental engagement with their young modulates epigenetic expression of the oxytocin receptor, such that greater levels of engagement are correlated with a reduction in OXTR DNA methylation (OXTRm), resulting in an increase in oxytocin receptors within the brain. Presumably, this increase in receptor availability allows for more endogenous oxytocin use and should strengthen the downward cascading effects of the oxytocin system- like the attentional mechanisms to social cues. We also know that social (non-sexual, pleasant, and affiliative) touch, is important in infant development. It facilitates maternal-infant bonding, acts as a preverbal form of communication, conveys emotion, and expresses affiliation. Thus, this research aims to assess whether parent-infant engagement is associated with OXTRm and if this mechanism effects how infants interpret social, versus non-social, touch neurologically. We hypothesize that greater levels of engagement will be associated with lower levels of OXTRm in the infant, resulting in a greater neural response to social compared to non-social tactile stimuli.

Methods: We recruited 22 parent-infant dyads to participate in a functional magnetic resonance imaging (fMRI) study. During the study, parents and infants underwent a five-minute feeding interaction that was behaviorally coded for engagement using the Maternal Infant Synchrony Scale. Additionally, a salivary sample was taken from the infant to be assayed for OXTRm levels at sites -923 and -924, regions associated with parental care. Lastly, infants undergo fMRI while asleep. The fMRI is a 2x2 block design consisting of social and non-social auditory and tactile cues, with this analysis focusing on the tactile conditions. During the social tactile paradigm, infants are gently stroked at a rate of three cm/sec for 36 seconds/block on their left shin, a rate which has been found to optimally express positive emotional valence. For the non-social tactile condition, medical grade plastic is placed over the shin, which in adults has shown to inhibit the rewarding response, and the gentle stroking continues at the same rate. The neural response elicited from the non-social condition will be subtracted from the social condition to contextualize the role sociality plays in tactile processing.

Results: Preliminary Results found preferential activation in the right calcarine cortex, postcentral gyrus, posterior cingulate gyrus, lingual gyrus, left precuneus and lingual gyrus to social compared to non-social touch. The quantified engagement levels, site-specific OXTRm levels, and neural response to social tactile processing will then be fed into partial least squares path modeling to assess the moderating effect of the oxytocin system on the neural processing of social touch.

Conclusions: This study may identify potential biomarkers for sensory processing disorders. Understanding the environmental, physiological, and neural mechanisms of tactile processing can guide parenting techniques that contribute to healthy neural development for high-risk infants.

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P1-G-61 Forgiveness Updates Negative Interpersonal Memories to be Less Negative

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Background and Aims:: Do we forgive and forget, or do we forgive and remember the experience differently? And what are the neural mechanisms underlying this process?

Methods: To answer these questions, we conducted a neuroimaging study (n=37) that spanned over two days using functional magnetic resonance imaging (fMRI). On day 1, participants were informed that two previous participants (hereafter referred to as "targets") selected images for them to view in the scanner (i.e., encoding phase). During encoding, participants saw images the target gave them (mostly negative, with the rest neutral images) and rated how each image made them feel on a scale of 1-4 (1 being negative and 4 being neutral). Following encoding, participants were given reasons for the two targets' mostly negative image selection, with one apologetic and the other one nonchalant. Participants then viewed and rated the negative images again and were at the same time instructed to either "forgive" or simply "view" according to the reasons given earlier (i.e., manipulation phase). On day 2, participants came back for another fMRI scan where they saw and rated both the negative and neutral images again (i.e., retrieval phase).

Results: Behavioral analyses revealed that after manipulation, participants rated images selected by the forgiven target as significantly less negative both in the short-term ($t(22) = 5.11$, $p < .001$) and on the next day ($t(22) = -2.84$, $p = .010$). We performed an item-level analysis on the negative image trials that assessed the extent to which multivariate neural patterns increase or decrease in similarity between two phases of the experiment as a function of how much the affective rating of that trial changed to be less negative. We then tested for significant interactions to see if changes in pattern similarity varied as a function of target (forgiven vs. looked at target) and the extent to which an item's affective ratings changed. Two of our targeted regions of interest showed such interactions between manipulation and retrieval phases: right dorsomedial prefrontal cortex (rDMPFC) derived from search-term of "mentalizing" in the Neurosynth platform ($\beta = -0.06$, $t(1352.81) = -2.78$, FDR-corrected $p = .030$), which also replicated with the Shen parcellation (parcel number 10; $\beta = -0.052$, $t(1349.82) = -2.47$, $p = .014$). We also observed this effect in the posterior left hippocampus derived from the Shen parcellation (parcel number 229; $\beta = -0.05$, $t(1351.99) = -2.83$, FDR-corrected $p = .030$). In other words, multivariate neural patterns in rDMPFC and posterior left hippocampus were more similar for retrieval and forgiveness manipulation (vs. retrieval and look manipulation) on trials in which the affective rating was less negative during Day 2 retrieval than during Day 1 manipulation.

Conclusions: Taken together, our Results suggest that interpersonal forgiveness occurs through taking the perspective of the transgressor, updating relevant details, and consolidating the information into memory

P1-G-62 Excitatory Stimulation of Somatosensory Cortex Affects Emotional Responses to Positive Social Images in Individuals with Low Affective Empathy - A Transcranial Current Stimulation (Tdcs) Study

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Background and Aims: Social touch is a key aspect of human interactions, involving physical contact between individuals that communicates social, emotional, or informational cues. Vicarious social touch refers to sensory or emotional responses triggered by merely observing others engaging in touch. The somatosensory cortex (SI) is thought to contribute to simulating the observed touch and facilitating affective processing in other brain areas, such that enhancing SI activity through excitatory neuromodulation may improve the simulation of observed social touch. Previous studies suggest neuromodulation of brain regions linked with affective processing enhances emotional responses when observing social touch, particularly for individuals with lower affective empathy who are less inclined to mirror others' emotions. Thus, we hypothesized that excitatory stimulation of SI and trait empathy would affect emotional responses to positive social touch.

Methods: Fifty-nine participants (ages 19–36) completed a well-validated questionnaire of trait affective empathy and underwent transcranial direct current stimulation (tDCS) to SI. We measured emotional reactions to images depicting either positive social touch between people or objects or the absence of touch. Each participant completed the task twice—once under sham stimulation and once under excitatory (anodal) stimulation over the right or left SI.

Results: Excitatory stimulation was associated with reduced emotional ratings in participants with lower affective empathy, specifically when viewing images of humans, regardless of whether touch was involved.

Conclusions: The Results indicate that the somatosensory cortex (SI) may contribute to emotional responses to positive social stimuli, with empathy levels moderating this effect. These findings prompt further questions about the role of SI activity in socioemotional processing.

Poster Session 2

Friday, April 25, 2025

4:15 - 5:15pm

P2-A-1 The Mechanisms Underlying Moral Licensing in Multi-Stage Decisions

Nitisha Desai[1], Austin Chrisley[1], Scott Huettel[1]
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Background and Aims: In many social decisions, we must make tradeoffs between what is best for ourselves and what is best for others. In some of these situations, we sacrifice the interests of others (by not choosing a more prosocial option) in favor of our own interests (by choosing a more self-interested option). But even in cases where we prioritize ourselves, we often desire to perceive ourselves as prosocial. One psychological process that allows us to do so is moral licensing, through which people use past prosocial behavior to justify future self-interested behavior. A decision context that seems particularly well-suited for exploiting moral licensing is multi-stage decisions, where top options are short-listed, and then a final selection is made. In these two-stage decisions, we may employ moral licensing by first choosing a prosocial option, which can then justify a final self-interested selection. Here, our aim is to test whether people use moral licensing in one- and two-stage decisions. We also use eye-tracking, and then plan to use fMRI, to understand the attentional and neural mechanisms that underlie moral licensing.

Methods: We investigate these aims in two domains: charitable giving (Study 1) and eating behavior (Study 2). In Study 1, participants made a series of decisions about allocating money between themselves and a charity. The participants were shown several options that varied in how much money the participant earned and how much the charity earned. These options ranged from very self-interested to very prosocial. In Study 2, participants decided between various foods. The participants were shown an image of the food and its environmental impact grade (A-E). In both studies, participants selected their preferred option in one-stage and two-stage decisions. Decisions in both studies were eye-tracked and incentive-compatible (i.e., in Study 1, we donated money to the charity and paid the participant a bonus per their decision; in Study 2, we gave the participant their chosen food).

Hypotheses and Analysis Plan: Through these studies, we will test two primary hypotheses. First, we will test if the presence of a prosocial option in the set increases the likelihood of choosing the antisocial option and if gaze time on the prosocial option predicts the likelihood of choosing the antisocial option. Second, we will test if the preferences change in each stage of the decision, such that people prioritize prosocial items in the first stage vs. their final decision. We will build a Bayesian computational model predicting choices in the two stages, capturing how preferences are updated when entering the second stage. We will also test if participants shift their attention from more to less prosocial options when moving from the first stage to the second.

Conclusions: Through this research, we investigate moral licensing in a multi-stage context, specifically whether initially shortlisting prosocial options increases self-interested final decisions. Eye-tracking will reveal attentional priorities, providing insights into moral licensing mechanisms. Future studies will tie together attentional and neural mechanisms to enhance our understanding of moral licensing, allowing us to mitigate its effect on prosocial behavior.

P2-A-2 Unequal Resource Division Occurs in the Absence of Group Division and Identity

Eliane Deschrijver[1], Richard Ramsey[2]
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Background and Aims: Based on the seminal "minimal group" experiment, the widely influential social identity theory has, in the last 50 years, led to the belief that discrimination follows from intergroup relations and social identity. In the paradigm, participants are assigned to one of two groups and given a social identity based on seemingly irrelevant, arbitrary, and meaningless features, or even random events. Such manipulations include being an over- versus under-estimator of the number of dots that they had seen, being part of a Klee versus Kandinsky group after having a preference for certain paintings, or belonging to a heads versus tails group after flipping a coin. A large body of research thus evidenced that people discriminate against members of their out versus ingroup, even if groups and identities were assigned on the basis of a quantity estimate, aesthetic judgement or a chance outcome. But to what extent may unequal resource division be accounted for by ad hoc difference versus sameness, outside of any group division? The present series of experiments investigated whether typical discriminatory strategies continue to arise when the group division manipulation is removed from the minimal group paradigm, leaving only sameness versus difference with a single individual.

Methods: We conducted 7 pre-registered experiments (>1400 subjects), in which the participants assigned money to a single other individual that demonstrated sameness versus difference in a painting preference, quantity estimation or the outcome of a coin flip. In experiments 1 to 3ab, we measured the strength of typical discriminatory strategies such as favoritism (FAV) and maximum differentiation (MD, see Fig. 1 for the results of experiment 1). In experiments 4 to 6, we developed a simpler dependent measure to quantify how much more money people were willing to give in sameness versus difference conditions (see Fig. 2 for these results).

Results: We show via Bayesian regression analyses that unequal resource division strategies persist against a single person that demonstrates a different versus the same quantity estimate, painting preference, or even coin flip (Experiments 1, 2 and 3ab), with 43.1% more money awarded for sameness relative to difference conditions (Experiments 4, 5 and 6).

Conclusions: These findings open up the possibility that one key driver of discrimination may exist in a mechanism of interindividual comparison that treats ad hoc difference more negatively than ad hoc sameness. If unequal resource division readily emerges against a single person even after a mere chance difference, discrimination may be more widespread and occur for partly different reasons than is currently assumed. Theoretical implications for understanding cognitive and brain systems of discrimination will be discussed.

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P2-A-3 The Importance of Locus of Control and Prediction Error for Updating Future Predictions

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Background and Aims: In order to avoid consequences and earn rewards, organisms need accurate predictions about how their actions impact future outcomes. Work from our lab has shown that when people make a prediction error (PE), they appropriately change future predictions and become more accurate with time. However, individuals who experience an unexpected negative outcome may not update their future expectations if they believe it is within their control to improve future outcomes. Therefore, we aim to understand how locus of control (LOC) influences how people update their predictions in response to previous PEs. LOC describes the degree to which individuals believe they have agency over the outcomes in their life. We hypothesize that LOC will be an important moderator in predicting how participants update their predictions.

Methods: We assessed undergraduate students (N = 224) taking an introductory chemistry course. To measure LOC, we adapted the Attributional Style Questionnaire. Students identified the top three factors contributing to their exam grade performance and rated the extent to which those factors were internally or externally driven, stable or unstable, and specific to this situation or generalizable to many settings. Participants completed the LOC assessment after completing an exam and provided an updated assessment after knowing their grade for that exam. Additionally, students predicted their exam grades after completing their exams. Grade PEs were calculated as the difference between the grade participants predicted and the actual grade they received. Changes in grade prediction were computed as a students' current exam grade prediction minus their previous prediction.

Results: We will begin statistical analyses shortly. Our analytic plan is to create several Bayesian regression models examining factors such as grade, change in grade, PE, and LOC regressed onto changes in grade predictions. Previous work from our lab found that a model including student's change in grade and PE performed best at modeling how students updated future expectations. We hypothesize that including LOC to this model will improve the model fit to the data. We will complete additional exploratory analyses to examine whether LOC is related to increased accuracy in exam grade prediction.

Conclusions: The results of this study may have implications for understanding what variables are important for learning. Previous work studying learning typically examines simple scenarios in which people learn the set rewards of an environment. However, in a real-world context, both the set environmental conditions and people's efforts in achieving rewards impacts future outcomes. This work may provide additional context to how people learn about reward in a real-world scenario.

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P2-A-4 Family Obligation Attitudes Predict Differentiated Functional Connectivity When Giving to Others During Adolescence

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Background and Aims: Family obligation attitudes, which reflect the prioritization of family needs and values, have been shown to influence prosocial decision-making and underlying neural processes. Previous research has demonstrated that individuals with stronger family obligation preferences showed greater functional coupling between regions involved in self-control and mentalizing (dorsomedial prefrontal cortex [dmPFC]) and with the ventral striatum (VS), a region involved in reward processing, when giving to the family. However, it remains unclear whether these neural patterns are family-specific or extend to prosocial decisions involving others, such as friends or strangers. This study tested whether family obligation attitudes relate to functional connectivity patterns during costly decisions to give to family, friends, and strangers.

Methods: Data are drawn from the first wave of a longitudinal study of 185 adolescents (9-15 years, Mage = 11.8 years, 47.8% Female). Participants completed an fMRI decision-making task in which they had the opportunity to give money to caregivers, friends, and strangers. Family obligation attitudes were assessed using a 25-item scale measuring current assistance, respect for family, and future support. Subscales were averaged to create an overall family obligation preferences index, as well as separate subscale scores.

Results: There were no differences in costly giving behavior, as measured by the percentage of accepted costly decision trials. However, subscales for respect for family and future support revealed significant neural differences. Stronger family obligation attitudes in these domains predicted greater functional connectivity between the VS and dmPFC when giving to family, while the inverse pattern was observed when giving to friends.

Conclusions: This study highlights the relation between family obligation attitudes and neural responses during prosocial decision-making in adolescence. The evidence suggests that lower family obligation attitudes were associated with less differentiated VS-dmPFC connectivity when giving across targets, but VS-dmPFC connectivity when giving to friends was weaker for adolescents with stronger family obligation attitudes, suggesting that these regions facilitate the integration of social value across social contexts. This differentiated functional connectivity between the dmPFC and the VS suggests that the dmPFC might affect social value by modulating the VS during prosocial decisions involving the self and others outside of the family. These findings are consistent with the perspective that motivated behavior during adolescence can be modeled by

a general value-based decision-making process centered around value integration between regions implicated in reward processing and mentalizing about others.

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P2-A-5 Negatively Valenced and High-Arousal News Headlines Drive Preferential Evidence Accumulation and Influence Selection Behavior

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Background and Aims: Citizens in modern democracies are more likely to select negative news compared to positive news. This is called the negativity bias. The negativity bias for news is thought to be evolutionarily and culturally advantageous. This account suggests that negative stimuli, including news, capture our attention. However, there is a substantial gap between stimulus-driven attentional capture and the decision to select and subsequently process news. We address this gap by examining the negativity bias from a value-based decision making framework and summarize five studies that develop and test a computational model to examine how valence and arousal shape news selection.

Methods: In a first study, economic news headlines were generated using ChatGPT 3.0. A total of 208 headlines were scored on valence and arousal using the ANEW dictionary and cross-validated by human annotators (n = 323) on Mturk using the self assessment manikin. The top 56 highest/lowest scoring headlines were selected and used to create four types of headline stimuli: high arousal/positive valence, high arousal/negative valence, low arousal/positive valence, low arousal/negative valence. Subsequently, four identical confirmatory studies were conducted. In studies two – five, participants completed a two-choice decision making experiment. During this experiment, participants were presented with all possible pairings of the news headlines and asked to choose which described a news article they would prefer to read. Selection and reaction time were recorded.

Studies two and three were among undergraduate students from three different universities (n = 357; n = 334), whereas study four was among nationally representative (in terms of age, gender, ethnicity, and political ideology) participants recruited from Prolific (n = 300). Study five was a functional magnetic resonance imaging (fMRI) experiment conducted among young adults from the university and surrounding community (n = 16 democrats, 14 republicans; right handed; no contraindication to fMRI).

Choice and reaction time data were used to fit a computational hierarchical Bayesian drift diffusion model with headline valence, headline arousal, and political ideology as terms. Functional imaging data were preprocessed using fmriprep and analyzed using nilearn.

Results: Results indicate a credible drift rate for negatively valenced and high arousal news headlines. Among college-aged participants, results demonstrate that liberals have the strongest preference for negatively valenced headlines whereas conservatives are approximately equal in their preference. The larger and more representative sample in study four allowed us to further interrogate these findings as moderated by age. Results show an overall preference for negative valence and high arousal headlines, with preferential evidence accumulation more similar among conservative and independent relative to liberal participants. Finally, the fMRI data demonstrate that the medial prefrontal, inferior temporal, and posterior parietal cortex appear sensitive to negatively valenced headlines. Arousal was associated with activation in the medial prefrontal cortex and striatum.

Conclusions: Our computational modeling results bridge the gap between stimulus-driven attentional capture and selection by demonstrating that people's negativity bias for news is the result of preferential evidence accumulation, thereby clarifying the negativity bias selection mechanism for news.

P2-A-7 Does Social Predictability Relate to Feelings of Connection and Bias Memory Recall?

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Background: The quality of our social connections determines the quality of our lives and health (Holt-Lunstad et al., 2017; Robles et al., 2014). Our satisfaction with our interpersonal relationships meaningfully predicts our own subjective well-being (Froh et al., 2007). Additionally, those that report being the happiest in everyday life also report feeling the most connected to their friends, family, and romantic partners (Diener & Seligman, 2002). One possibility is that predictable people are more likely to foster feelings of social connection, whereas unpredictable behavior may make us feel less socially connected to others.

Methods: In order to empirically test this, participants will watch video clips from Bravo's reality television series, The Valley. This show was chosen because, like much of reality TV, it portrays real people who show great variability in the predictability of their behavior. Each video clip in the task reveals novel social information about a particular target of interest. After viewing each video clip, participants are asked to rate their feelings of social connection to and decide whether they want to be friends with the target. Participants then perform a surprise memory test after viewing all video clips. Using participants' choice behavior, a simple reinforcement learning model will be used to generate person-specific social prediction errors to assess meaningful relationships with participants' memory performance and their experiences of subjective social connection to the target.

Results: We hypothesize that unpredictable social behavior will correspond with lower ratings of subjective social connection when compared to predictable social behavior. Additionally, we hypothesize that unpredictable social behavior may be better

remembered than predictable social behavior.

Conclusions: Although humans must connect with others to survive and thrive, this is not always an easy or straightforward task. Our social worlds are incredibly rich, complex, and dynamic. The current study aims to assess how the predictability of other people relates to our subjective sense of social connection to them and may color our subsequent memory of them.

P2-A-8 Neural Mechanisms Underlying the Transfer of Pavlovian Observational Learning to Decision Making

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In today's society, individuals increasingly learn about fear eliciting events (e.g., terrorist attacks) in a second-hand fashion, through social networks and mass media, and adjust behavior based on their observations. Using neuroimaging, we aim to elucidate the neural mechanisms through which observational threat learning impacts instrumental decision-making. In a Pavlovian phase, participants (n=44) watched videos in which a demonstrator was subjected to electric shocks after one conditioned stimulus (CS+), while another stimulus (CS−) was not followed by shock. Next, they performed an instrumental decision task, where they learned the association between a stimulus and an aversive event (i.e., electric shock) for themselves.

In the Transfer phase of one condition (Congruent; n=22), the previous CS+ was associated with a higher probability of shock than the other stimulus, such that Pavlovian and instrumental learning were congruent. In the Transfer phase of the other condition (Incongruent; n=22), the previous CS− was associated with a higher probability of shock, such that Pavlovian and instrumental learning were incongruent. Later, the associations were reversed in both conditions (Reversal phase). We found that Pavlovian observational learning transferred to instrumental learning. Instrumental learning performance in the Congruent condition was higher than in the Incongruent condition during the Transfer phase, but this difference diminished during the Reversal phase (Learning Phase x Congruent/Incongruent: Z=3.47, p=0.001).

At the neural level, prediction errors during the Pavlovian observational learning correlated with periaqueductal gray (PAG) activity. Moreover, PAG activity during observation was associated with the weight given to Pavlovian versus instrumental value during instrumental decision: greater activity for larger aversive prediction errors during observation corresponded to a greater influence of Pavlovian value during instrumental learning. Together, these findings suggest that the PAG is centrally involved in the social learning of threat and the subsequent use of the learned information for decision making and instrumental behavior.

P2-A-9 The Prioritization of Social Content During Episodic Memory Guided-Inferences

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Background: Episodic memory helps facilitate navigation of the social world. Some hints that social stimuli might hold a privileged role in long-term memory comes from work showing that social stimuli is easier to recognize as being familiar compared to other stimuli. Yet, whether social event details are prioritized in episodic memory is unclear. Here, we tested whether social content is prioritized in episodic memory-guided decision tasks.

Methods: Two independent sets of online participants were recruited for two pre-registered experiments studying social primacy in either an episodic memory-guided social decision making task (N=110) or non-social decision making task (N=55). In an encoding phase, participants created stories from triplets comprising an activity, a social group, and a location linked to either a social (fictitious person) or a non-social (object) decision item, e.g. "A curly haired boy with glasses (fictitious person) went to an abandoned parking lot (location) with his suburban friends (social group) to play soccer (activity) after school". There were 5 decision items with 2 associated triplets (i.e. decision set), adding up to 10 unique triplets in each experimental run. Participants then chose which of 5 labels best represented each decision item. Notably, the activity cue at the encoding phase was uniquely informative for these choices. Next, associative recall with activity items was tested in counterbalanced trials to determine whether social content had greater recall than non-social content, and whether this heightened recall depended on whether the lure item was from a different decision set (easier) or the same decision set (demanding). Each experiment contained 2 runs. We used linear mixed effect models to determine the impact of the experiment's 2x2 factorial design on response times(RTs) and recall performance. Computational modeling was used to link retrieval RT with performance.

Results: Across all experiments, associative memory tests revealed enhanced recall, but longer RT, for activity pairings with the social group compared to the location. Still, participant retrieval RT duration negatively correlated with accuracy for both social and non-social recall conditions. Additionally, episodic memory-guided decision-making in social contexts selectively boosted the primacy of social information under more demanding retrieval conditions. We found that pattern completion models revealed enhanced information pattern completion when retrieving social versus non-social content.

Conclusions: These results uncover an implicit preference for recalling social information in episodic memory-guided decisions even when it isn't informative for a given choice. A subsequent computational model revealed that this social prioritization may emerge through social details being more likely to provoke enhanced pattern completion mechanisms during episodic memory retrieval. Taken together, our findings highlight the importance of social details in shaping people's memory of events

P2-A-10 The Influence Of Egocentric Anchoring-and-Adjustment on Flexible Social Comparisons

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Background: An emerging body of literature has shown the brain assimilates relational social knowledge similarly to how it integrates different egocentric spatial cues into a map-like representation of the current environment. We recently observed

lingering egocentric biases in hippocampal and dorsomedial prefrontal cortex map-like representations of social knowledge. However, this work only tested map-like representations of different groups. Consequently, it remains unclear if groups are intrinsically represented in a more world-centered manner, or if these results reflect an intrinsic property of the absolute reference frame itself. To understand the influence of egocentric anchoring on social flexible comparisons, we tested whether there's a general egocentric bias present in absolute reference frames—and whether this bias is differentially applied depending on the social entities involved(individuals vs. groups).

Methods: 119 healthy volunteers (Exp.1 n=73 and Exp.2 n=46) completed a multi-phase behavioral task. During the anchor phase, participants provided likelihood ratings of partaking in everyday activities for themselves, fictitious individuals, and familiar social groups. During the transformation phase, participants learned a stranger's preference for an activity relative to one of the individuals (Exp.1) or groups (Exp.2), and then inferred how the stranger's preference related to the groups' preferences (Exp.1), or the individual's preferences (Exp.2). Egocentric social anchoring biases were measured using a linear mixed model to analyze the relationship between self-other discrepancy(absolute differences between self and others' preference ratings) and reaction time(RT) during the anchor phase. To study performance differences during the transformation phase between experiments, we ran a logistic regression model to predict accuracy by the absolute distance between the choice options, the memory for others' traits, and the self-other discrepancy in the absolute reference frame.

Results: For both experiments, we observed a significant effect of RT on self-other discrepancy, which is consistent with serial adjustment in egocentric anchoring-and-adjustment. Analyzing the transformation phase, no significant differences in performance or RT were observed between the two experiments. Replicating prior findings, the linear relationship between accuracy and the absolute distance between options was consistent across experiments. Additionally, we found that task performance was predicted by the absolute distance between the choice options, the memory for the social entities' rating present in the absolute reference frame, and the self-other discrepancy in the absolute reference frame. Notably, egocentric anchor biases interfered with the accuracy of social inferences when the absolute distance between the options in the absolute reference frame was small.

Conclusions: Participants used their own preferences as a reference point to infer others' preferences in map-like representations of any type of social entity. Isolating the presence of egocentric biases during flexible social comparisons, egocentric anchor biases interfered with comparisons between entities with similar preferences. Together, these findings highlight the general presence of egocentric biases in map-like social knowledge representations of other entities, where this bias can interfere with making accurate social comparisons of others

P2-A-11 Using Machine Learning and Mixed Effect Models to Predict Undergraduate STEM Dropout

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Background and Aims: Undergraduate students, upon beginning college, are thrown into a brave new world of learning, challenge, and change. All the while, students are forced to make academic decisions that may shape their future and influence their career prospects. Despite their best efforts, students and professors face an issue of attrition in high-stakes academic tracks, particularly in the fields of Science, Technology, Engineering, and Mathematics (STEM). Yet, because the academic and socioemotional factors that drive STEM attrition are poorly understood, it is unclear how academic stakeholders should focus their efforts to improve STEM retention and ensure students advance towards academic and career goals.

Methods: To better characterize the factors that drive STEM attrition, we used cell phone-based Ecological Momentary Assessments (EMAs) to track students' emotions, expectations, and academic goals as they completed introductory Chemistry courses—often perceived to be weed-out courses—at the University of Miami (n= 1243) and tracked longitudinal academic outcomes (i.e., whether they graduated with a STEM major or not).

Results: Using linear mixed-effects modeling, we found that unexpected exam grades (i.e., prediction errors) influence students' academic performance goals, and link malleability in performance goals to longer-term academic decisions, such as changing one's major or putatively abandoning a STEM field. Additional exploratory analyses using machine learning (Random Forest Classifier) have returned an initial classification accuracy of 63% and ROC AUC of .64 when combined with variance inflation factor reduction. Further insights and implications for these findings will be discussed.

Conclusions: Results of linear mixed-effects modeling suggest that poorly calibrated or inaccurate expectations for high-stakes exam grades shape academic goals and ultimately drive STEM attrition, thus highlighting novel targets to enhance student retention in STEM fields. Exploratory machine learning analysis further supports these findings by identifying patterns in the data, with initial predictive models demonstrating moderate accuracy, pointing to the potential for future refinement in understanding the complex drivers of STEM attrition.

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P2-A-12 The Dark Side of Guilt: The Victim-Centered Compensatory Effect of Guilt on Bribe-Taking

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Background and Aims: Bribery, a prevalent form of corruption, is inherently rooted in interpersonal interactions between the power-holder and the briber, often accompanied by moral emotions. Guilt, as a typical moral emotion, is known to serve prosocial functions such as compensating for harm. However, guilt can sometimes have adverse effects. In bribery scenarios,

a power-holder's experienced guilt from past harm inflicted on a briber may drive bribe-taking as a form of compensation for the victim, despite the potential negative impact on third parties. While theoretical assumptions exist regarding the critical role of guilt in bribe-taking behaviors, empirical evidence is still lacking. The present study employed two experiments to explore how experienced guilt influences bribe-taking behaviors and the underlying mechanisms by combining a novel behavioral task with computational modeling.

Methods: In both experiments (Experiment 1: N = 56; Experiment 2: N = 117), participants acted as power-holders in a multi-round interpersonal interaction task. Each round consisted of two phases, a "dot estimation" game (Phase1) to induce and manipulate participants' guilt feelings (high/low) and a "dice tossing" game (Phase 2) to measure their bribe-taking behavior. We also manipulated whether the briber was harmed by participants in Phase 1 (briber's identity: victim/non-victim), yielding a 2×2 within-subject design with four experimental conditions. Experiment 2 extended this task by introducing a control scenario and employing a parametric design in which potential power-holder's personal gains, payoff inequality between the briber and the power-holder, and financial losses incurred by third parties were parametrically manipulated. This allowed us to apply computational modeling to dissociate distinct psychological components during bribe-taking decision-making and further examine how guilt level and briber's identity jointly influence these components.

Results: Both experiments showed that participants were more inclined to accept bribes in the high (vs. low) guilt condition but only when the briber was previously harmed, suggesting a compensatory effect for victims. Through Bayesian model comparison, we selected the best-fitting model based on the choice data in Experiment 2, which revealed that individuals flexibly the adjusted the decision weights on distinct psychological components as a function of their guilt level and briber's identity when making bribe-taking decisions. Specifically, individuals generally reduced the moral cost of third-party harm (γ) when experiencing high (vs. low) guilt, while their concern for the immoral collaboration in bribery (δ) and the level of inequality aversion (β) significantly decreased in the high guilt condition when confronting the briber previously harmed. In other words, high guilt feelings may prompt a power-holder to accept a bribe from a previous victim as a form of compensation for past wrongdoing, possibly through overlooking the moral cost of engaging in corruption and the inequality of payoff in the bribe.

Conclusions: Our study provides empirical evidence for the victim-centered compensatory effect of guilt in the context of bribery and uncovers its underlying cognitive mechanisms. These findings enhance our understanding of the "negative" social functions of guilt and shed light on the complex association between moral emotions and corrupt behaviors.

P2-A-13 Investigating Age-Related Flexibility in Cognitive Effort Allocation

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Background: Adolescents are faced with a multitude of new decisions as they navigate their burgeoning independence. However, it remains unclear how cost-benefit decision-making about when to exert cognitive effort changes with age from childhood to adulthood. Prior research indicates that adults often weigh the potential costs of effort exertion against its potential reward benefits to guide decisions about when to exert effort. This behavior is consistent with effort discounting, which is the tendency to devalue rewards that require more effort to obtain. Notably, when asked to make choices between an easier task for low pay and a harder task for high pay, children, adolescents and adults make decisions that reflect effort discounting. However, little work has tested how children and adolescents translate these preferences into effortful actions, and it remains unknown how the relationship between preferences and actions change with age. We expected that while younger individuals might report preferences about effort exertion in similar ways as adults, they may not use cues about effort costs and reward benefits to flexibly adjust their behavior during difficult cognitive tasks.

Methods: Our sample consisted of 188 individuals aged 10 to 20 years. First, participants completed a baseline N-back task that included blocks of 1-back, 2-back, and 3-back, in which they were instructed to indicate if each stimulus shown was a "match" or a "mismatch" to the target presented N items back. Blocks with higher Ns are more difficult for participants. Next, participants completed a cognitive effort discounting assessment in which they were asked to choose between an easier N-back option or a harder N-back option with differing levels of monetary reward (1¢ -$2). Finally, participants completed another block of N-back tasks in which they could either win a high or low reward for each correct response.

Predicted Results: First, we hypothesize that individuals of all ages will self-report similar preferences on the cognitive effort discounting paradigm, whereby they will discount the values of reward that require higher effort exertion. Second, we hypothesize that reward-related improvements in N-back performance will emerge with age such that older participants will show an increase in performance when higher rewards are at stake. We also anticipate that this effect will be moderated by task difficulty, such that younger participants may improve accuracy for high rewards in the easiest condition (e.g., 1-back), but only the older participants will boost performance for high-reward trials on the more difficult blocks.

Conclusions: We anticipate finding an important distinction between self-reported preferences and behavioral flexibility that changes with age across childhood and adolescence. This work will help us understand how children and adolescents develop the crucial ability to titrate their cognitive effort in an efficient and goal-directed fashion.

P2-A-14 Trait Reward Sensitivity and Motivation Shape Connectivity Between the Default Mode Network and the Striatum during Reward Anticipation

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Background and Aims: Reward processing varies widely across individuals, shaped by both neural and behavioral factors.

The ventral striatum (VS) is critical for reward anticipation, and its connectivity with the default mode network (DMN)—a network associated with self-referential processes—has been implicated in these differences. However, the interplay between VS-DMN connectivity, reward sensitivity (RS), and behavioral motivation remains poorly understood. This study aimed to examine how individual differences in RS and motivation influence VS-DMN connectivity during reward anticipation.

Methods: We recruited 48 participants (ages 18–22; mean age: 20.45 years, SD: 1.89; https://aspredicted.org/brd7-wxqf.pdf). Participants completed screeners assessing reward sensitivity (RS) using the Behavioral Activation Scale (BAS) and Sensitivity to Reward Questionnaire (SR). They then performed an fMRI-based Monetary Incentive Delay (MID) task to gain or avoid losing money under conditions of varying reward and loss salience. Behavioral motivation was operationalized as reaction time (RT) sensitivity to reward salience. High motivation was indicated by faster RTs for reward-salient trials (e.g., large loss, large gain) relative to less salient or neutral trials, following an inverted "V" pattern. This pattern was quantified for each participant using a quadratic coefficient (V_beta) from second-degree polynomial fits of RTs across trial types, with higher V_beta values reflecting greater behavioral motivation.

Results: Reaction times varied significantly across conditions. Specifically, RTs in the Large Gain condition were significantly faster than in the Neutral and Small Loss conditions, while RTs in the Neutral condition were slower than in the Large Loss condition. Next, we analyzed the relationships between behavior and self-report measures, focusing on self-reported anhedonia (TEPSa) and reward sensitivity (RS). A significant interaction emerged between TEPSa and RS in relation to behavioral motivation ($t(46) = 2.799$, $p = 0.0078$). To assess striatal responses, we observed that activation varied significantly across conditions. Greater striatal activation was found in the Large Gain and Small Gain conditions compared to Neutral and loss conditions. Finally, we investigated corticostriatal connectivity, focusing on the interaction between RS and behavioral motivation across reward contexts. Significant interactions were observed for Reward Salience ($\beta = -12.05$, $t = -2.57$, $p = 0.0138$), Large Gain > Neutral ($\beta = -1.73$, $t = -2.83$, $p = 0.0072$), and Large Loss > Neutral ($\beta = 1.32$, $t = 2.77$, $p = 0.0084$). High behavioral motivation was associated with a stronger negative relationship between RS and DMN-VS connectivity for reward salience and large gains, while large losses showed no such relationship.

Conclusions: Reward sensitivity and behavioral motivation significantly shape VS-DMN connectivity during reward anticipation. High motivation was linked to distinct connectivity patterns, highlighting the importance of motivational context in modulating corticostriatal interactions and providing insights into individual differences in reward processing.

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P2-B-15 The Neural Basis of Emotion Regulation Across the Political Spectrum

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Background and Aim: As polarization rises across the U.S. political landscape, we must examine how individuals with extreme and radical political beliefs differ in their emotion regulation strategies. Building on Moral Foundations Theory and the Process Model of Emotion Regulation, this study investigates the relationship between political extremism and the use of cognitive reappraisal and expressive suppression. Prior research suggests that individuals with extreme beliefs experience heightened neural activation during regulation tasks, reflecting increased engagement in cognitive reappraisal. This study aims to assess both behavioral and neural markers of emotion regulation and their relationship to political ideology to better understand the underlying mechanisms of extreme belief.

Methods: Participants completed an emotion regulation task involving valence rankings of emotionally charged images under control, suppression, and reappraisal conditions. Behavioral outcomes (valence ranking difference scores between control and regulation tasks) were compared to political extremism scores. Neural responses were recorded using a 32-channel EEG, focusing on late positive potential (LPP) amplitudes, an event-related potential (ERP) component associated with emotional intensity and regulatory flexibility. Analysis examined relationships between LPP amplitudes, emotion regulation strategies, and political extremism scores.

Results: Individuals with extreme beliefs exhibited greater improvements in positivity rankings when using cognitive reappraisal, with higher difference scores compared to those with more neutral beliefs. EEG analysis revealed larger LPP amplitudes during reappraisal for individuals with more extreme beliefs, suggesting greater recruitment of cognitive resources for regulating negative emotions. Suppression conditions did not elicit significant differences in LPP amplitudes. Regulation tasks successfully modulated LPPs for individuals with extreme beliefs, as demonstrated by reduced differences between neutral and negative stimuli in regulatory conditions compared to control.

Conclusions: This study highlights cognitive reappraisal as a critical strategy for individuals with extreme political beliefs for managing negative emotions. The findings emphasize the interaction between ideology and neural mechanisms underlying emotion regulation, providing a foundation for future exploration with important implications for the emotional tax of political polarization.

P2-B-17 When Do We See Our Future Self as Other?

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When do we see our future self as other?

Background and Aims: Strong self-relevancy with one's future self has enhanced intertemporal decision-making, well-being,

and goal achievement. However, despite the benefits, previous research shows that a future self can also be perceived as a separate person entirely, leading to a diminished concern for the future self. We are interested in understanding if other factors may result in seeing a future self as other, such as valence and temporal span. Additionally, researchers suggest that if the future self is viewed as a close friend—technically considered "other" but closely connected—there is potential for maintaining a high level of concern for the future self. The present study utilizes neuroimaging and representational similarity analysis (RSA) to examine valence and time's role on self-relevancy.

Methods: Using a within-subject design, sixty-four healthy adults (thirty-two dyads) completed five listening blocks including narratives about a positive future event, positive past event, negative future event, negative past event, and personal control during an MRI scan. Within each block, participants listened to a corresponding narrative from the self, a friend, and a stranger, resulting in fifteen narratives per participant. Each narrative comprised a five-minute audio recording from the individual's perspective, corresponding to the event type. All blocks and narratives were randomized and counterbalanced.

Results: To examine if valence (positive versus negative) or time (past versus future) narratives separately impact self-relevancy, we will conduct an RSA to explore the neural similarity between self and other. We will utilize whole-brain searchlight and employ three contrasts: self>other, self>friend, friend>stranger, and calculate the neural similarity between these contrasts to measure self-relevancy. Consistent with prior research, we hypothesize that past and future self-other neural representations will have high similarity, and all other analyses are exploratory. To test this hypothesis, the data will be analyzed according to the methods above. All fMRI data has been cleaned and preprocessed by the time of submission, allowing for analysis and results to be presented at SANS.

Conclusions: This study contributes to a further understanding of how temporal span impacts self-relevancy and explores how valence influences this similarity. The implications of this work are that understanding how valence and temporal span influence the perception of the future self can inform strategies to enhance concern for one's future well-being, potentially improving decision-making, goal achievement, and overall well-being.

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P2-B-18 How Loneliness Manifests in Everyday Language: A Daily Diary Study

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Background and Aims: Loneliness has been linked with not feeling understood by others; indeed, prior neuroimaging work suggests that lonely individuals may process the world in ways that are dissimilar to their peers. However, what remains unknown is how lonely people behave and think in their daily lives outside of the lab. Given that subjective perceptions of social connectedness and stress have been shown to be stronger predictors of well-being than Objective measures, gaining insight into how individuals perceive and experience their daily lives can shed light on how and why these idiosyncrasies arise, which may contribute to feelings of disconnection. This study aims to investigate how lonely and non-lonely individuals may differ in the ways that they process and remember subjective events and experiences in their personal lives. Specifically, it will investigate whether non-lonely vs. lonely individuals differ in the topics that they recall about the events that unfold in their daily lives and track how these topics change over time.

Methods: Participants will participate in a two-week daily diary study, where they'll write paragraph-long entries reflecting on their most memorable experiences, thoughts, feelings, and interactions of the day. They'll complete daily measures of mood, loneliness, and well-being. Entries will be analyzed using natural language processing (NLP) methods. This approach will help uncover latent patterns in text and consider daily fluctuations in mood and well-being and trait-level differences.

Analysis Plans: Using topic modeling, dominant topics in lonely vs. non-lonely individuals' diary submissions will be identified, allowing us to test whether there are differences in the topics which lonely vs. non-lonely people focus on in their daily lives. Using dynamic topic modeling, changes in topics over time will be tracked. This approach will allow us to test whether lonely individuals more frequently revisit previously discussed negative topics and engage in negative rumination compared to non-lonely individuals. Using multilevel models will allow us to capture fluctuations in mood and emotions, which provide additional information about the subjective experiences of individuals.

Implications: While prior studies have explored how depression and anxiety are reflected in writing, relatively little is known about how loneliness manifests in written reflections and recall of everyday events. Examining how lonely individuals behave, think, and feel in their daily lives—and how these differ from non-lonely individuals—can enhance our understanding of the subjective experience of loneliness. Daily diary studies provide unique insights by capturing authentic reflections of subjective experiences, thoughts, and emotions as they occur every day. Applying NLP techniques to these entries over time allows us to identify key events and thought patterns that characterize the subjective experience of loneliness. This approach has the potential to shed light on potential negative or maladaptive behaviors in lonely individuals, highlighting ways in which lonely individuals may perceive the world in ways that perpetuate feelings of misunderstanding and isolation. Such findings could be instrumental in developing targeted, personalized interventions to effectively address loneliness.

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P2-B-19 Neural Signatures of Arousal Generalize Across Subjective Ratings During Narrative Viewing and Pupil Dilation at Rest

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Background and Aims: Arousal plays a central role in cognitive functions, affective processing, and emotional experience. It is, however, a heterogeneous construct that is used differently across the literature. On one hand, physiological indicators such as pupil dilation provide a measure of "autonomic arousal" thought to reflect the activity of the autonomic nervous system. On the other hand, affective scientists often study "emotional arousal" by having participants rate their subjective experience of arousal in response to stimuli. Do these forms of arousal share a common neural basis? To address this question, we trained two dynamic connectome-based predictive models (CPMs): one to predict fluctuations in pupil dilations at rest, and another to predict emotional arousal ratings during movie-watching. We then examined whether each model generalized to the other dataset. A generalized signature consistent across datasets would suggest a shared neural representation across different varieties of arousal.

Methods: We built a connectome-based model to predict fluctuations in pupil diameter from whole-brain dynamic functional connectivity (FC) patterns using an open resting-state fMRI dataset (N=27, pupil-CPM). We used the same approach to build a model that predicts subjective ratings of emotional arousal from an open fMRI dataset where participants watched a TV episode (N=16; movie-CPM). Dynamic FC patterns were calculated from the pairwise correlations between 122-ROI BOLD time courses with a tapered sliding window. Behavioral arousal ratings and pupil dilation time courses were convolved with a hemodynamic response function and the same tapered sliding window was applied. Model training and testing was performed following a leave-one-participant-out cross-validation procedure. Prediction accuracy was measured as the Fisher-z transformed average Pearson correlation between predicted arousal time courses and behavioral time courses across cross-validation folds. Significance was assessed by comparing model accuracy to a null distribution generated by training and testing the model on phase-randomized arousal time courses.

Results: Both CPM models significantly predicted their respective measures within-dataset (pupil-CPM: mean $r = .122$, $p = .001$; movie-CPM: mean $r = .562$, $p = .034$). In addition, the pupil-CPM significantly predicted subjective ratings of emotional arousal when applied to the movie data (mean $r = .072$, $p = .014$). Similarly, the movie-CPM significantly predicted pupil dilation when applied to the resting-state data ($r = .070$, $p = .031$).

Conclusion: Using connectome-based predictive modeling, we demonstrated that dynamic functional connectivity patterns predict both pupil dilation at rest and subjective emotional arousal during narrative viewing. Importantly, both models generalize to the other measure, indicating a common neural signature across autonomic and emotional arousal. These findings suggest that arousal, despite its heterogeneous use in the literature, may be supported by shared neural mechanisms. Our work lays the foundation for future research exploring the neural basis of arousal across diverse settings and its implications for emotional and cognitive functioning

P2-B-20 Trait Mindfulness and Political Polarization: Investigating Neural Responses and Emotional Orientations

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Background and Aims: Political polarization has escalated in recent years, leading to increased social distancing, aggressive partisan behavior, and discriminatory attitudes between Democrats and Republicans. Mindfulness, defined as the awareness and acceptance of present-moment experiences, has been associated with increased compassion, reduced prejudice, and diminished aggression toward out-group members. This research investigated the relationship between trait mindfulness and political polarization, focusing on its influence on neural responses and emotional orientations.

Methods: Using functional near-infrared spectroscopy (fNIRS), brain activity was measured in participants with varying levels of trait mindfulness while they viewed emotionally charged political videos and neutral content. Trait mindfulness was assessed using the Mindful Attention Awareness Scale (MAAS). Neural activity in the prefrontal cortex (PFC) was analyzed using laterality index (LI) calculations, Spearman's rank correlations, and representational similarity analysis (RSA) to identify brain-behavior similarities for emotional representations, particularly fear, disgust, anger, joy, and sadness.

Results: The primary hypothesis—that high trait mindfulness would correspond to left-lateralized prefrontal activation (approach orientation)—was not supported. While LI analyses revealed predominant left PFC activity across most channels, Spearman's rank correlations showed no significant relationships between MAAS scores and neural activities in hypothesized regions ($p > 0.05$). However, RSA revealed significant brain-behavior similarity in specific regions, including the Left Superior Frontal Gyrus (dmPFC 6; $r = 0.11$, $p < 0.05$) and the Right Superior Frontal Gyrus (dmPFC 14; $r = 0.06$, $p < 0.05$), particularly for emotional representations of fear and disgust.

Conclusions: This study demonstrates that trait mindfulness influences neural activation patterns associated with emotional processing, particularly in the context of politically charged stimuli. While mindfulness did not show direct lateralized patterns in the prefrontal cortex, the findings suggest that it modulates neural synchronization while processing negative emotions, such as fear and disgust. These results underscore the potential of mindfulness-based interventions to mitigate political biases and foster constructive political discourse, advancing the understanding of mindfulness as a tool for reducing polarization.

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P2-B-21 Neural Representation of Affective Valence in Human Amygdala

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The amygdala is a key brain structure for processing emotional information. Two models have been put forward, based on animal studies, to account for the role of the amygdala in representing the affective valence of sensory input. The 'on-off' model posits that neurons across the amygdala exhibit similar firing patterns, with the overall activity levels reflecting different emotional states. In contrast, the distributed representation model suggests that individual neurons are selectively responsive to either positively or negatively valenced input, with the collective patterns of neural activities encoding different emotional states. We tested these models in humans by recording fMRI data from 20 subjects who passively viewed 60 emotional pictures (20 pleasant, 20 neutral, 20 unpleasant) from the International Affective Picture System (IAPS). Applying both univariate and multivariate methods to two anatomical delineations of the amygdala, (1) a widely used amygdala template ("core amygdala") and (2) an enlarged version of the core amygdala ("augmented amygdala"), we reported the following findings. (1) In the core amygdala, both the univariate and the multivariate analyses equally predicted the normative valence of the IAPS pictures, with the weight map analysis revealing that almost 100% of the core amygdala voxels were selectively coding negative valence. (2) For the augmented amygdala, the multivariate analysis significantly outperformed the univariate analysis in predicting the normative valence of the IAPS pictures, with the weight map analysis indicating that the voxels located in regions surrounding the core amygdala were predominantly selective coding for positive valence. These results suggest that the neural representation of affective valence in the core amygdala is more in line with the on-off model whereas the neural representation of affective valence in the augmented amygdala is better accounted for by the distributed representation model.

P2-B-22 Emotion Dynamics Across the Menstrual Cycle During Adolescence

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Adolescence is a period of heightened vulnerability to internalizing psychopathology, particularly for adolescent girls. One potential contributor to negative affect and internalizing symptoms in this group is hormonal variation during menstrual cycle. Hormonal fluctuations have been linked, for example, to altered neural responsivity to reward and premenstrual exacerbation of depressive symptoms. It remains unclear whether and how variations in day-to-day affective experiences and internalizing symptoms are linked to hormonal changes, particularly in adolescents. Here, we aim to explore whether menstrual cycle phase is linked to changes reported depression and anxiety in regularly-cycling female adolescents.

Our study will characterize variation in reported depression and anxiety throughout the menstrual cycle, using experience sampling methods in an intensive longitudinal study of adolescent females aged 15–17 years old (N=30) assessed monthly for one year (monthly assessments=355). We will investigate three hypotheses: (1) During the late luteal phase of the menstrual cycle, adolescent girls will report higher levels of negative affect (i.e., depression, anxiety, anger), lower levels of positive affect (i.e., happiness, relaxation, excitement), and greater perceived stress relative to the early follicular phase; (2) Individuals reporting a greater number of stressors throughout the study period will show greater menstrual cycle-related changes in negative affect; (3) Associations of within-person fluctuations in perceived stress with depression and anxiety will be moderated by menstrual cycle phase, with a stronger relation during the late luteal phase relative to the early follicular phase. We will use Bayesian hierarchal models to test these hypotheses.

Participants completed four three-week long ecological momentary assessment (EMA) bursts, with surveys administered three times per day to assess levels of negative affect, positive affect, and perceived stress. Daily averages of negative affect, positive affect, and perceived stress will be utilized for statistical analyses. Menstrual cycle phase will be estimated based on monthly reports of most recent menses onset. The late luteal phase (1–7 days before menses onset) and early follicular phase (1–7 days after menses onset) will be identified by counting back and forward from the reported first day of menses, respectively. Participants completed the UCLA Life Stress Interview during each monthly session, assessing acute life stressors across multiple domains (e.g., academics, peers). Monthly fluctuations in the number and severity of acute stressors will be used to examine the moderating role of stressors.

This research will provide novel insights into how hormonal variation across the menstrual cycle may contribute to the affective experiences and mental health challenges of adolescent girls. Results can also inform future work on the emergence of internalizing symptoms in adolescent girls and on the biological and neural mechanisms that might contribute to affective experiences in this vulnerable population.

P2-B-23 Favoring the Rich: How Selective Learning Reinforces Pro-Upper-Class Bias

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Background and Aims: Pro-upper-class bias, the tendency to favor individuals of upper-class, is prevalent in society. More importantly, this bias can significantly shape social interactions and decisions, leading to unfairly favorable treatment towards them. Despite its broad implications, the mechanisms underlying this bias remain understudied, particularly in social contexts where people repeatedly interact with others from different social classes. Aiming to address this gap, we here propose that the "social-class selective learning", referring to the tendency to learn better about positive features of others from the upper- [vs. lower-] class, as a key driver of the pro-upper-class bias.

Methods: To test this hypothesis, we conducted four studies (three pre-registered) (total N = 968). Across the four studies, we employed an economic game where participants learned about a positive personality trait (generosity) and behavioral outcomes (the size of reward they produce) of targets from upper- or lower- social class (Studies 1-4). In addition, we investigated how this selective learning shapes people's attitudes and moral judgment. To do so, we measured how people evaluate affiliation and morality of members' of upper- and lower- class (Study 2), how they associate upper- and lower- class with positive attributes using Implicit Association Test (IAT) (Study 3), and how much they would praise positive behaviors of different protagonists in short videos, ostensibly from upper- and lower- class (Study 4).

Results: Leveraging a reinforcement learning model, we found that participants learned about targets' generosity better when upper-class targets were generous, than when lower-class targets were equally generous. Participants also learned about the reward targets produced better when upper-class targets produced large rewards, rather than when lower-class targets produced equally large rewards (Studies 1-4). This selective learning also reinforced participants' pro-upper-class bias: after learning about more generous and rewarding upper- [vs. lower-] [KP1] class targets, participants rated overall members of upper-class as more affiliative and moral (Study 2), as well as associating the upper-class with positive personality attributes in IAT (Study 3). Further, the better participants learned about highly generous upper- [vs. lower-] class targets, the more they praised upper- [vs. lower-] class protagonists for their positive behaviors in the videos (Study 4). These findings suggest that social-class selective learning fuels positive attitudes towards members of upper- [vs. lower-] class, across explicit evaluations, implicit associations, and moral judgments.

Conclusions: The present study first examined the underpinnings of pro-upper-class bias by using reinforcement learning. Specifically, people selectively learn about positive features of upper-class, strengthening pro-upper-class bias. Yet, the equivalent positive features from lower-class targets were less likely to be recognized or learned. These findings may not only explain why upper-class individuals are unfairly favored in real-world contexts, such as their greater likelihood of being hired or receiving lenient punishment in courtrooms. Lastly, this research underscores the need to promote equitable perceptions across social classes and raise awareness of this selective social class bias to mitigate pro-upper-class bias in society.

P2-B-24 Distinct Time-Varying Brain State Dynamics of Impulsive and Anxious Individuals

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Background and Aims: Impulsivity is characterized by rapid and unplanned reactions and acting without forethought, while anxiety is defined by hyper-control, excessive apprehension about potential outcomes. Although these traits appear incompatible with one another, a subset of individuals simultaneously possess both, implying a complex interplay between impulsivity and anxiety. This study aims to explore differences in time-varying brain state dynamics between impulsivity and anxiety and to uncover the unique characteristics of their shared state using the Hidden-Semi Markov Model (HSMM) method.

Methods: A total of 130 healthy participants from the Leipzig Study for Mind-Body Emotion Interactions (LEMON) dataset were analyzed. Participants in the top 30% for self-reported levels of anxiety and impulsivity were categorized into three groups: the High Impulsivity (HI) group (n=25), the High Anxiety (HA) group (n=19) and the High Impulsivity & High Anxiety (HIHA) group (n=20). Resting-state fMRI data were divided into 100 Schaefer functional parcels and categorized into 7 Yeo networks. As input data, time-series data for each subject were organized as length × number of ROIs matrices. HSMM was implemented using the mhsmm R package (O'Connell et al., 2011). Based on the Bayesian Information Criteria (BIC), the optimal number of states was determined as k = 4. To better characterize the 4 states, we calculated the numerical measures of local/global efficiency and modularity for each state. Additionally, we analyzed the empirical sojourn time distributions, dwell times, and state transition probabilities to compare potential differences across the three groups.

Results: The 4 states exhibited distinct characteristics in functional connectivity and brain mean brain activity levels: State 1 displayed generally positive functional connectivity across the entire brain and overall increase in mean brain activity, reflecting a state of enhanced functional coupling and widespread neural activation. State 2 was characterized by decreased default mode network (DMN) activity and increased attention network (AN) activity with generally weak or negative functional connectivity between these two networks. State 3 showed the strongest whole brain hyperconnectivity with the highest local/global efficiency and lowest modularity, suggesting a hyperconnected state. Finally, State 4 showed increased DMN activity paired with decreased AN activity, with negative functional connectivity between the two networks. Statistically significant differences in sojourn time distributions for State 2 were observed across all group pairs (all ps < 0.001). The HA group displayed the sharpest distribution, while the HI group showed the most diffuse distribution, indicating that the HI group spent longest time in State 2. Additionally, distinct state transition patterns were observed across the three groups. There were no significant differences in dwell time.

Conclusions: At rest, impulsive individuals' brains spent the most time in State 2, indicative of a focus on external attention, before transitioning to other states. Furthermore, distinct state transition probabilities were observed for each group. These findings highlight unique time-varying state dynamics differences between impulsivity, anxiety, and their shared characteristics.

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P2-B-26 The Representation of Emotion Concepts in Hippocampal-Prefrontal Systems

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Background and Aims: The nature of emotions—whether best characterized as discrete categories or as elaborations of more fundamental dimensions of valence and arousal—remains contentious. Drawing on research on cognitive maps of space and abstract concepts in hippocampal-prefrontal systems (Behrens et al., 2018), we propose a unified framework for emotion concept learning. This account predicts that the hippocampus encodes individual emotion concepts, and the ventromedial prefrontal cortex (vmPFC) organizes the concepts into two-dimensional affective spaces by tracking transitions between them. Within the hippocampus, emotion concepts are hierarchically organized, with fine-grained ones in posterior regions and broad ones in anterior regions.

Methods: We analyzed a movie-watching fMRI dataset (n = 24) with accompanying self-report ratings (Morgenroth et al., 2024). To test whether information about emotion concepts is represented in hippocampal-prefrontal systems, we used decoding models to predict normative ratings of 13 discrete emotion categories or valence (i.e., 'good'/'bad') from BOLD signals in the hippocampus and vmPFC. To quantify the extent to which information is uniquely related to concepts, we performed cross-decoding using a secondary model to predict category ratings from valence predictions (and vice versa). To quantify the scale of emotion representation across the hippocampal axis, we compared decoding performance in anterior and posterior hippocampus. Finally, to test if multi-scale representation of emotion concepts can emerge from learning transitions across varying temporal scales, we simulated concept mapping using the Tolman-Eichenbaum Machine (TEM; Whittington et al., 2020), an artificial neural network inspired by the hippocampal formation.

Results: Consistent with the proposal that the hippocampus encodes individual emotion concepts whereas the vmPFC contains additional information about relations between concepts, cross-validated decoding performance was higher in the vmPFC than in the hippocampus (linear mixed effects, $\beta = 0.019$, SE = 0.002, 95% CI [0.015, 0.023], $p < .001$), with a larger difference between regions for decoding valence than for categories ($\beta = 0.014$, SE = 0.006, 95% CI [0.002, 0.026], $p = .018$). Moreover, information loss when cross-decoding from valence to specific categories was smaller in the vmPFC than in the hippocampus ($\beta = -0.012$, SE = 0.003, 95% CI [-0.018, -0.006], $p < .001$), suggesting that information about locations in affective space in vmPFC are more robustly related to emotion categories than signals in the hippocampus. Within the hippocampus, decoding performance for categories was higher in posterior regions ($\beta = 0.005$, SE = 0.001, 95% CI [0.002, 0.007], $p < .001$), whereas decoding valence ratings did not significantly differ across anterior and posterior hippocampus ($\beta = 0.001$, SE = 0.004, 95% CI [-0.006, 0.008], $p = .811$). A similar pattern was observed in TEM, with higher decoding performance in units with higher spatiotemporal frequencies (analogous to the posterior hippocampus; $\beta = 0.053$, SE = 0.006, 95% CI [0.041, 0.064], $p < .001$).

Conclusions: Our results show that the vmPFC encodes emotion concepts as locations in affective spaces, in contrast to the hippocampus which encodes emotion categories in a multi-scale manner, consistent with computational accounts in which concepts are learned based on event transitions at varying temporal scales.

P2-B-27 Modeling Contextual Constraints in Brain-Behavior Relationships Using Traditional Machine Learning and Doubly Predictive, Self-Contextualizing Neural Networks

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Background and Aims: Growing evidence suggests that the relationship between neural activity and behavior is influenced by contextual factors, including individual differences and situational variables. These contextual constraints pose a modeling challenge, as understanding the neural-behavioral relationship requires capturing these additional dimensions. This study investigates the contextual nature of neural activity in relation to fear endorsements.

Methods: We analyzed a naturalistic video-viewing dataset comprising 73 participants who viewed videos from three semantic categories: heights, social, and spiders. Fear endorsements (self-reported fear ratings) were modeled using two approaches. First, we employed traditional machine learning to compare context-specific models (trained separately for each semantic category) with a general model (trained across all trials). Second, we introduced a doubly predictive, self-contextualizing neural network. This model first predicted the situational context (video category) representation from neural data and then combined the predicted context with neural data to predict fear endorsements.

Results: Context-specific traditional machine learning models significantly outperformed the general model in some semantic contexts ($p < .001$). The neural network achieved high accuracy in predicting situational context (88%) and demonstrated comparable performance to the best traditional machine learning models in predicting fear endorsements.

Conclusions: These findings reinforce the idea that the relationship between neural activity and behavior is shaped by contextual factors. Additionally, we present a novel method for modeling contextual relationships using only neural data. By first predicting contextual variables and subsequently incorporating them into predictive models, our approach offers a promising tool for end to end modeling of context-dependent neural-behavioral dynamics.

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P2-B-28 Modeling High-Dimensional Social Cognition in Naturalistic Context

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Background and Aims: People spontaneously make a wide range of inferences about others in daily life: thoughts and feelings, social status, personality, etc. Decades of research argue that all these inferences are underlain by a small number of latent dimensions, such as warmth and competence. However, prior work relied on constrained designs, limiting ecological validity. Others caution that this simplistic explanation may be subject to researchers' own cognitive limitations. Instead, each inference may be uniquely represented in the high-dimensional mind. For instance, describing an individual using words belonging to the same dimension may convey distinct impressions: a person described as elegant, affectionate, and self-assured reflects feminine stereotypes while someone described as handsome, kind, and assertive reflects masculine stereotypes, even though both involve inferences along the dimensions of appearance, warmth, and competence. Yet, empirical evidence for this high-dimensional perspective is lacking.

Methods: Here, we compare the low- and high-dimensional theories of social cognition in two pre-registered studies. To maximize generalizability, we used a naturalistic paradigm where participants viewed naturalistic videos from social media and freely described any inferences came to mind using their own words. We computationally sampled diverse naturalistic videos that conveyed most diverse visual, acoustic, and semantic information streams (n = 444). We recruited U.S. representative participants (N = 1,598) and participants from Asia (N = 651) and Europe (N = 792). To uncover the potential low-dimensional latent constructs underlying these data, we applied cross-validation and exploratory factor analysis which identified common dimensions that explained the shared variance across inferences. To uncover the potential high-dimensional structure, we applied sparse network modeling which captured the nontrivial, unique, unshared associations between inferences. To directly compare the performance of these two models, we simulated the full associations between all observed inferences based on each model and quantified the error they each made when comparing to the true observed associations.

Results: Cross-validation identified 25 latent dimensions which explained only 15% of the common variance in the data. Alternatively, the network model representing the unique correlations between inferences better represented the data (SRMR = 0.007). This performance gap was replicated in both the Asian and European samples. The network approach identified subsets of inferences that people tended to make together (e.g., young and leader, shy and depressed, which were typically viewed as belonging to distinct dimensions). It also showed that inferences naturally unfolded from physical appearance and social categories to abstract personalities and evaluations of the targets' opinions. Finally, it revealed cultural differences in the mental representations of these inferences (e.g., U.S. participants thought being happy and friendly were more likely to co-occur than Asian participants).

Conclusions: Together, these findings show that the high-dimensional network approach provides an alternative explanation for the mental representation of social cognition in naturalistic contexts. It provides new insights into the dynamics and diversities of social inferences beyond the static, universal structure found with the low-dimensional latent approach.

P2-B-29 How the Brain Resolves Emotional Ambiguity: The Role of Prestimulus Brain Activity in Emotion Perception

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Background and Aims: Interpreting emotional information from the faces of others guides social behavior. This information is often ambiguous, requiring reliance on internal brain states (those not directly evoked by external events). Thus, the intrinsic brain processes involved in resolving emotional ambiguity have implications for everyday interactions, including in the context of impaired emotion processing. The intrinsic state of the brain preceding stimulus onset has been shown to be functionally relevant in the context of multiple types of stimuli, e.g., greater prestimulus activity in the fusiform face area predictive of subsequent perception of Rubin's ambiguous face-vase1,2. Given that activity differences between the face and vase percepts in this prior work were greater in the prestimulus than poststimulus period, it is possible intrinsic activity plays a larger role in perception of ambiguous objects than task-evoked activity. However, it remains unknown whether this is also true for perception of emotional ambiguity. Thus, the present study will examine whether prestimulus activity is associated with the perceived expression of an emotionally ambiguous face image.

Methods: Participants (N=83, 41 female, Mage=22.5 (SD=3.7) before exclusions) repeatedly viewed an emotionally ambiguous face and responded each time via button press whether they perceived it as sad or neutral. A single image used on all trials of a given participant was individually chosen prior to the experiment using a threshold detection procedure on sad-to-neutral morphs, resulting in each percept reported about half the time as expected (Fig1). Finite impulse response models will be constructed and parameter estimates tested between -1.5 and 0 seconds to identify prestimulus activity differences between percepts. We will focus on hypothesis-driven volumes-of-interest comprising task-relevant regions (fusiform face area, amygdala) and task-control networks (cingulo-opercular, frontal-parietal, dorsal-attention, default-mode3). Further, an exploratory whole-brain approach with cluster-level correction will be used to examine potential differences in other regions.

Results: It is hypothesized that prestimulus activity in the amygdala and task-control networks will differ between percepts. No directional hypotheses were made given inconsistent findings about the functional role of the amygdala in emotion perception4 and involvement of task-control networks in both resolving ambiguity5 and signal detection6.

Conclusions: The proposed analysis will provide insight into whether and in what brain areas intrinsic activity biases perception of ambiguous emotion. Understanding how emotional ambiguity is resolved in the brain can inform about factors that influence social interactions and their disruptions in clinical conditions like depression and autism.

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P2-B-30 Autonomic Arousal Predicts Functional Network Integration and Memory Performance During Story Listening

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Background and Aims: Emotional events are often remembered with greater accuracy and detail. While earlier studies of this phenomenon focused on isolated brain regions, such as the amygdala and the hippocampus, recent work suggests that arousal has a more global effect. For example, animal studies demonstrated rapid changes in the functional connectivity across the whole brain following activations in the locus coeruleus. Similarly, human resting-state fMRI studies have revealed greater integration across functional networks during periods of heightened endogenous arousal. Here, we used an ambiguous social narrative to demonstrate that emotionally arousing events are recalled with higher fidelity to the encoded content. We then tested the hypothesis that changes in autonomic arousal, triggered by surprising events and changing plotlines, modulate the integration of functional brain networks.

Methods: In a publicly available fMRI dataset, participants (n=22) listened to a 20-minute-long story involving a mysterious social event while in the scanner. In our analysis, the story was segmented into 24 events, defined by major shifts in the storyline. For each event and participant, we constructed an unweighted, undirected graph from the pairwise functional connectivity matrices. We then calculated the average participation coefficient (PC) across all brain regions as a measure of overall network integration. A high average PC indicates a brain state with high levels of intermodular connectivity across the brain. To obtain measures of arousal, we invited an independent set of participants (n=35) to listen to the same story. Pupil dilation during story listening was used to measure autonomic arousal. Participants were then asked to recall the story from memory. To obtain a measure of recall performance, we converted both the transcriptions of the audio clip of the participants' verbal recall to text embeddings using Google's Universal Sentence Encoder. We then computed the recall accuracy as the cosine similarity between the stimulus and participant recall embeddings for each event. The higher the fidelity score, the more similar the participants' recall was to the story.

Results: Our analyses revealed events associated with greater pupil dilation were later recalled with greater accuracy ($b=0.09$, $t=2.44$, $p<0.05$). In other words, consistent with previous research, memory for arousing events was better compared to non-arousing events. We also found that events with increased pupil dilation were associated with greater functional network integration ($b=0.2$, $t=6.89$, $p<0.01$), providing further support for arousal-modulated functional integration. Finally, we found that functional network integration predicted recall performance ($b=7.6$, $t=4.6$, $p<0.01$), such that events associated with greater integration at encoding were later recalled with greater similarity to the encoded content.

Conclusions: These results suggest that physiological arousal facilitates the integration between functional brain networks, which may underlie arousal-driven memory enhancements. Using audio narratives as stimuli, our work adds to the literature on arousal and memory by demonstrating that widespread integration across brain networks strengthens memory for emotional events.

P2-B-31 Emotion and Reward Information Influence Choice in Age-Varying Ways

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Background and Aims: To behave adaptively, individuals of all ages must heed information in their environments. Our study examines how incidental emotion and integral reward shape learning and decision-making from childhood to adulthood (N=121, 8-22 years). From prior work, we predicted that emotion would modulate goal-directed action most in either adults or adolescents: while adults rely on supplemental information sources to shortcut reward learning more than children and adolescents, adolescents experience heightened emotional processing relative to children and adults. A series of measures adjudicated between these hypotheses to characterize age-related changes in the impact of emotion and reward on choice.

Methods: Participants first completed a probabilistic reinforcement learning task, implemented as a two-armed bandit. The choice options were distinguishable by faces with emotional expressions (happy, fear), and monetary rewards came to be associated with the options through trial-wise choice feedback (50 cents, 0 cents). Thus, emotions conveyed information incidental to reinforcement learning, while rewards conveyed information integral to achieving this goal. In some conditions, emotion and reward invoked congruent approach-avoid tendencies: following either cue promoted learning about the relatively good and bad options. In other conditions, emotion and reward invoked incongruent approach-avoid tendencies: following the emotion cue impeded reward learning. Together, the task indexed how incongruent information interfered with learning. Participants next completed a two-alternative forced-choice test phase, in which every option from the learning task was paired with every other, but participants no longer received feedback for their decisions. This phase indexed how emotion and reward persisted to bias choice. Generalized linear mixed-effects models were fit to participants' learning and decision-making data.

Results: In the learning task, emotion-reward incongruency hindered accuracy ($p<0.001$), especially at the beginning of the task ($p<0.05$). This interference dissipated by the end of learning. In the test phase, happy and high-reward cues were chosen more frequently and faster than fear and low-reward cues ($ps<0.01$), but reward moderation of choice intensified with age ($ps<0.001$). Moreover, children deliberated longer for pairs with emotion-matched than reward-matched cues, while adults deliberated longer for pairs with reward-matched than emotion-matched cues; this effect emerged during adolescence ($p<0.001$).

Conclusions: These analyses revealed that although participants of all ages were affected by emotion-reward incongruency in early learning, reward persisted to bias decision-making most in adults, while emotion drove choice patterns most in children. This change in cue prioritization was apparent through adolescence. In sum, our study suggests that incidental and integral information influence goal-directed behaviors in distinct ways across age.

P2-B-32 - A Unified Model for Representing and Regulating Decision Variables

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The ability to recognize facial expressions is central to social communication, engaging specific neurons, neural signals, and brain circuits, particularly when the emotions are ambiguous to interpret. In this work, we applied the drift-diffusion model (DDM) to model perceptual decision-making in emotionally ambiguous contexts across both healthy and neurological/psychiatric populations. We derived two decision parameters, initial bias and drift rate, to model emotion judgment criteria and efficiency in resolving ambiguity. Building on our prior findings that reaction time varies with ambiguity, we first developed a collapsing-bounds DDM model to capture evidence accumulation efficiency in ambiguous decisions, revealing that drift rate decreases as ambiguity increases. Using EEG, we extended our behavioral model to neural signatures, particularly the Late Positive Potential (LPP), highlighting its central role in encoding drift rates in a domain-general yet context-sensitive manner. Single-neuron recordings identified the amygdala and dorsomedial prefrontal cortex (dmPFC) as key regions for processing decision parameters, revealing a lateralized pattern where the left amygdala is associated with the initial bias toward happiness, while the right amygdala and right dmPFC primarily represent the drift rate. Complementary fMRI-based connectivity analyses further illustrated the distinct roles of the left and right amygdala and their individual connections with the lateral and medial PFC subregions in encoding different decision parameters. These findings were substantiated by high-definition transcranial direct current stimulation (tDCS) studies targeting the lateral and medial PFC and a subcortical amygdala lesion model, underscoring the causal role of the PFC-amygdala circuit and the distinct contributions of its subregions in modulating decision parameters. By mapping general decision parameters to behavioral indices, neural markers, and functional connectivity, followed by targeted neuromodulation, our research offers a unified framework to understand how network integrity affects behavior and guides precise therapeutic interventions for neuropsychiatric conditions.

P2-B-33 Attention and Self-race Bias: How Spatial Cues Affect Emotion Recognition Across Racial Group Memberships

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Background and Aims: Emotion plays a crucial role in social interactions by triggering bodily responses essential for survival, with an evolutionary advantage on recognizing and responding to the emotions of ingroup members [1-2]. Although emotion recognition has been considered automatic and exogenous, studies found that processing facial features and interpreting expressions are separate, independent processes, suggesting that spatial attention is crucial not only for facial encoding but also for the subsequent processing of emotional content [3-4]. This study aims to explore whether self-race bias—favoring one's own racial group—modulates early perceptual and attentional processes during emotion recognition, using emotions categorized by racial group membership and recorded via EEG (Figure 1). Early neural processing will be indexed by ERPs, N170 (associated with face processing) and P3 (linked to cognitive evaluation), while the mirroring of another's emotional expression will be measured through mu suppression. We hypothesize that self-race bias will depend on spatial attention, with stronger bias observed when attention is directed toward racially ingroup emotional stimuli. Specifically, we expect shorter N170 latency for ingroup emotional expressions and greater P3 amplitude for outgroup expressions, indicating increased attentional resources allocated to racially categorized outgroup faces. We also expect greater mu suppression for ingroup emotions, reflecting stronger mirroring of another's emotional expressions.

Method: To test the hypothesis, a minimum of 36 college students self-identifying as East Asian or Westerner will complete tasks involving the manipulation of spatial attention, in which two separate facial expression stimuli each flanked by two lines (Figure 2). In the first half, participants will direct their attention to recognizing emotional expressions from both racial ingroup and outgroup members. In the second half, participants will complete an emotion-unrelated task, which directs their attention away from the emotions and requires them to discriminate the length of a pair of lines. Data will be analyzed to assess the effects of spatial attention (emotion recognition vs. length discrimination), group membership (racial ingroup vs. outgroup), and emotion type (emotional vs. neutral) on N170, P3, and mu suppression. Post hoc analyses will explore whether shorter N170 latencies and greater P3 amplitudes are observed for ingroup and outgroup emotional expressions, respectively.

Implications: This study aims to clarify the effect of spatial attention on self-race bias in emotion processing by providing comprehensive evidence of the neural mechanism. These findings are critical for elucidating how biased perceptual and attentional processes contribute to social miscommunication and perpetuate intergroup divisions, with potential applications for reducing bias.

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P2-B-34 Integration of Static and Dynamic Visual Threat Signals in the Human Superior Colliculus

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Background and Aims: Human emotion is constantly shaped by visual input. People reflexively avoid visual looming, a radially expanding motion pattern associated with threat of collision that is rapidly detected by the superior colliculus. Individuals also learn to avoid threats based on static visual features (e.g., identifying an object as a spider based on its color, form, and texture) that are processed through the ventral stream and ultimately conveyed to the amygdala. Although it is known that dynamic and static visual features jointly facilitate threat detection (Vagnoni et al., 2012), it is unclear how these two sources of information are integrated in the brain. Given its involvement in looming detection (King et al., 1992; Billington et al., 2010; Thieu et al., 2024) and connectivity with visual cortex (Liu et al., 2022), we hypothesize that the superior colliculus integrates highly processed information about object type and optical expansion to detect looming threats typically described as evoking fear.

Methods and Results: To test this hypothesis, we are conducting an fMRI experiment in which participants (N = 17 at time of writing, data collection in progress) watch a series of short video clips that vary in terms of object type (cat, dog, frog, spider) and looming motion (present, absent), followed by post-scan ratings of valence, arousal, and fear evoked by the clips. Consistent with prior work, preliminary self-report data indicate that looming is associated with greater unpleasantness, arousal, and fear, and that these effects depend on object type (Figure 1A). To localize the integration of looming motion and object features in the brain, we will estimate single-trial response patterns in the superior colliculus and amygdala at the end of each video, when visual looming is the strongest. We will model the dissimilarity of response patterns in each region based on object type, looming motion, and their integration (see Figure 1B, which depicts group average pattern dissimilarity in the current sample). We predict that pattern dissimilarity in the superior colliculus will depend on the integration of object type and looming, compared to visual motion alone.

Conclusions: This study stands to provide evidence that the human superior colliculus represents looming in an object-dependent manner, which can enable flexible responses to varied threats.

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P2-B-35 Computational Single-Neuron Mechanisms of Face Coding in the Human Temporal Lobe

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Faces are among the most important visual stimuli we perceive every day. The neural circuits and pathways underlying face recognition involve a critical progression of information processing from the ventral temporal cortex (VTC) to the medial temporal lobe (MTL). In this process, complex visual features are extracted and transformed into meaningful semantic representations, enabling us to recognize faces regardless of changes in viewpoint, size, or context. To investigate the neural computational mechanisms of face recognition, we conducted a comprehensive study using intracranial EEG (iEEG) and single-neuron recordings in the human VTC and MTL when neurosurgical patients viewed 500 naturalistic face images. First, we characterized the spatiotemporal organization of visual representations in the human VTC. Neural responses from the VTC demonstrated axis-based feature coding, a finding that parallels observations in the macaque inferotemporal cortex. Second, using VTC neural feature axes (i.e., electrodes exhibiting axis coding), we constructed a neural feature space. Within this space, MTL neurons encoded a receptive field (i.e., coding region), demonstrating region-based feature coding. This, in turn, accounted for the sparse coding properties observed in the MTL and provided a computational framework linking visual processing to semantic encoding in the brain. Third, using the same stimuli, we replicated similar findings with single-neuron recordings in the macaque inferotemporal cortex, further validating our observations across species. Lastly, robust interactions between the VTC and MTL during face coding were observed, emphasizing coordinated neural processing between these regions. Specifically, VTC axis-coding channels were directly connected to the MTL to provide visual feature information, while MTL region-coding neurons exhibited synchronization with gamma oscillations in the VTC. Together, our findings reveal a computational framework that explains the transition of visual coding from dense, feature-based representations in the VTC to sparse, semantic-based representations in the MTL. This framework provides a mechanistic understanding of the neural processes underlying face recognition and highlights the physiological basis of coordinated processing between these critical brain regions.

P2-B-36 A Multimodal Approach to Decode Individual Emotional States from Natural Motor Rhythms, Physiological Signals, and Spontaneous Brain Activity

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Background and Motivation: Capturing individual emotional state dynamics remains challenging due to the lack of reliable tools and Objective measurements. Current methods for inducing emotional states often rely on task-evoked stimuli, such as emotion-specific videos. However, these approaches fail to capture the dynamic variations in emotional states under natural, spontaneous conditions.

This study aims to develop a tool to Objectively decode individual emotional state dynamics by tracking long-term natural motor rhythms and physiological markers, such as heart rate variability (HRV) and galvanic skin response (GSR). Furthermore, we will investigate how these emotional states are represented through spontaneous brain activity and functional connectivity patterns.

Our previous findings indicate that natural finger-tapping tempo reflects emotional states related to stress and motivation, as evidenced by functional connectivity within the frontal-striatal network associated with approach-avoidance motivation.

Additionally, motor tempo variations across contexts represent the state dynamics of excitation-inhibition trade-offs, as captured by aperiodic oscillations. These results suggest that natural motor rhythms and their variations serve as reliable indices for quantifying emotional states.

In this study, we extend measurements to include physiological signals and evaluate cross-modal consistency in decoding emotional state dynamics in a natural and ecological way while elucidating their neural representations.

Methods: 24 healthy participants will be recruited. Resting-state fMRI imaging will investigate spontaneous brain activity and its relationship with dynamic emotional states. A natural finger-tapping task combined with Objective measures, including GSR and HRV, will capture emotional state dynamics on days 1, 7, 30, and 90. These measurements will be accompanied by the Self-Assessment Manikin questionnaire to assess subjective emotional states. By integrating neural, physiological, and behavioral markers with subjective reports, we aim to evaluate their reliability and consistency in decoding individually unique emotional states.

Hypotheses and Analysis: Behaviorally, emotional states will be quantified from four aspects: speed, variability, uniqueness, and reliability.

- Speed: mean frequency of natural motor tempo.
- Variability: state-by-state deviations from the mean frequency.
- Uniqueness: an individual's distinctive behavioral tempo across states.
- Reliability: consistency across measurements and modalities.

We will assess emotional states based on these aspects and examine their relationship with subjective reports. We hypothesize that speed reflects general motivation linked to positive emotions (e.g., relaxation), while variability reflects emotional fluctuations associated with negative emotions and high arousal (e.g., stress). Each individual is expected to exhibit unique mean and variability metrics, reflecting distinctive emotional states consistent across physiological measures. Lastly, we hypothesize that the frontal-striatal-limbic circuit is engaged in representing and regulating emotional state dynamics.

General Implications: This study highlights the utility of multimodal biomarkers in decoding emotional states and linking them to the neural mechanisms underlying individual differences. These findings provide a foundation for personalized emotion assessments and hold clinical potential for early diagnosis and monitoring of emotional disorders.

P2-C-37 Tell Me More! Investigating Value Perception in Conversation Through Cortical Entrainment

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Background and Aims: Humans spend significant time engaged in spoken social interactions, yet the amount of time we choose to invest in a particular conversation depends on how much we value it. Two factors influencing these cognitive valuations are the conversation topic (semantic content) and the way speakers express themselves (prosodic features). Research suggests that these meaningful elements of conversation may be captured by the extent of cortical entrainment—the brain's automatic tracking of slow amplitude modulations in speech. Cortical entrainment acts as a signal-encoding mechanism, closely linked to attention. In this EEG study, we examined cortical tracking of conversational speech across varying levels of perceived social value.

Methods: Twenty-four participants listened to speech samples—anecdotes of approximately 10 seconds—from thirteen speakers, discussing either an interesting or boring topic and delivered in an engaging or neutral tone. A novel time-bidding task was developed to index the perceived value of each sample; after each anecdote, participants responded, "How long would you be willing to continue this conversation?" using a logarithmic time scale from 0 seconds to 90 minutes. Cortical entrainment was measured via Gaussian Copula Mutual Information (GCMI) between the speech amplitude envelope and EEG signals in three regions of interest within the 2-8 Hz frequency band, across a range of time lags. We identified the peak GCMI and its latency for each trial. Differences across conditions and the link between cortical entrainment and time bids were examined using linear mixed-effects models (LMMs).

Results: The behavioral LMM revealed significant effects of topic ($p < 0.001$) and speaking style ($p < 0.001$), indicating that listeners are more willing to extend conversations on interesting topics and with speakers who express themselves in an engaging manner. In the cortical entrainment LMMs, an engaging speaking style elicited greater cortical tracking, as indicated by higher GCMI values, than a neutral style ($p = 0.032$). In contrast, interesting topics yielded lower GCMI values compared to boring ones ($p = 0.001$). No significant predictors were found for latency or effects of time bids on cortical entrainment.

Conclusions: Our results reveal distinct cortical entrainment patterns in response to prosodic and semantic variations in conversational speech. Time-bidding effectively indexed perceived social value across speaking conditions; however, contrary to expectations, the extent of cortical entrainment did not align with the perceived value of the interaction based on the time-bidding ratings. While an engaging speaking style enhanced cortical tracking as predicted, boring anecdotes elicited greater entrainment than interesting ones, despite being perceived as less valuable. Thus, our results show for the first time that prosodic and semantic elements of speech have differential effects on the engagement of attentional resources and signal-encoding mechanisms in listeners. This dissociation underscores the complexity of social perception and neural encoding, suggesting that social valuation and cortical tracking may operate through distinct pathways when processing the prosodic and semantic nuances of conversational speech.

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P2-C-38 Exploring The Mirror and the Mentalizing System During Self-Directed and Other-Directed Communicative Intentions with EEG Measures

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Background and Aims: Accurate recognition of other intentions is crucial for social interaction and requires the involvement of two brain systems: the mirror neurons system (MNS) and the mentalizing system (MENT). However, their internal organization and the potential synergy of both systems during the observation of self-directed and other-directed actions are yet to be determined. Neurophysiology studies have indicated that mirroring activity may be reflected in the mu frequency band of the EEG (alpha: 8–13 Hz and beta: 15–20 Hz) and specific activations were found in key regions of the MNS and MENT in different eeg bands during the self-involvement in a social motor task. Here, using EEG source localization, we aim to investigate the role of MENT and MNS during the observation of communicative actions and to what degree they respond to self-directed and other-directed stimuli. We expected during observation of communicative actions Mu suppression (alpha and beta bands) highlighted by a regional decrease in the mirror neurons area. Moreover, we hypothesized a larger recruitment of MNS and MENT in self-directed communicative actions.

Methods: During High density-EEG recordings (64-channel) 35 participants watched video clips of actors performing four types of action sequence: communicative or private intentions as well as other-directed and self-directed intentions (task adapted from a previous fmri study). EEG data were analysed with sLORETA to compute cortical three-dimensional distribution of neuronal activity. Power spectral density (PSD) was averaged in five frequency bands: theta (3.5 -7 Hz), lower alpha (7.5–10 Hz), upper alpha (10.5–12Hz), lower beta (12.5–20 Hz) and upper beta (20.5-30 Hz) bands. We compared communicative and private intentions PSD values to obtain spectral activation maps.

Results: Activity elicited in theta and lower alpha bands revealed a different pattern of activation related to the kind of intention. Specifically, we observed a larger desynchronization in medial frontal gyrus, precuneus and bilateral posterior-temporal sulcus (key regions of MENT) in communicative rather than private intentions when actions were performed in the self-directed perspective. Moreover, in the same comparison a larger involvement of right pre and postcentral gyrus and inferior parietal lobe was observed within lower beta range (MNS regions). Comparisons within communicative intentions (self-directed vs other-directed) revealed a larger desynchronization in mentalizing regions and in the anterior part of the mirror neuron network respectively (theta band).

Conclusions: Our findings support previous fMRI data showing that both MNS and MENT are essential during communicative intentions. The observed modulations in theta and lower alpha band activity suggest their primary role in the integration of socially salient information and in the discrimination of intention type.

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P2-C-39 Collective Brain Alignment and Narrative Reflection: Can Neural Alignment During Story Listening Predict Memory Formation and Retention for Story Scenes?

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Objective: Prior work has shown that (1) the similarity of audience brain responses varies over the course of the narrative (Grady et al., 2022; Schmälzle et al., 2024), (2) some narrative scenes are significantly more impactful for viewers than others (Eden et al., 2024), and (3) idiosyncratic processing of narratives may be predicted by variables such as loneliness (Baek et al., 2023). This study seeks to examine if the neural responses of one audience can predict the subjective meaning-making and recall processes of another, and if this process may be moderated by individual differences such as loneliness.

Method: We match publicly available fMRI data (OpenNeuro, ds003643) of people listening to The Little Prince English language audiobook (N = 50, Li et al., 2024) to longitudinal self-report data from a novel sample to examine how intersubject correlations (ISCs) across story segments relate to scenes recalled and reported as meaningful. ISCs will be calculated using the Shen parcellation (2013) with parcels of the Default Mode Network (DMN) as regions of interest.

Recall and reflection measures were collected for a novel sample immediately after exposure, after one week, or one month (N = 81 for final survey). Open ended items of main point, moral of the story, ending, and scenes recalled will be coded and used to compare ISCs for different timelocked increments of the narrative.

Hypotheses & Research Questions

Brain response expectations

H1: ISCs will be highest in regions of the DMN in scenes that are most recalled.

RQ1: Are there other brain regions that also exhibit high ISCs during the most recalled scenes? Are there other periods in the story that exhibit high ISCs?

RQ2: Are the patterns in H1 and H2 consistent for lonely and non-lonely people?

Loneliness in self-reports

RQ3: Do people who are lonely (compared to non-lonely people) (a) name a different main point or moral to the story (b) recall different scenes, or (c) are they more likely to interpret the ending as the death of the Little Prince?

Analysis Plans: We will compare ISCs across segments of the audiobook to compare (1) within-story differences and (2) how coefficients vary for most recalled and most meaningful scenes from the story. We will test whether lonely individuals (a) recall different scenes and (b) show greater neural idiosyncrasy (i.e., less neural similarity) during commonly recalled scenes. Data collection is complete; data processing and analysis begin in January 2025.

Implications: This study advances our understanding how online story processing relates to story impact, and helps explain the mechanisms behind idiosyncratic story processing among lonely people. By examining how shared brain activity in the DMN varies along with recall, reflection, and meaning-making, we offer insights in the cognitive and affective processing of media and its subsequent effects on users.

P2-C-40 Effect of Asymmetric Noise on Interpersonal Communication Dynamics

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Objective: Communication success relies on effective coordination between individuals, with leader-follower dynamics often emerging when task difficulty is asymmetric. Research on non-verbal communication suggests that individuals with harder tasks assume leadership roles, while those with easier tasks adapt more. However, it remains unclear whether similar dynamics emerge in verbal communication, particularly under conditions of unequal sensory access, such as asymmetric hearing abilities. This study aims to investigate the impact of asymmetric noise on leader-follower dynamics during dyadic unstructured verbal interactions, focusing on how participants adapt their behaviors (e.g., turn-taking dynamics, hand and head movements) and physiological signals, and establish leader-follower roles.

Methods and Analysis: In this study, one participant in dyadic conversations will be exposed to speech-shaped noise, while the other will experience normal auditory conditions. Data collection includes voice activity, video recordings, physiological signals (heart rates), and movement data (head and hand motions). We hypothesize that noise-affected participants will face challenges in adapting, showing reduced variability in response timing, turn durations, and fewer instances of overlapping speech or backchanneling behaviors (e.g., verbal affirmations and non-verbal cues). In contrast, participants without noise are expected to compensate by exaggerating non-verbal signaling, such as head nods and hand gestures. Analyses will focus on response times, turn durations, and the frequency and amplitude of movements using motion-tracking data. Communication outcomes will be evaluated through post-interaction ratings of perceived connection and enjoyment.

Implications: This study aims to provide new insights into the impact of asymmetric sensory access on interpersonal communication dynamics, simulating scenarios that people with hearing impairment may face. By identifying behavioral changes and adaptive mechanisms in noisy conditions, we seek to advance the understanding of how individuals navigate communication challenges.

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P2-C-41 Shared Neural Patterns for Musically Evoked Imaginings in the Default and Language Networks

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When left to our own devices, our imagination can wander in various directions. This free-flowing thought is a unique and intriguing mental state. However, its inherent lack of shared or documented content makes it difficult for most cognitive neuroscience methods to study. But music-evoked thoughts provide a way in: although thoughts sustained while listening to music can feel free-flowing and idiosyncratic, research indicates that they often follow patterns that are consistent and predictable within a culture. In this study, we attempted to identify selective neural patterns underlying free-flowing, yet shared, musical imaginings. Twenty participants were instructed to freely imagine stories while listening to ten unfamiliar instrumental excerpts of music in an fMRI scanner. Afterward, they recounted the stories they had imagined. High similarities were found in the content of the imagined stories across different subjects. Participants' imaginings matched the consensus narratives for over 70% of trials. Participants then listened to spoken recordings of the consensus stories, selected based on participants' responses to the musical excerpts from a previous behavioral study. Our fMRI analysis sought to identify unique representations for stories imagined to each music excerpt in comparison to others. Across each experimental condition—whether participants were listening to the music excerpts, recalling their imagining, or listening to a verbal description of the consensus narrative—similar spatial patterns were observed in auditory regions of the superior temporal cortex, as well as in areas associated with the default mode network. Triple pattern similarity for all conditions revealed unique spatial patterns in a large set of brain regions consistent with social cognition and semantic processing. The brain map produced in this study closely resembles those identified in previous research on shared memories elicited by movies. These findings expand our understanding to include imaginatively constructed narratives, extending it beyond narratives that are directly perceived. They highlight that musical stimuli can provoke subjective but broadly shared thoughts, providing a valuable framework for exploring the neuroscience behind free-flowing imagination.

P2-C-42 Functional Connectivity, But Not Activation, Differs Between Autistic and Neurotypical Youth During Social Interaction

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Background and Aim: Autism Spectrum Disorder is characterized by difficulties with social interactions. Social reward and mentalizing (i.e., the ability to attribute mental states to oneself and to others) are proposed to relate to these social difficulties but empirical support is mixed. This inconsistency may be due to the non-interactive tasks typically used to study social interaction. In previous studies using a social-interactive paradigm, we found social interaction modulated activation and functional connectivity (FC) within regions associated with mentalizing and reward in non-autistic children and adolescents (Alkire et al., 2018; Xiao et al., 2022). The present study investigated activation and mean FC across mentalizing and reward networks in autistic (AUT) and neurotypical (NT) youth using this interactive paradigm.

Methods: During an fMRI scan, participants made predictions about either a perceived peer ("Peer" condition) or a story character ("Computer" condition; social interaction factor), using hints related or not related to mental states (mentalizing factor). Our sample is comprised of 33 AUT (8 females, mean age = 11.59 ± 1.76 years) and 33 NT youth (mean age = 11.59 ± 1.82 years) matched on gender, age, full-scale IQ, and head motion. We used mixed-effects multilevel analyses to assess differences in activation during social interaction within and between the AUT and NT groups, while controlling for age, head motion, reaction time, and number of functional runs. We used linear mixed-effect models to test the main effects of social interaction, age, group, and interactions between these terms on mean FC, while controlling for gender, IQ, and head motion.

Results: There were no significant group differences in activation for the contrast of Peer versus Computer. Individually, both groups showed greater activation in the dorsomedial prefrontal cortex, inferior frontal gyrus, anterior temporal lobe, visual cortex, and cerebellum for Peer > Computer ($p < 0.05$ for all regions). 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 reward network ($p = 0.008$) and between mentalizing and reward networks ($p = 0.041$), such that the NT group showed numerically greater connectivity during peer compared to character conditions while the AUT group showed the reverse pattern. This effect of social interaction on mean FC within the reward network was marginally significant in both the NT group ($p = 0.060$) and the AUT group ($p = 0.066$), and the effect of social interaction on mean FC between networks was marginally significant in the AUT group ($p = 0.062$).

Conclusions: We found group differences in how social interaction modulates FC but not activation in the reward and mentalizing networks. This distinction may point towards similar regional mentalizing and reward processes in both groups, but with differences between groups in integration across brain regions within and between the associated networks when these processes are occuring. Future investigations will examine relations between activation/FC and behavioral measures, including measures of social motivation and interaction enjoyment, to determine their behavioral relevance.

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P2-C-43 Attitudes Shape Neural Responses to Narratives of Racial Discrimination

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Background and Aims: Neural synchrony during exposure to naturalistic stimuli has been shown to reflect similar understandings of narrative contents and perspectives. Given that attitudes and prior experiences shape our understanding of social information, the way racial minorities and majorities make sense of racial discrimination at the neural level might differ due to their substantially different experiences. Here, we investigated how attitudes modulate neural similarity of racial minorities and majorities in understanding a narrative of racial discrimination and how these predict subsequent evaluations of the storyteller.

Methods: 28 black and 27 white participants reported their attitudes and beliefs about prejudice followed by a measure of implicit racial attitudes (the Evaluative Priming Task). Afterwards, they watched a video of a black woman recounting an experience of racial discrimination during functional neuroimaging (fMRI), and participants evaluated the storyteller. Using Intersubject Representational Similarity Analysis we computed the intersubject correlations of all participant pairs based on activity within the dmPFC. We then tested whether race moderated the relationship between attitudes and neural synchrony and whether neural synchrony itself predicts similarity in evaluations of the storyteller.

Results: Across racial groups of the pairs, neural synchrony after the revelation of racial discrimination was predicted by the similarity in political ideology (b=.013, permuted p<.001) and belief about malleability of the individual prejudice (b=.021, permuted p< .001). Significant interaction effects revealed some unique predictors of neural synchrony in each racial group. For black participants, similarity in social identity threat concern was a unique predictor of neural synchrony (b=.022, permuted p=.005), whereas for white participants, mean negative implicit racial attitude was associated (b=.030, permuted p<.001). Neural synchrony predicted similarity in trait evaluation on both stereotype dimension (b=4.283, permuted p <.001) and personality dimension (b=9.894, permuted p<.001) only for white participants.

Conclusions: Our results suggest that black and white people engage in both common and distinct processes when understanding a narrative of racial discrimination and these can lead to different evaluations of the storyteller among racial majorities. The relationship between neural synchrony and beliefs and political attitudes was shared across both black and white participants, whereas social identity threats and implicit racial attitudes were unique and depended on participants'

racial identity. The findings suggest that shared understanding of a story of racial discrimination may be driven by attitudes and may lead to similar impression of a storyteller.

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P2-C-44 Decomposing the Cognitive Structure of Human Social Intelligence

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Background and Aims: Social intelligence encompasses the cognitive skills and knowledge essential for navigating social environments, playing a critical role in individual survival, social competitiveness, and interpersonal relationships. The complex, abstract, and multifaceted nature of social intelligence, combined with the dynamic and flexible characteristics of human social behaviors, has left research in this area underexplored. A comprehensive theoretical framework and effective assessment tools for social intelligence are yet to be established, nor is there a clear understanding of its relationship with other domains such as general cognitive abilities (e.g., spatial processing, reasoning), meta-cognition, emotional traits (e.g., emotional intelligence, depression), values, and personality traits.

Methods: Here, we examined 20 components of social intelligence, including theory of mind, person perception, empathy, and prosocial tendencies. By conducting extensive research, local adaptation, item development, and reliability testing, a comprehensive set of 71 social cognition tasks and scales, as well as criterion measures (e.g., social network size, social adaptability, autistic traits), and 31 general cognition tests was developed. Using a within-subject design, 524 participants completed the task set, resulting in 301 indicators for each participant. Hierarchical clustering, exploratory factor analysis (EFA), and network analysis were applied to explore the underlying structures.

Results: First, clustering results revealed distinct psychological spaces for experiments and surveys, indicating that different measures potentially assess different facets of social intelligence. Besides, surveys demonstrated greater internal consistency and higher inter-item correlations, but also displayed significantly higher predictive validity than experimental measures. Second, EFA focusing on 64 survey indicators revealed five primary factors: integrity, self-consciousness, moral disengagement, detachment, and moral foundations. Network analysis demonstrated stronger correlations between social intelligence, personality traits, emotional factors, and metacognitive abilities.

Conclusions: This study provides evidence of distinct ontologies in measurements; the factor structure offers data-driven insights into the cognitive architecture of social intelligence, providing a foundation for future assessments and comprehensive mappings of social intelligence in both behavior and neural representations

P2-C-45 The Neural Representation of Social Relationships

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Background and Aims: Human relationships are central to social cognition, yet the neural mechanisms underlying how individuals represent and navigate the complexity of these relationships remain poorly understood. This study investigates how diverse social relationships are organized in the brain, examining whether they are represented in terms of dimensions, categories, or both.

Methods: Thirty-five participants underwent functional magnetic resonance imaging (fMRI) while completing a task in which they evaluated 76 social relationships based on a variety of theoretical features. In parallel, participants rated these relationships on 30 relationship features derived from 15 existing theories and categorized them using a free-sorting task.

Results: Dimensional reduction through PCA revealed five key relational dimensions: formality, activeness, valence, exchange, and equality (FAVEE). Clustering of the relationships revealed six canonical categories: familial, romantic, hostile, transactional, power, and affiliative relationships. Neural activity patterns during the relationship inference task were then analyzed and found to correspond strongly with both the five relational dimensions and the six relationship categories. Regions involved in social cognition, such as the vmPFC, precuneus, TPJ, STS, and ATL were implicated in representing these dimensions and categories. Notably, the neural representations of the five dimensions and six categories exhibited a high degree of alignment. Furthermore, we applied voxel-wise encoding models and found that the categorical model exhibited broader neural representation across the brain compared to the dimensional model. Model comparison revealed that the FAVEE model, which was derived from the PCA dimensions, explained the neural data more effectively than other existing theoretical models, providing a comprehensive framework for understanding how the brain processes and organizes social relationships.

Conclusions: These results highlight the distributed, network-based nature of social relationship representations and underscore the brain's reliance on both dimensional and categorical structures to represent the complexity of human relationships.

P2-C-46 Motivational Mechanisms Underlying Empathy and Subsequent Prosocial Behavior in Adolescents and Adults

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Background and Aims: Empathy consists of distinct social-emotional abilities that can motivate individuals to engage in prosocial behaviors (Cuff et al., 2014). Yet, empathy inconsistently predicts prosocial behaviors (Kamas & Preston, 2021), and it

is unclear how empathy evokes motivation to act in ways that benefit others. The current pre-registered study (full details and registered hypotheses: https://osf.io/48xwz) uses neural and subjective measures to examine how empathy subcomponents relate to motivation to help others in adolescents (n = 40 aged 12-17: 26 complete, 14 scheduling and to be completed by February 2025). For this submission, we will also utilize data from adults (n = 14, data collection ongoing).

Methods: To measure empathic neural responses, participants complete a physical pain empathy paradigm adapted from Decety and colleagues (2018) during electroencephalography (EEG) recording. While viewing pictures of people in pain or not in pain (Meng et al., 2024), participants are asked to think about empathy in two ways: perspective taking ("Think about how much pain this person is feeling") and empathic concern ("Think about how sorry you feel for this person"). Since motivation can be difficult to capture subjectively (Eisenberg et al., 2016), after viewing each picture, participants are asked to 1) think about how much they want to help the person in the picture and then 2) rate their desire to help on a sliding scale (1 – 10). Frontal alpha asymmetry (an EEG correlate of approach-based emotional and motivational processes; Briesemeister et al., 2013) is recorded during the thinking portion.

Expected Results: First, we will evaluate differences in N2 amplitude and LPP amplitude during perspective taking and empathic concern conditions. Based upon neural correlates of pain effects observed by Decety and colleagues (2018) in young children and prior EEG work (Mella et al., 2012; Miedzobrodzka et al., 2023; Wu et al., 2024), we predict a larger pain condition effect during empathic concern for N2 amplitude and perspective taking for LPP amplitude. Per our preregistered Analysis Plan, we will test how empathy (empathic concern vs perspective taking) evokes motivation to help by examining the relationship between 1) N2 amplitude/LPP amplitude and frontal alpha asymmetry and 2) N2 amplitude/LPP amplitude and self-rated desire to help. Left-dominant frontal alpha asymmetry is related to approach-based emotional and motivational processes (Briesemeister et al., 2013). Based on literature supporting a more consistent relationship between empathic concern and prosocial behaviors (Batson, 2009), we predict that N2/LPP amplitude while viewing painful images during the empathic concern condition will relate to left-dominant frontal alpha asymmetry and higher self-rated motivation in both adolescents and adults. The relationship between frontal alpha asymmetry as a neural indicator of motivation and self-rated motivation will also be examined. We anticipate left-dominant frontal alpha asymmetry will relate to higher self-rated motivation.

Conclusion: This study will demonstrate how different social-emotional responses evoke motivation to help others and whether these processes differ for adolescents and adults.

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P2-C-47 Divergent Neural Responses to Political Videos Predicted Using Language Models

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Background and Aims: Conservatives and liberals exhibit diverging brain activities even when they view the same political content. This divergence is thought to reflect different ideological perspectives that partisans use to interpret the content. Using language models as a quantitative framework to model the perspective differences, we analyzed fMRI data to investigate whether the neural divergence between partisans reflects the divergence in how they interpret the same content differently.

Methods: We fine-tuned two versions of Bidirectional Encoder Representations from Transformers (BERT) models: conservativeBERT and liberalBERT. conservativeBERT was trained to distinguish between news articles from conservative-leaning and neutral sources, while liberalBERT was trained to distinguish between articles from liberal-leaning and neutral news sources. These two models served as a proxy of how languages are represented from partisan-specific perspectives. We hypothesized that the model matching the partisan's political leaning would better explain the participants' brain activity. To test this hypothesis, we used two fMRI datasets (n=38 and n=36) of partisans watching political videos. For each voxel, participants were classified as liberal or conservative based on which model fit the brain data better. The significance of classification accuracy for each voxel was evaluated via permutations and was cluster-corrected using Threshold-free Cluster Enhancement (TFCE).

Results: In both datasets, classification accuracy was significant (TFCE-p < .05) in clusters at the bilateral precuneus, a region commonly associated with self-referential thinking and narrative processing. In other words, activities in the bilateral precuneus were better explained by the language model with shared political perspectives. Furthermore, regions related to the default mode network, a network attributed to the processing of shared narrative, had clusters with significant accuracies, although only in one dataset. These results suggest that while consuming political videos, brain regions involved in the interpretation of narratives were more aligned with language models sharing one's political beliefs.

Conclusion: Our findings show that language models aligned with one's political perspectives can capture divergent brain activities of partisans while viewing naturalistic political content. This suggests that divergence in the semantic representation of identical discourse is related to the divergent brain activity between partisans as they watch the same content. Furthermore, our findings indicate that aligning language models to specific ideological texts could be a powerful tool for modeling partisans' interpretation of contents and their perspectives and biases baked into the interpretation. Using language models to study how political beliefs are reflected upon neural representations may contribute to understanding the roots of partisan differences and building interventions addressing the polarized political landscape.

P2-C-48 From Brain Gradients to Real-World Social Connections: Mentalizing-Related Reconfigurations of Large-Scale Cortical Networks Predict Social Network Size

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Background: Individuals differ in their ability to form and maintain large social networks. Why? One key factor may be mentalizing—the capacity to understand others' thoughts, beliefs, and intentions. Our study explored whether mentalizing ability predicts social network characteristics using an innovative gradient approach. Gradients represent principal dimensions of the brain's cortical spatial organization, initially identified from resting-state fMRI data in the Human Connectome Project. Our study investigated whether mentalizing, conceptualized as dynamic brain state configurations within a multi-dimensional gradient space, contributes to individual differences in social network size.

Methods: We recruited 41 participants (27 f, age = 21.59 ± 5.33) to complete an established social inference task (Why/How task) during fMRI scanning. Participants made rapid judgments requiring either mentalizing (social inferences) or factual inferences (control). We then projected brain states from both conditions into a multi-dimensional space of established cortical gradients (independent from our data). Next, we assessed whether brain states shifts predicted variance in social functioning, measured as real-word social network size (Social Network Index, SNI) and mentalizing performance in the social inference task.

Results: The gradient space analysis revealed several key insights. First, brain states during social inferences differed from those during factual reasoning along key gradients. For instance, on gradient 3, brain states during social inferences were more aligned with the default mode network (DMN), while those during factual inferences were more similar to the frontoparietal network (FPN). Second, individual shifts toward the DMN end of gradient 3 during social inferences were associated with larger social network size in daily life. Third, the extent of shifts along gradient 3 was linked to differences in mentalizing performance. Greater shifts in brain states between social and factual inference conditions correlated with higher mentalizing. This performance difference mediated the effect of cortical gradient shifts on social network size (mediation analysis).

Conclusion: Our findings indicate that variations in mentalizing ability are reflected in changes in large-scale brain network configurations along principal cortical gradients. This suggests that mentalizing functions may emerge from the brain's dynamic reorganization along established macroscale patterns. Additionally, shifts in cortical organization related to mentalizing predicted social network size. These results enhance our understanding of the neurobiological mechanisms underlying social cognition and imply that adaptive changes in large-scale cortical networks during mentalizing are crucial for forming and maintaining social connections

P2-C-49 How is Delayed Justice Judged? Computational Substrates Underlying Judgment of Delayed Justice

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Background and Aims: Third-party justice refers to interventions by bystanders, who are not directly harmed by the transgression, to uphold social norms when violations occur, typically through punishing wrongdoers or helping victims. In real life, however, third-party justice may not always be realized in a timely manner. Rather, it can sometimes occur after a significant delay (e.g., a criminal being apprehended many years later or a victim receiving restitution long after the harm) Despite its substantial social impact, how delayed justice is judged and its underlying psychological processes remain poorly understood. To address this gap, the present study consisted of two online experiments combining behavioral tasks and computational modeling to investigate how time delay affects justice evaluations and its underlying computational substrates.

Methods: Exp. 1 (N = 192) employed a scenario-based imagination paradigm where participants read descriptions of crimes with third-party justice achieved after a delay (e.g., the criminal was caught and punished after evading capture) and then rated the perceived justice of the outcome on a scale (-50 = extremely unjust, 50 = extremely just). Two variables were manipulated: the time delay before justice was served (0, 15 days, 1 month, 3 months, 6 months, 1 year) and crime severity (low, medium, high). Exp. 2 (N = 60) used an incentivized task based on the third-party punishment paradigm where participants, as fourth-party observers, evaluated justice (as in Exp. 1) after a third party intervened to correct an unfair token distribution (either by punishing the transgressor or compensating the victim) after a delay. We parametrically manipulated the time delay before justice was served (0, 1 day, 10 days, 1 month, 3 months, 1 year) and the degree of inequity in allocation (60-40, 70-30, 80-20, 90-10, 100-0).

Results: In both experiments, we showed that justice ratings decreased significantly as delays lengthened, with the negative effect of delay more pronounced for severe crimes or more unequal distributions (a time delay × severity/inequality interaction). Moreover, in Exp. 2, we found that the negative effect of time delay on justice ratings was stronger in if the justice is achieved through compensation (vs. punishment; a time delay × way to achieve justice interaction). Computational modeling revealed that the best-fitting model, as demonstrated by the hierarchical Bayesian model comparison, indicated that both time delay (the κ parameter for discount rate) and the degree of inequity (the γ parameter for inequity aversion) were considered when evaluating delayed justice, depending on how justice was achieved. In particular, the subjective utility of justice discounted in a hyperbolic manner as the time delay increased. Moreover, individuals displayed higher levels of inequity aversion (i.e., a higher γ value) when justice was achieved via compensation compared to punishment.

Conclusions: Our findings demonstrate that time delays in the realization of justice consistently diminish positive evaluations of third-party interventions, particularly in severe norm violations or when justice involves compensating victims. These results deepen our understanding of how individuals evaluate delayed justice and highlight the critical role of timely justice in maintaining public trust in judicial systems.

P2-D-50 Negative Neura Emotion Discrimination is Associated with Anxiety

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Background and Aims: Poor emotion discrimination in children has been associated with increased anxiety symptoms, however, the neural mechanism behind this is still unclear. Here, we aim to test if 1) neural emotion discrimination is associated with anxiety symptoms and 2) if the intensity of the emotion presentation moderates that association.

Methods: We used self-report measures of anxiety and movie-watching fMRI data in children ages 7-15 (n=432) from the Healthy Brain Network (HBN) Biobank. Activation maps for specific emotions (anger, fear, sad, happy, excite) at different intensity presentations (low, middle, high) were derived from fMRI data and were used to calculate mean absolute differences in activation between pairs of negative emotions (e.g. anger vs. fear), which were then averaged to create an overall negative neural emotion discrimination. A general linear model (GLM) was next used to characterize the association between negative neural emotion discrimination and anxiety at whole brain, cognitive network, and parcel levels.

Results: For aim 1, we found that poor negative neural emotion discrimination was associated with increased anxiety in children across the whole brain ($B = -7.40$, $p = 0.002$) and specific networks that have been associated with anxiety (cingulo-opercular: $B = -8.66$, $p < 0.001$; dorsal attention: $B = -5.00$, $p < 0.010$; salience: $B = -4.90$, $p < 0.001$). For aim 2, we hypothesize that when emotion intensity is higher, neural emotion discrimination will be greater in children compared to when emotion intensity is low. However, this association between emotion intensity and emotion discrimination might be attenuated in children with anxiety.

Conclusions: The networks that showed a significant association in aim 1 have been associated with attention and arousal, suggesting that alterations in attentional processes may play a role in the association between negative neural emotion discrimination and anxiety in children. If our hypotheses for aim 2 are supported, it could suggest that children have an emotion intensity threshold for neural emotion discrimination and that children with anxiety have a higher threshold.

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P2-D-51 Effect of PTSD in the Triple Network Model (DMN, SN And FPN) in Women Survivors of Intimate Partner Violence Against Women

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Background and Aims: Intimate partner violence against women (IPVAW) is a highly prevalent problem worldwide. 30% of women around the globe have suffered physical, sexual and/or psychological violence by a partner or ex-partner. Growing evidence suggests that affective and cognitive dysregulation often draw upon the network paradigm, especially the Triple Network Model (TNM), which consists of the default mode network (DMN), the frontoparietal network (FPN), and the salience network (SN). DMN is involved in internally-focused attention and cognition such as self-reference. The FPN peaks during task involvement and cognitive exertion. Meanwhile, the SN appears to play a role in switching between the DMN and FPN, to efficiently allocate attentional resources. Alterations in intra- and inter-networks connectivity in the TNM may underlie Post Traumatic Stress Disorder (PTSD), that is highly prevalent in IPVAW survivors. The aim of the study is to investigate if the IPVAW-related posttraumatic disorder symptoms (IPVAW-PTSD) are associated with resting-state functional connectivity alterations within the TNM.

Methods: 39 IPVAW survivors attended a psychopathological assessment session where they completed the PCL-5 questionnaire to assess PTSD and the ACE self-report to evaluate childhood adverse experiences. Additionally, they conducted an 6-minutes resting-state fMRI scan session. After preprocessing, a ROI-to-ROI functional connectivity analysis was performed using 11 predefined regions of interest from the CONN-fMRI Functional Connectivity toolbox which included: DMN regions (posterior cingulate cortex/precuneus, lateral posterior bilateral regions and medial prefrontal cortex (MPFC), FPN areas (bilateral dorsolateral prefrontal cortex and parietal posterior cortex) and SN regions (bilateral insula and cingulate anterior cortex (ACC). A regression model was conducted to explore the relationship between IPVAW-PTSD and the TMN controlling for ACE to discard other traumatic experiences unrelated to IPVAW. Results were considered significant if they survived correction for multiple comparisons (FDR ≤ 0.05).

Results: Higher IPVAW-PTSD scores were associated with reduced functional connectivity within SN. Specifically, the ACC showed lower connectivity with bilateral insula ($F=8.28$; p-FDR=0.0383). As well, it was associated with increased connectivity between SN and DMN. Mainly, the MPFC showed hyperconnectivity with ACC and bilateral insula, and the right posterior region of the DMN with ACC and left insula ($F=8.28$; p-FDR=0.0426). No significant association was found between IPVAW-PTSD and intra or inter-FPN connectivity (Figure 1).

Conclusions: Reduced intra-network connectivity of the SN and hyperconnectivity between SN and DMN were associated with higher IPVAW-PTSD scores. These results could be related with the disruption in cognitive control over salience stimuli and might be linked to depersonalization and emotional detachment symptoms in IPVAW-PTSD. This study emphasizes the importance of investigating sequelae in women survivors of IPVAW for better diagnosis and treatment.

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P2-D-52 How Divergent Social Knowledge Shapes Social Learning in Autistic Adolescents

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Social interactions involve acquiring and applying social knowledge. Prior work shows both adults and teens use reinforcement learning (RL) mechanisms when learning about others' preferences by reducing prediction errors (PEs)—discrepancies between observations and initial inferences (Rosenblau et al., 2018, 2021). Autistic teens produced higher PEs and relied on own-preferences to infer preferences (Rosenblau et al., 2021). Likewise, non-autistic teens encoded task-based PEs in brain activity, while autistic teens' brain activity scaled with their own-preferences. Prior work did not test if autistic teens instead use knowledge of their autistic reference group. Prior work also only probed cortical PE-related activity, overlooking the cerebellar posterior lobe (CPL), which is implicated in error monitoring and autism-related social challenges (Van Overwalle et al., 2014). This study probes if autistic teens use knowledge of their reference group and the role of the CPL during social learning. We first assessed own-preferences of 187 non-autistic and 253 autistic teens to robustly characterize autistic and non-autistic reference groups. Next, we tested learning about two non-autistic teens' preferences in a larger online study of 98 non-autistic adults (18 - 30 yrs, 38 F) and 86 autistic teens (12-17 yrs, 26 F). We expected non-autistic adults would learn more efficiently than autistic teens, with the former referencing average adolescent preferences and the latter relying on own-preferences. A controlled, neuroimaging experiment will replicate the task in age/sex-matched autistic and nonautistic teens (N=40/group). We report a preliminary analysis in 17 non-autistic (9-17 yrs, 5 F) versus 17 autistic (9-17 yrs, 3 F) teens. Behavioral analyses compared groups in PE magnitude and change and participants' inferences as a function of own- or reference group preferences. Neuroimaging analysis probed cortical encoding of PEs, own- and reference group preferences and utilized specialized cerebellar processing pipeline to examine PE encodings in CPL (Diedrichsen, 2006). own-preferences of autistic and non-autistic groups differed significantly. Autistic teens displayed greater rating variability as a group and higher rating consistency within item categories. The online sample of non-autistic adults produced lower PEs and greater PE reductions over time than autistic teens. The preliminary lab-based study showed no significant group differences in PE magnitude, change, or PE-related brain activity. PEs were encoded in cortical regions, such as the medial prefrontal cortex (MPFC) and the CPL. In terms of predicted diverging reference points between groups, autistic teens did reference knowledge about autistic preferences while adults shifted to represent adolescent preferences during the task. Own-preferences were a stronger predictor of autistic teens' ratings. These results were reinforced in the lab-based study. Neurally, autistic teens encoded own-preferences more in the angular gyrus and MPFC than non-autistic teens. Autistic teens exhibit distinct preferences compared to non-autistic groups, leveraging both own- and reference-group knowledge during social learning. Greater reliance on own-preferences and mean autistic preferences distinguishes them from non-autistic peers. Next, we will examine group differences in the neural encoding of reference-group preferences and cortico-cerebellar connectivity during social learning.

P2-D-53 Neural Sensitivity to Positive Autobiographical Memory Recall Predicts Smoking Lapse During Abstinence

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Background and Aims: Quitting cigarette smoking is notoriously difficult, with most attempts ending in relapse (i.e., return to regular smoking). A major outstanding question is why some smokers struggle to maintain abstinence even when incentivized. Lapsing (i.e., any amount of use) during early abstinence is a robust predictor of relapse and has been associated with stress and individual differences in sensitivity to affective and motivational cues (e.g., McKee et al., 2011; Wilson et al., 2014). One approach shown to boost positive mood and help buffer stress outside the context of substance use is recalling memories of positive life experiences (Speer et al., 2017). The present study builds on these findings by characterizing individual differences in psychological and neural processing of positive autobiographical memories during smoking abstinence. Our primary aim was to test whether sensitivity to more naturalistic reward stimuli contributes to smokers' ability to maintain motivation and cope with stress to resist lapsing.

Methods: Daily smokers (N=19) first completed a semi-structured autobiographical memory (ABM) survey in which they were instructed to retrieve and describe positively valenced memories in response to common life event cues. Over two MRI sessions, participants smoked as normal (session 1) and abstained overnight (12-hours; session 2) prior to a scan session, during which they completed a cued ABM recall task (24 trials). Smoking was assessed via expired carbon monoxide (CO; a biological measure of recent smoking). Participants rated their subjective feeling of how positive or negative they felt after recalling each memory, as well as their mood, stress, and craving levels (7-point Likert scales) before and after the task. The subjective memory feeling ratings were used as a parametric modulator (i.e., covariate) of BOLD response during memory recall. Following the recall task, participants completed a lapse analogue task (McKee et al., 2009) to measure willingness to resist smoking for up to 50 minutes for an increasing monetary gain.

Results: Approximately 44% of participants (N=8) lapsed in the abstained session. Preliminary neuroimaging analyses revealed that smokers who successfully resisted lapsing tended to have a stronger relationship between striatal activation and positive subjective feeling ratings ($M = 0.07$, $SD = 0.06$) than those who lapsed ($M = -0.08$, $SD = 0.09$) ($t = 4.42$, $df = 13.43$, $p < 0.01$). This result was unique to the abstained relative to the smoking-as-usual session. These results stand even when controlling for pre-post recall mood change and baseline stress in an exploratory regression ($b = -0.12$, $t = -4.06$, $p < .01$). Interestingly, the same regression showed that positive mood change post-recall predicted higher striatal feeling signal ($b = 0.03$, $t = 2.51$, $p < .05$) while higher pre-recall stress marginally predicted lower signal ($b = -0.03$, $t = -1.75$, $p = .1$). The overall model including lapse category, mood change, and stress was significant ($F(3,15) = 12.27$, $p < 0.01$, $R^2 = 0.71$).

Conclusions: Preliminary results suggest that maintaining stronger neural sensitivity to positive affective memory value may act as a protective factor against lapse during early abstinence. The ability to positively regulate mood through memory recall may in part drive this maintenance.

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P2-D-55 Are Trust and Reciprocity Related to Functional Connectivity in Behavioral Variant Frontotemporal Dementia And Alzheimer's Disease?

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Background and Aims: Interpersonal trust and cooperation are important aspects of prosocial behavior and are frequently studied in neuroeconomics by administering the Trust Game, which quantitatively measures trust and trustworthiness. This experimental paradigm has rarely been implemented in patients with Alzheimer's disease (AD) and behavioral variant frontotemporal dementia (bvFTD), who exhibit antisocial behaviors as their neurodegenerative disease progresses. Our preliminary behavioral data show that bvFTD patients learn to cooperate differently during the Trust Game compared to AD patients and healthy controls and suggest that bvFTD patients are less receptive to reciprocity than the other groups. Prior studies have demonstrated that differences in individual propensity for trust and reciprocity could be predicted by individual differences in resting-state functional connectivity (RSFC), particularly within the frontoparietal and salience networks (Bellucci et al 2018; Chen et al 2023), but this association has not yet been tested in bvFTD and AD patients. Therefore, the Objective of this pre-registered study is to determine if differences in trust behaviors and cooperative learning during the Trust Game between patients with bvFTD and AD are associated with functional connectivity pattern differences.

Methods: We have collected behavioral data (already analyzed) for 38 bvFTD patients, 22 AD patients and 26 cognitively normal subjects and neuroimaging data (to be analyzed) for only the bvFTD and AD patients. All participants played the Trust Game on a computer out of the scanner. MRI scanning was performed on a 3.0 Tesla Philips scanner that included resting-state functional MRI: Whole-brain functional images were collected with a gradient-echo EPI sequence in 39 interleaved slices (TR = 2s, TE = 30ms, 3mm isotropic voxels).

Trust Game: Each participant played the Investor/Trustor role in the Trust Game. They were instructed to invest money in two separate partners and receive a proportion of the profit in return. One partner returned a fair proportion of the investment (the cooperative opponent) while the other partner did not (the selfish opponent). See Figure 1 for task design schematic.

Data Analysis Plan: Our behavioral data show that bvFTD patients invested less money on average with their cooperative partner than the AD and control groups and invested less over time with the cooperative partner, while the AD and controls groups invested more over time (Figure 2). Our planned analysis will determine if these behavioral differences between the two dementia groups are also related to network functional connectivity patterns. fMRI data will be preprocessed using fMRIPrep and include correction for slice timing and motion. RSFC will be computed between 180 regions-of-interest (defined by HCP-MMP1 atlas) with bivariate Pearson's correlation between ROI-average BOLD signals using the CONN toolbox, then transformed into Fisher's z-values and generate individual correlation matrices. We will perform linear regression models with RSFC correlations as independent variable and behavioral trust game measures as dependent variable while controlling for age, sex and dementia severity covariates. This would be the first study to our knowledge to show whether differences between functional connectivity patterns are correlated with differentiable trust and cooperation behaviors in bvFTD and AD.

P2-D-56 Uncovering the Enduring Nature of Fear in High Trait Anxiety With a Longitudinal Computational Affective Neuroscience Approach

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Background and Aims: Anxiety disorders affect over 300 million people worldwide, emphasizing the need to get a deeper understanding of its risk factors, in particular trait anxiety. Individuals with high trait anxiety may exhibit maladaptive fear regulation, leading to persistent fear responses even when exposed to the same negative stimuli. Our study aims to investigate whether high trait-anxiety individuals demonstrate more consistent brain expressions of fear across various naturalistic contexts compared to low trait-anxiety individuals, using a two-phase longitudinal naturalistic neuroimaging approach.

Methods: Forty participants were divided into a high (N=17 in the HA group) and a low trait anxiety group (N=23 in the LA group) based on their State-Trait Anxiety Inventory (STAI) scores. At Time 1, participants viewed a series of 18 video clips spanning a range of everyday themes—such as sports, relationships, politics, environmental awareness, travel, comedy, and satire while undergoing fMRI scanning. These videos were selected to mimic the diversity of narratives encountered in daily life. An independent group (N=68) identified seven of these videos as predominantly negative in emotional valence. All participants underwent the same scanning procedure and watched the same series of videos at Time 2, which was two months after Time 1. Utilizing a validated multivariate predictive brain model of subjective fear, we decoded expressions of subjective fear across these seven negatively valenced videos for each participant at both time points. As a result, seven time series of fear expression dynamics were extracted from each participant's brain data at Time 1 and Time 2, respectively. Subsequently, we assessed the consistency of fear expression dynamics to repeated video exposure by computing intra-individual correlations of the two dynamics over time.

Results: Employing a linear mixed-effects model with non-parametric statistical testing via time-series circular shift, we discovered significantly higher intra-individual correlation in fear expression dynamics within the HA group compared to the

LA group, t = 2.47, p = 0.009, indicating that individuals with high trait anxiety exhibit more stable dynamics of subjective fear across varying naturalistic contexts. This finding, robust across all 18 videos as well as resting-state neuroimaging data, t = 2.02, p = 0.038, highlights the persistent nature of fear expressions in individuals with high trait anxiety.

Conclusions: Our findings suggest that individuals with high trait anxiety exhibit more consistent fear responses across different naturalistic contexts. This enhanced self-consistency in fear expression may contribute to the maladaptive regulation of fear observed in high trait anxiety individuals, offering valuable insights into the subjective feelings of fear in individuals prone to anxiety, offering potential directions for future research into the emotional experiences of those with heightened anxiety susceptibility.

P2-E-57 Incidence and Continuity of Transgender Identity in the Adolescent Brain Cognitive Development (ABCD) Sample

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Background and Aims: In recent years there has been an increase in the rate of adolescents adopting a transgender identity, due in part to relaxed social and cultural strictures on gender identity. However, the incidence and factors associated with emergence of a consistent gender identity during adolescence is not well understood. Using data from the Adolescent Brain Cognitive Development (ABCD) Study, we aimed to understand the prevalence and continuity of transgender identity adoption in a large, longitudinal community sample.

Methods: The youth self-report items in the ABCD Release 5.0 dataset were used to identify gender-diverse individuals and assess the continuity of their gender diversity across five timepoints. Congruent with past literature, responses of "Yes" and "Maybe" to the item, "Are you transgender?" were considered transgender identity endorsing. All other responses were collapsed into non-endorsement. Incidence was derived from the proportion of the total sample categorized as transgender-endorsing relative to the total sample. We assessed temporal continuity within this endorsing subsample by examining consistency of responses over time. Continuity was defined as at least two consecutive years in which the individual persisted in transgender endorsement, while those who returned at some point to a non-endorsing response were considered discontinuous. These continuous and discontinuous groups were then characterized according to assigned sex at birth, age, and Tanner stage at endorsement.

Results: Across all timepoints, 490 of the 11,868 enrolled individuals endorsed a transgender identity at least once. Incidence of transgender identity increased over time, with 0.5% of the overall sample endorsing at baseline and 3.6% endorsing by the fifth subsequent year of data collection. Among the 440 individuals who had sufficient data for analysis, 58 (13%) individuals were classified in the continuous group and 164 (37%) were discontinuous and 224 (50%) endorsed only at their most recent timepoint and could not be classified in either group. Concordant with existing findings, regardless of group membership, trans youth were predominantly (80.5%) assigned female at birth (AFAB). However, the continuous group had a greater relative proportion of AFAB individuals (88%) than the discontinuous group (74%), $\chi 2$ (1, N = 221) = 4.65, p = .03. Those in the continuous group were also older (M age in months = 147.44, SD = 10.81) than those who were not continuous (M = 131.06, SD = 13.78) t(219) = 8.20, p < .001 and in later Tanner stages (M continuous = 3.65; M discontinuous = 2.67) $\chi 2$ (4, N = 181) = 45.46, p < .001.

Conclusions: In this large community-based sample, over 4% of adolescents [EN2] endorsed transgender identification at some point during the study. Transgender identification was more likely in older adolescents and those assigned female at birth. Individuals assigned female at birth and who endorsed a transgender identity later in adolescence were more likely to experience continuity in transgender identity. Gender identity, as with other aspects of the emerging sense of self, undergoes important maturational changes in adolescence. Gaining an understanding of how this process unfolds – particularly for those who do not adopt a cisgender identity – is important for guiding families, health care providers, and social policy.

P2-E-58 High School-University Partnerships Advance Naturalistic STEM Research Outcomes: Investigating Preschoolers' Health, Cognitive Flexibility, and Behavior in the Real World

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Background and Aims: A healthy diet, quality sleep, and regular physical activity are recognized as fundamental for healthy development across the lifespan. However, research on specific health recommendations for each developmental stage and their effects on cognitive development remains inconsistent. This study explores the impact of health on cognitive flexibility and behavior in toddlers aged 3-4 years. We present a collaborative effort led by a high school student along with researchers from New York University to examine the relationship between these factors and classroom behavior in preschoolers (N=19). This research highlights the growing trend of involving young scientists in real-world scientific investigations through collaborations with professional researchers. Such partnerships are designed to foster STEM identities, particularly among underrepresented groups, by providing exposure to advanced scientific topics and promoting independence.

Methods: Preschoolers were surveyed on most consumed foods, sleep quality, and activity levels. Diet profiles were rated by a mixed group of dietitians, researchers, teachers, and parents on a 6-point scale from 'least healthy' to 'most healthy.' Average scores were calculated categorizing participants into low, medium, and high health groups. Cognitive flexibility was assessed using the Dimensional Change Card Sort (DCCS), a standard measure for toddlers. Teachers also evaluated participants using the Conners' Teacher Rating Scale (CTRS) to assess hyperactivity, oppositional behavior, and inattentiveness in the classroom.

Results: Toddlers' diets related to other health measures, albeit unexpectedly with the low health group exhibiting the most

impaired sleep, followed by the high health group, while the medium health group reported the best sleep outcomes. Although healthier diets generally correlated with better sleep, they were also associated with lower activity levels. The lowest health group had the highest activity scores, followed by the medium and high health groups. Surprisingly, the highest health group also showed the most impaired cognitive and behavioral outcomes, scoring highest on the CTRS with medium and low health groups scoring significantly lower. Preliminary analyses revealed no relationship between average health scores and cognitive flexibility and other behaviorS (DCCS).

Conclusions: This study reveals mixed results regarding the relationship between preschoolers' health scores, cognitive flexibility, and behavior. Preliminary analyses show that both the healthiest and least healthy groups exhibited poorer performance on the CTRS, reduced activity levels, and worse sleep quality, while the "medium" health group performed better, contrary to initial hypotheses. Findings indicate raters agree on what constitutes a "healthy" diet for preschool-aged children, though current literature lacks consensus on this definition. Limitations include a small, socioeconomically homogenous sample, reliance on self-reported data, and potential ceiling effects which may not have fully captured cognitive flexibility. However, taken together, these promising results suggest the most overall benefits for a medium health diet profile for better sleep, activity levels, and in class behavior.

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P2-E-59 Developmental Differences in Neural Responses to Ostracism: Unpacking Adolescent Sensitivity to Exclusion and Inclusion

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Background and Aims: Ostracism (i.e., being ignored/excluded) can cause intense emotional reactions that impact mental and physical health. Adolescents may be particularly susceptible to these negative consequences due to brain maturation and changing social priorities. Neuroimaging research using traditional ostracism paradigms (e.g., Cyberball) in adolescent samples have consistently found that the social pain that results from ostracism activates the same neural regions that process physical pain and emotional distress (e.g., anterior cingulate cortex, insula). Additionally, event-related potential (ERP) components thought to be associated with the "neural alarm" that is set off by the anterior cingulate cortex when conflict occurs (e.g., N2, P3) have been found to be more sensitive to social exclusion. Few studies, however, have found clear developmental effects across adolescents. As such, our goal was to evaluate EEG/ERP correlates of ostracism in context of developmental factors across early adolescence in an adapted task geared toward minimizing reading-related challenges and inequity of participant involvement from trial to trial.

Methods: Eighty-four adolescents completed an adapted version of Hudac's (2019) Lunchroom task (Figure 1) while EEG was collected. In this task, participants are asked to choose between two picture options (primes) that vary by social or nonsocial stimuli. Participants are told that based upon this decision their best friends (represented by avatars) would choose to sit with them at the lunchroom table (inclusion) or sit at a different table (exclusion). In this way, participants saw 26 trials across four conditions: social exclusion, social inclusion, nonsocial exclusion, nonsocial inclusion. P1, N2, and P3 ERP components and source estimates were measured via EEG. Additionally, we used participant age and self-reported pubertal development via the Pubertal Development Scale (Petersen et al., 1988) to better understand the effects of development on neural responses to ostracism.

Results: Results indicated unique effects across ERP amplitudes (Figure 2), including greater sensitivity to inclusion for the P1 ($p<0.0001$), greater sensitivity to exclusion for the N2 ($p<0.0001$) and the P3 but only when modulated by puberty ($p=0.002$). Source estimation identified different neural networks that were likely driving sensitivity to exclusion (e.g., amygdala, SCG, and IFG; $p<0.0001$) or inclusion (e.g., ACC, cingulate, fusiform, insula, SPL, STG; $p<0.0003$). Further, sensitivity to exclusion increased over pubertal development for P3 amplitude ($p<0.03$) but over age for amygdala and IFG ($p<0.0003$). Sensitivity to inclusion decreased over age for P1 amplitude ($p=0.0002$) but over age for inclusion sensitive regions ($p<0.0002$).

Conclusions: By highlighting different neural mechanisms and networks underlying evolving sensitivity to social exclusion, this study may help future research begin to delineate how the neural underpinnings of ostracism unfold across critical developmental periods and vary across individuals. Additionally, the current study emphasizes the utility of using paradigms that isolate neural processes associated with ostracism while controlling for participant involvement.

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P2-F-60 Effects of Individual Social Network Structures on Interpersonal Coordination and Brain Dynamics

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Background and Aims: People's social landscapes differ. Some individuals navigate distinct groups of friends and have to adapt their behavior to the group they are in. Others might be immersed in a single tightly-knit community where everyone knows each other so there is no need to readjust their behavior. Previous studies have demonstrated that social network properties of individuals relate to the structural connectivity in their brain networks (Hyon et al., 2022) and their neural processing of stimuli (Baek et al., 2022; Schmälzle et al., 2017). However, little is known about how the different personal network patterns modulate behaviour and neural mechanisms when people interact in real time. Can social network properties predict who takes the role of

the leader and the follower? How do (a)symmetries in such properties relate to the extent of movement and neural synchrony? In the current dual-EEG study, we zoom in on simple dyadic interactions unfolding in the lab to investigate how people's existing network properties manifest in novel interactive encounters.

Methods: We recruited Danish neurotypical right-handed volunteers from the general and student populations (N = 104, mean age = 22.9(3)) who formed 52 dyads of strangers (21 female-male, 16 male-male, and 15 female-female). First, the dyads engaged in a movement task in a dual-EEG hyperscanning setup. The participants were seated in front of each other separated by an experimentally controlled shutter screen that alternated between opaque or transparent conditions, allowing the participants to see each others' right hands or blocking the view. They were instructed to place their right hands on provided handles, look at the fixation point directed at the other person's hand, and produce smooth circular movements with their right index fingers (with any speed and in any direction). In order to measure spontaneous coordination, all of them were told they could synchronize or ignore each other while the separating screen was transparent and they could change this behavior during and/or between trials. After the recording, the participants individually completed a social network task in which they listed people whom they knew personally and with whom they interacted within a given time frame. They were also asked to draw links between people from their networks who knew each other.

We plan to investigate what network parameters (number of friends, density of connections, etc.) of interacting participants predict the distribution of leader-follower roles within dyads. We will also systematically explore how dyadic asymmetries in various network parameters can be used to predict the extent of non-instructed movement synchronization. Finally, we will calculate inter-brain synchrony between interacting participants and test the relationship between inter-brain synchrony, movement synchrony, and social network parameters.

Implications: The results of this study will inform us about how the habitual patterns of social interactions, in which individuals engage on a daily basis, are reflected in the flow and neural processing of their novel real-time interactions. This will help us better understand and predict interaction dynamics in human social networks.

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P2-F-61 Distinct Functional Connectivity Patterns in Schizophrenia vs. Healthy Controls While Viewing Naturalistic Social Stimuli

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Background: Social dysfunction is a core feature of schizophrenia, with many individuals experiencing social disconnection that leads to a poorer quality of life. Prior research suggests that normativity in neural responses to naturalistic stimuli is associated with greater social connectedness. Given that individuals with schizophrenia often experience reduced social connection, we examined whether functional connectivity (FC) patterns evoked while viewing naturalistic, socially relevant stimuli could distinguish individuals with schizophrenia from healthy controls, as well as reveal differences in FC variability and coordination among key brain regions involved in social processing.

Methods: Individuals with schizophrenia (n=73) and healthy controls (n=67) underwent fMRI while watching naturalistic stimuli (a series of social videos). First, we tested whether it was possible to classify schizophrenia vs. healthy controls based solely on patterns of FC during movie watching. Next, we investigated whether the variability of FC patterns evoked during movie-watching differed between groups, motivated by previous findings that idiosyncratic neural responses are associated with social disconnection. We then applied inter-subject functional connectivity (ISFC) analyses to assess how regions of the default mode network (DMN) differentially coordinate with each other and with regions of other brain networks in a stimulus-driven manner during movie watching in schizophrenia vs. healthy controls.

Results: Using a support vector classifier, we could distinguish individuals with schizophrenia from healthy controls with a 65% accuracy based on their FC patterns during movie viewing. Moreover, schizophrenia patients showed increased variability in FC in the DMN region, consistent with the hypothesis that schizophrenia patients would show relatively idiosyncratic neural response patterns. ISFC analyses revealed that the activity of DMN regions in healthy controls was more tightly coordinated with various other brain areas. Within the DMN itself, several pairs of regions (e.g., the precuneus and medial prefrontal cortex) exhibited reduced stimulus-driven coupling in schizophrenia compared to healthy controls, indicating altered intra-network organization that could underlie impaired social processing.

Conclusions: These findings demonstrate that patients with schizophrenia exhibit distinctive and exceptionally variable patterns of FC involving the DMN during naturalistic social stimulation. Taken together with the reduced stimulus-driven coordination of DMN regions observed in individuals with schizophrenia, these findings align with the idea that less normative neural responses may lead to social dysfunction in the disorder. This study highlights the potential of using stimulus-based FC measures as a biomarker for social dysfunction and paves the way for future work exploring the neural basis of social disconnection.

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P2-F-62 - Neural Similarity in Early Visual Processing and Its Connectivity With Higher Networks Predicts Friendship

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Background and Aims: Birds of a feather flock together, and so do people. Previous research has shown that friends are similar not only in behavior but also in biological features, such as brain function. Existing evidence suggests that friends (defined by social distance within a social network) exhibit the greatest similarity in neural activity within the attention network when viewing natural stimuli. However, whether this neural similarity among friends extends to the early stages of information processing—specifically visual processing—remains unclear. Furthermore, it is unknown whether functional connectivity between early visual processing regions and later-stage regions, such as the attention network and the sense-making-related default mode network, also shows similarities among friends. This study aims to provide a more nuanced understanding of how friends are similar across different stages of the information processing stream.

Methods: We first calculated social distance within a social network (N = 77), defining friends as individuals with a short social distance (e.g., social distance = 1). An eye-tracking experiment was conducted to provide behavioral evidence that inter-subject similarity increases as social distance decreases, using eye-gaze trajectories as an index to reflect visual processing during video viewing. Next, 36 students participated in a functional magnetic resonance imaging (fMRI) study, watching the same video during the scanning session. Inter-subject neural similarities were assessed by analyzing the time course of neural responses in the visual areas and the functional connectivity between visual areas and other brain networks. Ordered logistic regression (OLR) models were used to test whether neural similarity decreases with increasing social distance, with permutation-based significance testing and false discovery rate (FDR) correction applied. Additionally, participants' verbal understanding of the video content in both the fMRI and eye-tracking experiments (N = 63) was recorded to test whether similarity in content understanding decreases as social distance increases.

Results: Behavioral results revealed that inter-subject similarity in both eye-tracking trajectories and verbal understanding decreased as social distance increased. Neural analyses showed that inter-subject similarity of neural responses across different stages of the visual processing hierarchy, from V1 to V5, significantly and negatively predicted social distance. Furthermore, inter-subject similarity in functional connectivity between V5 and higher-level brain networks, including the attention and default mode networks, also predicted reductions in social distance. Granger causality analysis confirmed that information from V5 is transmitted to higher cognitive brain networks, potentially contributing to the similarity in higher cognitive functions (e.g., sense-making) observed among friends.

Conclusions: This study demonstrates that similarities among friends can be observed as early as the initial stages of visual processing, reflected in neural similarity within early visual regions and their functional connectivity with later brain regions. These findings offer deeper insights into the biological bases of similarity among friends.

P2-F-63 Reverse Inter-Subject Functional Connectivity to Reveal Cerebellar-Sensitive Social Cognitive Processes

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Background and Aims: Accumulating evidence shows the cerebellum is not solely involved in motor processing, but rather a host of cognitive processes. These include social-cognitive processes such as biological motion processing and mentalizing. What remains unknown is a mapping of the types of social cognitive processes the cerebellum is involved to subregions of the cerebellum. In this study, we will use a naturalistic fMRI dataset to examine the different social cognitive processes that the cerebellum could be involved in, based on the cerebellum's connectivity to large-scale brain networks.

Methods: This previously collected dataset includes fMRI data from 60 adults (12 male, 46 female, 2 non-binary; 18-30 years, mean age = 21.1 years). Twelve video clips, each two to five minutes long, were presented across four 10-minute runs. The video clips depicted a range of genres including comedy shows, documentaries, and reality television. Data was preprocessed using fmriprep. The video clips will be annotated for various content properties, such as actions, facial expressions, lexical features, and semantic contexts, using a combination of human ratings and machine learning algorithms. Additionally, video clips will be annotated for mentalizing, by a reverse correlation approach examining peak mean activation within the mentalizing network in the cerebrum. A second reverse correlation analysis will be used to examine how regions in the cerebellum for their peak activations during the video clips. The data driven and human rated annotations will give insight into the type of information each cerebellar regions is sensitive to. Next, inter-subject functional connectivity will be used to examine the connectivity profiles of each cerebellar region. A functional parcellation of the cerebellum will be used for individual cerebellar regions of interest in the reverse correlation analysis and the inter-subject connectivity analysis.

Results: It is hypothesized that different social contexts will have different cerebellar activation and connectivity profiles. We hypothesize that medial Crus I/II will have increased activation during situations where biological motion processing will be high, and greater connectivity to visual and somatosensory networks. In contexts that would require more mentalizing, we hypothesize that lateral Crus I/II will have increased activation and connectivity to the default mode network.

Conclusions: The results of this study will provide a dictionary of social cognitive processes in which the cerebellum would be involved in. Using a naturalistic approach in this study affords us the opportunity to examine the cerebellum under conditions which would be more similar to everyday processes, rather than lab-constrained, single domain tasks that are typically used in fMRI studies. This study would also provide for more detailed localization of social processes within the cerebellum, than has been previously presented.

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P2-F-64 Greater Depression Symptoms Relate to Altered Medial Prefrontal Cortex Functional Connectivity During Self-Related Processing

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Background and Aim: An altered view of ones' self is central to depression. Stronger negative self-beliefs are associated with both acute depression and risk for future recurrence. Therefore, identifying the biomarkers of altered self-related processing in depression can provide clearer targets for treatment and prevention. Research demonstrates that within the default mode brain network (DMN), the ventromedial PFC – the anterior hub – specifically represents abstract concepts of the self, whereas the posterior cingulate (PCC) hub integrates autobiographic memory for more detailed, granular self-related processing. We hypothesize that negative self-concepts held by those with depression are more generalized and abstract, leading to a reliance on the vmPFC during self-related processing over the more specific, memory-based PCC.

Methods: To test this hypothesis, we sampled N=199 adults across two studies spanning two sites: 93 with mild-severe symptoms of depression, 39 in remission from depression, and 67 without current or historical psychiatric illness). During fMRI, participants rated how accurately either positive and negative adjectives described themselves and famous others. Depression symptoms were measured with the Hamilton Measure of Depression severity we first extracted average signal for a 10mm sphere in the vmPFC, then used a repeated measures generalized least squares model with a three-way interaction between task features (valence and person) and depression symptom severity, controlling for age, sex assigned at birth, and scan site. The vmPFC seed was also used to test a generalized psychophysiological interaction analysis. An identical model was used to determine whether depression was associated with task-related vmPFC connectivity. All group models were corrected for multiple comparisons with cluster-extent thresholding (a = .005, p = .05, ks > 74).

Results: As hypothesized, we observed a three-way interaction between depression symptoms, valence, and person (self vs. other) in vmPFC connectivity. Specifically, vmPFC connectivity with a bilateral PCC cluster was weaker during negative self judgements than for negative others in those with higher depression symptoms. We also found a valence and depression symptom interaction for vmPFC connectivity with cortical sensory/perceptual regions (right somatosensory cortex, lateral occipital, and middle and inferior temporal gyrus clusters). Here, higher depression symptoms were associated with increased connectivity during negative judgements and decreased connectivity during positive judgements. We did not find evidence of task-depression interactions in the vmPFC's average activation (ps > .4)

Conclusions: These results provide insight into the neural underpinnings of altered self-related processing in depression. Decreased connectivity between the anterior and posterior DMN suggests that more depressed individuals may rely more heavily on broad concepts of the self (i.e. schemas) and incorporate less fine-grained autobiographical detail when making negative judgments about themselves. Future work could explore how altered connectivity maps onto differences in how individual's describe themselves and how these patterns of connectivity change over the course of a depressive episode to enhance our diagnostic, treatment, and relapse prevention models.

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P2-G-65 Do Impressions of Characters and Individual Differences in Viewers Influence Memory of a Narrative?

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Background and Aims: Memories are not exact representations of what we experienced. Rather, they are influenced by factors such as context, emotion, and expectations. One such factor that is crucial to the way we represent everyday events is our impressions of the people around us. However, the way attitudes about people influence memory for events is not well understood. We hypothesized that the extent to which a character is liked, how moral they are perceived to be, and the viewer's personality and moral values will influence how a character is remembered.

Methods: In the present study, participants watched a short film broken into 10 clips where two main characters made morally ambiguous choices. Following each clip, using rating scales and free responses, participants answered questions designed to measure how much they liked the character, how moral they believed the character was, and why they rated the characters as they did. After watching all of the clips, participants were asked to describe everything they remembered from the movie in detail, and provide final descriptions of the main characters.

Results: Our preliminary results show considerable individual variability across character impressions and recall performance, which we will leverage to correlate with impressions and individual differences in personality and moral values. Initial results employing natural language processing tools hint that the language used when formulating impressions of the story tracks with morality ratings of the characters. Bag-of-Words models were highly accurate in differentiating if character ratings were positive or negative based on the key words in the description of the character. The area under the curve of the ROC for using unigrams in descriptions of the man to predict high vs low morality ratings of the man was .97. The area under the curve for using unigrams in descriptions of the woman to predict high vs low morality ratings of the woman was .87. Additionally, linear regression models using standardized character ratings to predict similarity in descriptions of the characters and in recall were significant (p-values < 0.0005 for all models). Ongoing analyses are exploring sentiment analysis tools as a means of characterizing character descriptions and recall across participants. We will also investigate if participants' language and attitudes about the characters are influenced by their own personalities and moral beliefs.

Conclusions: Using two different analysis methods, Bag-of-Words and regression, we have found that there is a significant relationship between words used by participants when describing characters and how they rated the characters. However, the relationship with recall was not always significant with the Bag-of-Words models, and was closer to chance, likely due to the increased amount of Objective information included in the text. While sentiment analysis tools are being explored, thus far, we have had limited success with characterizing free responses (in part, this may be due to limited sensitivity of these tools). Nonetheless, our data support the hypothesis that perceptions of characters influence the language used when describing and remembering the characters.

P2-G-66 Idiosyncratic Neural Responses to Ambiguous Social Situations in Individuals With High Trait Aggression

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Background and Aims: Social interaction involves the interpretation of subtle cues and the formation of appropriate responses. Individuals with high trait aggression are prone to interpret ambiguous situations as hostile, resulting in a greater tendency to act aggressively. However, it remains unclear whether individuals with high trait aggression share a common hostile interpretation of ambiguous situations or if their interpretations are idiosyncratic. To address this question, we used fMRI to examine neural responses to ambiguous social situations in individuals with varying levels of trait aggression. Using inter-subject correlation analysis, we searched for brain areas that are differentially synchronized between participants with high and low trait aggression.

Methods: Forty-three participants completed the Video Social-Emotional Information Processing task (V-SEIP) while undergoing fMRI. The V-SEIP consists of 40 short videos depicting a social interaction between two individuals that were either ambiguous or clearly not aggressive in intent. Trait aggression was assessed using the Life History of Aggression (LHA) scale, and participants were split into high-aggression and low-aggression groups based on the median LHA score. Neural synchrony between every pair of participants was quantified as the inter-subject correlation (ISC) of brain activity during video viewing. We grouped participants into three dyad types based on their trait aggression level: high-high (HH), low-high (LH), and low-low (LL). A linear mixed-effect model (LME) was used to test the effect of the dyad group on pairwise ISC during the video-viewing task. To test the hypothesis that individuals with high trait aggression level had idiosyncratic responses to the videos, we performed planned contrast to identity brain regions where dyads containing high trait aggression individuals had lower ISCs: ISCLL > ISCHH, ISCLH > ISCHH, ISCLL > ISCLH. We controlled for false discovery rate at $q < 0.05$ across all ROIs and contrasts.

Results: ISC was significantly lower between pairs with high trait aggression than between pairs with low trait aggression (ISCLL > ISCHH) within a network of brain regions previously implicated in theory of mind and affective processing. These regions included the temporo-parietal junction, precuneus, ventromedial prefrontal cortex, superior temporal gyrus, and superior parietal lobule, as well as subcortical areas such as the amygdala and nucleus accumbens. Similar results were observed for the other two contrasts (ISCLL > ISCLH and ISCLH > ISCHH), indicating that including an individual with high trait aggression reduced the degree of neural synchrony. Together, these findings suggest that individuals with high trait aggression exhibit idiosyncratic neural responses to ambiguous social situations.

Conclusion: Our findings demonstrate that individuals with high trait aggression exhibit idiosyncratic neural responses to ambiguous social situations, marked by reduced inter-subject neural synchrony in brain regions that are critical for interpreting social cues and evaluating others' intentions. This idiosyncrasy may underlie the tendency to misinterpret ambiguous cues and respond maladaptively, contributing to aggressive behavior. These results provide new insights into the neural mechanisms of social information processing in aggression and highlight the importance of individual variability in understanding maladaptive social responses.

P2-G-67 Unpacking the Association of Mental Representations of Friendship and Well-Being Through the Anna Karenina Principle

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Background and Aims: This study aims to test whether intersubject similarity in mental representations of friendships predicts their well-being. Inspired by the Anna Karenina Principle, which suggests that individuals with higher well-being share common representations while those with lower well-being display more idiosyncratic representations. We examined whether individuals with higher well-being share similar mental representations of friendship.

Methods: In a sample of 1,190 participants, we assessed individuals' mental representations of friendships through a multi-context, two-tier questionnaire, evaluating nine distinct dimensions of friendship such as trust, emotional closeness, and shared interests, across seven different social contexts. Individuals' well-being was computed based on an integrated well-being index, reflecting multiple facets of well-being. We used dyad-level inter-subject correlation (ISC) analysis to explore whether higher well-being was associated with more homogeneous mental representations of friendships.

Results: Our findings showed that individuals with higher well-being indeed displayed higher similarity in their mental representations of friendships compared to those with lower well-being, who exhibited more diverse and idiosyncratic patterns, beta = .133, p = .007. Further analysis using exploratory factor analysis identified three core dimensions underlying mental representations of friendships, including socio-emotional, instrumental, and collectivism. When examining these dimensions separately, our ISC results showed that only the mental representations in the socio-emotional dimension, which is composed of aspects such as trust, shared interests, and emotional support, are significantly associated with their well-being, beta = .278, p < .001. This association suggests that individuals with higher well-being may represent their friendships around shared

socio-emotional frameworks, enhancing their sense of connection and satisfaction within these relationships. In contrast, those with lower well-being tend to have unique, idiographic representations that lack this commonality, potentially contributing to feelings of disconnection.

Conclusions: These findings shed light on the critical role of socio-emotional aspects in friendships for mental health and well-being. Our findings align with the Anna Karenina Principle, indicating that shared positive factors lead to feelings of happiness, while negative experiences such as unhappiness result from diverse deficiencies. By highlighting the significance of emotional bonds in the mental representations of friendships, our findings provide a new perspective on a deeper nderstanding of the psychological mechanisms that link friendships with well-being. Our study contributes to the broader understanding of how shared mental representations within close relationships impact mental health, offering valuable insights for future research and suggesting practical pathways for interventions aimed at enhancing well-being through social relationships.

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P2-G-69 Shared Impressions Track Shared Neural Responses During Narrative Comprehension

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Background and Aims: Perceiving and interpreting others' behavior is central to navigating our everyday social world. When viewing social interactions, how do we dynamically update impressions of others? How are these evolving impressions reflected in neural responses during social perception?

Methods: 36 participants watched a temporally scrambled version of the first episode of a previously unseen TV show, This is Us (41m 40s), while undergoing fMRI. The episode features a multi-threaded narrative involving four characters whose four parallel, interleaved storylines unfold independently and culminate in a major reveal of their relationships at the end. The episode was segmented into 48 scenes, grouped into 10 runs and presented in scrambled order. Participants gained new understandings about the characters as the narrative unfolds. After each run, participants verbally described their thoughts of each character. Thus, each run's verbal report period served as the post-scene thoughts for the current run's movie scenes and as pre-scene thoughts for the next run's scenes. We used gpt-4o to remove noise and extraneous speech features from the verbal report to focus on participants' character impressions.

We parcellated the brain data into 100 cortical (Schaefer et al., 2018) and 16 subcortical (Tian et al., 2020) ROIs. For each ROI, neural similarity of each scene was measured as the intersubject correlations (ISC) of mean time course averaged across voxels. Between-subject thought similarity was assessed as the cosine similarity of semantic embeddings of participants' verbalized impressions of each character extracted using Google's Universal Sentence Encoder. We first measured how thoughts changed over time and differed between individuals. We next conducted intersubject representation similarity analysis (IS-RSA) to link neural and thought similarity.

Results: Within participants, thoughts were more similar in adjacent runs than in distant runs ($z = 2.514$, $p = 0.012$), suggesting that impressions gradually evolve as the narrative unfolds. These thoughts were more similar within- than between-participants, reflecting individuals' unique character interpretations ($z = 22.75$, $p < 0.001$). Greater similarity in thoughts before a scene correlated with increased neural synchrony in the right superior temporal gyrus during that scene (FDR-corrected $p < 0.10$). Higher neural synchrony in the bilateral visual cortex and right auditory cortex during a scene was associated with more similar thoughts after that scene (FDR-corrected $p < 0.05$). Together, these findings suggest that shared neural responses to social interactions track shared impressions of others.

Conclusions: Our results provide preliminary evidence that impressions of others gradually update during social perception and that individuals with similar impressions share similar neural patterns when viewing others' behavior. These findings highlight the evolving nature of representational updates–mental priors track subsequent neural responses during social perception, contributing to shared understandings of the unfolding social interactions.

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P2-G-70 Resting-State Functional Connectivity of the Default Mode Network as a Predictor of Empathy and Altruistic Giving in Pre-Adolescent Girls

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Background and Aims: Increased functional connectivity (FC) within the default mode network (DMN) has been variably associated with levels of empathy, a driver of prosocial behavior (Decety et al., 2016), in adults (Kim et al., 2017; Winters & Hyde, 2022). The DMN, which includes the medial prefrontal cortex (mPFC), lateral parietal cortex, anterior cingulate cortex (ACC), and precuneus, exhibits heightened activity when an individual is at rest and engaged in internally focused and self-referential thought, behaviors that are integral to empathy (Apps et al., 2016; Li et al., 2014; Moriguchi et al., 2007). The mPFC and ACC, in particular, are recruited when individuals engage in prosocial behavior (Cutler & Campbell-Meiklejohn, 2019). Our study extends these prior findings by testing whether FC within the DMN during rest is longitudinally associated with altruistic giving in youth, when pubertal development influences self-referential thought to become more nuanced (Li et al., 2014), an association

particularly important for adolescent girls (Pfeifer & Allen, 2021). We hypothesize that greater FC within the DMN at rest will be associated with higher levels of empathy, predicting altruistic giving during a behavioral task one year later.

Methods: Twenty-nine pre-adolescent girls (Mage = 10.19, SDage = 1.99), recruited from Southern California as part of a larger longitudinal study, completed an 8-minute resting-state fMRI scan (60 slices with a T2*-weighted echo-planar sequence [TR = 800 ms; TE = 30 ms]). Approximately one year later, children participated in a behavioral giving task wherein they were informed that another child in the study ostensibly fell ill with COVID-19 and would be unable to participate and receive their compensation of 20 USD. Children were asked on a scale of 0 (happy) to 20 (unhappy) how they felt for the ostensibly ill child (M = 15.78, SD = 3.34) and whether they would like to donate their study compensation to them. Those who agreed indicated how much of their money they wanted to donate (MUSD = 8.76, SDUSD = 5.69). Children also self-reported their trait empathy with the 21-item Empathy Questionnaire for Children and Adolescents (EmQue-CA; Overgaauw et al., 2017) on a 3-point Likert scale (M = 33.034, SD = 4.05).

Results/Analysis Plan: All data have been collected and processed. We plan to examine FC during resting state using the CONN FC toolbox for MATLAB. Our first-level analysis will test region-to-region FC within the DMN. Our second-level analysis will use mediation analysis to test the association between FC within the DMN as a predictor variable and the size of participants' donation as an outcome variable, with participants' self-reported empathy as a mediator.

Conclusions: By evaluating possible associations between functional brain connectivity at rest and altruistic giving behavior, our study could expand the current understanding of neural activity as one of many components associated with prosocial actions in a younger population. Results could help to inform self-reflection training to increase FC within the DMN and charitable engagement (Thwaites et al., 2017).

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P2-G-71 Structural Neural Correlates of Extraordinary Altruists

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Background and Aims: Extraordinary altruism, defined as extreme acts of selflessness, represents a crucial yet understudied aspect of prosocial behavior. Examples include donating a kidney or a lobe of the liver to a stranger or risking one's life to save others in danger, acts that are exceedingly rare. Standing apart from typical prosocial behaviors, these actions challenge the fundamental assumptions of reciprocal benefits or kinship ties. Understanding the mechanisms driving such behaviors is essential for uncovering the broader spectrum of human altruism. However, little is known about the neural underpinnings in extreme altruists, particularly regarding structural brain features. Rather than relying on individuals in general populations making altruistic decisions in hypothetical scenarios measured in laboratory settings, studying the brain regions of individuals who have engaged in extreme altruistic acts offers a unique opportunity to examine the neurobiological basis of these altruistic behaviors. Moreover, while functional MRI has been widely utilized in altruism research, structural MRI remains relatively underexplored in this context. This research aims to identify structural brain differences associated with extraordinary altruism, helping to uncover the neural mechanisms that may explain why some individuals engage in these exceptional behaviors.

Method: The participant sample includes 60 non-directed kidney donors and 65 typically developing controls, aged 18-65. Structural magnetic resonance imaging (MRI) data were collected and will be analyzed using voxel-based morphometry (VBM) with the standardized ENIGMA-VBM tool to examine gray matter volume differences between the groups. Based on the observed regional differences, correlation analyses will be conducted using the Interpersonal Reactivity Index (IRI) to investigate whether these differences are also behaviorally associated with measures of empathy. Covariates for these analyses will include age, gender, socioeconomic status, and intracranial volume.

Expected Results: We anticipate observing group differences in gray matter volume, particularly in the orbitofrontal cortex, pre- and post-central cortex. The extraordinary altruist group is predicted to exhibit greater gray matter volumes in these areas. It is expected that the Empathic Concern subscale of the IRI will show a positive correlation with the gray matter volumes in these regions.

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P2-G-72 Tracking the Influence of Emotional Uncertainty on Memory for Complex Social Events

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Background and Aims: Whether you're chatting with the barista who's making your morning coffee or watching a conversation between two TV characters on your favorite show, we are constantly attending to and sorting out social interactions that we have experienced and observed. What features of these social interactions are most salient, and what determines what part of these interactions will be more or less recalled? One factor may be the amount of ambiguity or uncertainty experienced during the interaction. The goal of the current study is to use stimulus-based approaches to identify what features of social interactions determine the likelihood and extent of their recall.

Methods: We conducted analyses in a sample of 26 participants (mean age = 24.4 years; age range = 19-44; SD age = 5.6 years; 12 female) that were part of a larger study to examine uncertainty in social contexts. Participants continuously rated how certain they were of a character's innocence or guilt while watching a television episode (The Undoing, HBO Television) while undergoing

fMRI imaging, followed by a free recall session wherein participants were prompted to talk for at least 10 minutes and to try and recall events chronologically. To examine how uncertainty influences memory recall, we leveraged EmoNet (Kragel et al., 2019), a convolutional neural network that identifies the emotional states associated with visual stimuli, coupled with the continuous behavioral ratings. We used EmoNet output to calculate scene-wise emotional entropy (i.e., higher uncertainty detecting the focal emotions associated with the scene). We hypothesized that scenes with higher levels of emotional entropy would be associated with a higher likelihood of recall. To test our hypothesis, we ran a generalized linear model to account for clustering at the scene and participant level.

Results: We found a marginal effect that scenes higher in emotional entropy were more likely to be recalled relative to those that were lower in entropy ($z = 1.807$, $p = 0.071$). To further understand the features that lead to better recall, we used machine learning to identify what emotions enhanced the probability of a given scene being recalled. We found that 54% of scenes recalled had an EmoNet disgust score of 0.13 or higher.

Conclusions: These results potentially indicate that information that is emotionally ambiguous is attended more deeply than information that is more emotionally discernible. Notably, disgust may be the driving emotion behind a given scene being recalled, consistent with its previously identified role in social – and particularly moral – cognition. Neuroimaging implications for both information processing and memory retrieval will be discussed.

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P2-G-73 Lonely Individuals Idiosyncratically Interpret Social Information from Novel Narratives

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Background and Aims: Shared social narratives–whether it is who should win in a love triangle or why an underdog is worth rooting for–help foster common ground and connection between people. Here, we ask whether lonely individuals may form less normative interpretations of narratives about other people, and if so, why?

Prior work shows that lonely individuals exhibit idiosyncratic neural responses while encoding a series of naturalistic videos without an overarching narrative. Additionally, lonelier individuals have idiosyncratic neural representations and linguistic descriptions of well-known celebrities, including people from pop culture. This suggests they have atypical, crystallized social knowledge. Building off this work, we asked whether idiosyncrasy emerges in the learning and memory of new social narratives, and if so, whether neural idiosyncrasy emerges during the encoding and/or consolidation of the narrative**.**

Methods: While undergoing fMRI, participants watched a short trailer for the TV show Orange is the New Black that conveyed a naturalistic narrative consisting of five characters and their relationships. After viewing the trailer, participants completed a resting state scan to measure memory consolidation processes. After the scan session, participants provided free-response descriptions of all characters and their relationships. To measure semantic similarity between participants, we embedded free-response text entries using Sentence Transformers (SBERT) and calculated the cosine similarity between participants' descriptions. To measure similarity in encoding and consolidation processes, we calculated how synchronized participants' neural responses were while watching the trailer (i.e., encoding phase) and during post-encoding rest (i.e., consolidation phase).

Results: We found that, relative to their less lonely counterparts, lonelier participants had significantly more idiosyncratic semantic descriptions for all characters. Interestingly, this relationship between loneliness and idiosyncrasy was not significant for descriptions of relationships between characters. Neural analyses are still ongoing, but preliminary results indicate different brain regions implicated in social cognition may show this same pattern of idiosyncrasy during encoding and rest, while others show greater synchrony among lonely participants.

Conclusions: Whether we laugh, cry, cheer, or curse, the formation of shared social narratives help us connect with the people around us. Our findings suggest that lonely individuals think and talk about other people (but not those peoples' relationships) differently than each other and their non-lonely peers. Furthermore, our neural results suggest that different social cognitive brain regions play distinct roles during the encoding and consolidation phases of memory development to form these unique interpretations. This work helps provide insight into when and how lonely individuals might develop idiosyncratic social knowledge by examining three distinct stages of this process.

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P2-G-74 Conversations With Friends Reduce the Neural Expression of Loneliness

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Background and Aims: Loneliness poses significant physical and mental health risks. One way to reduce loneliness is by enhancing social connections. Conversations are a key way people form and maintain social connections. Here, we tested whether engaging in conversation could decrease loneliness in real-time. Dyads of friends and strangers engaged in naturalistic conversation while undergoing fMRI hyperscanning. We leveraged our validated neural signature of loneliness to decode how much each participant experienced loneliness over a series of short conversations.

Method: We collected fMRI hyperscanning data from 57 dyads (N = 30 friend pairs; N = 27 stranger pairs) as they engaged in 10 3-minute naturalistic, free-flowing, real-time conversations. Dyads were given prompts designed to foster closeness, with the intimacy of prompts increasing with each conversation. Outside of the scanner, participants rated their overall level of

closeness and similarity to their partner and enjoyment of the conversations. They also rated their enjoyment and closeness during each conversation trial at the end of the study. To examine loneliness during conversations, we examine the degree to which participants' whole-brain neural connectivity pattern expressed a previously developed loneliness neural signature derived from resting-state fMRI data in the Human Connectome Project. We applied the loneliness signature to the fMRI data by taking the dot product of the signature, yielding a continuous neural expression of loneliness score for each participant, for each conversation. We analyzed how loneliness differed between friends and strangers and how changes in loneliness over the series of ten conversations predicted overall social outcomes.

Results: We found robust evidence that meaningful conversation can reduce neural expression of loneliness. First, we see that friends' loneliness expression was lower than that of strangers during conversation, suggesting that talking to a close connection diminishes the expression of loneliness more than talking to a stranger. Second, loneliness expressed during the conversation predicted its social outcomes among strangers. The strangers who reported the greatest closeness and enjoyment at the end of the conversation showed the highest neural expression of loneliness at the start of the task, and the largest decrease in neural expression of loneliness over the series of conversations. In contrast, strangers who felt least close increased their neural expression of loneliness over the course of the conversations.

Conclusion: These findings provide evidence that conversation—particularly with a friend—can reduce loneliness, as reflected in a validated neural signature. Even strangers can benefit from conversation. The neural expression of loneliness decreased over time for the most successful dyads. These results underscore the potential of tailored conversational interventions for alleviating loneliness in real-time.

P2-G-75 Default Mode Subnetworks Carry Information About Characters and Their Relationships in an Extended Narrative

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Background and Aims: Social information is a centerpiece of human experience. Despite a wealth of research into the way we understand social relationships and how aspects of social life might be supported by the brain, relatively little is known about how the brain represents individual people and their relationships with others. Further, increasing evidence suggests that representations of complex events are parcellated across subsystems of the "Default Mode Network" (DMN), with some subsystems representing contextual elements of an event and others representing local features. How do intrinsic networks in the brain track people and their connections in complex situations? Here, we sought to understand this issue using an open neuroimaging dataset in which people freely viewed "The Grand Budapest Hotel."

Methods: We used support vector machine classification of fMRI data obtained during movie viewing in 24 healthy young participants. In a separate sample of 7 participants, we obtained descriptions of specific characters from the movie, which were used to analyze semantic overlap between characters and the influence of this overlap on neural patterns. For all analyses, we separately analyzed four subsystems of the DMN: an Anterior-Temporal (AT) network, a Posterior-Medial (PM) network, a Medial Prefrontal (MP) network, and a Medial Temporal (MT) network. We conducted several analyses. First, across each network, we used a classifier to decode the identity of specific characters throughout movie watching. Next, we constructed confusion matrices for main characters in the movie based on (1) co-occurrence and (2) semantic similarity in character descriptions. We conducted linear regression analyses comparing neural pattern similarity across characters to these confusion matrices.

Results: We found reliable character decodability throughout all 4 DMN subnetworks, though character representations were strongest and most consistent in the ATN and MPN. For relationships between characters, neural patterns relating to co-occurrence were evident across all 4 subnetworks, but were weakest in the MPN. Conversely, semantic relationships between characters were most strongly present in the ATN and MPN, with these networks showing a mixture of both types of relational coding between characters.

Conclusions: These data show that subsystems of the brain's DMN carry information about individual people, as well as perceptually and semantically-driven connections between them in an extended naturalistic stimulus. Further, our findings highlight a particularly strong role for the AT and MP networks in representing these types of information.

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P2-G-76 Mentalizing Predicts Loneliness Despite Age-Related Decline in the Brain's Mentalizing Network

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Background: Loneliness has become a critical public health issue, with growing evidence of effects on mental and physical health, including depression, anxiety, cognitive decline, and even premature death. As our global population ages and societal changes reduce face-to-face interactions, understanding loneliness has never been more crucial. Here, we examine the role of one facet of social cognition in loneliness: mentalizing. Does variance in the ability to understand other's inner mental states (mentalizing) explain who does and does not feel lonely? Is this functional link moderated by age-related declines in mentalizing ability, changes in underlying neural substrates, or the number of daily-life social contacts?

Methods: To address these questions, this cross-sectional study utilized data from a sample of younger adults (n=42, 18-30 years) and older adults (n=42, 65-76 years). All participants completed the established EmpaToM task, a video-based social

interaction task assessing affective empathy, compassion, and mentalizing, while their brain activity was measured using fMRI. This project focused on variance in mentalizing abilities, as captured in task-based behavioral performance and brain activation. On the neural level, we identified the mentalizing network using a whole-brain searchlight decoding approach, which identified multi-voxel activation patterns that distinguished mentalizing and control conditions. We then tested if age (years) or self-reported loneliness (UCLA loneliness scores) covaried with neural information in the mentalizing network (covariates in group-level models implemented in SPM12). Finally, we tested if Objective social network size (Social Network Index, SNI) moderated the link between mentalizing brain activity and loneliness.

Results: Behaviorally, we found lower mentalizing accuracies in late adulthood. This was mirrored at the neural level, with significantly lower decoding accuracies in the older adult group in core areas of the brain's mentalizing network like the dmPFC ($p<0.05$, FWE corrected). Interestingly, dmPFC decoding accuracy also varied with people's loneliness (UCLA loneliness scores). This mentalizing-loneliness link was age-independent. Finally, we found that the mentalizing-loneliness relationship in the dmPFC was mediated by Objective social network size (SNI).

Conclusions: Our results point to the important role of mentalizing for variance in people's ability to form meaningful social connections in daily life throughout middle and late adulthood. Specifically, we found that differences in the brain's mentalizing network predicted variance in subjective feelings of social isolation and loneliness, irrespective of age. This relationship was mediated by Objective indicators of daily social functioning (i.e. social contacts in daily life), suggesting that active social engagement might potentially buffer against the effects of age-related neural changes in the brain's mentalizing network.

P2-G-77 Investigating the Automaticity of Face Learning From Exposure to Multiple Images Using Fast Periodic Visual Stimulation (FPVS)

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People are better at recognizing familiar versus unfamiliar faces. This advantage is particularly pronounced in studies using images from real-world settings, often referred to as ambient images, which simultaneously vary across many different visual properties. For example, when participants are asked to sort ambient images of the faces into piles based on facial identity, they perform well with familiar faces, but they tend to sort unfamiliar faces into more piles than necessary. These results suggest that an important part of becoming familiar with someone's face is learning to recognize it across different settings. In support of this idea, past work has demonstrated that exposure to variable images of a person's face improves face learning. Here we investigate the automaticity of this type of face learning by examining whether brief and passive exposure to ambient images of faces will influence responses to facial identity as measured via fast periodic visual stimulation (FPVS). To obtain ambient images of faces, an initial group of volunteers each provided 40 images of themselves for use in research. Currently, a second group of participants, who are not familiar with the initial group of participants, are performing a face learning task with these images. While EEG is recorded, participants view sequences of faces in which multiple images of a single novel identity are presented at a rate of 6 Hz and oddball faces with different identities are presented every fifth face (6 Hz/5=1.2 Hz). Participants indicate when a fixation cross changes color, a task that is not related to the faces. Participants complete two trials for each base identity, allowing us to examine whether exposure to multiple images of a face during the first trial will influence the face individuation response during the second trial. Across all trials, we expect to observe a general visual response at 6 Hz over occipital cortex and beyond. To the extent that participants recognize that the base and oddball faces are different people, we also expect to observe oddball responses at 1.2 Hz and its harmonics over bilateral occipitotemporal cortex, a region involved in face individuation. Very importantly, we are interested in whether the size of the general visual responses and oddball responses will change from the first to the second trial for each base identity. To the extent that face learning is taking place, we expect to observe both decreased responses to the base identity at 6 Hz, because the base images will be more likely to be seen as coming from a single identity, and increased responses to the oddball identities, which will be more likely to be seen as different from the base identity. We expect to observe the interaction between presentation frequency and signal strength over bilateral occipital cortex. If this is found to be the case, this study will demonstrate that face learning can take place in a very short time frame, without participants explicitly attending to faces

P2-G-78 The Cognitive Mechanisms of Social Perception: A Predictive Processing Approach

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Background and Aims: People can flexibly adapt different conceptualizations to predict other agents' behaviors. For example, when making sense of people's movements on a street, one can use simple conceptualizations of patterned behaviors (e.g. people tend to walk in a straight line), or socially motivated conceptualizations (e.g. that person is searching for their friends). The utility of adopting different conceptualization priors is to generate predictions for the following motion. In this framework, the optimal conceptualization serves as a prior to minimize prediction error. Correspondingly, prediction errors serve as signals to adjust the conceptualization, or prior. The aim of this study is to identify brain areas that support conceptualization and the prediction error signals.

Methods: Participants (n=30) completed a social movement prediction task based on the Heider Simmel Paradigm (1944). They watched a cue video showing two squares moving on the screen, guessed where one square would move next, and then saw a feedback video. To manipulate the prior expectation, participants completed the task in two conditions, one in which adopting a non-social conceptualization was more optimal and one in which adopting a social conceptualization was more optimal. In a non-social prior run, 70% of the feedback videos followed a patterned movement. In a social prior run, 70% of the

feedback videos followed an anthropomorphized movement. The remaining 30% of the feedback videos served as prediction error (PE) videos taken from the opposite condition. Critically, the cue videos were identical across conditions; yet, the feedback videos made it more optimal to conceptualize the cue video using a social, or non-social, prior.

The feedback videos were categorized as "congruent" or "prediction error" based on whether the feedback videos showed the same results as the participants' subjective predictions. An omnibus F test was used to identify activation clusters that showed significant variability due to the six (2 cue videos, 2 feedback congruent, and 2 feedback prediction error videos) conditions. To identify common activation groups, betas from activation clusters were submitted to a k-means clustering analysis.

Results: Four groups of activation groups were identified from the k-means cluster analysis. Of these, Group 1 (ventral motor cortex, right thalamus, anterior cerebellum) showed greater activity during the cue period. Group 4 showed higher activations during the cue period and higher activation during social prediction error. Group 2 (anterior prefrontal cortex, anterior mid cingulate cortex, and superior parietal gyrus) showed greater increased activity during the feedback period. Group 3 showed overall reduced activity during the task, and especially cue period, and included the posterior cingulate cortex and posterior lateral cerebellum.

Conclusions: These findings support a functional dissociation between brain regions associated with agentic movement predictions (Groups 1 and 4), which include "mirror neuron" areas, and those associated with prediction errors or mental model updating (Group 2), which includes dorsal and anterior portions of the "default mode network". These collections of areas may underlie generating concrete predictions of agentic movement v. processing errors and updating the conceptualization.

P2-G-79 The Impact of Age-Related Changes in Working Memory and Cognitive Theory of Mind on Lie Detection

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Background and Aims. As scam tactics become more sophisticated, it is increasingly difficult to distinguish between legitimate offers and scams. Substantial age-related declines in prefrontal brain regions can make older adults even more vulnerable to scams due to associated declines in functions necessary for deception detection, including cognitive theory of mind (ToM) and working memory. Relative to working memory, cognitive ToM relies on a more robust network outside of the prefrontal cortex, allowing it to decline more slowly in aging. However, while cognitive ToM has been shown to aid in deception, there is limited evidence on whether it can protect individuals from being deceived and greater cognitive ToM may actually increase susceptibility to scams by increasing empathy for scammers. The present study aimed to clarify the relationship between working memory, cognitive ToM and lie detection in older adults. We hypothesized that older adults would exhibit 1) a truth bias, 2) age-related decline in working memory and cognitive ToM, 3) a negative association between cognitive ToM and lie detection, and 4) the negative association between cognitive ToM and lie detection would be reduced with greater working memory abilities.

Methods. Working memory was assessed through the List Sorting Working Memory Task from the NIH Toolbox. Cognitive ToM was assessed with the cognitive ToM subscales of The Awareness of Social Inference Test – Short. Lie detection was assessed using the LIE Task in which participants made truth/lie judgments about real news clips of individuals confirmed as lying or telling the truth.

Results: Results from a group of healthy older adults (n= 126) found a significant truth bias in the LIE Task (supporting H1), and negative associations between older age and working memory, as well as cognitive ToM (supporting H2). Additionally, greater cognitive ToM abilities were associated with worse lie detection (supporting H3). Finally, we found that greater working memory abilities help to counteract the negative relationship between cognitive ToM and lie detection (supporting H4).

Conclusions: Collectively, results indicated that cognitive resources such as working memory may buffer the negative effects cognitive ToM in lie detection among older adults, ultimately improving lie detection accuracy. This study gives insights on how older adults with more intact cognitive ToM may be particularly susceptible to interpersonal scams, particularly among those with substantial declines in working memory. Therefore, age-related deficits in working memory may be a particularly sensitive signal for increased vulnerability to interpersonal scams and fraud.

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P2-G-80 Neural Entrainment to Cardiorespiratory Rhythms as a Possible Driver of Interpersonal Neural Synchrony

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There is mounting interest in the role of interpersonal neural synchrony (INS) in social behavior, yet research on INS is lacking in theories or models that mechanistically account for brain-to-brain coupling. The interpersonal coupling of slower physiological rhythms, such as heart rate and respiration, has broader empirical support and biological plausibility given that these rhythms operate on the same timescale as human behavior and can be both voluntarily and involuntarily coordinated. The present study explores the possibility that the entrainment of neural oscillations to interpersonally synchronized cardiorespiratory rhythms may mechanistically account for some aspects of INS. Within the individual, fluctuations in heart rate (heart rate variability; HRV) have been found to modulate spontaneous neural oscillations through phase-amplitude coupling (PAC). PAC is a mechanism of organization and cross-frequency communication that has typically been studied in the brain but recently has been shown to

extend to brain-body interactions, wherein the phase of respiratory, cardiac, and even gastric cycles modulates the amplitude of ongoing EEG oscillations. We propose that coupling between HRV and EEG may at least partially account for oscillatory neural synchrony between individuals, as interpersonal HRV synchrony may drive correlated fluctuations in neural oscillations through neural entrainment. The present study tests this hypothesis using a publicly available dataset of 32 dyads interacting in virtual reality with simultaneous recording of EEG, ECG, respiration, and electrodermal activity. We will adapt Methods used to compute HRV-EEG PAC within the individual to assess interpersonal HRV-EEG PAC, wherein we test for systematic relationships between HRV phase of one participant and EEG amplitude of their dyad partner. If HRV-EEG coupling is found to extend across individuals, this may offer a plausible explanation for INS through correlated neural entrainment to synchronized physiological rhythms.

Poster Session 3

Saturday, April 26, 2025

1:50 - 3:00pm

P3-A-1 Neural Mechanisms of Mindful Emotion Regulation Across an Emotional Stroop Task

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Background: Trait mindfulness (TM) is the dispositional ability to be attentive and aware in the present moment with nonjudgmental acceptance. While salutary benefits of mindfulness have been demonstrated, neural mechanisms underlying them remain unknown. Some studies report recruitment of top-down emotion regulatory areas (e.g., prefrontal cortex) and others report recruitment of bottom-up emotion processing areas (e.g., amygdala, insula). This between-study variability suggests that different strategies may be invoked by task variables such as stimulus type, extent of individuals' TM levels, and time course dynamics of mindful emotion regulation. Results from behavioral data suggest a time course dynamic in which higher mindful individuals adapt and update strategies across the duration of an affective task. Specifically, if awareness to emotional stimuli enhances affective influence initially, we expect increased activity in emotion processing areas during early task stages. When such emotions are then regulated through nonjudgmental acceptance, we expect increased activity in top-down regulatory areas during later task stages. We tested whether individual differences in TM predicted changes in brain areas employed across the duration of an emotional Stroop task.

Methods: Forty-three undergraduate and graduate students were recruited to participate in the study. During scanning, participants saw emotional words, appearing one at a time, in either red, blue, green or yellow font colors. They pressed one of four buttons that corresponded to the font color of the word. Words were chosen from the English Lexicon Project and manipulated on valence (Negative and Positive) and arousal (High and Low) resulting in 4 experimental conditions (e.g., Positive valence High arousal). Neutral words served as a control condition. Words were equivalent in length and dominance ratings. TM was measured using the Five Facet Mindfulness Questionnaire. Functional Blood Oxygen Level Dependent images were acquired on a 3T Prisma SIEMENS scanner. Anatomical MPRAGE T1-weighted images were also obtained. fMRI data were preprocessed with a standard pipeline. Linear mixed effects analyses were conducted on the beta coefficients obtained from the first level general linear models for the experimental-control contrasts. Amygdala and insula showed significant decreases in signal over the course of the task for specific contrasts, conditional on TM levels.

Results: Prefrontal cortex showed significant increases in signal over the course of the task for all contrasts during later task stages, conditional on TM levels. These results indicate that higher mindful individuals process, update, and regulate emotions generated by external environments differently over time than lower mindful individuals. Changes in the lateral prefrontal cortex also predicted behavioral performance in the task in specific contrasts. Changes in the medial prefrontal cortex predicted taskunrelated academic performance, measured as GPA (Grade Point Average).

Conclusions: It may be that such time-course changes, in emotion processing and regulation areas, account for between-study variability in the TM literature and comprise the mindful emotion regulation mechanism that underlies the salutary cognitive benefits attributed to mindfulness.

Acknowledgements and Funding: I acknowledge Dr. Lyndahl Himes's contribution to this study and thank the Friends of BrainHealth committee for funding this study.

P3-A-2 Emotion Biases on Explore-Exploit Decision-Making Diminish from Adolescence to Adulthood

Kathy Do[1], Hannah Evans[2], Alexandre Dombrovski[3], Beatriz Luna[3], Michael Hallquist[2]
[1]University of California, Los Angeles, [2]University of North Carolina at Chapel Hill, [3]University of Pittsburgh

Background and Aims: Exploration and learning from reinforcement changes from adolescence to adulthood, potentially promoting future adaptive behaviors. To successfully navigate novel environments, individuals should adjust exploratory behavior based on feedback, typically learning to stay with a rewarded action (exploitative win-stay, WS) and making adjustments after unrewarded actions (exploratory lose-shift, LS). However, less is known about how appetitive and aversive emotional cues affect the adaptive explore-exploit transition across development. The current study tested two hypotheses based on prior findings that suggest cognitive and emotional development tends to prioritize exploitation over exploration as individuals transition from adolescence to adulthood: (1) task-irrelevant emotional cues will disrupt the explore-exploit transition and(2) there will be age-related increases in the WS-LS asymmetry that reflect a great reliance on win-stay behavior for maximizing rewards, particularly in response to emotional cues.

Methods: Seventy-three 13- to 30-year-old participants completed a reinforcement learning task in which they learned to stop a rotating clock hand to win points in the context of a task-irrelevant emotional face (happy, fear, and scrambled). Faster response times (RTs) yielded higher points (decreasing expected value [DEV] reward contingency) on three blocks of trials, whereas slower RTs yielded higher points on the other three blocks (increasing expected value [IEV]). Exploratory behavior was indexed by larger average absolute shifts between previous and current trial RTs ('RT swings').

Results: First, we tested age differences in overall task performance by emotion and reward contingency. Linear mixed effects of mean RT revealed an interaction between age and contingency; this effect did not vary with emotion: The tendency to respond faster for larger rewards (DEV) did not differ by age, but waiting to respond for larger rewards (IEV) increased with age. In addition, there were age-related increases in total earnings. Mean RT during IEV—but not DEV— learning significantly mediated the association between age and total earnings. Second, we examined within-person changes in performance across learning. Linear mixed models of points earned in each run revealed a three-way interaction among emotion, contingency, and behavioral shifts. In DEV learning, individuals who showed larger within-run behavioral shifts (greater exploration) when happy cues were present earned fewer points on the run. This effect was qualified by age, such that happy biases on increased behavioral shifts diminished from adolescence to adulthood.

Conclusions: Our results identify a developmental mechanism explaining how age-related improvements in learning to wait for bigger rewards, rather than responding quickly, promotes adaptive exploratory behavior in complex learning environments. Moreover, emotionally appetitive cues can trigger the expectation of rewards and motivate increased exploratory behavior in adolescence versus adulthood. This tendency during adolescence may be suboptimal when behaviors that lead to positive outcomes should be repeated to maximize future rewards.

Acknowledgements and Funding: This work was supported by NIMH (R01MH048463, R01MH124092 to MNH), California Institute on Law, Neuroscience, and Education (KTD), and UC|CSU Collaborative for Neuroscience, Diversity, and Learning (KTD).

P3-A-3 Emotion Regulation Strategies Moderate the Association Between Anterior Insula Responses to Fairness and Relative Deprivation

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Background and Aims: The Ultimatum Game (UG) has been used to study how offer fairness impacts decisions to accept or reject a proposal. However, while these decisions are made within an experimental context, they are still not made within a vacuum impervious to outside influence. Internal norms calibrate how "unfair" of an offer someone is willing to accept. These internal norms for this financial decision can be influenced by external factors, such as social context of the choice and an individual's socioeconomic status (SES). Further, emotions may impact an individual's internal decision parameters and push them to reject or accept Objectively unfair offers. One that is more adept at bettering theirs and others' emotions, for example, may accept unfair offers more often. We seek to elucidate the respective influence of 1) social context , 2) individual deprivation and community-level deprivation, and 3) emotion regulation on individuals' neural responses to proposed offers varying in fairness and agent sociality during the UG.

Methods: Ninety-four participants (mean age = 34.3, age range = 21-55, SD age = 10.9; 60 female) from our ongoing data collection (Smith et al., 2024, Data in Brief) underwent fMRI scanning while completing the UG task as the responder. Participants responded to offers (5, 10, 25, or 50%) of a $16 or $32 endowment from either a stranger (social) or computer (nonsocial). The Emotional Regulation of Others and Self (EROS) was administered to gather participant scores across four subscales: extrinsic bettering or worsening, and intrinsic bettering or worsening. Participants provided their home address, which was used to determine their Area Deprivation Index (ADI) score, and completed the U.S. Index of Socioeconomic Deprivation (USiDEP) to determine their individual deprivation score. Novel relative deprivation scores were calculated to be the difference between their individual deprivation and their area deprivation scores.

Results: In line with previous research, participants rejected unfair offers at a higher rate compared to fair offers (e.g., Güth et al., 1982). Further, we found that fair offers resulted in activation in the ventral striatum (e.g., Tabibnia et al, 2008), whereas unfair offers elicited aINSactivation (e.g., Sanfey et al., 2003). We also found that participants with lower USiDEP scores had increased activation in the dorsolateral prefrontal cortex (dlPFC) (MNI = 22, 20, 65; 27 voxels, p = .010) as offers from social agents became increasingly (un)fair. We also found that the association between aINS response to fairness and relative deprivation was moderated by extrinsic bettering (MNI = 36, 20, 8; 39 voxels, p = .001).

Conclusions: Overall, our preliminary results are indicative of SES-related differences in neural responses to social agents proposing offers of varying fairness. Our results also suggest that the links between neural responses to fairness and community- and individual-level deprivation depend on emotion regulation strategies. These initial results showcase the interaction between SES and emotion regulation in individuals' perceptions of offer fairness, which may drive social decision making.

Acknowledgements and Funding: This work was supported by a National Institute on Aging grant (R01-AG067011 to DVS), which includes a diversity supplement awarded to MCK.

P3-A-4 Affective Social Episodic Memory Guides Approach Avoidance Decisions About Social Targets

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Background and Aims: Decisions to approach or avoid people shape much of our daily social lives. Research has explored many factors that guide approach avoidance (AA) decisions including physical appearance of the social target, inferences about the target, as well as group-level factors like race and gender. One factor that may be important in understanding how AA decisions are made is memory. In particular, recent work has found evidence that the valence (positive and negative) of social episodic memories may play an important role in subsequent AA decision. However, this past work has only compared positively and negatively valenced stimuli without a baseline comparison. The current study examined how memory for valenced (positive, negative) social targets compared to non-valenced (neutral) social targets affected subsequent AA decisions.

Methods: Participants made impressions (positive, neutral, negative) of social targets comprised of faces and sentences describing behaviors. Then, participants were asked to remember their impression of each social target and asked to report if they would approach or avoid that target.

Results: AA decisions were analyzed based on the impressions participants made of social targets (positive, neutral, negative) and impression memory accuracy and compared decisions to "approach" relative to a 50% baseline. Participants approached social targets significantly more often when they correctly remembered making a positive impression; whereas participants showed no tendency to approach or avoid social targets that they correctly remembered as neutral.

Conclusions: The current study provides further evidence that memory for affective details is a driving factor in AA decisions.

Acknowledgements and Funding: No funding supported this work.

P3-A-5 Unraveling the Dynamic Changes of Mind: The Critical Role of the Dorsal Anterior Cingulate Cortex in Predicting Attitude Changes

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Background and Aims: In everyday life, we are often exposed to debates presenting valid arguments on both sides of an issue. While previous research has identified brain regions associated with one-shot attitude changes, little attention has been paid to the neural mechanisms underlying dynamic attitude changes in response to debatable persuasive information. In this study, we used functional magnetic resonance imaging (fMRI) to investigate how the brain processes debatable information and determines whether and how we change our minds. Moreover, understanding whether neural dynamics in the brain can predict attitude changes is both a fascinating scientific question and a promising area for practical application.

Methods: Thirty-seven participants were scanned using fMRI while watching a video of a debate on a specific topic that presented persuasive arguments on both sides. Participants were initially instructed to rate their attitude toward the topic on a 15-point scale ranging from support to opposition. They were then allowed to adjust their attitude at any time during the video if they felt it had shifted (Fig. 1A). The inter-subject similarity (ISS) in neural responses between pairs of participants while viewing the debate and the similarity in their attitude changes throughout the debate were calculated. We applied inter-subject representational similarity analysis (IS-RSA) to identify brain regions coupled with attitude shifts (Fig. 1B). Additionally, multi-voxel patterns within these brain regions and the functional connectivity of the whole brain with seed regions were used to predict the direction of attitude change at each shift point. Attitude changes were classified into four categories: More Support, More Oppose, Less Support, and Less Oppose, and predictions were made using support vector machines (Fig. 1C).

Results: The greater the similarity in attitude changes among participants, the more similar their neural responses in the dorsal anterior cingulate cortex (dACC, $r = 0.23$, $p = 0.012$, $n = 10000$ permutations). Specifically, increased neural activity in the dACC was observed at the time points when participants shifted their attitudes (Fig. 2A). Moreover, multi-voxel patterns in the dACC and the functional connectivity of the dACC seed region with other brain regions were used to predict the direction of attitude changes. Although the multi-voxel pattern prediction did not achieve above-chance accuracy, the whole-brain functional connectivity with the dACC seed region reliably predicted the four categories of attitude changes (More Support, More Oppose, Less Support, and Less Oppose) with an accuracy of 0.46 ($p < 0.001$; chance level = 25%) (Fig. 2B).

Conclusions: Our study demonstrates that when exposed to debatable persuasive information, neural dynamics in the dACC are coupled with changes in attitude. Furthermore, functional connectivity between the dACC and other brain regions reliably predicts the direction of attitude shifts. These findings highlight the role of the dACC in processing persuasive arguments, with its connectivity being crucial for dynamic reassessment and attitude changes in real-time contexts.

P3-A-6 Temporal Contexts of Effort and Arousal: Decision Speed and Pupillometry Illuminate the Experience of Choice Difficulty During a Novel Risky Monetary Decision-Making Paradigm

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Background and Aims: Choices vary in difficulty and effort is aversive – thus, people typically expend less effort on easier choices and more on difficult choices. However, major models of risky decision-making have not systematically examined the role of cognitive effort in shaping decision processes. This is especially important to understand given that people may budget effort exertion across time as a function of individual differences in cognitive capacity and contextual factors.

Methods: We developed a novel risky monetary decision-making paradigm that quantified individual differences in risk attitudes and used them in real time to create easy and difficult choices tailored to each participant. We analyzed how the deployment of cognitive effort, indexed by response times (RTs) and pupil dilation, was shaped by both current and previous choice difficulty and working memory capacity (WMC). Pupillometry complemented RTs as a context-sensitive, dynamic, and continuous measure of effort throughout each trial and across trials over time.

Results: RTs. RTs were affected by both current and previous difficulty. With increasing current difficulty, RTs were slower. This effect was amplified for high-WMC individuals and was consistent throughout the study. In contrast, greater previous difficulty was associated with faster subsequent decisions. This effect was stronger in low-WMC individuals, but the effect faded by the end of the study for everyone, alongside a general speeding over time.

Pupillometry. Pupil dilation post-choice to pre-outcome reflected global, trial-specific, and individual-level variables. Globally, pupil diameter constricted with increasing time-on-task, especially in low-WMC individuals. Locally, pupil dilation increased after risky choices. Pupil dilation was initially greater in easy, risky choices but changed with increasing time-on-task, with difficult, risky choices eventually linked to greater dilation. Previous difficulty also affected dilation: over time, pupils increasingly dilated as a function of previous difficulty in low WMC people but constricted in high WMC people. Pupil dilation thus likely reflected a dynamic combination of effort (reflecting task difficulty and WMC) and arousal (reflecting uncertainty in risky choices). Preliminary analyses extending to other portions of the continuous pupil response replicated global constriction but also identified unique trial-level effects across different time windows.

Conclusions: We examined RTs and pupil dilation in a risky decision-making paradigm where participants completed individualized easy and difficult choices to examine effort exertion during decision-making. Difficulty affected RTs and pupil dilation in unique ways. Crucially, both the difficulty of the current trial and the preceding trial influenced these effects, which were further modulated by individual differences in WMC. Some of these effects additionally changed over time-on-task, which

might reflect emerging practice effects (reduced reliance on previous contexts) and/or fatigue (reduced arousal on easy, risky choices). These findings serve as initial evidence that the experience of effort in risky decision-making is dynamic, sensitive to individual differences, and responsive to both immediate demands and recent context. Understanding how effort is exerted and experienced, across individuals and over time, will be critical to understanding not just what choices are made, but how and why.

P3-A-7 The Role of Moral Anger in Misinformation Sharing: An Affective Harm Account Perspective

Xiaozhe Peng[1], Hongbo Yu[2], Shenyuan Guo[1], Haoyang Jiang[1]
[1]Shenzhen University, [2]University of California, Santa Barbara

Background and Aims: Understanding the mechanism behind sharing misinformation is critical for mitigating its spread. Previous research highlights moral outrage as a key driver of sharing behavior on social media. However, the distinct roles of moral anger and disgust, two core components of moral outrage, remain unclear. Additionally, sympathy, a moral emotion directed toward victims may also increase sharing behavior. The present study aimed to investigate how different moral emotions affect the sharing of misinformation, over and above content credibility. We conducted four experiments and applied computational modeling to quantify decision-making processes underlying online sharing behaviors.

Methods: Participants read moral-related news headlines and rated their willingness to share (WTS) each news. Headlines were presented one at a time in a random sequence, varying in source credibility and severity of moral transgression

Specifically, Study 1 manipulated the information focus by prompting the participants to pay attention to the morality or accuracy of the news headlines. Before reporting their WTS, the accuracy prompt group first rated the accuracy, while the morality prompt group first rated the moral violation. The control group only rated WTS.

Studies 2 and 3 elicited different moral emotions prior to reading and sharing headlines (anger and disgust for Study 2, anger and sympathy for Study 3). Lastly, in Study 4, we elicited moral anger (vs. neutral) and used Hierarchical Drift-Diffusion Model (DDM) to examine how such emotional states influence the decision-making processes underlying information sharing behaviors.

Results: Study 1 showed that participants' WTS increased as the severity of moral transgression in headlines rose (main effect of transgression: B±SE = 0.54±0.1, t = 5.32, p < .001). It is unsurprising that higher source credibility generally increases participants' WTS (for the Study 1, 2, and 4, all ps < .001). However, this effect was moderated by other factors. Interestingly, we observed a three-way interaction: participants in the morality prompt group cared less about the source credibility (prompt*credibility*transgression interaction: B±SE = -0.67±0.31, t = -2.15, p < .05).

Study 2 showed that moral anger elicitation led participants to care less about the source credibility (elicitation*credibility interaction: B±SE = -0.52±0.13, t = -3.97, p < .001).

Study 3 and Study 4 consistently showed that moral anger elicitation made participants more likely to share (main effect of elicitation: B±SE = 0.29±0.13, t = 2.33, p < 0.05; B±SE = 0.36±0.08, t = 4.71, p < .001, respectively).

Moreover, DDM in Study 4 showed that when moral anger was elicited, participants exhibited lower decision thresholds (95% CI = [–0.88, –0.34]) and higher drift rate towards the sharing decision boundary (95%CI = [0.00, 0.17]).

Conclusions: These findings suggest that morality mindset, especially moral anger, increases online sharing behaviors, possibly by reducing the requirement on information accuracy or source credibility. In contrast, disgust and sympathy do not exhibit similar effects. These results align with the Affective Harm Account, emphasizing the key influence of moral anger in driving misinformation transmission, and shed light on potential interventions targeting emotional triggers on social media.

P3-A-8 A Comparison of the Reward Positivity in the Doors and Stopwatch Tasks: A Source Localization Study

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Background and Aim: Reward is an essential component of everyday life. Dysfunction in reward processing has been linked to symptoms in several mental health conditions including anhedonia in major depressive disorder. A neural signature of reward processing is the reward positivity (RewP), an event-related potential measured using electroencephalogram (EEG) at frontocentral electrodes at 250 to 350 ms following reward feedback. Previous studies have implicated areas such as the anterior cingulate cortex (ACC), ventral striatum, and ventromedial prefrontal cortex (vmPFC) as neural generators. Paradigms such as the Doors and the Stopwatch tasks elicit the RewP. However, the relative efficacy of these tasks in eliciting the RewP and their corresponding neural source remains unclear. Thus, we will examine the difference in RewP amplitude across the Doors (guessing/chance) and Stopwatch (perceived performance) tasks and what regions are implicated as neural generators of the RewP.

Methods: Participants (target N = 60; >=18 years) will complete in randomized order the Doors and Stopwatch tasks. Participants will wear a 256-electrode cap for continuous EEG recording. In the Doors task, participants will focus on a fixation cross in the middle of the screen until two doors appear. Participants then pick the door they believe will lead to a reward. If they click the correct door, a green 'Win' appears. A red 'Lose' appears if they click the wrong door. In the Stopwatch task, participants see a stopwatch that starts counting up, which is covered by a box at two seconds, and they are instructed to click when they feel three seconds have passed. Participants receive a green 'Win' or red 'Lose' feedback. Half of the participant sample has been collected and data analysis is expected by April 2025.

EXPECTED Results: A 2 x 2 repeated measures ANOVA will be conducted to analyze RewP amplitudes extracted from the frontocentral electrodes across types of tasks and feedback. GeoSource software will be used to estimate the neural generators

of the RewP. Across these tasks, we expect to observe larger RewP amplitudes for the win than the loss feedback with the underlying brain activity sourced in the ACC and vmPFC. We also expect to see variation due to the different reward types on the RewP and its neural source.

Conclusions: This study's expected results will help clarify how different reward types influence the RewP and its neural source. The results can help guide future research by identifying which types of tasks are most effective in eliciting the RewP and activating its underlying reward circuitry. By comparing different types of rewards, this study clarifies inconsistencies in the current literature and contributes to the general understanding of how variability in reward type influences engagement of the reward system.

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P3-A-9 Identification of Social Computational Phenotypes Associated with Hitop Transdiagnostic Dimensions and Spectra

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Background: The ability to learn about other people and make social decisions is critical for successfully navigating our complex social environment and the consequences of failure can be severe (e.g., loss of employment, damage to relationships, etc.). Impairment in the social processes that support this ability is a key component of dysfunction across many mental health disorders. However, there has been a lack of systematic, data-driven research on the relationship between socio-cognitive impairment and mental illness. Moreover, what research exists has been limited in the social processes it surveys, disorder-focused, and population-specific, in sharp contrast to efforts to reconstrue mental health within a multidimensional set of transdiagnostic spectra (e.g., the NIMH research domain criteria; RDoC, and the Hierarchical Taxonomy of Psychopathology; HiTOP). Computational Psychiatry has had great success using computational approaches to decompose behavioral indicators of mental disorder into their component processes and identify computational phenotypes. However, this research has focused primarily on nonsocial learning and decision-making (LDM). A critical next step is the systematic data-driven exploration of how mental health spectra map onto social computational phenotypes. Here, we will systematically investigate the social-cognitive aspects of individual differences in mental health with the goal of identifying social computational phenotypes (SCPs) that correspond to distinct transdiagnostic mental health spectra.

Methods: To target a breadth of social LDM processes, participants (N=1000; 50% female) will complete tasks assessing three levels of learning: nonsocial learning (i.e., about non-social targets), trait learning (i.e., learning about individual-trait associations with no Theory-of-Mind; ToM), and ToM learning (i.e., learning about and inferring the preferences of individuals under different contexts). Given evidence that clinical populations and neural systems can be sensitive to reward type (i.e., monetary vs. social) and the presence of reward (i.e., reward-based vs information-based learning), tasks will also vary in feedback type (informational, monetary, social). To assess a broad range of mental health dimensions and spectra, participants will complete the HiTOP Self-Report measure (HiTOP-SR). We predict that, H1: individual variation along distinct HiTOP dimensions will be associated with distinct SCPs, and H2: A subset of SCPs associated with distinct HiTOP dimensions will distinguish between the learning level (nonsocial/trait/ToM) and/or feedback content (informational/monetary/social) of LDM.

Data Analysis: Participant-level social LDM model parameters will serve as outcome variables in multiple regressions against spectra, subfactors, and syndromes of the HiTOP to identify specific SCPs that are associated with distinct components of the HiTOP. Identified HiTOP component scores will also be incorporated into the SNSL and ToML models as parameters with single group-level weights and Bayesian model comparison will be utilized to identify combinations of components that best explain participant responses across the tasks.

Conclusions: These findings will improve our understanding of the relationship between social LDM and mental health, elucidate the etiology of psychopathology, help to identify novel targets for treatment, and provide a model for future research.

P3-A-10 Prospective Estimates of the Cognitive Cost of Self-Control Preferentially Engages Anterior Prefrontal Cortex

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Background: Decades of work have suggested that humans find the deployment of self-control to be subjectively effortful. We recently provided a direct test of this notion by quantifying the monetary cost choosers were willing to pay to use prospective strategies that allowed them to avoid tempting foods that could lead to self-control failures. In the current study, we extended this work to test what brain regions encode prospective estimates of how cognitively costly self-control is predicted to be. Although a large body of work points to the dorsolateral prefrontal cortex (dlPFC) as a core brain region that facilitates the successful execution of self-control, we hypothesized that the prospective nature of our self-control task would engage more anterior brain regions (e.g., frontopolar cortex, or FPC) as well as regions involved in aversive processing (e.g., insula), pointing to self-control exertion as costly and aversive.

Methods: Healthy dieters (N=46) completed 180 trials of a self-control decision task during which they were presented with images of low, medium and high-tempting snack foods. After each presentation, participants reported their willingness-to-pay (WTP; from $10 study endowment) to avoid encountering each these foods for different intervals of time. Brain activity was modeled during the 4s decision period with a parametric modulator of WTP value as a proxy of the perceived cost of using self-control.

Results: Higher WTP yielded increased activation in bilateral frontopolar cortex, as well as in the right dlPFC, pointing to a central

role in these brain regions in estimating the perceived cost of self-control. To track the extent of this effect from anterior to posterior PFC, we next examined a gradient of prefrontal activity ranging from dlPFC coordinates reported in past neuroeconomic work to be critical to the execution of self-control decisions to more anterior regions reported in past work to be involved in prospective decision-making (FPC). The strength of our effect increased across the posterior-to-anterior gradient with dlPFC regions involved in control execution showing the weakest effect ($p = 0.124$) and anterior FPC involved in prospective control showing the strongest effect ($p = 0.009$).

Conclusions: Our findings reveal a neural mechanism through which temptation intensity increases the cognitive cost of using self-control and further suggests that exercising self-control engage a distinct neural circuit than those traditionally involved in implementing control. Understanding the basis of these cost estimates may provide neural targets to help improve the success of self-control strategies.

P3-A-12 Neurobiological Trajectories of Gaming Disorder in Adolescents: A Longitudinal ABCD Study Analysis

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Background and Aims: Adolescence is a developmental period marked by significant neurobiological changes that heighten vulnerability to gaming disorder, a behavioral addiction characterized by impaired control over gaming and associated negative personal, social, and academic consequences. According to the I-PACE and Competing Neurobehavioral Decision Systems models, gaming disorder arises from an imbalance between impulsive reward-seeking (System 1) and self-regulation deficits (System 2). This study investigates the neural underpinnings of gaming disorder using longitudinal fMRI data from the Adolescent Brain Cognitive Development (ABCD) study, focusing on the interplay between reward sensitivity and impulse control mechanisms.

Methods: Participants were drawn from the ABCD study, comprising 1,367 adolescents at two time points 2 years apart. Gaming disorder symptoms were assessed using the Video Game Addiction Questionnaire (VGAQ), with participants categorized into typical/normal or problematic/clinical gaming behavior groups. Neural activity related to reward processing and inhibition was measured using the Monetary Incentive Delay (MID) task, which examines responses to reward and loss anticipation. Functional connectivity analyses targeted the ventral striatum (VS) as the seed region, with a focus on its interaction with areas in the limbic system (System 1) and the prefrontal cortex (System 2).

Analysis Plan: Seed-based functional connectivity analyses will assess the neural mechanisms underlying gaming disorder. Connectivity between the VS and PFC regions will be calculated for reward and loss anticipation conditions. Psychophysiological interaction (PPI) analyses will model task-dependent functional connectivity, identifying whether connectivity differs by gaming disorder severity.

Longitudinal analyses will evaluate changes in functional connectivity between two time points over a period of two years, examining whether disrupted connectivity patterns persist or evolve over time. Cross-Lagged Panel Model (CLPM) will explore associations between functional connectivity patterns outlined above and gaming behavior, controlling for sex. This analysis will providing insights into cause and effect relationships between reward sensitivity and inhibition at the neural level, and gaming behavior at the behavioral level.

Conclusion: We anticipate reduced connectivity between VS and System 1 and System 2 regions in problematic/clinical gaming behavior adolescents compared to typical/normal adolescents. These findings would support the I-PACE and CNDS models in suggesting that the poor integration of both systems predisposes youth to impulsive, reward-seeking behaviors, increasing the risk of gaming disorder. Longitudinally, we expect to find a mutually reinforcing, bi-directional relationship between poor integration of control signals (disrupted connectivity) and gaming behavior. Targeted interventions that strengthen cognitive control, such as cognitive training and reward management techniques, may help mitigate this risk. Limitations include the exclusive reliance on the MID task, which may not capture the full complexity of gaming behaviors, and the potential underrepresentation of clinically diverse populations. Further research is necessary to validate the findings and expand their applicability.

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P3-A-13 Differences in Adolescent Male and Female Resting-State Functional Connectivity of Problematic Media Use

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Background and Aims: Digital media is pervasive in adolescence, with 97% owning a smartphone (Petrosyan, 2024) and 80% a gaming console (Vogels, 2022). Problematic media use (PMU) is characterized by impaired control over digital media use, despite negative personal, social, or academic consequences. According to the I-PACE model (Brand et al., 2016; 2019), PMU behaviors arise from interactions between neurobiological traits, psychological characteristics, and mediating factors such as sex. Adolescents are particularly vulnerable to PMU due to neurodevelopmental shifts during this period, especially in brain regions linked to reward processing and impulse control. PMU may reflect an imbalance between the Ventral Attention Network (VAN; compulsive attention shifts; System 1) and the fronto-parietal network (FN; higher-order cognition; System 2; Chen et al., 2024), with differences expected across sexes due to variations in media preferences.

Methods: We analyzed data from 1,367 adolescents (52% female) from the Adolescent Brain Cognitive Development (ABCD) dataset who completed resting-state fMRI scans at ages 11-12 (Time 1) and 13-14 (Time 2). PMU was assessed using the Problematic Media Use Measure (PMUM; Domoff et al., 2019), and participants were classified into typical or clinical PMU groups. Brain connectivity was examined within and between VAN and FN networks using Fisher-transformed correlations.

Participants with excessive movement or less than 7 minutes of resting-state data were excluded.

Analysis Plan: We will compare VAN-FN co-activation, calculating standardized beta values as measures of system interaction. A Cross-Lagged Panel Model will assess longitudinal relationships between VAN-FN imbalance, PMU development, and sex from Time 1 to Time 2.

Conclusions: This study tests the hypothesis that adolescents with PMU prioritize immediate rewards over long-term consequences due to heightened reward processing and limited impulse control. We expect this imbalance to differ by sex, reflecting differences in media preferences (e.g., boys prefer video games, girls prefer social media). Findings could inform early interventions targeting executive function development, such as cognitive training to improve impulse control and decision-making. Identifying hyperactive reward systems may guide reward management techniques to reduce PMU behaviors.

Limitations include reliance on resting-state data, which reflects passive rather than active reward processing, and exclusion criteria that may underrepresent adolescents with severe PMU, such as those with ADHD or autism. Future research should include more diverse clinical populations to address these gaps.

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P3-A-14 Predicting Internalizing Symptoms in Early Adolescence from Computational Cognitive Profiles of Risk, Reward, and Social Processing

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Background and Aims: Adolescence is marked by heightened exploration and risk-taking, both crucial for development. However, it is also a period of increased vulnerability to internalizing symptoms, which are often linked to blunted reward responsiveness and altered exploration tendencies. Despite the contrast, little research has examined how risk and reward processing in adolescence relate to internalizing symptoms. Furthermore, adolescence is also uniquely associated with heightened sensitivity to peer influence, with deficits in social information processing suggested to play a role in anxiety progressing into comorbid depression. Leveraging behavioral data from the large-scale Adolescent Brain Cognitive Development (ABCD) dataset, we aim to adopt computational modelling to characterize the cognitive components underlying internalizing symptoms in adolescents.

Methods and Analysis Plan: We plan to utilize trial-level data from three cognitive tasks, the game of dice task (GDT), delay discounting task (DDT), and social influence task (SIT) from their initial collection in the ABCD dataset (N = 10,001, age 10-12). In the first phase of analyses, we are developing and fitting models on participants' decisions in each task, identifying the best-fitting models, and deriving individual parameter values. GDT assesses risky decision-making between four options varying from riskier (low probability, high gain vs high probability, high loss) to safer (high probability, low gain vs low probability, low loss). Using models derived from Prospect Theory that consider the cumulative outcomes, we will estimate risk aversion, loss aversion, and choice consistency (inverse temperature). DDT estimates how one devalues delayed reward, with participants choosing between a small, immediate reward and a larger, distant reward. We adopt a hyperbolic discounting model to estimate discount rate and inverse temperature. Finally, in SIT, participants rate to what extent they perceive given scenarios as 'risky'. They are then shown the average ratings provided from peers (manipulated to be higher or lower than theirs) and asked to rate the riskiness of the scenarios again. We plan to estimate the influence of peer ratings on participants' final risk assessments, also incorporating initial rating uncertainty and the direction of influence. In the second phase of our analyses, we will cluster participants based on their 'parameter profiles' using K-means clustering and explore potential associations with internalizing symptoms measured with the Child Behavior Checklist. Initial analysis will identify profile categories that predict specific internalizing symptoms cross-sectionally, with plans to expand the findings longitudinally.

Implications: Our findings will enhance our understanding of the cognitive mechanisms associated with risk-taking, reward processing and social influence in early adolescence, which may contribute to internalizing symptoms during this key period of development. Furthermore, the identified profiles may have implications for targeted prevention and intervention strategies for youth, through facilitating early detection of risky phenotypes.

P3-B-15 Interplay of Working Memory Capacity and Cognitive Control in Emotion Regulation: An EEG Analysis of Frontal Midline Theta Contributions

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Background and Aims: Understanding the role of working memory is crucial for comprehensively grasping the dynamics of emotion regulation (ER) and cognitive control, as it serves as a foundational cognitive resource that influences how individuals manage their thoughts, emotions, and behaviors. This study aimed to examine the role working memory capacity (WMC) has on Frontal Midline Theta (FMT), an EEG marker for cognitive control, and two common ER strategies emotional suppression and cognitive reappraisal.

Methods: In order to determine WMC, participants performed an Operation Span task. Participants then completed an ER task, where they viewed a series of negative images and were instructed to either passively view, suppress their reactions towards, or rethink the context of the images. Following the presentation of each image, participants were prompted to rate the pleasantness of each image. Scalp electroencephalography was recorded while participants performed the ER task.

Results: Behavioral results revealed that participants rated negative images significantly more pleasant during cognitive

reappraisal than during the passive viewing condition. This significant pleasantness score difference was not seen while participants utilized emotion suppression. Additionally, FMT power was significantly greater during both regulation conditions than during the passive viewing condition. Although WMC did not account for changes in pleasantness ratings, there was a significant negative relationship between WMC and FMT change, whereby individuals with higher WMC scores showed reduced FMT while performing cognitive reappraisal than during the passive viewing condition. This relationship with WMC was not seen during the emotional suppression condition.

Conclusions: Similar to previous reports, cognitive reappraisal had greater emotional benefits (as revealed by increased pleasantness ratings) than emotional suppression. The increase in FMT during both strategies demonstrates that cognitive control is recruited during ER regardless of the strategy. Although WMC did not relate to the emotional outcome of utilizing either ER strategy, the significant negative relationship between the change in evoked FMT activity between the cognitive reappraisal and passive viewing conditions suggest that individuals with higher WMC required less recruitment of cognitive control neural resources during cognitive reappraisal in order achieve the same emotional benefits of the ER strategy as people with low WMC. These findings highlight the nuanced role of WMC in ER, suggesting a potential pathway for optimizing emotional outcomes through tailored strategies based on individual cognitive profiles.

P3-B-16 Multivariate Brain Prediction of Inflammatory Responses to Social Evaluative Threat

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Background and Aims: A small but growing literature suggests that greater activity in the salience network (i.e., amygdala, sgACC) and default mode network (i.e., dmPFC) during social evaluative threat is associated with inflammatory reactivity (Muscatell et al., 2015; Muscatell et al., 2016; Slavich et al., 2010). This literature is based on mass-univariate analyses, which are useful for considering the explained variance in stress responses when brain regions are considered in isolation; however, mass-univariate analysis ultimately explains much less variance in the variable of interest compared to whole-brain predictive modeling (Woo et al., 2018). This pre-registration aims to outline planned analyses to identify a multivariate neural pattern predictive of inflammatory responses to social evaluative threat.

Methods and Analysis Plan: One hundred one healthy young adults (Mage = 20.3 years old, 57.1% female, 42.9% male; 65.3% White, 14.9% Asian American, 13.9% Black American, 5.9% Multiracial; 90.1% Not Hispanic) underwent an MRI where they received negative, neutral, and positive evaluative feedback from a race and sex-matched confederate. Blood samples taken before and after the stressor were assayed for circulating levels of interleukin-6. MRI data from 90 participants were preprocessed in fMRIPrep 22.1.1, and preprocessed data were spatially smoothed (5mm FWHM) and high pass filtered (128 s) in FSL 6.0.3. Traditional univariate analyses conducted in FSL revealed that viewing negative relative to neutral feedback was associated with greater activity in a large cluster of voxels encompassing areas of the ACC, mPFC, inferior frontal gyrus, paracingulate gyrus, left caudate, PCC, and precuneus (cluster thresholded at $z > 3.1$, $p < 0.01$). For the prediction analysis, we will test whether individual differences in brain activity during social evaluative threat predict inflammatory reactivity. We expect that multivariate patterns across the SN and DMN evoked by negative feedback trials will predict the change in IL-6 levels from baseline to 90-minutes post-stressor. To estimate the model parameters, we will use principal component dimensionality reduction of the condition maps for negative trials combined with least absolute shrinkage and selection operator within to estimate the model parameters (LASSO-PCR; Wager et al., 2011, 2013). To establish the generalizability of the predictive map, we will implement nested and k-fold cross-validation (Gianaros et al., 2017; Kohoutová et al., 2020).

Conclusions: Results from these analyses would be an important first step in identifying a generalizable predictor of individual differences in stress-related inflammation and would inform our understanding of brain-immune interactions.

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P3-B-17 The Impact of Inflammation on Emotion Regulation Networks in Youth Exposed to Early Life Adversity

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Background. Early life adversity (ELA) is a prominent risk factor for poor psychosocial outcomes, including deficits in emotion-related functioning such as difficulties with emotion regulation. Emotion regulation is a critical skill that develops over adolescence, providing adolescents with an important opportunity to refine their repertoire of emotion regulation strategies. Additionally, problems with emotion regulation skills are strongly linked to maladaptive mental health outcomes. However, the neurobiological mechanisms by which ELA leads to difficulties with emotion regulation skills are still largely unknown. Emerging evidence suggests stress-related inflammation as a potential pathway underlying altered neurodevelopment associated with emotion regulation, including corticolimbic circuitry. In particular, research points to the role of peripheral cytokines given that they are able to access the brain in multiple ways, demonstrating neuroimmune communication.

Study Aims & Hypotheses. Therefore, the present pre-registered study (https://osf.io/5cf4v) seeks to examine how inflammatory signaling affects brain circuitry important for emotion regulation in a sample of youth exposed to ELA and to explore immune dysregulation as a mechanistic pathway explaining the links between ELA and corticolimbic circuitry during explicit emotion regulation. We hypothesize that higher levels of inflammation will be associated with (1) greater amygdala activation when reacting to negative images (2) reduced frontoamygdala connectivity during reappraisal of negative images

(3) greater negative affect during reappraisal of negative images (less emotion regulation success). We also hypothesize that increases in pro-inflammatory markers will mediate the association between ELA and increased threat-related brain activation and reduced frontoamygdala connectivity.

Methods & Analysis Plans. This analysis leverages data from a larger existing study examining the effects of early life experiences on socioemotional development. This sample consists of youth who have experienced a severe form of ELA in the form of previous institutional orphanage care and comparison control youth reared by their biological parents. 89 participants provided both blood samples to be assayed for circulating markers of peripheral inflammation and underwent a functional scan during a reappraisal task that probes explicit emotion regulation. This task leverages a cognitive reappraisal emotion regulation strategy by assessing the participant's ability to emotionally distance oneself from threatening or aversive social stimuli. We will assess two different aspects of emotional functioning from this task: emotion reactivity (reactivity/negative > reactivity/neutral) and emotion regulation (reappraisal/negative > reactivity/negative). Participants also complete subjective affect ratings so that we can assess emotion regulation success – the extent to which participant's self-report negative affect decreased during the reappraisal v. reactivity trials.

General Implications. It is imperative to increase our understanding of the effects of ELA on neurobiological development to improve psychosocial outcomes. Inflammation is a promising modifiable but understudied target that may be a key pathway between ELA and long-term psychosocial outcomes. Findings from this work will increase insights into neuroimmune signaling as a potential target to improve emotional functioning in adolescents.

P3-B-18 Person-Specific Changes in Brainstem-Cortical Functional Connectivity During Social Stress: A 7T fMRI Study of Humans

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Objective: Social stress is thought to emerge from a system including brainstem nuclei (e.g., periaqueductal gray, PAG) and cortical regions (e.g., anterior insula). However, little is known about how functional interactions between the brainstem and cerebral cortex reconfigure during stress. Additionally, the brain is likely a degenerate system, in which different structures can produce the same function. Yet statistical analyses of the brain often downplay this property, which implies variation between individuals, in favor of simply interpreted group-level aggregates. We aimed to characterize how a degenerate, distributed system of brainstem nuclei and cortical regions reconfigures its functional connectivity during periods of social stress using ultra-high field (7 Tesla) fMRI.

Methods: In a sample of healthy adults (N = 72; mean age = 27.0 ± 6.4 years, 32 women/40 men), we estimated functional connectivity (FC) between 360 cortical and 58 brainstem regions during thirty minutes of resting-state and a Trier social stress task (i.e., speech preparation). We tested FC stability in resting-state vs. stress in the full FC matrix (i.e., accounting for all brainstem-brainstem, brainstem-cortical, and cortico-cortical connections) and at individual connections. We conducted group-average analyses, as well as subject-level analyses allowing for degeneracy.

Results: In group-average analyses, FC appeared largely stable between periods of rest and stress. Full FC matrices for each condition were highly correlated (r = .96). T-tests of individual connections revealed significant (pFDR < .05) stress-related changes in 0.9% of brainstem-brainstem, 3.6% of brainstem-cortical, and 8.8% of cortico-cortical connections. We observed FC changes in the previously implicated regions (PAG, anterior insula), as well as numerous additional regions. In particular, this included connections between somatomotor cortical regions and dopaminergic (ventral tegmental area) and cholinergic (laterodorsal tegmental nucleus) brainstem nuclei, and between the salience and default mode cortical networks. However, analyses at the subject level revealed FC to be less stable between periods of rest and stress. Subject-specific full FC matrices for each condition were moderately correlated (M r = .64, SD r = .07). Bootstrapping analyses at the subject level revealed that the proportion of connections that significantly changed during stress varied between subjects, ranging from 0.0-12.3% of brainstem-brainstem, 0.0-21.1% of brainstem-cortical, and 0.3-19.8% of cortico-cortical connections. The regions displaying FC changes also varied widely between subjects.

Conclusions: For most subjects, a distributed system of brainstem nuclei (including multiple neuromodulatory systems) and cortical regions (including multiple networks) reconfigured its functional interactions during periods of social stress. This system is broader than previous descriptions of the brain system involved in social stress, and its constituent parts may reflect the specific demands of the speech preparation task. Crucially, the extent and nature of these changes were specific to the person, suggesting future studies of the brain basis of stress should allow for degeneracy.

P3-B-19 Social Insensitivity is a Protective Factor for Depression in Low Social Cohesion Environments

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Background: Social baseline theory suggests that the social coping strategies with stress can engender better mental and physical health outcomes via ecophysiological mechanisms. However, the strategy leveraging social resources may also be vulnerable in low social cohesion settings. Research in our labs suggests that some individuals exhibit a "socially insensitive" phenotype marked by blunted neural responses to both social resources and threats combined with a hyper-self reliant stress-coping style. We asked if this social phenotype might be useful to buffering depressive symptoms in a low social cohesion context.

AIMS: This study investigates the association between neural sensitivity to social inclusion, exclusion, and depressive symptoms in the different context of social cohesion. We hypothesized that higher neural responses to social inclusion and exclusion will correlate with increased depression symptoms, but lower neural responses to both inclusion and exclusion in the dACC, anterior insula (AI), and dlPFC will correspond to lower levels of depressive symptom in low social-cohesion environments.

Methods: Forty-four undergraduates (30 cisgender females) completed a Cyberball task during multi-echo fMRI and questionnaires on depression, life history, and neighborhood cohesion. Social cohesion was measured as a latent factor score from exploratory factor analysis using social context questionnaires. The measures along with perceived ostracism distress, were used in a hierarchical cluster analysis to identify three social phenotypes. Neural sensitivity to ostracism inclusion was operationalized as Z statistics for each ROI from the contrast between inclusion (ball tossing between participant and confederates) in the inclusion block and ostracism in the exclusion block. Neural sensitivity to ostracism was derived from the contrast between ostracism (ball tossing between confederates only) and initial inclusion (participant and confederates) in the exclusion block. Linear regression models were conducted to test the effects of cluster type on the association between neural sensitivity, and their associations with depressive symptoms.

Results: The findings identified three distinct clusters: (1) high levels of perceived social ostracism and social cohesion, (2) low levels of perceived social ostracism and high social cohesion, and (3) moderately low levels of perceived social ostracism and low social cohesion. Specifically, the third subgroup (N=5) exhibited reduced neural responses to ostracism and inclusion and moderately low depression. Linear models revealed significant negative relationships between neural sensitivity to inclusion (dlPFC, dACC, AI) and depression. Low neural sensitivity to social inclusion coincides with lower depression symptoms for individuals in a low social cohesion context, particularly for the third groups (adjusted R^2 = .48, .45, and .41). Additionally, higher neural sensitivity to ostracism in AI was significantly associated with higher depressive levels (adjusted R^2 = .28, .25, and .36), with this relationship remaining consistent across clusters. However, the small sample size underscores the need for further research to investigate the moderating role of neural social sensitivity.

Conclusions: Our findings indicate that insensitivity to social inclusion as a phenotype may act as a resilience factor for depression in low social-cohesion settings, even if it is not an optimal long-term strategy for health.

P3-B-20 Training Flexible Emotion Regulation in Response to Real-World Contexts Via Implementation Intentions: A Multilevel, Longitudinal Investigation

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Background and Aims: Flexibility in emotion regulation strategy use in response to different situational contexts is critical for adaptive well-being outcomes. Individuals vary in their tendencies to use particular strategies at certain times, as well as the efficacy of those strategies. There is a need for experimental work that employs novel emotion regulation training of specific strategies based on the interplay between person (e.g., cultural values), situation (e.g., stress characteristics), and strategy factors. This multilevel, longitudinal study aims to deliver emotion regulation training in such adaptive matching patterns via implementation intentions training, investigate longitudinal training effects, and investigate whether individual differences, specifically cultural values, are associated with training outcomes. We hypothesize that the target training group (Group 1; see below) will be associated with more adaptive well-being outcomes (i.e., more positive and less negative affect, better mental and physical health, and a greater sense of success at regulating emotions) relative to the control groups. We further hypothesize that cultural values will moderate the associations between training and well-being.

Methods: There are 5 procedural stages of the study: (S1) Baseline Assessment; (S2) Training Session; (S3) 7-day Daily Diaries; (S4) Post-Diaries Assessment; and (S5) 4-Week Longitudinal Assessment. See the attached figure for an illustration of the study's procedure. Seven randomly assigned groups are trained in various emotion regulation strategies based on 4 situational context pairings: (i) high stress, high-recurrence situations; (ii) high stress, low-recurrence situations; (iii) low stress, high-recurrence situations; and (iv) low stress, low-recurrence situations. Group 1 will be trained to use distancing for (i), reinterpretation for (ii), and situation selection/modification or distraction for (iii) and (iv); Group 2 will receive training as Group 1 with (i) and (ii) reversed; Groups 3-6 will receive training in one strategy across all situational contexts (e.g., Group 3 is trained in distraction only), and Group 7 will receive no intervention training. See the attached figure for an illustration of the group training breakdown. Cultural values are assessed using the Schwartz Values Survey (SVS-57). Data collection is ongoing, with a current n = 133 and a target sample range of n = 200-250 by March 2025.

Analysis Plan: Conduct mixed model ANOVAs to test the impact of training on affect and health outcomes over time. Following that, we will test for moderating effects of cultural values via linear mixed effects models. Analytic plans will be preregistered on OSF before data collection concludes and the full dataset is analyzed.

Implications: Investigating the contexts and individual differences in which emotion regulation is adaptive can lead to translatable ways of improving health and well-being outcomes through targeting emotion regulation in increasingly personalized approaches. Implementation intentions training for emotion regulation is a promising approach to experimentally test the effectiveness of specific strategy-situation pairings and could be incorporated into new treatments and pevention efforts.

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P3-B-21 Examining the Role of Emotion Regulation on Adolescent Stress and Negative Affect: A Preliminary Daily Analysis

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Adolescence is marked by social and emotional change and increased negative affect (NA). Prior work strongly links stress to reported NA, and Emotion regulation (ER) may moderate this association, depending on ER strategy. Namely, cognitive reappraisal has been shown to buffer against worsening NA in response to stress, while greater rumination may enhance stress-induced NA. Neuroimaging studies of ER commonly use cognitive reappraisal tasks, but open questions remain about real-world variation in ER strategy choices, as well as the impact of those choices on daily experiences of stress and NA. One recent study examining monthly within-person fluctuations showed that rumination mediated a link between stressful life events and internalizing symptoms, while monthly changes in stress were unrelated to reappraisal. Day-to-day dynamics between stress, affect, and specific ER strategies require further investigation.

Our study examines daily fluctuations in within-person stress and affect and whether ER strategies moderate observed relations. We will test moderating roles of two ER strategies––rumination (e.g., where focus is repeatedly drawn to negative thoughts and feelings) and reappraisal (e.g., where meaning of a situation is reinterpreted, to shift emotional impact) – on the relation between stress and affect. Our sample includes adolescent females, who are particularly vulnerable to NA.

Thirty (N=30) 15- to 17-year-old female adolescents engaged in a year-long, longitudinal study that included measures of stress, affect, and emotion regulation. Participants completed three consecutive weeks of ecological momentary assessment (EMA) surveys at four separate timepoints. Surveys were sent three times per day (i.e., morning, afternoon, evening) probing current feelings of stress and two variables relevant to NA (depression, anxiety). During a monthly study session, participants also completed the Cognitive Emotion Regulation Questionnaire (CERQ-Short) assessing reported use of reappraisal and rumination strategies. Our variables of interest include daily average ratings of stress, depression and anxiety, and monthly scores on reappraisal and rumination subscales (after each EMA wave). We will examine three primary hypotheses: (1) Higher average within-person levels of stress will correlate to higher average levels of momentary depression and anxiety; (2) When participants report greater daily stress than their average, they will also report worsening affect (i.e., increase in depression and anxiety) the next day; (3) ER strategy use will moderate the relation between average reported levels of stress and affect, such that higher scores for reappraisal will weaken a positive association between stress and depression and anxiety, and higher scores for rumination will strengthen a positive association between stress and depression and anxiety. To test our hypotheses, we will use a Bayesian framework and conduct multi-level modeling to examine whether within-person changes in stress predict subsequent changes in other affect-relevant variables, as well as whether between-person emotion regulation scores moderate such associations. This study will advance understanding of how ER tendencies relate to day-to-day feelings of stress and affect within female adolescents. Findings can inform how individual variation in ER strategy use might relate to observed variation in brain response on common ER tasks in this particularly vulnerable group.

P3-B-22 The Bodily-Emotional Experience of Time: Neural Evidence of the Effect of Anxiety on Temporal Perception

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Background and Aims: Emotions significantly alter our perception of time, making it seem to either drag or fly by. Variations in the ability to perceive bodily changes (interoception) can shape emotional experiences. However, the neural mechanisms linking emotions, time perception, and interoception remain unclear. This study investigated how anxiety influences time perception while considering variations in interoception. We hypothesized that better interoception would increase anxiety, which in turn would impair time perception. Using fMRI, we focused on brain regions involved in temporal and emotional processing, such as the insula and amygdala.

Methods: To test this, thirty participants (15 females, mean age=21.75±4.28) performed an auditory temporal reproduction task while undergoing fMRI. The task had two phases. In the Encoding phase, participants listened to sounds of variable durations. In the subsequent Reproduction phase, they pressed a button to stop a second sound when they felt the same amount of time passed. In half of the blocks, they were at risk of hearing random screams (threat condition), whereas in the other half, they were ensured that no screams would be presented (safe condition). In addition, anxiety trait and interoceptive accuracy were assessed outside the scanner. fMRI data was preprocessed with fMRIprep and analyzed with AFNI.

Results: Our paradigm successfully induced changes in anxiety, with higher anxiety perceived in the threat blocks compared to the safe ones (SE = 1.62, $t = 6.13$, $p < .001$). Increased interoceptive accuracy was associated with higher anxiety (SE = 0.55, $t = 4.82$, $p < .001$), and the interaction of individual anxiety state and trait predicted poorer temporal accuracy (SE = 0.01, $t = -3.98$, $p < .001$). Results from a whole-brain searchlight and subsequent ROI analysis confirmed the effectiveness of the anxiety manipulation, revealing increased activation in the insula and amygdala (FDR-corr, $p < 0.01$) during the presentation of the screams, as compared to non-emotional sounds. We found a positive correlation between interoception and activation in the anterior insula ($t = 2.19$, $p = .032$) and the amygdala ($t = 2.42$, $p = .018$) during the Reproduction phase. Additionally, the anxiety state and trait interaction predicted increased insula activation ($t = 2.03$, $p = .042$) during the Encoding phase.

Conclusion: These findings provide new insights into how emotions shape our experience of time, suggesting that anxiety disrupts time perception, with interoceptive skills influencing the activity of temporal and emotional processing regions.

P3-B-23 A Hand Held is a Burden Halved: Social Proximity Lowers Energetically Costly Cingulo-Prefrontal Activation

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Background and Aims: Social Baseline Theory (SBT) posits that the human brain evolved to assume proximity to supportive conspecifics, which allows us to relax physiological investment to cope with challenges and preserve bioenergetic resources for future demands. Prior research has demonstrated that a supportive social presence enables more efficient regulation of stress and threat monitoring in the brain. However, it remains unclear whether social proximity similarly impacts higher-order cognitive functions that are energetically costly. To address this gap, we tested whether holding hands with a close individual modulates neural activation in regions implicated in executive or attentional functions during an effortful working memory task.

Methods: Fourteen healthy adults (Mean age = 24.1 ± 6; cis. Male N = 8) completed four runs of a spatial N-back task while undergoing multi-band multi-echo fMRI scans. During half of the runs, participants held hands with an individual of the opposite sex whom they trust and have formed an affiliative relationship with, such as a close friend or romantic partner. Blood oxygen level-dependent (BOLD) fMRI signals associated with high vs. low working memory load (3- vs. 0-Back) and social presence (Alone vs. Handholding) were analyzed using univariate and multivariate approaches, focusing on the key nodes of the central executive (dorsolateral prefrontal cortex, dlPFC) and salience networks (dorsal anterior cingulate cortex, dACC). We also measured fasting blood glucose, demographics, self-reported relationship closeness (Inclusion of Self in other scale, ISO), and post-run fatigue levels to explore the individual- and dyad-level correlates of the fMRI findings.

Results: Consistent with previous literature on working memory load, univariate analyses revealed greater BOLD activation in the dlPFC and dACC during the 3- vs. 0-Back condition. Handholding significantly decreased neural activation in both regions, irrespective of the N-back conditions. This reduction was not linked to behavioral task performance, fasting glucose, age, or sex. Instead, the handholding effect was more pronounced in dyads with higher relationship closeness, with ISO ratings predicting lower dlPFC and dACC activation specifically for the handholding runs. Moreover, dampened dACC activity due to social proximity coincided with lower fatigue levels measured after the handholding- vs. alone runs. Lastly, representational similarity analysis (RSA) showed that higher ISO ratings were associated with increased multi-voxel similarity between high- and low working memory load in the dlPFC during the task regardless of social presence.

Conclusions: Executive and attentional functions in the brain are energetically costly and psychologically taxing. Social proximity and relationship closeness attenuated BOLD signal magnitudes and blurred otherwise-distinct spatial activation patterns associated with high and low working memory loads in the dlPFC and dACC. The handholding effect lowered self-reported fatigue without affecting task performance, suggesting that social proximity alleviated the burden of sustained neural effort required for the task. Our findings extend previous literature on the neurobiological integration of social processes, showing how supportive relationships may help us navigate demanding environments with increased bioenergetic efficiency.

P3-B-24 (Pre-Registration) Neural Correlates of Cross-Race Social Evaluation and Associations with Past Exposure to Racism-Related Stress

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Objective: While extensive research has examined peripheral physiological mechanisms of racism-related stress, neural mechanisms linking racism-related stress and mental health have received less attention. This study investigates associations among neural underpinnings of Black-White cross-race social evaluation, past exposure to racism, and mental health symptoms in Black adolescents and young adults. Specifically, we aim to (1) analyze associations between past racism exposure and neural reactivity during cross-race (vs. same-race) social evaluation and (2) explore the link between past racism exposure and internalizing symptoms, with neural activation during cross-race social evaluation as a potential mediator.

Hypotheses: H1a. Cross-race social evaluation will elicit increased activation in salience and threat-detection networks relative to same-race evaluation, specifically in the dorsal anterior cingulate cortex (dACC), insula, and amygdala.

H1b. Past experiences of racism-related stress will predict increased activation in the dACC, insula, and amygdala in response to cross-race (vs. same-race) social evaluative stress.

H2. The link between exposure to racism-related stress and psychopathology will be mediated by elevated activation in salience/threat detection network regions (i.e., in the dACC, insula, amygdala) to cross-race social evaluation.

Methods: Data collection is currently in progress, with completion expected by January 2025. Participants are being recruited from a larger, longitudinal study and will include a sample of Black/African American adolescents and young adults aged 14-22 (Current N=34, Expected N=50). Each participant undergoes the Social Network Aggression Task (SNAT; Achterberg, 2016) in an fMRI scanner, where they receive social feedback from both same-race (Black) and cross-race (White) peers. Participants also complete self-report measures assessing past racism-related stress exposure (using the Index of Race-Related Stress – Brief [IRSS-Brief]; Utsey, 1999) and current mental health symptoms (using the Youth Self-Report or Adult Self-Report forms from the Achenbach System of Empirically Based Assessment; Achenbach 1991, 2003).

Analysis Plan: H1a. Neural correlates of cross-race social evaluation will be assessed through whole-brain, group-level, random effects analyses contrasting neural activation during cross-race vs. same-race evaluation for each type of social feedback (positive, negative, neutral). Reverse contrasts (e.g., Blackpositive > Whitepositive) will also be conducted.

H1b. We will examine associations between past racism-related stress and neural reactivity to cross-race vs. same-race social

evaluation by conducting whole-brain regression analyses, with IRRS-Brief scores as a participant-level regressor predicting neural activity across feedback valences.

H2. To test whether neural activation during cross-race social evaluation mediates the relationship between past racism exposure and internalizing symptoms, we will conduct path analysis, using regions of interest (ROIs) from significant clusters identified in H1b.

Implications: Results will provide novel insights into how racism-related stress shapes neural responses that may contribute to psychopathology risk in Black adolescents and emerging adults.

P3-B-25 Pre-Registration: Real-time Social and Affective Predictors of Caregiver-Child Prefrontal Cortex Synchrony

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Background and Aims: Across two-brain fNIRS studies, caregiver-child co-activation of prefrontal cortex regions (i.e., "neural synchrony") has been associated with both positive behavioral factors and positive child development outcomes. Researchers theorize that dyadic behavioral factors may guide children into states of neural co-activation with caregivers, which may create optimal conditions for learning (Wass et al., 2020), but real-time relationships between behavioral and brain states are unknown. Prior studies have found associations between caregiver-child PFC activation and global attachment factors (Zhao et al., 2024) as well as positive affective state matching (Morgan et al., 2023), both of which support child emotional development and regulation. In this preliminary analysis, we examine the real-time relationship between behavioral and brain states and will ultimately test a novel hypothesis linking caregiver-child affective and brain states to child emotion regulation.

Methods: 57 caregiver-child dyads (65% non-White) worked together on a series of challenging and impossible puzzles while wearing fNIRS headbands capturing real-time cortical surface activation of the prefrontal cortex (Brodmann's areas 9,10,11,46). Immediately after completing the puzzles, caregivers were prompted to discuss the puzzle task with their child (3-6yo) for three minutes. This analysis focuses on behavior and brain states during this post-puzzle dialogue.

Variables:

- Every 5 seconds, caregiver sensitivity (1-9 scale; Biringen et al., 2000) as well as caregiver and child valence (1-7 scale; Posner et al., 2005) will be coded. Positive affective state matching will be calculated as the distance between these values (zero represents exact affective state matching).
- Parent-child PFC co-activation will be calculated using a sliding window (5 - 10 seconds) wavelet transform coherence approach in PFC regions of interest.
- Control: Language factors have been linked to caregiver-child PFC synchrony (Nguyen et al., 2021) so we will include caregiver-child verbal interaction (words per minute) as a control.
- Control: Child age will be coded in months.
- Future direction: Child emotion regulation composite score (Shields & Cicchetti, 1997).

Hypothesis: positive affective state matching will predict subsequent states of neural synchrony across the prefrontal cortex (pilot analysis, preliminary results presented at SANS). In this model we will control for mean caregiver sensitivity and caregiver-child verbal interaction.

Results: Preliminary data: In-progress behavioral coding of caregiver sensitivity suggests that caregivers display a range of sensitivity within these short interactions. Parent-reported child emotion regulation in our sample is normally distributed (mean: 62.1; SD: 6.0; n = 48). See attached histogram. Data collection/cleaning are complete. Behavioral coding and fNIRS processing are in progress. We will present preliminary findings with n = 10 families at SANS and anticipate completing the full analysis by August, 2025.

Conclusions: After coding the full dataset, we will test our hypothesis that caregiver-child midline PFC synchrony during positive affective state matching will be associated with child emotion regulation skill (n = 30-40 dyads).

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P3-B-26 Investigating Cognitive and Emotional Interference: Classical vs. Emotional Stroop Tasks

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Background and Aims: The Stroop task is a commonly used cognitive test to measure attention and executive control, and cognitive interference. Emotional words have been used to study the impact of affective stimuli on cognitive processes. Such "emotional Stroop" tasks (eStroop) provide a theoretical window on how individuals deal with conflicting emotional stimuli and how they learn or adapt to these stimuli over multiple encounters. In this study we compared performance in the classical Stroop task (cStroop) to that in the eStroop tasks. We sought to investigate practice-related improvement participants' reaction times (RTs) across multiple runs of both eStroop and cStroop tasks, while considering individual differences in emotion processing, such as is observed in high- versus low-trait mindfulness. We hypothesized that participants would exhibit decreased in RTs over repeated runs, showing a practice-related improvement, with RTs differing based on mindfulness traits.

Methods: A total of 71 participants (aged 18 to 43, 55 female) performed both a traditional cStroop task and a newly developed eStroop task. In the cStroop task, participants were shown a series of stimuli in three conditions: X's (neutral condition), color words matching the font color (congruent condition), and color words that did not match the font color (incongruent condition).

For each stimulus, they were required to name the font color only. In the estroop task, participants also had to name the font color while being presented with emotionally stimulating words. The words were drawn from a standardized behavioral and descriptive database that included positive-valence low-arousal, positive-valence high-arousal, negative-valence low-arousal, negative-valence high-arousal, and a set of inappropriate words labeled "taboo words" to provoke emotional interference. In addition to the cognitive tasks, participants completed the Southampton Mindfulness Questionnaire (SMQ) to measure their mindfulness levels. Participants were categorized as "Low-" or "High-" mindful individuals by median split.

Results: A repeated-measure ANOVA taboo words RTs and the difference in RTs between taboo and neutral words (taboo interference) showed a significant reduction across runs ($p < .05$). There were no significant reduction in RTs in the cStroop task, indicating that the practice-related improvement was specific to the taboo words and taboo interference.

A two-way ANOVA revealed a significant difference in RTs between high- and low- mindful individuals for each of the eStroop and cStroop conditions ($p < .05$).

Conclusion: These results suggest that mindfulness, as measured by the SMQ, influences RTs in eStroop and cStroop tasks, with high-mindfulness individuals showing faster RTs for all conditions. The significant reduction in RTs for taboo words and taboo interference across runs indicates a specific practice-related improvement effect for these emotionally charged words. This effect was not observed in the cStroop task, indicating that the emotional and arousing components of these words slows RTs on the first run. Subsequent runs do not show such taboo interference, suggesting this source of interference is more readily resolved compared to the interference introduced by color words themselves.

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P3-B-27 The Role of Social Interaction in Children's Learning of Abstract Concepts: an fNIRS Hyperscanning Study

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Background and Aims: Learning novel concepts is a remarkable and complex human ability that begins in childhood and is inherently embedded in interactions with others. Face-to-face communication provides a rich, dynamic context for learning new concepts, both abstract and concrete. Abstract concepts like fraud and inflation refer to complex situations detached from physical experience. They enable advanced reasoning and the exploration of phenomena beyond immediate sensory perceptions. However, most concept-learning research focuses on concrete concepts like coin or bill, which refer to physical objects, and often investigate conceptual acquisition in impoverished contexts such as learning alone from a screen. These approaches overlook the crucial dynamics of behavioral and neural coordination that emerge during natural learning in face-to-face interaction. The social context may be especially important for abstract concepts because the immaterial nature and indeterminate meanings of these concepts mean there may be more need for interaction to establish shared understanding. To address these gaps, this study aims to characterize how primary-school-aged children learn abstract concepts in social interaction with caregivers. We also aim to establish learning trajectories across three age groups (6-7, 8-9, 10-11). Here, we present initial insights from the first collected age group, 8-9-year-olds.

Methods: We present an ongoing multimodal fNIRS hyperscanning study in which 28 dyads of caregivers and their 8 to 9-year-old children participated in a novel, interactive concept learning task. The primary aim was to test which brain and behavioral measures can predict successful learning. Conceptual learning was assessed by evaluating children's comprehension and ability to generalize knowledge to new situations. Additionally, we present a pipeline for dyadic verbal analysis, integrating AI-based transcription and automatic annotation of turn-taking, open questions, closed questions, and backchanneling.

We built an LMER model to identify verbal behaviors contributing to abstract concept learning. We measured caregiver and child brain activity simultaneously with a Hitachi ETG4000 NIRS device (22 channels per person). We focused on the left dorsolateral prefrontal cortex, middle temporal gyrus, and temporoparietal junction, key regions involved in social cognition, language processing, and learning. Using Wavelet Transform Coherence analysis across successful and unsuccessful learning trials, our study uncovers whether and when brain-to-brain synchronization between caregivers and children predicts successful learning in the above-mentioned regions of interest.

Results: Preliminary findings indicate that verbal coordinative behaviors, especially asking more open-ended questions but not closed-ended questions, predict children's successful learning. Furthermore, we find that more brain-to-brain synchronization over the middle temporal gyrus significantly predicts abstract concept learning.

Conclusion Adopting an embodied approach to social neuroscience, we reveal specific patterns of behavioral coordination and brain-to-brain synchronization in interactive dyads, which seem especially important for supporting childhood abstract concept acquisition. This rich dataset is promising for investigating other behaviors (like nonverbal cues) and brain-to-brain dynamics underlying interactive social learning.

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P3-B-29 Exploring the Influence of Pain Expectation on the Sympathetic Nervous System

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Background and Aims: Expectations of negative stimuli can help engage the sympathetic nervous system (SNS), which plays an important role in activating the body's reaction to stress and danger, known as the "fight-or-flight" response. Previous work has supported that subjective pain ratings and brain markers of nociception can both be modulated by expectations of thermal heat

stimulation. However, less research has been done to study how expectations of pain might influence physiological outcomes, such as sympathetic arousal. To address this gap in understanding, we asked if the expectation of cue-based pain influences sympathetic arousal during thermal heat stimulation. We hypothesized that 1) in response to the same level of heat stimulation, the expectation of high pain will increase sympathetic arousal compared to the expectation of low pain, and 2) effects would replicate across multiple studies.

Methods: Data was combined across 4 different studies that each manipulated expectations using pain-predictive cues. Participants were first conditioned to cues in each task, where low cues predicted low intensity painful stimulation and high cues predicted high intensity painful stimulation. After calibration, the cues were either paired with the predicted intensity level or a single medium temperature calibrated to induce moderate pain, enabling an assessment of expectancy effects on pain-related responses. Skin conductance responses (SCRs), a measurement of sympathetic arousal, were recorded from 135 healthy volunteers during heat stimulation. Following data collection, SCRs were scored using a combination of Ledalab's trough-to-peak sum of amplitudes and manual scoring to remove noisy trials. We tested our hypotheses using a mixed factorial ANOVA design to analyze effects of Cue and Study on average SCR during medium heat trials, and performed post-hoc pairwise t-tests to further investigate effects and interactions.

Results: Analyses revealed a significant main effect of Cue ($P = 0.014$), such that average SCR was higher when medium heat was preceded by High cues relative to Low Cues. While no main effect of Study was observed ($p = > 0.3$), we identified a significant interaction between Cue and Study ($p = 0.032$). This interaction was further explored by comparing Cue effects on average SCR within each study, and we observed that average SCR was significantly different based on Cue in two of the studies ($p = 0.017$, $p = 0.004$), but not in the remainder ($p = 0.94$, $p = 0.78$).

Conclusions: Our findings support that the expectancy of high pain can encourage an increase in sympathetic arousal in response to SNS activation. However, the interaction between Cue and Study suggests that there might be heterogeneity in this effect, which may be explained by variation across studies. Given that it is also unclear whether these findings extend to other modalities of pain, future research should explore a broader range of stimuli (e.g., pressure, shock, cold) to determine whether the observed effects of expectancy on the SNS are unique to heat pain.

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P3-B-30 Comprehension of Causal Event Structure Through Reinstating and Updating Neural Patterns at Insight Moments

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Background: We comprehend narratives through moments of insight, sudden realizations that often evoke positive feelings as we make sense of events and their connections. But what happens in the brain during these moments of insight? How does the brain construct and update situational representations at insight moments over the course of comprehension?

Methods: During fMRI, 36 participants indicated moments of insight by pressing an "aha" button while watching a 42-minute television episode that was segmented into 48 events and presented in a temporally scrambled order. At each run, after watching several events, participants verbally explained their reasons for each button press. Participants underwent 10 runs in total, followed by a post-scan comprehension test in which they recounted the scrambled story in its original order.

Results: We first asked what neural signature characterizes these insight moments. A hidden Markov model-based segmentation of multivariate voxel activity (Baldassano et al., 2017, Neuron) revealed significant changes in cortical patterns 2 TRs (TR = 1.2s) prior to the aha button presses, with 19 out of 100 parcels showing a higher likelihood of pattern shifts (FDR-$p < 0.05$). The degree to which neural patterns changed correlated with the number of meaningful words used in the post-scan comprehension test. The results suggest that insight during comprehension is characterized by a sudden shift in cortical representation patterns, which reflects an update of the situational model.

When explaining reasons for each insight moment, participants frequently mentioned events that occurred in the past (41.11 % ± 16.65% of aha moments). In particular, participants were likely to retrieve past events that were causally related to the current event (correlation between memory retrieval and causal relationship: $rho = .715$, $p < .0001$). This was greater than the likelihood of similar past events being retrieved—similar in terms of semantics, characters, places, and low-level visual and audio features. This suggests that insight is accompanied by retrieving causally related past events.

Then how are causally related past events reinstated in the brain? We created an integrated neural pattern, defined as the sum of neural patterns representing past events weighted by their causal relation to the current event. This integrated neural pattern was correlated with the pattern observed near aha button presses. This neural reinstatement effect was observed from 6 to 3 TRs prior to aha button presses in the default mode network B (commonly known as the comprehension or language network) and from 3 to 5 TRs after the button presses in the hippocampus and default mode network C regions (including retrosplenial and parahippocampal cortices) (FDR-$p < 0.05$). These results suggest that integrated representations of causally related past events are reinstated both before and after insight moments in two distinct brain networks.

Conclusion: Together, this study provides a neural account of insights during the ongoing comprehension process. Comprehension is achieved through multiple insight moments, characterized by shifts in neural representation patterns and the reinstatement of integrated past events that are causally related to the current event.

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P3-B-31 Longitudinal Cognitive Emotion Regulation Training in Bereaved Spouses Reduces Self-Reported Negative Affect, Perceived Stress, Depressive Symptoms, And Grief Rumination

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Bereavement is an extremely stressful life event. Most existing psychotherapeutic interventions aimed at reducing stress during grief are heterogeneous, making it more difficult to discern mechanisms of action and assess which strategies may be most effective for which people in which situations. This study examined the efficacy and behavioral and neural mechanisms of a novel cognitive emotion regulation training intervention in bereaved spouses. We compared two cognitive reappraisal strategies: distancing, or appraising emotional stimuli in an Objective and impartial manner, and reinterpretation**,** or reframing a situation to be better than initially considered. Bereaved participants were randomly assigned to distancing (N=29) or reinterpretation training (N=32). During training, participants were shown images related to stress, grief, and loss. Self-reported negative affect, perceived stress (via the Perceived Stress Scale), depressive symptoms (via the Center for Epidemiologic Studies Depression Scale), and grief rumination (via the Utrecht Grief Rumination Scale; UGRS) were collected over the course of a 5-session training paradigm over approximately 2 weeks using an image-based reappraisal task. Long-term follow-up data were also collected at 1 and 2 months. fMRI data were acquired at Sessions 1 and 5. Data were analyzed using linear mixed models. While fMRI data analysis is currently ongoing, analyses of self-reported negative affect, perceived stress, depressive symptoms, and grief rumination have been completed. At session 5, the distancing ($M = 1.64$, $SD = .31$) group had significantly lower negative affect than the reinterpretation group ($M = 1.83$, $SD = .37$), $t(59)=-2.21$, $p=.031$. Perceived injustice, a subscale of UGRS, measures how often one would ruminate on the injustice of the loss. Injustice scores in the distancing group ($M = 4.05$, $SD = 1.46$) were significantly lower than in the reinterpretation group ($M = 5.87$, $SD = 3.40$) at the 2 month follow-up, $t(43)=2.32$, $p=.025$. Change in perceived stress scores over time was statistically significant in the distancing group between session 1 ($M = 17.72$, $SD = 5.74$) and session 5 ($M = 14.41$, $SD = 6.28$), $p < .01$, the 1 month follow-up ($M = 14.29$, $SD = 5.71$), $p < .01$, and the 2 month follow-up ($M = 13.00$, $SD = 5.64$), $p < .01$. Change in perceived stress scores over time was not statistically significant in the reinterpretation group for any of these comparisons. Change in depressive symptoms over time was statistically significant in the distancing group between session 1 ($M = 26.03$, $SD = 8.45$) and session 5 ($M = 21.59$, $SD = 10.99$), $p < .01$, the 1 month follow-up ($M = 18.96$, $SD = 8.00$), $p < .01$, and the 2 month follow-up ($M = 16.77$, $SD = 8.74$), $p < .01$. Change in depressive symptoms over time was not statistically significant in the reinterpretation group for any of these comparisons. These results suggest that distancing training is adaptive in reducing self-reported negative affect, perceived stress, depressive symptoms, and grief rumination in bereaved spouses. These results have implications for the development of increasingly personalized grief interventions.

P3-B-32 Behavioral Traits and Tendencies Predictors of Frustration Prone Individuals

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Background and Aims: Frustration, an emotional response triggered by blocked goal attainment under pressure, has significant emotional and behavioral consequences. Despite its importance, there is limited understanding of how individual differences shape emotional responses to frustration. This study aims to identify personality traits and behavioral tendencies that predict frustration sensitivity, with the goal of informing personalized strategies for emotional regulation.

Methods: We developed and validated a novel frustration-induction task that captures the multifaceted nature of frustration. In a controlled experimental study, 150 participants (age range 18-55) completed pre- and post-induction assessments of behavioral and personality traits, including measures of Internal Control, Perfectionism, Concern Over Mistakes, Personal Standards, Discomfort Intolerance, Emotional Intelligence, Self-Esteem, and Impulse Control Difficulties. Additionally, behavioral tendencies were assessed using the Behavioral Inhibition System (BIS), Behavioral Activation System (BAS), Reward Responsiveness, Drive, Fun-Seeking, and the Big Five Inventory-2 Extra Short Form (BFI-2-XS). Statistical analyses were conducted to identify relationships between individual differences and frustration sensitivity.

Results: Data analysis is underway. Our hypothesis is that heightened frustration sensitivity will be significantly associated with high impulsivity and perfectionism. Specifically, we expect individuals with high impulsivity to exhibit stronger emotional reactions to frustration, while those with high perfectionism will show increased frustration when their high standards are unmet. These findings would underscore the critical role of personality traits in mediating emotional responses to frustration.

Conclusions: Impulsivity and perfectionism may be key predictors of frustration sensitivity, highlighting the need for personalized emotional regulation strategies based on individual traits. Future research should explore interventions targeting these traits to improve emotional regulation in individuals prone to frustration.

Acknowledgements: We would like to thank all participants for their involvement in this study.

P3-B-33 Implications of Listening to and Singing Music on Working Memory

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Background and Aims: Music is known to improve focus and memory, yet different brain regions are activated when listening to music versus singing. For example, singing uniquely engages the frontal and parietal systems, which are closely linked with thinking and problem-solving. However, singing also requires certain motor skills and is considerably more cognitively taxing

than simply listening to music. Despite the differences in brain activation, the benefits of singing to memory remain poorly understood. This project aims to understand the distinct roles of listening to music and singing in memory, and how music as a whole may be advantageous.

Methods: Participants were assigned to one of three groups: no music, listening to a song, or singing along with a song. The song used for this study was "Here Comes the Sun" by the Beatles, commonly associated with positive valence. Thirty-two words from the California Verbal Learning Task (CVLT) were randomly read aloud and participants were asked to remember as many as they could. In between the encoding and recall phases, participants underwent a sustained attention task where they pressed the space bar every time they saw the number 5 as various numbers 1-9 flashed across the screen (n=25 trials).

Results: Using a preliminary trial of n=12 participants, we found that the listening group performed the best, averaging 8.6 recalled words. In comparison, those who sang along averaged 7.5, and those who experienced no music averaged 5.8. Additionally, a one-way ANOVA revealed that there was potential for a statistically significant difference using a larger sample size. More specifically, we hypothesize that there will be a significant difference between mean scores of word recall across groups (Effect Size, 0.683) using an ANOVA test. This test will require a sample size of 39 and will have a power of 0.964. The critical F-Test value for this test will be 3.259. Currently, more participants are being recruited (n=60) to determine the strength of the effect of listening to music versus singing on word recall.

Conclusions: Memory is one of the most important aspects of being human, allowing us to reflect on ourselves and make decisions about the future. Little research has been dedicated to exploring the role of music in preserving memory, and thus far, we have found that the listening group has displayed the highest rate of recall, in line with the paradigm of 'music-induced plasticity'. The results of this study have immense potential to highlight music-based therapies as a tool for those with poor working memory, and the power of music in improving well-being.

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P3-B-34 The Influence of Feedback and Perceived Similarity on Pain Assessment Accuracy Via Facial Expressions

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Background and Aims: Previous research on facial expressions shows that feedback significantly enhances the recognition of basic emotions (Blanch-Hartigan et al., 2012). Perceived similarity between an observer and the observed individual also plays a crucial role in emotion recognition (Yan et al., 2016; Elfenbein and Ambady, 2003). However, the impact of feedback and perceived similarity on pain assessment accuracy remains poorly understood. We hypothesized that (1) feedback would improve pain recognition and (2) perceived similarity would enhance pain assessment accuracy.

Methods: We recruited 47 healthy participants to observe video clips of individuals ("targets") experiencing noxious heat stimulation at different temperatures. Participants undertook two tasks: (1) determining whether each target was experiencing pain and (2) estimating the intensity of each target's pain. Participants in the Feedback Group (n=23) received the actual pain ratings of targets after making their assessments, while the No-Feedback Group (n=24) did not receive feedback. Following the tasks, participants rated their perceived similarity to each target. To predict pain assessment accuracy, we utilized model selection to identify the best fitting models, incorporating all main effects and interactions of Group (Feedback), Block, Trial, and Perceived Similarity.

Results: The most predictive models indicated that the Feedback Group demonstrated significantly higher accuracy in both tasks compared to the No-Feedback Group (β Pain/No Pain = 0.191, $p < .05$; β Pain Intensity = -5.127, $p < .001$). A significant interaction between Group, Trial, and Block was observed in the accuracy of categorical judgments (β = -0.052, $p < .05$). Post-hoc analysis indicated that the Feedback Group exhibited an altered learning trajectory over time (Block x Trial, β = -0.047, $p < .01$). Additionally, Perceived Similarity was associated with enhanced accuracy across both tasks (β Pain/No Pain = 0.010, $p < .001$; β Pain Intensity = - 0.077, $p < .01$) and interacted with Group in the assessment of pain intensity (β = 0.095, $p < .05$). Post-hoc analysis revealed that only the No-Feedback Group showed associations between Perceived Similarity and accuracy of pain intensity assessments (β = -0.122, $p < .001$).

Conclusions: Our study demonstrates that feedback significantly enhanced the accuracy of pain assessment and influenced social learning. In addition, participants were more accurate when they reported higher similarity to the targets they viewed, suggesting that perceived similarity may lead us to prioritize individuals with whom we feel a sense of connection. These findings emphasize the importance of feedback as a fundamental tool in clinical pain assessment and underscore the need to consider how empathy and patient identification impact diagnostic outcomes. This research provides valuable insights into integrating feedback mechanisms and sociocultural factors into training protocols to optimize pain management practices.

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P3-B-35 The Protective Role of Amygdala Volume in Adolescent Sleep Problems: A Longitudinal Biopsychosocial Perspective

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Background and Aims: Adolescent sleep problems are a growing public health concern, given their associations with mental

health issues, academic difficulties, and overall well-being. Identifying the neurobiological and environmental factors that contribute to these issues is essential for developing targeted interventions. Prior research suggests that the amygdala, a brain region critical for emotion processing and regulation, may play a key role in adolescent sleep. Specifically, less developed amygdala has been linked to increased susceptibility to stress and emotional dysregulation, which are key contributors to sleep problems. However, much of this work is cross-sectional, leaving the longitudinal role of amygdala volume underexplored. Furthermore, while negative family environments, such as high levels of family conflict, are well-established predictors of adolescent sleep problems (El-Sheikh & Sadeh, 2015), it remains unclear whether amygdala volume may serve as a protective factor against the adverse effects of these environments.

Methods: Using longitudinal data from the Adolescent Brain Cognitive Development (ABCD) study, this research takes a biopsychosocial approach to examine whether amygdala volume predicts changes in adolescent sleep problems over time and moderates the relationship between family conflict and sleep. The study utilized baseline (T1) and two-year follow-up (T2) data from 11,365 adolescents (51% male; mean age = 9.96 years; 57% White, 11% African American, 19% Latino, 2% Asian, 11% Other). Adolescents' left and right amygdala volumes were assessed at T1 (Casey et al., 2018). Parents reported adolescents' sleep problems at both waves, and adolescents reported their experience of family conflict at T1 using the Family Environment Scale (Moos & Moos, 1981). Demographic characteristics including adolescents' age, sex, race, parents' educational attainment, and family income were also included in the analyses.

Results: Findings revealed that larger left and right amygdala volumes at T1 predicted fewer sleep problems two years later at T2, even after controlling for earlier sleep problems and demographic factors (left amygdala: $B = -.82$, $SE = .36$, $p = .02$; right amygdala: $B = -.84$, $SE = .38$, $p = .02$). Additionally, greater family conflict at T1 predicted more sleep problems at T2 ($B = .09$, $SE = .04$, $p = .04$). Crucially, the left and right amygdala volumes moderated the association between family conflict and sleep problems, $ps < .05$. Simple slope analyses showed that for adolescents with smaller left or right amygdala volumes (1 SD below the mean), there was a significant positive association between family conflict and sleep problems ($Bs > 1.57$, $SEs = .06$, $ps < .01$). In contrast, for adolescents with larger left or right amygdala volumes (1 SD above the mean), this association was not significant ($Bs < .01$, $SEs = .05$, $ps > .92$).

Conclusions: These findings highlight the protective role of larger amygdala volumes in reducing adolescent sleep problems, particularly under conditions of family conflict. This study provides evidence of how neurobiological factors interact with social environments to influence adolescent sleep trajectories. By identifying amygdala volume as a resilience factor, these results emphasize the importance of considering individual differences in brain development when designing interventions for adolescent sleep problems.

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P3-C-36 Event Segmentation and Goal Tracking in Social Interactions: The Role of Individual Differences

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Background and Aims: Event segmentation is a core cognitive process that organizes continuous activity into meaningful episodes, helping individuals understand and predict social behavior. This process is thought to be driven, at least in part, by changes in an actor's goals, as individuals track these shifts. While event segmentation and goal tracking are correlated, their direct relationship has rarely been examined in social contexts. Prior research has predominantly focused on non-social stimuli, leaving social interactions neglected. Social interactions, characterized by goal-directed exchanges and conversational dynamics, require individuals to infer and adapt to others' goals and behaviors. This study specifically investigates the temporal alignment and granularity of event boundaries with goal changes during social interactions. Additionally, it explores how individual differences in the tendency to enjoy effortful thinking (Need for Cognition Scale), level of action identification (Behavior Identification Form), autism-related social deficits (Social Responsiveness Scale-2), and various aspects of empathy (Interpersonal Reactivity Index) shape this alignment, offering insights into the mechanisms underlying variability in social perception.

Methods and Analysis Plan: A total of 200 participants (aged 18–35) will be recruited from Prolific and the USC Psychology Department's subject pool. The 15-minute study includes two counterbalanced conditions: event segmentation and goal change identification, followed by a survey. Participants will view two clips (~3 minutes each) featuring naturalistic social interactions: one depicting a mild argument between a couple and the other featuring a vlog between a mother and daughter. In each condition, participants will mark event boundaries or identify goal changes. A practice round featuring a vlog of a couple having breakfast (~3 minutes) will familiarize participants with the task. Following the main task, participants will complete questionnaires assessing the individual differences described above. Data will be analyzed using time series analyses to assess within-subject event-goal alignment and mixed-effects models to explore how individual differences contribute to between-subject variation.

Hypotheses and Expected Results: This study examines how individual differences affect event-goal tracking alignment in social contexts. By analyzing this alignment, we aim to understand the role of goal tracking in event segmentation and explore how variations in alignment may reflect differences in processing social behavior. We hypothesize that individuals with higher NFC will exhibit more detailed tracking of events and goals, while those with higher action identification tendencies (BIF) may focus on broader, overarching goals. Individuals with higher empathy (IRI) are expected to track goals and intentions effectively, leading to coarser goal boundaries.Conversely, individuals with autism-related social deficits (SRS-2) may display distinct patterns in identifying events, potentially due to difficulties in processing social cues. These findings will provide insights into how goal tracking may influence event segmentation and contribute to understanding variability in social perception, with implications

for both cognitive and social processes.

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P3-C-37 Decoding Human Brain Activity During Social Narrative Processing Using Deep Neural Networks

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Background: Deep neural networks have shown great promise in understanding how the brain processes visual and linguistic information. Recent studies have highlighted parallels between human brains and transformer models. Additionally, generative models (e.g., diffusion models) have been used to reconstruct sensory inputs, such as images and stories, from brain activity. However, higher-order brain functions, including social cognition, remain largely unexplored through these lenses, while it has also been challenging for conventional methods to computationally account for these complex cognitive functions. Here, we present a pipeline that decodes brain activity across modalities using transformers and diffusion models. Participants completed both story-listening and movie-watching tasks while fMRI data was collected. This pipeline aims to reconstruct content from narratives in one modality (e.g., images) based on fMRI data from another modality (e.g., story-listening). Given the modality-independent nature of many aspects of high-level cognition and social narrative processing, this approach could provide insights into the neural mechanisms underlying these mental processes.

Methods: For each participant, the pipeline was first trained solely on the visual modality (i.e., decoding images from movie-watching fMRI data) and then tested for cross-modal performance (i.e., decoding images from story-listening fMRI data). The visual training involves two stages. In stage 1, latent embeddings were obtained from a vision-language transformer (e.g., CLIP) for the movie frames viewed by participants. For each participant, we identified the most predictive voxels and used them to build a decoding model (ridge regression) to predict the latent embeddings from fMRI data. In stage 2, the embeddings predicted from this decoding model served as input for a generative model (e.g., stable diffusion) to reconstruct the original movie frames. The generative model was further fine-tuned with each participant's movie-watching data to improve reconstruction quality. Subsequently, the movie-watching data will be replaced with story-listening fMRI data from the same participants without further training, to test for cross-modal reconstruction performance. Additionally, different decoding models will be constructed by systematically selecting voxels from different sets of brain regions. The generated images will be compared to gain insight into the unique contribution of each set of brain regions to the extraction and processing of supramodal information from social narratives.

Results and Conclusions: Our pipeline has greatly simplified the approach used in previous works that decoded images from image-viewing fMRI data and has shown initial success in a similar image-to-image decoding capacity. Extending this pipeline to a multimodal context will not only help evaluate the feasibility of cross-modal mental state reconstruction but also offer a novel lens allowing us to better understand how the brain derives high-level, supramodal meaning from narratives.

P3-C-38 Integrated Neural Representation of Facial Stereotypes and Group Stereotypes

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Background and Aims: People form trait impressions from facial appearance, which are largely inaccurate yet profoundly impact social behavior. Classic models argue that face impressions rely on a universal 2D architecture comprising core dimensions of trustworthiness and dominance, but this work only modeled White male faces (Oosterhof & Todorov, 2008). Subsequent studies incorporating faces diverse in age and gender found evidence of a 3D model (adding a youthfulness-attractiveness dimension) (Sutherland et al., 2013), while recent work using maximally representative traits and faces proposed a 4D model, adding a femininity dimension (Lin et al., 2021). As researchers use larger and more diverse stimulus sets, the dimensions found to underlie trait space have continued to increase (Freeman & Lin, 2025). Recent neuroimaging work provided the first evidence of a multidimensional representation of face impressions in the bilateral middle temporal gyrus (MTG), a region broadly involved in activating conceptual attributes from visual cues, finding the 2D model to best explain neural response patterns to White male faces (Chwe et al., 2024). However, all such work has treated face impressions as reflecting fixed mappings between facial features and traits (i.e., facial stereotypes) while ignoring stereotypes related to targets' gender, race, and age (i.e., mappings between categories and traits), which also affect the structure of face impressions (Xie et al., 2021). At the neural level, it is unclear whether the MTG reflects an integrated representation for both facial and group stereotypes, or whether they are represented via distinct neural mechanisms.

Methods: Participants will passively view faces of Black, White, and Asian men and women (39 per race-gender group). We will conduct whole brain searchlight ($p < .05$, TFCE corrected) and parcellation-based ($p < .05$, FDR corrected) analyses, using multiple regression representational similarity analysis to assess how well facial stereotype models (2D, 3D, 4D) vs. shared facial + group stereotype models (which include gender, race, and age stereotypes) predict faces' neural pattern similarity, while controlling for faces' intrinsic visual similarity using bottom-up visual models (HMAX, C2, FaceNet).

Results: We predict that integrated facial + group stereotype models will better explain faces' neural representational structure compared to the facial stereotype models alone. Alternatively, regions associated with social knowledge, such as the anterior temporal lobe, may reflect an integrated representation of face and group stereotypes while the MTG exclusively represents facial stereotypes.

Conclusions: These findings will shed new light on the neural basis of stereotyping, testing integrated vs. dissociable mechanisms for facial and group stereotyping that can inform current debates on the mechanisms underlying impression

formation. This work also highlights the need to better account for diversity in models of social cognition, offering a more nuanced understanding of how social categories shape impressions.

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P3-C-39 Idiosyncratic Event Segmentation as a Neural Marker of Loneliness

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Background and Aims: Loneliness is often associated with feelings of isolation and not being understood by others. One potential reason for this could be that lonely individuals appraise everyday experiences differently, making it difficult for them to achieve shared reality with others. Real-life experience consists of a continuous stream of information. To understand, appraise, and remember these experiences, the human brain structures them by automatically segmenting the flow into discrete events. Event segmentation is guided by perceived changes in actions, goals, emotions, and situations. Thus, an individual's event segmentation patterns reflect their attentional focus, prior knowledge, and cultural Background, and imply their unique way of processing information. In this study, we tested whether lonely individuals exhibit idiosyncratic event segmentation patterns when processing naturalistic information, which may lead to unique appraisals and contribute to feelings of isolation. Notably, instead of explicitly asking participants to mark event boundaries, which can disrupt the flow of viewing, we inferred individuals' event boundaries from neuroimaging data using a newly developed algorithm.

Methods: This study utilized neuroimaging data collected in a prior project (N=68) where participants' neural responses were captured while they watched two naturalistic videos: an episode from Nathan For You ("Gas Station Rebate") and an episode from Love, Death, and Robots ("Zima Blue"). These two videos are rich and diverse in naturalistic information, mimicking the continuous flow of information that individuals encounter in everyday life. We then inferred individuals' neural event boundaries using Hidden Markov Modeling (HMM). This algorithm detects shifts in latent brain states by analyzing the BOLD time series and identifying transitions in spatial patterns.

To measure similarity in neural segmentation across participants, we calculated the pairwise alignment of event boundaries. Specifically, event boundaries occurring within 3 TRs (1 TR = 1s) of one another were classified as a match. We then performed a permutation test to compare the true matches to a null distribution to derive z-scores for each video, brain parcel, and subject pair. Finally, we fit a linear mixed-effects model to examine the relationship between similarities in event boundaries across participants and loneliness, to test whether loneliness was associated with dissimilar event segmentation patterns.

Results: Across the two videos, we found that dyads in which both individuals were highly lonely exhibited lower pairwise similarity in their event boundary patterns compared to dyads where one or both individuals were not lonely. This pattern was observed in brain parcels in the default mode network, as well as parcels in the ventral attention system, and the limbic system.

Conclusions: We found that loneliness is associated with idiosyncratic patterns of event segmentation, reflecting a fundamental difference in how lonely individuals process and organize the continuous flow of naturalistic information. These findings extend prior work linking loneliness to neural idiosyncrasies by taking a more granular approach, highlighting that loneliness may be characterized by unique ways of perceiving and structuring continuous information.

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P3-C-40 Common and Distinct Neural Correlates of Social Interaction Perception and Theory of Mind

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Background and Aims: Social cognition involves a continuum from perception of agents and their interactions to inferences based on theory of mind (ToM). Despite their frequent co-occurrence in real life, they were predominantly studied in isolation. We aim to better understand the commonality and distinction between social interaction perception and ToM at the behavioral and neural levels.

Methods: Participants (N = 231) rated four text and four audio narratives on the presence of social interactions and their use of ToM. Another group of participants (N = 90) experienced the same eight narratives passively during functional magnetic resonance (fMRI) scanning. We analyzed co-variation between neural activity and time courses of normative social interaction and ToM ratings by voxel-wise general linear models and determined their common and distinct neural correlates using Bayes Factors (with 5 and 1/5 as thresholds).

Results: Social interaction and ToM ratings were only modestly correlated across time (r = .32). At the neural level, social interaction perception and ToM activity maps generalized across text and audio presentation (correlations between unthresholded t maps r = 0.83 and 0.57, respectively). In the same model, when ToM was held constant, merely perceiving social interactions activated all regions canonically associated with ToM under both modalities (FDR q < .01), including temporoparietal junction, superior temporal sulcus, medial prefrontal cortex, and precuneus. ToM activated all these regions as well, suggesting the existence of a shared, modality-general system for social interaction perception and ToM. Furthermore, ToM was uniquely associated with activity in lateral occipitotemporal cortex, left anterior intraparietal sulcus, and right premotor cortex.

Conclusions: These results show that perceiving social interactions automatically engages regions implicated in ToM. In addition, ToM is distinct from social interaction perception in its recruitment of regions associated with multiple higher-level

cognitive processes such as action understanding and executive functions. They further imply that both social interaction perception and ToM involve automatic, pre-reflective inferences, while ToM additionally involves controlled, deliberative inferences.

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P3-C-41 On the Same Wavelength: Investigating the Neural Underpinnings of Collaboration

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Background and Aims: Collaborative activities (i.e., activities where people work together to construct shared knowledge to solve problems) have proven benefits across development. For instance, collaboration in childhood promotes verbal, cognitive, and social skills (Slavin, 2015) and adult collaboration leads to increased productivity and employee engagement in the workplace (Park et al., 2019). During EEG hyperscanning, increased interbrain synchronization of frontal alpha asymmetry (FAA; a proxy for approach/avoidance processes) is observed during adult dyadic interactions (Nelson et al., 2024). However, it is less clear how these processes dynamically shift during peer-peer interactions or child-caregiver interactions. Here, we seek: 1) to better understand how FAA is modulated during collaboration between different aged dyad contexts (child vs. and adult), and 2) to investigate relationships between FAA, collaborative behaviors, and self-reported wellbeing across childhood and adulthood.

Methods: Preliminary data from child peer-peer dyads (8 dyads N=11, 8-17 years-old), emerging adult peer-peer dyads (4 dyads, 18-20 years), and child-caregiver (1 dyad) were included in these analyses (all data collection ongoing). Participants completed a battery of hyperscanning paradigms but to investigate collaboration neural processes, we used an adapted version of the Diapix goal-directed collaborative task (Engen et al., 2010; Figure 1) with social and nonsocial conditions. During this task, each person sees a different photo and the dyad is asked to talk together to find the differences between the pairs. Electroencephalography (EEG), electrocardiogram (ECG), behavioral, and self-report data were collected from each dyadic partner.

Results: There were no significant condition effects within dyad types, $F(1, 22) = 0.12$, $p = 0.88$. While nonsocial images collapsed across dyad types evoked slightly more positive FAA ($M = 1.09$, $SD = 0.861$; Figure 2) than social images ($M=1.06$, $SD=0.857$), model results suggested no significant effect of condition, $F(1,24)=0.00$, $p=0.98$ or age, $F(1,24)=2.41$, $p=0.13$. Thus, we collapsed across condition and age to better understand relationships between FAA during collaboration and individual wellbeing. We found significant relationships between FAA and post-session negative affect, $F(1,24)=7.31$, $p=0.01$ such that more positive FAA values (indicating approach-like signatures) were associated with less negative affect (Figure 3A). There was also a significant relationship between FAA and (1) post-session negative feelings of social connection ($F(1,23)=14.92$, $p=0.0008$), and (2) post-session satisfaction ($F(1, 24) = 4.10$, $p = 0.05$) and stress ($F(1,24)=11.55$, $p=0.002$), such that more positive FAA values were associated with more negative social connection feelings (Figure 3B), less satisfaction (Figure 3C) and more stress (Figure 3D).

Conclusions: These preliminary results indicate that neural responses during a collaborative task impact subsequent affect, stress, and feelings toward your collaborative partner. While data collection is ongoing to determine if there are any developmental differences in these trends, these initial findings indicate some relationship between approach-like neural signatures and negative feelings that arise during social collaboration.

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P3-C-42 The Role of Similarity Feedback in Preference Adjustment

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Background: People frequently communicate their preferences, providing us with information that guides our social interactions. Knowledge of a shared preference among two individuals is highly valuable when forming new social connections as we tend to bond with and feel closer to those that are most similar to us. One outstanding question is how feedback shapes shared preferences during interactions with new acquaintances. Considering that feeling similar to a peer is a highly valuable, we may modify our preferences to align with our peer over time. This behavior may also make us feel closer to them. The present study sought to understand how neural systems support changes in preferences while interacting with a new acquaintance and whether it promotes social connection.

Methods: Prior to entering the scanner, participants (N = 29; preliminary) were instructed that they would be interacting with a research assistant through computerized tasks. On day 1, participants ranked their preference for certain internet video genres. On day 2, participants completed a scanner task where they view video clip titles from their high preference genres (rank 1 & 3) and low preference genres (rank 8 & 10). On a given trial, the participant viewed a video clip title from one rank genre, rated how much they would personally enjoy watching this video, and how much their partner would enjoy watching this video. They then received feedback on whether their preference matched their partner's. Feedback varied as a function of preference such that participants received 80% match feedback in one high and one low preference condition and 20% match feedback in the remaining preference conditions. Following the task, participants completed closeness and liking ratings to measure social connection development. This design allowed us to measure the extent to which preference similarity feedback is incorporated

into alignment of personal preferences with others.

Results: Preliminary results show that participants change their enjoyment rating in low preference genres in response to feedback and in doing so, like their partner more (t(28)=2.4, p=.03) and feel closer to them (t(28)=2.1, p=.05). When participants receive match feedback on the previous trial, their personal enjoyment ratings increase in low preference genres (b=1.7, p=.03; b=2.0, p=.01). When rating titles of their lowest preference genre, the difference between personal and peer ratings increases over the course of the task (b=1.37e-2, p=.02). In this genre, participants continuously adjusted their preferences to align despite a fixed feedback ratio (b=1.7, p=.03). Low preference genres increased in preference compared to high preference genres post-task (F(3,26)=9.3, p<.001). Neuroimaging analysis of the final sample will probe the response to feedback and response to preference cues. We hypothesize that participants experience increased reward-related activity during match feedback compared to no match feedback and when viewing titles in 80% match feedback genres.

Conclusion: Preliminary results highlight how participants may be more willing to manipulate their low favorability preferences in pursuit in of alignment and closeness with a social partner.

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P3-C-43 Attachment Moderates the Effects of Intranasal Oxytocin on the Emotional Content and Self-Disclosure of Recollected Childhood Memories Featuring Maternal Caregivers: A Replication and Extension

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Background and Aim: Childhood memories featuring primary caregivers are the basis for our working models of attachment. The neurohormone oxytocin plays a critical role in the formation of attachment bonds and social memory possibly, in part, by enhancing the emotional salience of social cues. Consistent with this, prior work (in males) indicates that oxytocin administration positively biases recollections of maternal care and closeness for more securely attached individuals but negatively biases such recollections for more anxious individuals (Bartz et al., 2010). This study aims to replicate and extend this previous work by probing more deeply oxytocin's effects on the emotional content of these memories, and by including females in our sample.

Methods: To this end, we administered 24 IU intranasal oxytocin to healthy male and female adults (N=71), using a double-blind, placebo-controlled within-subject design. Participants then recalled childhood memories of their mothers in response to positive or negative cue words using the Autobiographical Memory Task (AMT). Sentiment of these memories were analyzed with two natural language processing tools: Linguistic Inquiry and Word Count (LIWC) and Valence Aware Dictionary and Sentiment Reasoner (VADER); these analyses were supplemented by two human coders. Finally, participants rated how comfortable they felt and how much emotion they disclosed as they were recounting these memories.

Results: Preliminary results indicate that individuals high on attachment anxiety used more negative sentiment words when describing childhood memories following oxytocin (vs. placebo); which is consistent with prior work (Bartz et al., 2010) and the social salience hypothesis. While there was no effect of avoidance on sentiment, more avoidant individuals reported that they were less likely to emotionally self-disclose following oxytocin (vs. placebo), which is consistent with their tendency to avoid emotional intimacy.

Conclusion: This study supports the social-emotional salience hypothesis of oxytocin, and provides further evidence that oxytocin's effects depend on individual differences in attachment. Specifically, oxytocin may amplify negative emotional recall in more anxious individuals, and further inhibit emotional self-disclosure in those high in avoidance. Finally, participant sex did not moderate these effects, indicating that previously reported effects in males generalize to females.

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P3-C-44 Using Inner Monologue Narration in Film to Investigate Component Processes of Theory of Mind

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Background and Aims: In everyday interactions, people infer what others might be thinking or feeling based upon a wide array of noisy, ambiguous cues. But what if you could directly access the thoughts and feelings of those around you? Fiction and filmmaking make such mind reading possible, through narrated inner monologues.

We can take advantage of this kind of creative media to ask deep questions about social phenomena that are otherwise difficult to disentangle. Here we leverage such media as stimuli to understand how different perceivers can draw different Conclusions about the personality of a target person from the exact same information. Two processes could account for this difference. One possibility is that perceivers draw different inferences about the target's mental states, and this leads to different Conclusions about personality. A second possibility is that perceivers draw the same inferences about the target's mental states but link those mental states to the presence of different personality traits in the target. The goals of the present investigation are to identify the neural correlates of these two processes and determine the extent to which each explains individual differences in personality trait impressions.

Methods: To achieve these goals, we manipulated two short videos that feature narrated inner monologues. By selectively

muting this narration, we created two versions of each video, with each version missing a different half of the original's inner monologue. Participants (current N=21, target N=50) watched one version of each of the two videos in the fMRI scanner, and then rated their impressions of the main characters' personality traits.

Results: We first aim to localize regions involved in drawing mental state inferences from observable behavior. To do so, we will use a univariate contrast to find brain regions that are more active when the inner monologue is muted relative to moments where the inner monologue is present. The principle of this contrast is that the inner monologue delivers some participants direct access to the target's mental states, bypassing the need for inference, whereas the muted narration segments oblige participants to engage in more naturalistic mental state inference.

Next, we will localize the brain regions involved in contextualizing target people's subsequent behavior, after mental state knowledge is acquired. To do so, we will identify regions in which inter-subject correlation (ISC) is higher after the unmuted monologue segments than after the muted monologue segments. This will reveal which regions become aligned across participants after they receive the same information about the target's individual states.

Finally, we will employ inter-subject representational similarity analysis (IS-RSA) to correlate trait rating similarity with the ISC a) during monologue segments and b) after monologue segments. This analysis will reveal whether differences between perceivers are being driven more by differences in the mental states they're inferring (during muted segments) or by differences in using the same mental state knowledge (after narrated segments).

Conclusions: The results of this research will help to identify component processes of theory of mind which are usually confounded in naturalistic settings, as well as determine how much each of those processes contributes to idiosyncrasies in impression formation.

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P3-C-45 Neural Synchrony During Natural Viewing Predicts Alignment in Impression Updating

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Background and Aims: As we get to know people, new situations can sharply impact our impressions. For example, a friend might appear agreeable until money is involved or until they're under stress. Here, we investigated how seeing familiar others in conflict changes our impressions of them and whether subsequent alignment of impressions is reflected in the neural similarities across participants.

Methods: Thirty participants were invited to the lab where they watched the first episode of the reality show "The Mole" and reported their impressions of its central characters' Big 5 personality. Afterwards, they underwent functional magnetic resonance imaging while they watched an edited version of 3 later episodes of the show that included several scenes of the characters in conflict. After scanning, they again reported their impressions of the characters.

Results: Using Inter-Subject Representational Similarity (IS-RSA), we found that similarity in prior impressions predicted similarity in neural synchrony during subsequent viewing. Analysis of the post-scan ratings indicated that participants were more likely to update their ratings of the characters' agreeableness. Moreover, we found that greater alignment between participants' impressions of agreeableness was associated with greater neural alignment during movie viewing.

Conclusions: Our results show that as impressions are updated based on observation of characters in novel social situations, the intersubject similarity of these new impressions is rooted in greater alignment of neural activity in the MPFC.

P3-C-46 Sophisticated Perspective-Takers are Distinctive: Neural Idiosyncrasy of Functional Connectivity in the Mentalizing Network

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Background and Aims: Naive perspective-takers often perceive the social world in a simplistic and uniform way, whereas sophisticated ones recognize the diversity and complexity of others' minds. This commonly accepted distinction points to a possibility of greater inter-individual variability in mentalizing for sophisticated than naive perspective-takers. Previous findings have merely illustrated the trend in which the degree of involvement of the mentalizing network (MTN) varies with individuals' perspective-taking (PT) levels during mentalizing, while neglecting the differences in inter-individual variability between sophisticated and naive perspective-takers. Therefore, this study aimed to investigate whether all sophisticated perspective-takers are distinctive and naive perspective-takers are similar during mentalizing.

Methods: Participants were categorized as either sophisticated (i.e., high PT) or naive (i.e., low PT) perspective-takers according to their PT scores (measured by the PT subscale of Interpersonal Reactivity Index (IRI) scale). Neural responses of the MTN were recorded with functional magnetic resonance imaging (fMRI) while participants (N = 55) watched a silent video "Partly Cloudy". The neural idiosyncrasy was indexed by the pairwise inter-subject dissimilarity of both the regional and connectomic features of the MTN. Specifically, three indices were examined: time dynamics of the neural responses of single regions, functional connectivity between regions, and the strength centrality (based on the functional connectivity) of regions within the MTN. The inter-subject dissimilarity of these three indices was compared between high-high (HH), high-low (HL), and low-low (LL) PT dyad groups to examine whether the neural idiosyncrasy during mentalizing supports the Anna Karenina (AnnaK) model, positing that all sophisticated perspective-takers are distinctive, and naive perspective-takers are similar. To assess the behavioral manifestation of the AnnaK effect, the eye-gaze trajectories during movie watching were recorded in an independent

eye-movement experiment (N = 41), as well as the verbal interpretations of the movie contents by all participants in the fMRI and eye-movement experiments. The inter-subject dissimilarities of these two behavioral indices were calculated.

Results: The results demonstrated that the functional connectomic features (i.e., functional connectivity between regions and strength centrality for regions) of the MTN, but not the regional features (i.e., time dynamics of single regions), alongside the eye-gaze trajectory and verbal interpretations on others' mental states exhibit greater inter-individual variability for the high PT group than the low PT group (i.e., HH > HL > LL). When treating PT as a continuous variable, positive correlations were observed between mean PT scores and inter-subject dissimilarity in two neural indices (i.e., functional connectivity and strength centrality), as well as in verbal interpretations of others' mental states.

Conclusions: In Conclusion, this study provides robust and converging evidence that sophisticated perspective-takers are distinctive while naive ones are similar. These findings deepen our understanding of mentalizing by highlighting the idiosyncrasy and homogeneity of neural collaboration across varying levels of perspective-taking sophistication.

P3-C-47 Decoding Identity from Representations of Traits, Attitudes and Moral Character

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Background and Aims: When we first meet someone, what kinds of information do we rely on when forming an impression? Previous research suggests that social information such as personality traits, moral character, and attitudes/opinions are important for person perception and interpersonal attraction. In the present study, we examined whether different identities could be reliably decoded in the medial prefrontal cortex (mPFC) based on personality, morality, and attitude information using multivariate pattern classification analysis.

Methods: Twenty-six right-handed adults between the ages of 18 to 35 participated in this study. Participants watched an episode of The Circle and completed a trait evaluation task during fMRI scanning for 8 characters previously introduced in the show. This trait task was modified to additionally include evaluations of moral character and attitudes.

Results: Using neural patterns derived from the trait, moral and attitude domains, character identity decoding accuracy was significantly above chance in both within- and between-subject analyses. Moreover, this remained true when restricting the analysis to information within traits/moral domain (i.e., a classifier trained and tested on traits/moral character alone). Finally, we tested whether identity could be reliably decoded based on classifier models trained on one domain (e.g., moral character) and tested on another domain (e.g., traits). The accuracies of these cross-domain classifiers were above chance for four of the six possible combinations (personality-morality, morality-personality, attitude-personality, attitude-morality).

Conclusions: Our study suggests that the brain incorporates personality, morality, and attitude information to form impressions of novel others. Although identities could be decoded with information in one domain, accuracy was greatest when using information across all three categories. Taken together, these findings suggest that the neural code in the mPFC that enables successful identity decoding is to some degree common across these three important domains of person perception.

P3-D-48 Dorsal Attention Network Connectivity in Women Survivors of Intimate Partner Violence: A Resting-state ICA Study

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Background and Aims: Intimate partner violence against women (IPVAW) is a highly prevalent problem worldwide. 30% of women around the globe have suffered physical and/or psychological violence by a partner or ex-partner during their lifetime. IPVAW survivors are most likely to develop psychological, and physical health problems, and may also experience impairment in several neuropsychological functions, including attention. Despite the high prevalence of IPVAW, very little is known about how IPVAW may impact brain functioning, particularly with regard to the brain's intrinsic connectivity at rest. So far, no studies have examined ICA-derived resting-state functional connectivity (rsFC) of the Dorsal Attention Network (DAN) in women affected by IPVAW. The aim of this study is to (1) compare DAN connectivity in women survivors from IPVAW to a group of women who have not experienced IPVAW; and (2) study the relationship between DAN connectivity and severity of violence experienced throughout the relationship, and other clinical variables relevant in IPVAW such as quality of life, depression, anxiety, and PTSD, in the IPVAW group.

Methods: 78 women (aged over 18 years) participated in the study: a group comprising 39 women survivors of IPVAW, and a control group comprising 39 with no history of IPVAW. All participants attended a psychopathological assessment session, and a resting-state fMRI session. First, data was preprocessed and denoised using CONN toolbox. Second, DAN was characterized through independent component analysis (ICA). In order to investigate between-group differences in intra- and inter- DAN connectivities, a T-test was performed including age and education as control variables. Finally, Pearson correlation analysis was performed between values extracted from each between-group significant region in each participant and anxiety, depression, PTSD, severity of violence experienced throughout the relationship, and quality of life scores measured using self-reports.

Results: IPVAW group showed lower intra-network connectivity in the bilateral superior parietal regions of the DAN, compared to the control group. In addition, the IPVAW group exhibited lower inter-connectivity in the posterior cerebellum and supramarginal gyrus, and higher connectivity in the middle temporal gyrus, inferior temporal gyrus, superior frontal gyrus, and cingulate gyrus (Table 1 and Figure 1). Correlational analysis showed that superior frontal gyrus negatively correlated with the severity of violence and the maximum psychological violence experienced throughout the relationship ($r = -0.429$, $p = 0.009$;

r = -0.480, p = 0.003, respectively). Moreover, the supramarginal gyrus positively correlated with PTSD score (r = 0.374, p = 0.035).

Conclusions: The IPVAW group exhibited reduced intra-DAN connectivity in the left and right superior parietal regions compared to the control group. The inter-connectivity was associated with the violence experienced and PTSD. This study sheds light on the importance of investigating brain networks related to attention in women survivors of IPVAW. Future studies should continue to investigate other brain networks in this population, and their relationship with the severity of the violence experienced during the IPV relationship, as well as other possible clinical variables such as anxiety, depression and PTSD.

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P3-D-49 Sex Differences in Functional Connectivity Within the Default Mode Network and ADHD Symptom Profiles in Youth

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Background and Aims: Attention deficit hyperactivity disorder (ADHD) is among the most common childhood psychiatric disorders, yet its neurobiology is not fully understood. A growing body of research points to differences in functional connectivity (FC), particularly in the default mode network (DMN), as a potential mechanism. While there is not a clear consensus on the directionality of the association, several studies have found ADHD to be associated with hypoconnectivity within the DMN and hyperconnectivity between the DMN and task-positive networks. However, ADHD symptoms differ significantly by sex: girls typically exhibit inattentive symptoms and internalizing behaviors, while boys show hyperactivity and externalizing behaviors. These differences, combined with sex disparities in diagnosis and treatment, highlight the need to investigate sex-specific brain differences in ADHD.

This study aims to:

1. Characterize sex differences in ADHD symptoms, sex differences in internalizing and externalizing symptoms, and sex differences in ADHD symptoms in children with and without a diagnosis
2. Determine if there is an association between symptom profiles and functional connectivity
3. Determine if the association between symptom profile and functional connectivity differs between girls and boys.

Methods: The full sample includes 3291 children (2141 boys, 1150 girls) from the Healthy Brain Network (HBN) study. ADHD symptoms were assessed using SWAN scores, and internalizing/externalizing symptoms were measured with CBCL scores. Independent t-tests were used to evaluate sex differences in symptom profiles. A subset of 1067 children with usable MRI data will be analyzed for FC differences using resting-state fMRI and video-watching tasks. The data will be split as 75% training/25% testing, and an SVR (Support Vector Regression) model with 5-fold cross-validation will predict relationships between FC and symptoms, controlling for age, head motion, and comorbidities. Separate SVR models will then be trained for each sex, and permutation-based feature importance and t-tests will be used to identify significant contributors.

Preliminary Results: Boys had significantly higher scores than girls on total ADHD symptoms ($t=12.22$, $p<0.001$), inattentive symptoms ($t = 8.686$, $p<0.001$), and hyperactivity symptoms ($t = 13.02$, $p<0.001$). Girls scored higher on internalizing symptoms than boys ($t(3289)=-2.72$, $p<0.05$), while boys scored higher on externalizing symptoms than girls ($t(3289)=4.21$, $p<0.001$). SWAN scores were moderately correlated with internalizing ($r=0.28$) and externalizing ($r=0.48$) symptoms for both sexes. SWAN scores were also higher in children diagnosed with ADHD in the sample than children without a diagnosis ($t(3289)=23.12$, $p<0.005$), and the male group in the sample was 1.6 times more likely to have an ADHD diagnosis than the female group. Within the undiagnosed group, boys had higher inattentive scores ($t(3289)=6.82$, $p<0.001$) and hyperactivity scores ($t(3289)=9.55$, $p<0.001$) and within the diagnosed group, boys scored higher on hyperactivity ($t(3289)=6.03$, $p<0.001$), but there was no significant sex difference in inattentive scores. FC analyses are currently underway.

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P3-D-50 Trait Anxiety is Associated with Idiosyncratic Neural Event Boundaries in the Temporoparietal Junction During Movie-Watching

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Background and Aims: Event perception, involving the process of segmenting continuous experiences into meaningful events, is fundamental to cognition. To do so, the brain compares current inputs to past events and relies on detecting contextual changes to identify event boundaries. Trait anxiety may be associated with differences in event segmentation due to heightened sensitivity to threat-related stimuli, which can impair the ability to integrate information across time. This study explores how trait anxiety influences event perception, focusing on the temporoparietal junction (TPJ), which plays a critical role in multisensory information integration and is involved in attention, social cognition, and theory of mind.

Methods: We analyzed fMRI data from the Cam-CAN dataset, where participants viewed an 8-minute edit of Alfred Hitchcock's Bang! You're Dead. Equally-sized control and test groups (N=60 in each group) were formed based on anxiety scores as measured by the anxiety subscale of the Hospital Anxiety and Depression Scale (anxiety group M=10.2, SD=2.4, control group M=2.8, SD=1.3). Spherical ROIs were created in the left and right TPJ with MNI coordinates from Neurosynth. Visual regions V1 and V5 served as control regions. The number of events during movie-watching was estimated using the Greedy State Boundary Search algorithm (Geerligs et al., 2020), and individual event boundaries were identified with Hidden Markov Models (Sava-Segal et al., 2023). Subject-pair boundary alignment was computed by counting the number of matches within one TR,

and normalizing it by the expected random matches derived by permuting boundary locations 1,000 times for each participant. We used inter-subject representational similarity analysis (IS-RSA) to examine the relationship between subject-pair event boundary alignment and subject-pair anxiety score alignment. One set of analyses tests whether participants with similar anxiety scores have closer event boundary alignment (Nearest Neighbors model). Another tests whether anxious individuals have idiosyncratic event boundaries (Anna Karenina model). Significance was assessed against a null distribution generated by shuffling the anxiety scores in 10,000 permutations.

Results: Higher anxiety scores were associated with lower boundary alignment, suggesting that individuals with elevated trait anxiety demonstrated more idiosyncratic event boundaries compared to both non-anxious individuals and others in the anxious group. These effects were observed in both the left TPJ ($r = -0.1$, $p=0.04$) and right TPJ ($r=-0.1$, $p = 0.02$), but not V1 and V5. Notably, these findings are consistent with the Anna Karenina model. In contrast, the Nearest Neighbors model showed no significant results, indicating that event segmentation patterns in anxious individuals are not only different from non-anxious individuals, but also different from other anxious individuals.

Conclusions: Our findings indicate that trait anxiety is associated with reduced neural event boundary alignment in the temporoparietal junction. These results suggest that anxiety-related attentional biases and disruptions may cause idiosyncratic segmentation of continuous experiences into events. Our study shows the applicability of the HMM and GSBS algorithms in analyzing naturalistic fMRI data to detect group differences in neural event segmentation, offering a novel approach to understand event segmentation in other mental disorders.

P3-D-51 Dissimilarity in Ventral Striatum Response to Socially Rejecting Events Predicts Increased Loneliness in Autistic and Non-Autistic Youth

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Background and Aims: Loneliness substantially impacts well-being, particularly for autistic youth that report higher rates of loneliness compared to non-autistic peers. One factor that influences loneliness is perceiving the world differently from others, such that lonely individuals have more idiosyncratic neural responses compared to non-lonely peers (Baek et al., 2023). While this neural dissimilarity has been previously assessed using naturalistic video stimuli, understanding which specific features of the stimuli drive this relation between neural dissimilarity and loneliness will shed insight on which aspects of the differences in neural processing are most predictive. Here, we test for the presence of specific time periods within naturalistic video stimuli that most strongly predict loneliness in autistic and non-autistic youth.

Methods: Autistic (n=30) and non-autistic (n=81) youth aged 11-14 completed an adapted version of the Loneliness and Social Dissatisfaction Scale (Parker & Asher, 1993), then participated in an MRI scan. During the scan, youth viewed a five-minute socially rich animated clip, Partly Cloudy (Richardson et al., 2018). Preprocessed BOLD time series were extracted from bilateral ventral striatum, in line with the role of reward processing in loneliness. To quantify dynamic fluctuations in neural dissimilarity across the length of the video stimulus, sliding window correlations of 15 TRs (TR=1.25s) were calculated between each potential pair of participants across the time series. Models were constructed for each window to test relations between loneliness and that window's neural similarity value following an Anna Karenina approach in which lonely participants were predicted to be more neurally idiosyncratic. We implemented these models as multilevel models with crossed random effects, with neural similarity between any given pair of participants in a given window as the outcome, the mean of the pair of participants' loneliness scores as a predictor, and random intercepts for each participant in the pair (Chen et al., 2017). Significant time periods were considered meaningful if they were comprised of 2 or more consecutive significant windows. Analyses were conducted across the full sample, and separately for the autistic and non-autistic groups.

Results: Across the full sample, two time periods were identified in which ventral striatum dissimilarity significantly predicted increased loneliness ($ps<0.05$). Both time periods, each 30-35 seconds long, corresponded to previously identified mentalizing events within the clip (Richardson et al., 2018), including depictions of social rejection between the characters. When analyses were conducted within the two groups, the analysis for the autistic group replicated one of the two significant time periods, while the analysis for the non-autistic group revealed no significant time periods.

Conclusions: These findings highlight a relation between increased loneliness and idiosyncratic reward processing, specifically for socially rich events involving rejection, and particularly for autistic youth. Future analyses will complement this data-driven approach with independent event coding and continuous participant coding of affective experiences during clip viewing. Through these approaches we aim to further understand the role of reward processing in loneliness and better characterize the neural correlates of loneliness.

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P3-D-52 The Role of Reward Processing and Cognitive Control in Depression

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Background and aims: Depression is one of the most prevalent mental health disorders. Symptoms of depression can include blunted reward sensitivity. The association between depression and reward sensitivity has been found in behavioral and electroencephalography (EEG) studies. Reward processing can be measured using event related potentials (ERPs). One of the most common ERPs used in reward processing is reward positivity (i.e., RewP), which is usually seen 250-350 milliseconds after a reward is presented. Depression is also associated with impaired cognitive control, which is the ability to regulate one's

thoughts and actions based on the demands of the task at hand. In the EEG literature, the ratio between theta and beta frequencies measured during resting-state has been used to indicate the level of cognitive control. Previous research shows the unique contribution of reward processing and cognitive control in depression. However, how they interact with each other in predicting depression remains unknown. This study aims to look at the role of the neural correlates of reward processing and cognitive control in depression.

Methods: Data have been collected on 32 participants, with an expected sample size of 60. Participants completed the Doors Task while EEG activity was recorded, followed by a resting-state EEG session. In the doors task, participants were asked to choose between two doors presented simultaneously on the screen. Participants were instructed that one door contained a point-based reward, whereas the other door resulted in a loss of points. After making a choice, participants received "WIN" or "LOSE" feedback. In the resting state EEG session, participants were asked to focus on a central fixation cross for two 5-minute blocks. All data were collected using a 256-electrode EEG cap. Participants also completed the Depression Anxiety Stress Scale.

Data analysis plans: To measure reward processing, we will calculate the RewP difference by subtracting the RewP amplitudes of the "LOSE" trials from the "WIN" trials. The ratio between theta and beta band activity will be extracted and calculated from the resting-state session. We will use Pearson correlation analysis to see if RewP and beta/theta ratio are correlated with depression scores. In addition, a hierarchical multiple linear regression model will be used to see if they have a unique contribution and interaction in predicting depression scores.

General implication: We expect to see lower RewP amplitudes and higher theta/beta ratios in participants with higher depression. If the expected results are shown, then our research will provide empirical evidence that RewPs and theta/beta ratios can be considered as biomarkers for depression. This research will further our understanding of the risk factors related to depression**.**

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P3-D-53 - Neural Mechanisms of Reward Processing: The Relationship Between Reward Anticipation and Reward Consumption in High and Low Reward Responsive Individuals

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Background: Reward sensitivity can influence many aspects of our daily lives including well-being, motivation, learning, and personality. The reward positivity (RewP), a time-locked event-related potential (ERP) component, is a measure of reward-related neural activity elicited by win or gain feedback. A blunted RewP has been previously linked to greater risk of depression, while a high RewP can be associated with heightened impulsivity. The stimulus preceding negativity (SPN) is another ERP component that measures anticipation to possible feedback. Prior research indicates that there may be an association between the SPN and the RewP in individuals with major depressive disorder. Understanding how reward reactivity relates to patterns of reward anticipation may have significant implications in everyday life and mental health conditions. Yet, the extent to which individual differences in reward reactivity relate to variation in reward anticipation is relatively unclear.

Objectives: The purpose of our study is to determine whether individuals that are most reward responsive show different patterns of anticipatory reactivity in comparison to individuals with low reward responsivity. By splitting participants based their score on a self-report reward reactivity scale, we intend to look at the individuals that are most reward responsive and assess whether they show different patterns of anticipatory reactivity in comparison to individuals that are less reward responsive. We hypothesize that individuals with low reward reactivity scores will have a greater relationship between the SPN and RewP in comparison to the participants with high scores.

Methods: A target sample of N = 60 adults will be recruited to participate in this study. After giving informed consent, participants will be fitted with a 256-electrode high-density electroencephalogram (EEG) cap. Participants will complete the Doors Task, where they will choose between two doors and attempt to pick the door that contains a reward. Participants will receive win or lose feedback based on their choice. Participants will then complete the Reward Responsiveness Scale (RRS). ERP data will be extracted at frontocentral electrode sites. The SPN will be measured 200 ms before feedback while for the RewP it will be measured at 250-350 ms post feedback.

Data analysis: Using linear regression, we will test the degree to which reward responsiveness moderates the association between reward consumption (RewP) and reward anticipation (SPN). We expect high reward responsive individuals to show a stronger association between the SPN & RewP, and low reward responsive individuals will have a weaker association.

General implications: Given the previous findings linking together the RewP, the SPN, and major depressive disorder, our results may generalize these findings to high vs low responders more broadly. Thus, this project has important implications for understanding how the neural processes implicated in different stages of reward processing (i.e.,SPN and RewP) may be differentially related across high and low reward reactive individuals–which are phenotypes of mental health conditions such as addiction and depression

P3-D-54 A Neural Signature of Vaping and Smoking Cues

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Background and Aims: The rapid increase in e-cigarette use among young adults is alarming, as it raises the risk of transitioning to smoking and developing nicotine addiction. A key feature of drug addiction is the distinct neural response to conditioned drug-related cues, known as cue reactivity.

Methods: In this study, we used functional magnetic resonance imaging (fMRI) and machine learning methods to identify a neural signature of vaping severity in young adult vapers. Sixty-six non-smoking young adult vapers (age = 20.08±1.50, 46 females, vaped on 15 or more of the past 30 days) viewed visual cues related to vaping, smoking, and a non-nicotine-related reward (i.e., food) during fMRI scanning. Participants also provided weekly self-reports of their vaping behaviors over the subsequent four weeks. We developed a classifier using Support Vector Machine (SVM) to distinguish between pairs of cue conditions and examined the association between SVM-based brain weight maps and future vaping frequencies using inter-subject representational similarity analysis (IS-RSA).

Results: The SVM model achieved high performance in distinguishing between vaping and food cues (cross validated accuracy = 98% ± 3.5%(SE), AUC = 99%) and smoking and food cues (cross validated accuracy = 97% ± 2.1%(SE), AUC = 99%), though its accuracy was slightly lower when differentiating between vaping and smoking cues (cross validated accuracy = 91% ± 1.5%(SE), AUC = 91%). Key brain regions with high discriminative weights for differentiating between cue conditions include areas associated with reward and self-referential processing, such as the insula and the medial prefrontal cortex. Additionally, IS-RSA revealed a significant correlation between future vaping frequencies reported in the follow-up surveys and the brain activity patterns identified by the SVM ($r = 0.11$, corrected $p<.001$).

Conclusions: These findings highlight the link between brain activity in response to vaping-related cues and real-world vaping behaviors. The study demonstrates the potential of combining fMRI and machine learning analysis to identify complementary neuromarkers associated with vaping escalation risk. This approach provides preliminary evidence for identifying high-risk populations and informs the development of targeted, effective intervention strategies to reduce vaping among young adults.

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P3-E-55 Functional Network Reconfiguration Between Rest and Movie-Watching Relates to Theory of Mind Performance Among Young and Older Adults

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Background and Aims: Extensive literatures examine brain function during rest and task states in isolation. Yet, the underlying patterns of functional connectivity across states are highly correlated. Task-evoked brain function accounts for only a fraction of additional variance explained, and yet has important consequences for behavior. To understand the interplay between these factors, we examined how reconfiguration (i.e., change in functional connectivity) associated with watching movies involving social interactions related to theory of mind (i.e., accurate understanding of others' thoughts and feelings). Given that aging disrupts both the functional architecture of the brain and theory of mind, we tested whether the association between reconfiguration and performance varied in an age-dependent manner.

Methods: One-hundred and one young adults (Mage=21.81, SDage=4.30; 62 women, 36 men, 3 non-binary) and 83 cognitively healthy older adults (Mage=72.88, SDage=6.23; 53 women, 30 men) underwent fMRI during 15-minutes of rest and 15 minutes of passive-viewing of the mockumentary TV show Nathan For You®. Participants then rewatched the show outside the scanner while making continuous joystick ratings of awkwardness – a core feature of theory of mind. To operationalize accuracy, we compared each participant's timeseries to consensus timeseries extracted from an independent sample of young adults (n=110) to create a "similarity score". The similarity score exhibits construct validity and advantageously lacks ceiling effects, making it well-suited to detect individual differences. To calculate network reconfiguration for each person, we constructed 200-cortical-region static functional connectivity matrices for rest and movie-watching and correlated them in a pairwise fashion. Finally, we related reconfiguration and awkwardness similarity scores across all participants and examined age differences in their association using permutation significance testing. See Figure 1A-1D for a methods visualization.

Results: Consistent with prior work, older adults had poorer theory of mind performance (e.g., lower similarity scores) than young adults during movie-watching. Older adults also had more reconfiguration between rest and movie-watching than young adults. We observed, for instance, that the default and frontoparietal networks were more strongly connected during movie-watching versus rest in older adults versus young adults (Figure 1E). Addressing the core aim of this work, less reconfiguration between rest and movie-watching was related to better theory of mind performance, $r(182)=.17$, $p=.02$ (Figure 1F). The strength of this association did not differ between young and older adults, $rDiff =.15$, $p=.32$. Network-level analysis indicated that the default ($r=.23$), frontoparietal ($r=.20$), and visual ($r=.17$) networks most strongly contributed to this pattern.

Conclusions: This study contributes to an emerging body of work suggesting that there is a shared functional architecture underlying rest and task states, and that the efficiency by which it is modulated relates to better behavioral outcomes. Understanding reconfiguration may improve insights about the context in which task-evoked brain function occurs as the field moves towards a dynamical understanding of brain function at more fine-grained temporal scales.

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P3-E-56 Do I Know You? Brain Responses to Familiar and AI-Generated Faces

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Background and Aims: Face perception emerges at birth and continually improves over early development and into adulthood. However, there is limited knowledge about brain processes that are specialized for detecting AI-generated faces, especially in adolescents. Since adolescents are growing up with more internet and AI exposure than seen previously, we will be analyzing its impact on brain processes and how it relates to their social belonging occurring through virtual means. Social connection is growing more and more virtual through social media and video calling, and adolescents have grown up on this online sphere. With this, adolescents may not be aware of when faces are AI-generated and may place more connection to celebrities than adults, which would change the specificity of their neural processing. We do not know how the adolescent brain distinguishes between celebrity, known, and AI-generated faces or whether it maps onto their social well-being on virtual platforms, and this project hopes to fill that gap in understanding.

Methods: We are recruiting preliminary participants aged 12-17 (e.g., <55% White Non-Hispanic, an=15 to date). During electroencephalography (EEG) recording, participants view a series of faces across conditions: familiar intimate (friend), known non-intimate (celebrity), and unfamiliar non-intimate real (stranger), and generated unfamiliar non-intimate (AI-generated stranger). Celebrity faces will be selected using AI software that maps cardinal facial features from the friend's face to find a celebrity "lookalike". The unfamiliar non-intimate faces are generated from the friend's face, looking very similar to, yet distinct, from the friend. Approximate age, race/skin tone, gender, and lighting are constant among the categories. Faces are displayed in the center of the screen for 1000 ms and participants are asked to press a button if a distractor with a dog is displayed. EEG data for each stimulus reaction will be mapped onto responses to the Canadian Social Connection Survey to analyze the amount of time they spend with people in virtual settings (relative to in-person settings).

Results: Amplitude and latency will be extracted for the N170 (120-250ms) EEG outcome post-face onset. We will test condition differences using linear mixed effects modeling. We will test the relationship between brain effects and virtual interaction times using Pearson correlations.

P3-E-57 The Behavioral and Neural Process of Children's Interactions with Artificial Intelligence (AI): An Integrative Observational and Neuroimaging Approach

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Background and Aims: In the current era, social interactions are no longer limited to human counterparts but extend to AI. Humans are engaging with AI companions, virtual assistants, and interactive devices, often perceiving these entities as social partners. This shift raises a profound question: how do children and their developing brains adapt to these novel, non-human social interactions? Behavioral theories of human-AI interaction suggest that individuals often unconsciously apply social heuristics from human interactions to their interactions with machines, particularly when human-like cues are present. While children's behaviors in AI interactions may mirror human communication, little is known about the underlying neural mechanisms supporting these interactions.

Methods: To address this, we implemented an innovative approach integrating naturalistic observational techniques with neuroimaging methods to triangulate the behavioral and neurodevelopmental processes underlying children's social interactions with humans versus AI in a joint story-listening context. In our approach, children listen to a child-friendly story; during the story, they verbally respond to questions and then receive real-time verbal feedback from their story-listening partners. Children's brain activity is recorded using fNIRS, and their interactions are audio-recorded. Here, we tested two groups of children (mean age = 9.6 years): one interacted with real, physically-presented human partners (N = 45), and the other with conversational AI partners presented using a computer speaker (N= 45).

Results: Substantively, our integrative approach combines behavioral observation and neuroimaging to investigate the mechanisms underlying everyday social interactions, focusing on how the developing brain responds differently to humans versus AI. Methodologically, by utilizing fNIRS, naturalistic story-listening, and real-time verbal interactions, we capture the neural and behavioral dynamics of children's social interactions in an ecologically valid and culturally sensitive manner. This design addresses the limitations of traditional studies in social and affective neuroscience, which often lack ecological validity due to controlled experiments and artificial stimuli. Furthermore, our approach maximizes cultural and developmental relevance, as story listening is a common and culturally ubiquitous childhood activity, and real-time verbal interactions mirror everyday social experiences.

Conclusions: Overall, our multimethod research provides methodological innovations in social and affective neuroscience by presenting a novel approach that integrates observational protocols, developmentally appropriate neuroimaging techniques, conversational AI technology, and a naturalistic story-listening paradigm. Our findings also show the neural basis of how the developing brains support child-AI interaction. These features of our research advance the future of social and affective neuroscience by promoting accessible, inclusive, and culturally informed practices in studying human social cognition and neural development.

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P3-F-59 Resolving Uncertainty Fosters Tie Formation in Real-World Social Networks

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The formation of friendships is a fundamental aspect of human social life, yet the processes by which friendships emerge and evolve remain poorly understood, particularly in dynamic social networks where relationships are constantly evolving. Existing research has predominantly focused on reciprocal friendships, thus overlooking how asymmetrical connections evolve, and how initial disagreements about the nature of two individuals' relationship might be resolved over time. Drawing on t heories of relational uncertainty (Knobloch & Solomon, 2002) and cognitive consistency (Festinger, 1957; Abelson et al., 1968), we hypothesize that greater uncertainty about the state of a relationship drives individuals to reduce uncertainty, which can lead to the formation of a new mutual tie. Here, we leverage a longitudinal dataset of a real-world social network composed of 187 first year undergraduate students within three adjacent dorms to examine how divergent perceptions of a relationship lead to changes within that relationship over time. At various time points in an academic year, individuals rated their relationship with everyone else in the social network, allowing us to track the trajectory of specific dyads. When looking at our network, we observed notable discrepancies in how dyads perceived their relationship, as approximately 20% of dyads reported an asymmetry. This asymmetry in perceptions across individuals could be thought of as a measure of uncertainty about the status of the relationship. Consistent with this idea, group perceptions reflected uncertainty about relationships for asymmetric dyads, as measured from the dispersion of relationship assessments provided by others in the network. How do these asymmetries become resolved? A new mutual tie is more likely to form in the future when there is greater uncertainty, i.e., when views of a relationship are more misaligned. This effect is enhanced by geographical proximity; that is, if two people live in the same dorm, they are more likely to become friends if they initially reported discrepant views of their relationship. What drives the effect of closing this uncertainty gap? We find that although the view of a relationship from both parties becomes more aligned as time progresses, the individual who initially feels more distant from the other person in the pair tends to adjust their perception over time, leading to greater alignment and higher closeness in the relationship. This offers a potential mechanism for how individuals seek symmetry in relationships (Newcomb, 1953) and how networks become balanced as a whole (Heider, 1958). Together, our results reveal the dynamic nature of interpersonal relationships and highlight how the dyad-level uncertainty and closeness, as well as group-level perceptions of a pair, underlie relationship change in a real-world social network.

P3-F-60 Naturalistic Theory of Mind Measurement Localized Neural Activity and Connectivity Within Single Model Framework

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Objectives: Theory of mind – the ability to infer others' thoughts and feelings – plays a key role in social cognition and is impaired in numerous clinical populations. Though these differences have generally been attributed to differences in the magnitude of activation in specific brain regions during theory of mind, recent work suggests that reduced functional connectivity may also contribute to differing performance. However, because no prior work has directly compared these approaches, it remains unclear whether task-based activity and functional connectivity explain unique variance associated with theory of mind performance. Here we address this question using a novel approach that allows us to disentangle contributions of activity and connectivity to theory of mind.

Methods: Young adults (N=99, MAge[SD]=21.8[4.2]) passively watched two episodes of a mockumentary-style television show (Nathan for You®) presented using Psychtoolbox-3 while undergoing fMRI. The show was selected because it engages theory of mind. An independent sample of young adults (N=110, MAge[SD]=18.7[0.9]) watched the same episodes outside of the scanner while making continuous, real-time judgment of awkwardness (a proxy judgment for theory of mind); these judgements were collapsed to create a consensus rating. Functional and anatomical MRI data were processed using fMRIprep (Esteban et al., 2019), and regional timeseries were extracted from 200 regions of interest (Schaefer et al., 2018). We calculated edge time series—a measure of time-varying connectivity resolved at single frames. For every pair of nodes, we fit linear models that include the activity time series of both nodes along with their edge time-series as predictors. We used these models to explain the time-varying consensus awkwardness rating. We retained model weights for each term (two node and one edge timeseries) and corrected for multiple comparisons and assessed network level significance using spin-test permutations.

Results: Both activity and edge time series contributed to explain awkwardness. In the case of activity (see Fig. 1A, 1B), regions in the control (e.g., precuneus, posterior cingulate) and somatomotor (e.g., primary motor, supplemental motor areas) networks were positively related to awkwardness, whereas activity within the dorsal attention and default mode network was negatively related. In the case of connectivity (edge time series; see Fig. 1C), edges with the greatest explanatory power primarily fell between networks, with cofluctuations between the default and control networks positively predicting awkwardness, whereas cofluctations between default and dorsal attention networks were negatively associated with awkwardness.

Conclusion: These findings not only help create a cohesive mapping of important naturalistic social behaviors such as theory of mind, but do so utilizing ecologically valid, dynamic, and naturalistic stimuli. Creating novel composites of both task activity and connectivity associated with theory of mind.

P3-F-61 Neural Evidence of Social Influence and Homophily in an Emerging Community of Adolescent Girls: A Longitudinal fMRI Study

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Background and Aims: Friends are similar to one another, but is that similarity a cause or consequence of friendship? Past cross-sectional social neuroscience research examining intersubject correlations (ISCs) of neural responses to naturalistic stimuli in a friendship network illustrates that socially proximal individuals exhibit more similar neural responses across many brain regions, possibly reflecting shared attention, interpretation, and emotional responses among friends. However, given the cross-sectional nature of past research, it is difficult to ascertain whether the neural similarity observed among friends reflects social influence processes (friends grow similar to one another), homophily (people befriend similar others), or both. Recent research has shown preliminary evidence of neural homophily, such that people with high pre-existing neural similarity are more likely to befriend one another. Using a longitudinal study paradigm, the current study shows, for the first time, whether friends become more neurally similar over time, reflecting the effects of social influence processes, and replicates findings of neural homophily in a non-WEIRD, developmental sample.

Methods: Participants were recruited from a girls high school in South Korea. At the beginning of their first year (t1) and a follow-up about 8 months later (t2), participants completed surveys about their social networks, which were used to characterize in-school sociocentric friendship networks. At both time points, a subset of participants (t1: n = 58; t2: n = 59) completed an fMRI study where they viewed naturalistic video stimuli (the stimuli presented at t1 and t2 were different but matched in content), and their neural time series during movie-viewing were used to conduct ISC analysis.

Results: Social network proximity at t1 predicted an increase in neural similarity from t1 to t2 when controlling for neural similarity at t1, such that people who were close to one another at the beginning of the school year grew more neurally similar over time. Further, neural similarity at t1 predicted social proximity at t2, such that higher neural similarity at baseline predicted shorter dyadic social distance in the future.

Conclusions: The current study reveals that social influence processes and homophily both contribute to why friends exhibit more similar neural responses to one another. Through social influence processes, friends may grow similar to one another over time, either by influencing one another directly or due to the influence of others around them. At the same time, homophily suggests that people should be more likely to befriend others who share pre-existing similarities because these similarities create opportunities for encounters, facilitate communication, and foster mutual understanding and positive interactions. To our knowledge, this is the first longitudinal study that employed naturalistic fMRI paradigms in conjunction with sociocentric network analysis to study the cause and consequence of friendship, and specifically, to examine the neural manifestation of homophily and social influence. In addition, the current study is distinctive for extending this research to a non-WEIRD and developmental sample.

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P3-G-62 Detecting Distributed Social States from Multimodal Signals in Group Conversations

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Background and Aims: Just as individual mental states emerge from distributed neural activity, collective social states may emerge from distributed patterns of behavior across interacting individuals. While people spend much of their lives participating in group interactions, we know surprisingly little about how social information is distributed across multiple people during natural social behavior. In this work, we seek to understand statistical regularities in multimodal social signals distributed across interacting people and how these signals index social psychological outcomes.

Methods: Using an unconstrained naturalistic conversation paradigm, we will quantify the vocal acoustics, speech semantics, facial expressions, and body language of freely conversing groups of 3-4 participants. Using an array of deep neural network models, we will detect multimodal regularities both within and between individuals that may represent emergent group states. To understand the social-psychological contents of these states, we will correlate them with pre- and post-conversation ratings of interpersonal perception and conversation quality.

Results: We anticipate that the results will provide evidence for distributed state-like patterns emerging across individuals and modalities. The relative frequency of these distributed patterns will predict post-conversation interpersonal perceptions, suggesting they capture behaviorally meaningful social information.

Conclusions: This work will provide initial evidence for systematic patterns underlying collective social states and offer preliminary insights into how multiple individuals coordinate during group interactions. We suggest that people exploit the occurrence of distributed multimodal regularities to navigate complex social interactions involving multiple people. These findings will characterize distributed social cues across groups of people, providing new ways to study how individuals navigate complex, multi-person interactions.

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P3-G-63 Neural Sensitivity to Social Exclusion Moderates the Relationship Between Narcissism and Anxiety Among Adolescents

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Background and Aims: Social media and narcissism are intertwined in adolescent development, as adolescents seek validation and connection in digital spaces, critical for their well-being (Hawk et al., 2019; Timeo et al., 2020). This study examines whether the conflict network, a neural system managing challenging social feedback, moderates the link between narcissism and anxiety. Specifically, it explores how neural reactivity in the conflict network during negative peer feedback on social media posts influences the relationship between self-reported narcissism and anxiety, offering new insights into the connection between narcissism and adolescent anxiety.

Methods: Forty-one adolescents aged 13-15 (average age 13.95, SD=0.63) at a large Midwestern university were recruited through community-based approaches. Participants completed self-report questionnaires, including narcissism and anxiety. During an fMRI scan, they participated in a peer feedback task, viewing both positive and negative social media-style feedback from peers of varying status levels. Conflict network (defined based on the Neurosynth search term "conflict") activation was examined to examine its relationship with narcissism and anxiety. Data analyses included regression models and moderation analyses.

Results: Adolescents reported an average narcissism score of 2.64 (SD = 1.28) and anxiety score of 11.58 (SD = 3.49). Narcissism and conflict network sensitivity to negative feedback were not significantly associated, suggesting narcissistic characteristics alone do not predict heightened neural reactivity in ambiguous social media contexts. However, narcissism positively predicted anxiety ($\beta = 0.334$, $p = 0.029$), and conflict network sensitivity moderated this relationship ($\beta = 2.651$, $p = 0.038$). At higher conflict network sensitivity (+1 SD), the narcissism-anxiety link was significant ($\beta = 0.51$, $p < 0.01$), while at lower sensitivity (-1 SD), this link was not amplified. These results highlight the role of neural reactivity in moderating the relationship between narcissism and anxiety.

Conclusions: This study shows that conflict network sensitivity increases the emotional risks linked to narcissism in online social contexts, with adolescents high in both narcissism and conflict network reactivity reporting heightened anxiety, particularly in situations getting negative peer feedback, which is frequent on social media.

The findings highlight the conflict network's role in shaping emotional reactions to social feedback, indicating that individual variations in neural sensitivity are pivotal in understanding vulnerability to anxiety among adolescents with narcissistic tendencies. Adolescents with heightened conflict network reactivity experience a stronger link between narcissism and anxiety, as their neural sensitivity to negative social feedback exacerbates their emotional susceptibility. In contrast, adolescents with lower conflict network sensitivity show a reduced impact of narcissism on anxiety, highlighting neural reactivity as a crucial moderating factor in emotional reactions to negative social experiences. These insights point to the possibility of tailored interventions that consider neural sensitivity as a way to promote socio-emotional well-being in adolescents navigating social obstacles in digital settings.

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P3-G-64 Exploring the Link Between Loneliness, Mind-Wandering, and Idiosyncratic Perceptions

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Objective: The sense of social connection is fundamental to well-being and shapes how individuals perceive and relate to the world. Prior research has demonstrated that lonely individuals often hold idiosyncratic views compared to non-lonely individuals. However, the mechanisms underlying this relationship remain unclear. Another body of research suggests that lonely individuals are more prone to engage in mind-wandering, potentially providing a pathway to understanding these unique perceptions. Building on this prior work, this preregistered study aims to investigate whether the idiosyncratic perceptions of lonely individuals can be partially attributed to their tendency to engage in mind-wandering. The study has two main objectives: (1) to assess whether lonely individuals exhibit higher rates of mind-wandering, and (2) to explore whether mind-wandering is linked with a greater likelihood of exhibiting idiosyncratic views.

Methods: Preliminary findings from our pilot study revealed a significant link between loneliness and mind-wandering. Thirty-four participants completed a Sustained Attention to Response Task (SART) to measure individual levels of mind-wandering, which were then analyzed in relation to trait-level loneliness. The results supported the hypothesis that loneliness is associated with greater likelihood to engage in mind-wandering. To extend this work, we propose incorporating functional near-infrared spectroscopy (fNIRS) and eye-tracking devices to identify the neural and behavioral correlates of these patterns and explore their connection to idiosyncratic perceptions. Specifically, participants will self-report trait-levels of loneliness and complete the SART, which will allow us to assess their tendency to engage in mind-wandering. Participants will also watch naturalistic stimuli while their eye movement patterns and neural activity are measured. Participants will also provide self-reported ratings of the stimuli, which will allow us to further analyze their perceptions.

Analysis Plans: Idiosyncrasies in video perception will be evaluated using pairwise distance matrix analyses of self-reported ratings and intersubject correlation (ISC) analysis of fNIRS data. Relationships between loneliness, mind-wandering, and idiosyncrasies will be analyzed using regression analyses. We hypothesize that lonely individuals will be more likely to display idiosyncratic responses to the stimuli, both in neural responses and self-reported measures. Furthermore, we hypothesize that

higher mind-wandering tendencies will partially mediate the relationship between loneliness and idiosyncratic perceptions.

Study Implications: By integrating neural and behavioral data, this research seeks to deepen our understanding of how loneliness influences internal thought processes and contributes to idiosyncratic worldviews. In addition, findings from the proposed study have the potential to address the critical gap in understanding why lonely individuals often hold non-normative views and are often perceived as less relatable by others as a result. Insights from this study could inform the development of effective interventions to reduce loneliness and its associated consequences.

P3-G-65 Intrinsic Motivation and Reward Processing

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Problem: This study investigates neural correlates of reward processing and intrinsic motivation using HD-EEG. Intrinsically motivated behaviors are performed for their inherent satisfaction and enjoyment. When rewards are delivered as contingent upon task engagement, completion, or performance, engagement and enjoyment in the task is reduced. Less clear however, are the neural processes underlying these effects (Di Domenico & Ryan, 2017). Reward Positivity (RewP) is an event-related potential (ERP) electroencephalogram (EEG) measurement, time-locked to positive and negative feedback. RewP is maximal at 250-350 ms post-feedback. The RewP reflects an early evaluation of outcomes as either better or worse than expected. A greater difference in RewP waveforms infers greater affective involvement or motivational engagement in the task (Gering & Willoughby, 2002). Thus, the RewP is linked to underlying reward system activity and appears to be well suited to measure how manipulations in intrinsic motivation are reflected in reward system electrocortical activity. RewP appears to be enhanced by external gains such as monetary rewards as well as internal changes in motivation. What is missing is clear and direct evidence for the link of RewP and intrinsically motivated task engagement. We hypothesize that higher intrinsic task engagement will be associated with higher RewP.

Procedure: Participants will wear a high-density electroencephalogram (HD-EEG) 256 electrode cap using a 10/20 system. This study aims to have 60 participants (over 3/4 completed to date), 18+ years old. The participants will complete the doors task and the stopwatch task, with order counterbalanced. In the doors task, participants are presented two doors and must select the correct one to win points. They are shown a green "win," red "lose" feedback for each trial. The stopwatch task presents participants with a stopwatch that counts up to 2 seconds. The time is then covered with a white box and they estimate when a third second has passed. Participants are similarly presented with win/lose feedback. At the end of each task, participants complete an engagement/disaffection questionnaire.

Results: Data is still in the collection phase. All data will be collected by the end of January. Data will be analyzed in February. To examine differences in motivation levels between the tasks and any task order effects on our key outcome variables, a 2 (task order) X 2 (task) MANOVA will be run with RewP amplitudes and self-reported engagement as dependent variables. We will also run bivariate correlations between RewP and self reported engagement for each of the two experimental tasks. We expect to find a statistical link between intrinsic motivation and RewP amplitude. Specifically, participants with higher self-reported engagement in a particular task will also have a higher RewP in the respective task.

Conclusions: Most historical research on intrinsic motivation relies on self report of interest and enjoyment or free-choice time behavioral persistence. Self-report is riddled with issues like demand characteristics, social desirability, and accuracy of conscious awareness. Free-choice time persistence can be motivated by ego-involvement, or the Zeigarnik effect, which can lead to interest and enjoyment being incorrectly inferred. This research provides additional data needed for the identification of a more reliable, physiological measure of intrinsic task motivation.

P3-G-66 Dorsal Anterior Cingulate Responses to Unreciprocated Trust are Associated with Neural Responses to Unfairness

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Background and Aims: Social interactions often involve navigating trust and fairness, both of which can evoke strong emotional and cognitive responses. Violations of these norms, such as betrayal or unfair treatment, engage the dorsal anterior cingulate cortex (dACC), a region associated with processing conflict and affective responses to social violations. While previous research has examined dACC activation in isolated contexts (e.g., Ho et al., 2017, NPP), it remains unclear whether neural responses to trust violations generalize to fairness-related decisions. This study aims to address this question by combining data from two established paradigms: the Trust Game (TG) and the Ultimatum Game (UG). We hypothesize that elevated dACC responses to unreciprocated trust in the TG will be associated with heightened dACC activation during rejection of unfair offers in the UG.

Methods: We collected data from 118 participants (ages 18-55) as part of our ongoing data collection effort (Smith et al., 2024, Data in Brief). Participants completed the Trust Game (TG) and the Ultimatum Game (UG) while undergoing fMRI, with task order counterbalanced across participants. In the UG, participants were presented with offers from a partner to split an endowment ($16 or $32) at proportions of 5%, 10%, 25%, or 50%. Participants chose to accept or reject each offer, with rejections resulting in no payout for either party. In the TG, participants acted as the investors, deciding how much money to entrust to their partner, which could then be reciprocated or defected upon. We identified dACC using Neurosynth (keyword: "dACC"; $Z > 5.37$) and created 10mm diameter spherical mask centered on MNI x=5, y=29, z=20. We extracted dACC responses to the unreciprocated trust during the trust game and used these individual-level responses in our group-level model of the ultimatum game. We corrected for multiple comparisons across the whole brain using a cluster-defining threshold of $Z > 3.1$ with family wise error rate (FWER) of 5%.

Results: Consistent with prior research, participants rejected unfair offers at a higher rate compared to fair offers. Moreover, fair offers elicited ventral striatum (VS) activation (e.g., Tabibnia et al., 2008, Psych Science) while unfair offers were associated with anterior insula activation (e.g., Harlé et al., 2012, NeuroImage). Next, we tested our core hypothesis that dACC responses to unreciprocated trust would be associated with neural responses to unfairness. Our preliminary analyses revealed significant effects in the dACC and the dorsolateral prefrontal cortex (dlPFC) Specifically, individuals exhibiting the largest dACC responses unreciprocated trust also had the largest dlPFC and dACC responses to unfair offers from social agents.

Conclusions: Overall, our preliminary results indicate that dACC responses to unreciprocated trust generalize to fairness-related decisions, with heightened dACC activation during trust violations in the Trust Game showing relationships with dACC and dlPFC responses to unfair offers in the Ultimatum Game. These findings highlight the dACC's role in processing social violations across contexts, contributing to our understanding of the neural mechanisms underlying trust and fairness.

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P3-G-67 Predicting Whole-Brain Neural Dynamics from Prefrontal Cortex fNIRS Signal During Movie-Watching

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Background and Aims: Functional near-infrared spectroscopy (fNIRS) offers a portable, cost-effective alternative to functional magnetic resonance imaging (fMRI) for non-invasively measuring neural activity, making it a promising tool for naturalistic tasks and populations sensitive to the noise and movement restrictions posed by fMRI. However, fNIRS measurements are limited to cortical regions near the scalp, missing important medial and deeper brain areas. This project aims to explore the possibility of bringing together fNIRS' flexibility and fMRI's whole-brain coverage through supervised predictive modeling.

Methods: We introduce a predictive model that maps prefrontal fNIRS signals to whole-brain fMRI activity during movie-watching. By aligning neural responses to a common audiovisual stimulus, our approach leverages shared dynamics across imaging modalities to map fNIRS signals to broader neural activity patterns. We scanned 30 participants with fNIRS (one was excluded for poor data quality) and utilized a publicly available fMRI dataset of participants watching the same episode of Sherlock. We adapted a principal component regression (aPCR) model to predict whole-brain fMRI signals from prefrontal fNIRS signals. The model was trained on the first half of the episode (Run 1) and tested on a held-out participant watching the second half (Run 2) to assess cross-individual and cross-stimulus generalizability. We then tested if the predicted whole-brain signals recapitulated ground-truth functional connectivity patterns by measuring the correlation between predicted and ground-truth inter-subject functional connectivity (ISFC) matrices.

We converted detailed annotation of the movie scenes into time-resolved vector embeddings using the Universal Sentence Encoder, and trained Ridge regression-based encoding models to predict neural dynamics in each brain region from the embeddings. We tested if the encoding models trained on ground-truth neural dynamics generalized to predicted neural dynamics to test whether semantic information was retained by predicted signals.

Results: The model significantly predicted fMRI time courses in 66 out of 122 brain regions, including in areas otherwise inaccessible to fNIRS such as precuneus/posterior cingulate, temporal parietal junction, and basal ganglia, among others (Figure 1A). Model performance was highest in the default mode network (DMN; median r = 0.303, percentage significant ROIs = 84.6%) and control network (CONT; median r = 0.296, percentage significant ROIs = 80.8%; Figure 1B).

The predicted fMRI time course also recapitulated ground-truth ISFC patterns (Figure 2) and retained semantic information about the movie content (Figure 3).

Conclusions: To enhance the versatility of fNIRS, we introduced a predictive model for inferring broader neural dynamics across the brain from prefrontal fNIRS signals, offering new opportunities for studying the neural basis of complex cognitive processes during naturalistic tasks. The model was able to predict the moment-to-moment neural dynamics in more than half of the regions across the brain, including areas not accessible with fNIRS. The predicted neural dynamics recapitulated functional connectivity patterns, and encoded semantic contents of the movie. We have made an fNIRS-fMRI model trained on all participants' Run 1 data publicly available at https://github.com/ycleong/fNIRS-fMRI_models, and we invite the fNIRS community to utilize and contribute to this tool.

P3-G-68 Removal of Slow, Brain-Wide Spatiotemporal Patterns Improves Predictions of What Participants Think and Feel While Lying in the Scanner

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Background and Aims: Previous work has shown that what someone feels and thinks while lying in an MRI scanner leaves an imprint on functional connectivity during rest1, indicating that at least some of the variance in resting state data reflects in-scanner experience. However, a remaining open question is what brain components of detected activity are tied to ongoing experience. Additionally, other recent work shows that a large amount of variance in resting state fMRI (rs-fMRI) is accounted for by three low frequency spatiotemporal activity patters which can be identified using complex principal component analysis (CPCA)2. In this work, we use CPCA to decompose rs-fMRI data and test whether the removal of these patterns changes our ability to predict ongoing experience using connectome-predictive modeling (CPM)3, providing insight into what brain activity is tied to ongoing experience.

Methods: Dataset: We use 471 rs-fMRI scans from the MPI-Leipzig Mind-Brain-Body dataset4. Following each scan, participants

completed a questionnaire (Fig. 1A) which asks about the form and content of their thoughts throughout the scan, including asking about thinking of yourself or other people, and in a positive or negative way.

Response dimension reduction: Interpretability Constrained Questionnaire Factorization5 is used to generate two summary descriptors of ongoing experience that we refer to as "Thought Patterns" (TPs).

Basic fMRI Pipeline: Preprocessing replicates previous work1 (Fig. 2D, blue).

cPCA Pipeline: We extracted the first three cPCA patterns using 50 randomly selected scans as described in Bolt et al.2 Next, we generated voxel-wise, scan-specific regressors for these patterns as in Abbas et al.5 Finally, regressors were used as additional nuisance factors (Fig. 1D, orange).

FC Matrices: Constructed using the 400 ROI/7 Networks Shaefer Atlas7 extended with 8 subcortical regions from the AAL atlas8 for both pipelines.

CPM: We used TPs 1, 2 and Wakefulness as prediction targets. We perform two versions of CPM with (1) the original data, and (2) the data with the first three principal components removed. Prediction accuracy is evaluated as the correlation between observed and predicted values over 500 iterations, and compared to 10,000 null permutations for significance. Significant differences across pipelines are evaluated via paired T-tests.

Results:

1. We can replicate the CPCA pipeline and identity slow spatiotemporal patterns in a new data set. The patterns align with previous work2 (Fig 2A).
2. Removal of the first three CPCs causes significant changes in FC across the brain, aligning with previous findings6 (Fig 2B-D).
3. The predictions for TP1, TP2, and Wakefulness all improve with the removal of the first three components (Fig 2F), providing new evidence that these patterns do not reflect ongoing experience.

Conclusions: Removal of the first three principal components improves predictions for ongoing experience in rest, suggesting that these specific patterns are not tied to what someone thinks or feels while inside the scanner.

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P3-G-69 Social Comparison Contexts Influence Empathy for Pain: An fMRI Research

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Background and Aims: Empathy, the ability to share the emotional and sensory states of others, plays a vital role in social interactions. Previous studies have investigated the neural correlates for empathic responses, implicating the anterior insular cortex (aIC) and dorsal anterior cingulate cortex/anterior mid-cingulate cortex (dACC/aMCC) in empathy for pain, and striatum and medial prefrontal cortex in positive empathy. Evidence indicates that social comparison, a process that people evaluate a target (i.e., self) based on comparing with a standard (i.e., others), modulates emotional responses for self and others' experience. However, how social comparison contexts, especially upward social comparison contexts in which we compare ourselves to a better other, influence empathic responses remains largely unclear. The aim of the present study is to elucidate the neural mechanisms underlying the effect of social comparison contexts in empathic responses.

Methods: In a pain-related social comparison paradigm with electrical pain stimuli and fMRI scanning, we recruited 46 participants who were paired with a confederate and asked to rate how they emotionally felt about the pain outcome [a decrease in pain experience, DEC; no change in pain experience, NO; an increase in pain experience, INC] on self in the Individual Self task (SX) or the confederate in the Individual Other (OX) or in the Sequential task (SO). We designed DEC, NO, and INC pain outcomes to evoke relatively positive, neutral, and negative emotions, respectively, for both self and the confederate. We also subtracted the emotion ratings in the Individual Other task from those in the Sequential task to unbiasedly isolate the effect of social comparison contexts on empathy (3 self pain outcomes × 3 other pain outcomes). We used SPM12 to analyze fMRI data.

Results: In upward social comparison contexts, participants showed less positive empathic responses in the SNOODEC and SINCODEC conditions and more negative emotions in the SINCONO condition compared to positive empathic responses for XODEC or XONO in the Individual Other task. The negative emotions were then classified as envy in the post-scanning rating. On the neural level, we found that the activity in the left aIC in the extreme upward social comparison context (contrast "SINCODEC > XODEC") was negatively correlated with the change in empathy rating in the same condition and positively correlated with envy rating in the SINCODEC condition. A mediation analysis demonstrated that the correlation between left aIC activity and the change in empathy rating in the "SINCODEC > XODEC" condition was mediated by envy responses in the SINCODEC condition.

Conclusion: Our findings suggest that upward social comparison-related envy reduces positive empathic responses, which was mirrored by the left aIC activation. These findings enhance current understanding of social emotions and provide insights into the pathogenesis of impaired social interactions in patients with mood disorders.

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P3-G-71 Identifying Theta Connectivity Subgroups and Their Associated Symptoms in Anxious Adolescents

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Background and Aims: There has been an increase of anxiety disorders amongst the general population but in adolescents especially (Malik, et al., 2022). Despite the upward trend, little is known about specific subtypes of anxious individuals and heterogeneity within the disorder that may provide insight to more personalized treatment and intervention. This current study attempts to characterize biologically-derived subgroups of anxiety to specific behaviors and symptoms using electroencephalogram (EEG) connectivity patterns. Specifically, we examined theta connectivity, referring to the synchronization or coordination of neural activity within the theta frequency range across different brain regions, in a sample of anxious adolescents. Previous studies have shown certain theta connectivity to be an important marker for anxiety, specifically increased connectivity in the midline frontal channel in anxious individuals compared to control groups (Xing, et al., 2017). We hypothesize that these subgroups with specific functional connectivity maps differ in behavioral measurements of attentional bias and anxiety.

Methods: The data was collected from teens (N=64) aged 12-14 (M =12.89) with mild to severe anxiety. Participants underwent a clinical interview (ADIS-5; Barlow and Brown,. 2014) and answered a set of self-report questionnaires such as Intolerance of Uncertainty Scale (IUS; Freestone et al,. 1994) and Screen for Child Anxiety Related Disorders (SCARED; Birmaher et al., 1997) accessing for different symptoms of anxiety before completing a baseline task and the dot probe while EEG was recorded. The baseline task measures the brain activity of participants at resting state, requiring participants to relax with each minute keeping their eyes open or closed. Trial Level Bias Scores (TLBS; Zvielli et al., 2015) were derived from the dot probe.

Results: Using Group Iterative Multiple Model Estimation (GIMME; Gates and Molenaar., 2012), two subgroups were identified: Subgroup A, was characterized by more frontal connectivity and Subgroup B, was characterized by frontal and posterior connectivity. Compared to Subgroup A, Subgroup B scored consistently higher in anxiety scores and anxiety-related measures including: greater SCARED GAD, higher intolerance of uncertainty, and greater TLBS mean positive scores (indicated bias towards threat).

Conclusions: The results suggest that there are distinct anxiety subgroups that vary in symptom severity and highlights the need for further research into heterogeneity within a disorder for intervention as well as the stability of subgroup classifications over time.

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P3-G-72 Neural Mechanisms of Social Information Processing in Loneliness: Insights from Tasks based on Dynamic and Static Social Stimuli

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Background and Aims : Loneliness is increasingly recognized as a major public health concern, prompting a surge in studies exploring the cognitive and neural mechanisms underlying its detrimental effects on mental and physical health. However, previous research has yielded inconsistent findings regarding the relationship between loneliness and the activity of key social brain networks during social information processing, including networks associated with social perception (fusiform gyrus; FG, posterior superior temporal sulcus, pSTS), emotion processing (amygdala, AMY; instula, INS) and theory of mind (medial prefrontal cortex, mPFC, temporoparietal junction, TPJ, precuneus, PC). Several factors, such as variation in task design, may contribute to these inconsistencies. Thus, the current study examined neural responses to static pictures and dynamic point-light dyadic vignettes in a large sample of participants who were recruited based on their trait loneliness levels.

Methods: One hundred and four nonclinical participants (52F) aged 18-35 years were recruited using cut-off scores for the extreme quartiles of the distribution of the Polish version of the UCLA-R Loneliness Scale scores to form high-lonely (HL, n=52; 26F, UCLA-R>=49) and low-lonely (LL, n=52, 26F; UCLA-R<=32) groups. Participants were asked to complete the neuroimaging session with two experimental tasks. The first task (Social Perception and Interaction Task; SoPIT) has been developed to investigate brain response to various types of third-party encounters, and presents a wide range of dyadic actions of point-light agents, including (1) interactions based on the communicative gesture of one agent (COM); (2) emotional exchanges between agents (EMO); (3) independent actions of agents (IND) and (4) scrambled motion of two agents (SCR). During the second task, the participants were presented with static pictures with positive, neutral, or negative social and nonsocial content

Results: During the SoPIT, nonlonely participants have shown increased mPFC, bilateral ventrolateral PFC and cerebellar activity in response to EMO compared to IND, and increased activity in response to IND compared to EMO in left INS, anterior cingulate and postcentral gyrus regions. However, these activity patterns were not observed in lonely individuals. Furthermore, larger response to point-light vignettes was found in nonlonely compared to lonely participants in precuneus, left inferior occipital and left pSTS. At the same time, in the task based on the static pictures, only minor between-group differences were found in the pattern of response to social vs nonsocial pictures in the right FG (larger response in the mid-lateral FG for HL>LL and larger response in posterior lateral FG for LL>HL).

Conclusions: The current findings suggest decreased involvement of key mentalizing regions during the processing of emotional interactions compared to dyadic individual actions in lonely individuals, thus suggesting an association between loneliness and reduced sensitivity to salient third-party encounters. Furthermore, these results emphasize the importance of task and stimulus

design in studying the neural mechanisms of loneliness and suggest that dynamic stimuli might be more sensitive in revealing differences associated with loneliness.

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P3-G-73 The Effect of Friendship on Temporal and Spatial Alignment of Events in Real-Time Conversation

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Conversations among friends are often more dynamic, enjoyable, and wide-ranging than those between strangers. How do friends do this? Because friends have inside jokes, shared past experiences, and mutual interests, they may start with a shared mental map, allowing them to leap from one topic to another without losing each other. In contrast, strangers begin in separate mental landscapes, so they must tread carefully and coordinate smaller steps to avoid confusion. Here we test this possibility by investigating how friends and strangers represent and move through moments in a conversation. To do so, we scanned dyads using fMRI hyperscanning as they engaged in naturalistic conversation. We used Hyper-Hidden-Markov-Modeling, a computational method that allows us to track how each member of the dyad represents each decoded 'event' in the conversation. We hypothesized that friends would share more common representations, seeing each moment similarly, particularly in mentalizing regions. We hypothesized that these shared representations would promote more wide-ranging, exploratory conversations, whereas strangers' lack of overlapping representations would constrain their topic exploration.

We analyzed fMRI hyperscanning data from dyads (N=30 self-identified friends; N=27 strangers) engaged in a real-time conversation. We explored how an existing social connection influences the processes involved in the representational alignment of conversation events. To this end, we employed a computational method, termed Hyper-Hidden-Markov-Modeling, to project each interaction partner's neural states into a shared latent space and to segment them into meaningful events. This method allowed us to assess both how similarly each dyad represented a given event in latent space. The similarity of an event quantifies how aligned or attuned two people are in their thinking about the conversation, as indicated by how close their neural patterns are in the shared latent space. We then tested how representational alignment related to objective measures of conversation exploration derived from topic modeling analyses.

H-HMM revealed that friends represented events more similarly in latent neural space. Representational alignment was particularly pronounced for regions in the mentalizing network (MPFC & STS). This higher similarity in event representation was significantly correlated with several linguistic measures of exploration: Dyads whose representation aligned more closely in latent neural space tended to generate more topics, switch between them more often, and jump larger distances in semantic space.

Our study reveals that friendship is associated with more aligned event representations in conversation. As friends navigate from one conversation moment to the next, they represent the conversation content more similarly. This alignment may arise from their shared history, as friends often build upon a repository of common experiences, knowledge, and inside references. This enhanced alignment has direct consequences for the dynamics and the quality of their conversation. If friends see the world more similarly to each other, they can embark on more diverse and far-reaching conversations spanning a broader range of topics, all while staying anchored on common ground.

P3-G-74 Inside the Mind! How Social Support Impacts Neural Reactions to Peer Feedback in Sexual and Gender Minority Youth

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Background and Aims: Over 3 million U.S. youth aged 8-18 identify as LGBTQ. Sexual and gender minority (SGM) individuals face elevated stress from internal and external factors, leading to negative outcomes such as difficulties in forming a coherent self-identity, increased social isolation, distress, and suicidal thoughts (Bockting et al., 2013; Brandon-Friedman & Kim, 2016; Hogg et al., 1995; Meyer, 2003; Rimmer et al., 2023). Strong social connections, such as family and peers, are key to mitigating such stress and promoting well-being (Hoy-Ellis, 2023; Meyer, 2003). Social media feedback may foster self-evaluation, engaging self-referential neural mechanisms (Sherman et al., 2018). However, most studies rely on self-reports, leaving gaps in neural understanding. This study investigates whether perceived social support moderates the effect of an individual's identity (SGM vs. non-SGM) on self-referential neural activities when exposed to peer feedback.

Methods: Adolescents aged 13-14 residing in a Midwestern state were recruited through community-based events, web platforms, and other channels. Participants completed a pre-fMRI scan questionnaire, including questions about perceived social support. Next, during the fMRI scanning session, participants completed a peer feedback task where they were shown how anonymous peers rated social media posts created by the participants. To examine neural activity related to self-referential processing, we used the association test map for the search term "self-referential" to create our region of interest (ROI) using the meta-analytic tool Neurosynth.

Results: The study included a total of 50 participants, and 15 of the sample identified themselves as sexual and gender minorities. A significant negative association was found between SGM identities and the total support they perceived ($b = -0.771$, $p = 0.011$), such that SGM youth reported lower levels of social support they perceived compared to non-SGM

participants. Next, we conducted a linear regression analysis examining whether the relationship between SGM and perceived social support was moderated by neural activity in the self-referential network during exposure to peer feedback (positive > negative), controlling the age. Results indicated that perceived social support significantly moderates the relationship between individuals' sexual and gender identity and sensitivity in the self-referential network (b= 0.777, p= 0.019). Put another way, as more social support is received, SGM individuals showed a stronger association with self-referential neural activity compared to non-SGM individuals, which aligns with the theory that social support is beneficial for SGM youth.

Conclusions: Overall, the findings in this study contribute to a nuanced understanding of social support, which may serve as a critical buffer for SGM youth and enhance self-referential neural activity. Compared to non-SGM peers, SGM youth report lower perceived social support, which indicates more social challenges may be encountered by SGM adolescents, such as social exclusion and isolation. The observed moderation effect suggests that increased social support enhances SGM adolescents' ability to process peers' feedback with greater resilience, potentially reinforcing positive self-perception and reducing vulnerability to social rejection cues.

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P3-G-75 Behavioral, Neural Signatures, and Individual Differences of Attitude Flexibility during Naturalistic Debate Viewing

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Background and Aims : There are two sides to every issue. Personal attitudes are not set in stone but updated continuously in response to new information, persuasive arguments, or cognitive dissonance, reflecting the changing nature of belief (Verplanken & Orbell, 2022). While research on attitude change mostly examines collective behaviors over time (Charlesworth & Banaji, 2022), especially through the lens of political polarization (Leong et al., 2020; Van Baar et al., 2021; Van Baar & FeldmanHall, 2022), the neurocognitive processes underlying individuals' shifts between different viewpoints, termed attitude flexibility, remain a significant and unresolved question (Lorenz et al., 2021). In this work, we sought to investigate the behavioral and neural patterns underlying attitude flexibility and test how these patterns relate to individual real-life social interactions.

Methods: We collected naturalistic fMRI data from 61 students (in an undergraduate program) as they watched video clips from 7 debaters, each lasting 3 min, on the topic 'Can humans fall in love with artificial intelligence'. The clips were presented in an alternating sequence of con and pro sides, followed by a 2 min resting-state scan. During the viewing, participants self-reported their agreement in real-time on a scale from -10 to 10, where negative scores indicated support for the opposing side and positive scores indicated support for the pro side. After scanning, participants provided subjective cognitive and emotional ratings for all arguments presented by the debaters, enabling us to quantify the arguments' strength and model neural signatures over time.

Results: Results showed that (1) Participants' attitude trajectories significantly aligned with debaters' arguments, demonstrating notable fluctuations in agreement levels that paralleled the presented pro and con perspectives. (2) We developed an fMRI-based predictive model of self-stance, agreement, and emotional valence, successfully distinguishing neural patterns associated with varying levels of support and emotional responses (Kohoutová et al., 2020). Moreover, we decoded final stance ratings from resting-state brain activity, demonstrating the predictive power of baseline neural signatures. (3) Participants' reports on their traits, prior knowledge, and personal experiences related to the debate topic revealed that higher cognitive flexibility and more extensive topic-related knowledge were significantly linked to more dynamic attitude transformations. (4) Based on participants' reports of their social networks within the program, we found that neural signatures of flexibility predict the number of real-life social contacts and the ability to maintain friendships, highlighting the ecological predictive validity of attitude flexibility in social settings.

Conclusions: Our study demonstrates that attitude flexibility is associated with distinct neural signatures and cognitive traits, and it effectively predicts real-life social interactions. These results advance our understanding of the neurocognitive mechanisms driving dynamic attitude changes and emphasize the importance of flexibility in social connectivity

P3-G-76 Neural Correlates of Environmental Rewards and their Relation to Pro-Environmental Behavior

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Background and Objectives: The reward positivity (RewP) is an event-related potential (ERP), derived from the continuous EEG signal, sensitive to positive versus negative outcomes; reflecting electrocortical responses to rewards and non-rewards. Reward processing is critical for maintaining successful interactions with one's environment and motivating behavior. Although activity in the brain's reward system has been shown to increase in response to eco-labels and predict pro-environmental behavior, it is currently unknown how positive vs. negative environmental outcomes affect RewP amplitudes. This study aims to compare RewP amplitudes for non-environmental and environmental rewards and the degree to which RewP amplitudes predict engagement in pro-environmental behavior.

Methods: Participants will perform two tasks in a counterbalanced order while EEG activity is recorded: a traditional reward task (i.e., the "doors task") and an environmental reward task (i.e., the "lightswitch task"). During the doors task, participants choose between two doors with a 50% chance of winning ($0.25) or losing ($0.13). This serves as a control measure for non-environmental rewards. The lightswitch task is similar to the doors task, but choices involve energy-efficient (win) or

inefficient (loss) outcomes, with monetary rewards and losses identical to the doors task. The participants are compensated $10 per task for a total of $20. Upon completion of the tasks, participants were offered an opportunity to donate their earnings from the environmental reward task to a local environmental organization. They were given three options: donate $10, donate $5, or donate $0. Participants then completed the fifteen-item New Ecological Paradigm (NEP) Questionnaire, a self-report measure that assesses general environmental attitudes. The twenty-two-item Climate Change Anxiety Questionnaire (CCAQ) was used to assess participants' anxiety levels, experience, and engagement with climate change.

Data from RewP amplitudes, feedback type (win vs loss), and task type (environmental vs non-environmental) will be analyzed using a 2 x 2 within-subjects Analysis of Variance (ANOVA). A Spearman's rank-order correlation will be conducted to assess the relationship between RewP amplitude and donation magnitude ($0, $5, or $10) across tasks.

Results: The study is ongoing: data from roughly three-quarters of participants (N = 40) has been collected. Participants will be 18 years or older. This study hypothesizes that RewP amplitudes in response to environmental outcomes will correlate with engagement in pro-environmental behavior, which would provide evidence that environmental reward motivates pro-environmental behavior. It is also hypothesized that the RewP amplitudes will be larger for positive vs. negative environmental outcomes, which would indicate that the environmentally-geared task is effective in engaging reward-related brain activity.

Conclusions: Our methodology involves tasks designed to replicate real-world decision-making scenarios and the utilization of EEG to capture precise neural responses, allowing us to investigate the relationship between brain activity and pro-environmental behavior in a controlled environment. We can gain valuable insight into the neural mechanisms behind sustainable behavior, and develop effective strategies for increasing engagement in such behaviors.

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