Social & Affective Neuroscience Society Annual Meeting 2016

April 28-30 | New York University

NYU | LEONARD N. STERN SCHOOL OF BUSINESS

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Conference Schedule

Thursday April 28

Start	End	Session
3:30 PM	7:45 PM	Registration – Stern School of Business
4:15 PM	5:15 PM	Poster Session A & Welcome Reception
5:20 PM	5:30 PM	Welcome from the Organizers
5:30 PM	7:00 PM	Symposium A: Reward & Decision Making

Paul Glimcher: Normalization Models of Subjective Value Representation in Cortex
Amanda Utevsky: Low frequency rTMS to monkey STS moderates neuronal sensitivity to social reward
Micah Edelson: Responsibility Aversion and Leadership Ability - Behavioral, Cognitive and Neurocomputational Mechanisms
Yael Niv: The role of the orbitofrontal cortex in social and affective decision making

7:00 PM	7:45 PM	**Presidential Keynote**: **Mahzarin Banaji** The Development of Implicit Social Cognition

Friday April 29

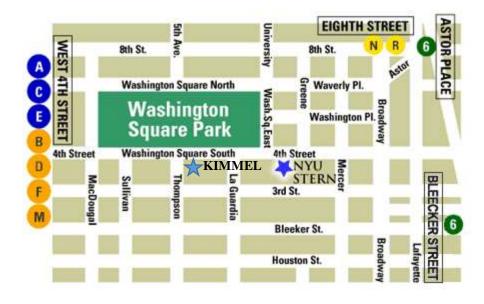| Start	End	Session
8:00 AM	9:00 AM	Breakfast & Registration
9:00 AM	10:30 AM	Symposium B: Social Interactions

Liane Young: The structure of morality

Patricia Lockwood: Neurocomputational mechanisms of prosocial learning
Suzanne Dikker: Brain synchrony and real-world dynamic group interactions: Evidence from a crowdsourcing classroom EEG study.
Leonard Schilbach: Toward a second-person neuroscience & neuropsychiatry

10:30 AM	11:30 AM	Poster Session B & Coffee Break
11:35 AM	12:20 PM	**Distinguished Scholar Address: John Cacioppo** Through the Lens of Social Isolation
12:20 PM	2:00 PM	Lunch Break
12:30 PM	1:30 PM	*Special Working Lunch Session: The Grant Process* Janine Simmons, *National Institute of Mental Health, NIH* Betty K. Tuller, *National Science Foundation* * Requires registration

2:00 PM	3:30 PM	Symposium C: Emotion Regulation and Stress

Wendy Berry Mendes: Affect contagion: Physiological covariation among strangers and close others
Elliot Berkman: Me, myself, and (a better) I: Neural systems and behavioral outcomes of an identity-based intervention to improve self-regulation
Tae-Ho Lee: Parent-child relationship quality shapes neural pattern similarity between mothers and their child
Kevin Ochsner: New perspectives on the regulation of emotion

3:30 PM	4:30 PM	Poster Session C & Coffee Break
4:30 PM	5:25 PM	Trainee Data Blitz

Matthew Apps: The neural basis of economic decisions guided by a social norm

Leor Hackel: Instrumental Learning of Traits versus Rewards: Dissociable Neural Correlates and Effects on Choice

Jocelyne Whitehead: Specificity of neural responses to processing emotional information across modalities: an fMRI-adaptation study

Mariah DeSerisy: Neural Correlates of Language Ability Impacting Emotion Regulation in Young Children

Brent Hughes: Wanting to like and be liked: Motivation alters attraction and neural representations of social reward

Björn Lindström: Neural and computational mechanisms of social fear learning

Kristin Brethel-Haurwitz: Extraordinary altruists demonstrate enhanced self-other overlap in pain processing in anterior insula

Alejandra Sel: Heartfelt Self: Cardio-visual stimulation affects self-face recognition and interoceptive cortical processing

Robb Rutledge: The social contingency of momentary subjective well-being

5:25 PM	5:45 PM	Break: Walk to NYU Kimmel Center (60 Washington Square South), Rosenthal Pavilion (10th floor)
5:45 PM	6:30 PM	**Presidential Keynote: Malcolm Gladwell** When smart people do dumb things
6:30 PM	8:00 PM	Presidential Reception

Saturday April 30

Start	End	Session
8:00 AM	9:00 AM	Breakfast & Registration
9:00 AM	10:30 AM	Symposium D: Social Cognition & Social Groups
		Carsten De Dreu: Oxytocin Conditions Human Group-Living **Carolyn Parkinson:** Brains of a feather: Similarity of neural responses to naturalistic stimuli predicts social network proximity **Lucile Gamond:** In-group advantage in emotion recognition: The causal role of the mentalizing network assessed by TMS **Emily Falk:** New approaches to understanding the spread of ideas
10:30 AM	11:30 AM	Poster Session D & Coffee Break
11:35 AM	12:50 PM	Faculty Flash Talks
		June Gruber: Affective Neuroendocrinology Approach to Positive Emotion Disturbance in Bipolar Disorder
		Manos Tsakiris: Racial bias in a heartbeat: cardiac afferent activity modulates the expression of racial stereotypes **Leah Somerville:** Do incentives help or hurt adolescent self-regulation?
		Elizabeth R. Losin: Psychological and neural mechanisms underlying ethnic differences in pain report
		Peter Sokol-Hessner: The Actor's Benefit: Interoception and Metacognition in Actors
		Anne Krendl: Stigma on the mind: Neural response to mental health stigma predicts attitudes toward treatment
		Frank Krueger: Mortality salience attenuates the in-group bias of costly punishment: a functional MRI investigation **Rebecca M. Jones:** Social development trajectories as a predictor of outcome in autism
		Daniela Schiller: A map for social navigation in the human brain
12:50 PM	2:40 PM	Lunch Break
1:00 PM	2:00 PM	*Special Working Lunch Session: The publication process: Nature Neuroscience* Sasha Devore, Associate Editor: *Nature Neuroscience* Jean Mary Zarate, Associate Editor: *Nature Neuroscience* * Requires registration

2:40 PM	4:10 PM	Symposium E: Methodological Approaches to Social Neuroscience

John O'Doherty: Computational approaches to social neuroscience
Tessa West: Moving beyond the individual to the interpersonal: Psychophysiology in dyads and small groups
Tor Wager: Generalizable representations in social and affective neuroscience

4:10 PM	5:10 PM	Poster Session E & Coffee Break
5:15 PM	6:00 PM	Farewell & TED Style Talk

Matt Lieberman: If on a winter's night, a social neuroscientist

Talks are held at Paulson Auditorium UC50 -- 40 West 4th Street.
Saturday night keynote is held at Kimmel Center -- 60 Washington Square North.
Poster sessions will be held outside Paulson Auditorium.

2016 Awards

Distinguished Scholar Award

John Cacioppo, University of Chicago

Innovation Award

Rachael E. Jack, Institute of Neuroscience and Psychology, University of Glasglow

Dynamic Facial Expressions of Emotion Transmit an Evolving Hierarchy of Signals over Time
Rachael E. Jack, Oliver G.B. Garrod, Philippe G. Schyns.
Current Biology, 2014, 24(2)

SANS Poster Awards[1]

Jojanneke A. Bastiaansen
Sonia Betti
Robert Chavez
Xiaoxue Gao
Amy R. Krosch
Laura Niemi
Christin Scholz
Jenifer Z. Siegel
Yin Wang
Julio A. Yanes

SANS 2016 Logo - Created by Marianne Reddan

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[1] *In recognition of the top 10 most highly rated abstracts that will be presented as posters.*

Special Pre-Meeting Town Hall Luncheon

Thursday, April 28th – 1-3pm

The Kavli HUMAN Project (KHP), a joint initiative between NYU's Institute for the Interdisciplinary Study of Decision Making (NYU IISDM) and the Kavli Foundation, is holding a town hall luncheon at the Social & Affective Neuroscience Society (SANS) Conference in NYC on Thursday, April 28th, from 1-3pm. The goal of the KHP is to create a massive interdisciplinary discovery dataset for use by scholars to conduct their own original research using the already collected measurements, rather than the traditional approach of conducting one-off studies. The luncheon, open to SANS conference attendees, will provide a venue for KHP leadership to educate our community about this 20-year, 10,000-person bio-behavioral longitudinal survey and solicit feedback from our members to ensure that the KHP meets your research needs. The town hall luncheon, which will take place at the NYU Global Center's Grand Hall (near our conference venue), will feature KHP Director, Paul Glimcher.

Admission is FREE, but registration is required! For more information and to register: http://kavlihumanproject.org/event/khp-town-hall-nyc-at-sans2016/

Thursday, April 28 2016

Poster Session A & Welcome Reception

4:15 – 5:15 PM

See page 29 for abstracts

Welcome from the Organizers

5:20 – 5:30 PM

Symposium # Reward & Decision Making

Thursday, April 28, 2015

5:30 – 7:00 PM

Chaired by: Mauricio Delgado, Rutgers University-Newark

Paul Glimcher, *New York University*	5:30-6:00
Amanda Utevsky, *Duke University*	6:00-6:15
Micah Edelson, *University of Zurich*	6:15-6:30
Yael Niv, *Princeton University*	6:30-7:00

A B S T R A C T S

NORMALIZATION MODELS OF SUBJECTIVE VALUE REPRESENTATION IN CORTEX *Paul Glimcher, New York University* – Over the last 5 years there is growing evidence that we now understand the basic mechanisms by which decision-variables are represented in the brain. Like perceptual and motor variables, decision-variables seem to employ a highly efficient coding strategy much like the one that, in the visual system, can account for many visual illusions. This raises the possibility that efficient coding in the decision-making system lies at the heart of the many of the choice anomalies that have puzzled psychologists for a generation. In this talk I will present our understanding of these "normalization models' and show how they may, in time, come to replace the Prospect Theory of Kahneman and Tversky.

LOW FREQUENCY RTMS TO MONKEY STS MODERATES NEURONAL SENSITIVITY TO SOCIAL REWARD *Amanda Utevsky, Duke University, Michael Platt, University of Pennsylvania* – The superior temporal sulcus (STS) contributes to various aspects of social cognition, including face perception, joint attention, empathy, and theory-of-mind. Recent brain imaging studies have implicated this area in social decision-making; however, the precise neuronal mechanisms mediating STS contributions to social decisions remain unknown. To address this, we used a combination of repetitive transcranial magnetic stimulation (rTMS) to STS and simultaneous neuronal recordings in the area in monkeys performing a social reward-donation task. Monkeys chose to allocate juice rewards to self, another monkey, both, or no one. Consistent with previous results, monkeys preferred to reward the recipient monkey over no one, but preferred to reward

self over both monkeys. Single and multi-units in the STS responded strongly during the decision and reward-outcome phases of the task. Moreover, firing rates varied systematically with the social context of decision, responding most strongly to "both" and "self" trials and significantly less to "other" and "none" trials. Importantly, this self-referenced firing preference did not persist in a forced-choice control condition. Critically, suppressing STS activity using low-frequency rTMS decreased prosocial behavior in both the self- and other-referenced conditions. Indeed, the magnitude of decrease in firing rate tracked the decrease in prosocial choices. Further, high-frequency rTMS lead to an enhancement of current social tendencies. Together, these findings suggest STS neurons signal predicted and experienced social reward outcomes and that these signals contribute directly to social decisions. Our data also demonstrate that low-frequency rTMS disrupts prosocial behavior by disrupting neurophysiological activity at the site of stimulation.

RESPONSIBILITY AVERSION AND LEADERSHIP ABILITY - BEHAVIORAL, COGNITIVE AND NEUROCOMPUTATIONAL MECHANISMS *Micah Edelson, University of Zurich, Rafael Polina, University of Zurich, Ernst Fehr, University of Zurich, Todd Hare, University of Zurich* – A key characteristic of individuals in leadership positions is the willingness to assume responsibility for the outcome of others. Here we aim to identify the, as-yet unknown, cognitive and neural processes underlying this behavior. To this end we developed a new paradigm in which individuals face identical decisions under uncertainty that result in real consequences to themselves alone or both themselves and others. We first establish that individuals' show a subjective preference for controlling their own outcomes but demonstrate an inherent responsibility aversion to controlling others' outcomes. By means of a computational model incorporating subjective value calculation and its underlying uncertainty we isolate a latent variable uniquely representing responsibility aversion. Crucially, we demonstrate that individuals with lower responsibility aversion display significantly better leadership ability as quantified by external independent measures. In fact, responsibility aversion is a much better predictor of leadership ability than traditional measures such as risk, ambiguity or control preferences. We then completed an independent replication of these findings in a new group of participants in combination with functional magnetic resonance imaging. We identified a network of regions in which activity correlates with the different subcomponents of the task. Notably, specific connectivity changes within this network predicted both leadership decisions and individual differences in responsibility aversion with a high degree of classification accuracy. These results characterize responsibility aversion as a new motivational force that appears to be an important component of leadership ability and predicts hitherto unexplained individual differences at both the behavioral and neural levels.

THE ROLE OF THE ORBITOFRONTAL CORTEX IN SOCIAL AND AFFECTIVE DECISION MAKING *Yael Niv, Princeton University* – In recent years ideas from the computational field of reinforcement learning have revolutionized the study of learning in the brain, famously providing new, precise theories about the effects of dopamine on learning in the basal ganglia. However, the first ingredient in any reinforcement learning algorithm is a representation of the task as a sequence of "states". Where do these states come from? In this talk I will first argue, and demonstrate using behavioral experiments, that animals and humans learn the latent structure of a task, thus forming a state space through experience. I will then suggest that the orbitofrontal cortex represents these states, and is especially critical in tasks whose states must be inferred from partial cues, such as in social scenarios.

Presidential Keynote

The Development of Implicit Social Cognition

Thursday, April 28, 2016

7:00 – 7:45 PM

Introduced by: Elizabeth Phelps, New York University

Speaker: Mahzarin R. Banaji

Richard Clarke Cabot Professor of Social Ethics at Harvard University

A B S T R A C T

As we learn and grow through experience, our minds are transformed. Psychology's rich history has mapped out the principles that guide behavior change via learning, many of which have acquired the status of laws of behavior. We have also accumulated countless empirical discoveries showing systematic changes in behavior as a function of types of learning. It is therefore striking when vast differences in amount of experience, as measured by a person's age, show no differences in acquired mental content such as attitudes, even though we should have every reason to believe that the number of years of social experience in society should influence intergroup preferences. Across several studies, primarily with children of varying ages as well as adults, we find that implicit intergroup cognition is invariant across age. When 3-year olds and adults and everybody in between show near identical responses, we should be surprised and ask why this may be so. I hope the SANS audience will help me speculate about the nature of a system that seems to be impervious to experience as measured by age, even though it is not impervious to experience through acute interventions producing short-term changes in implicit cognition.

Friday, April 29 2016

Social Interactions

Friday, April 29, 2016

9:00 - 10:30 AM

Chaired by: William A. Cunningham, University of Toronto

Liane Young, *Boston College*	9:00-9:30
Patricia Lockwood, *University of Oxford*	9:30-9:45
Suzanne Dikker, *New York University*	9:45-10:00
Leonhard Schilbach, *Max Planck Institute of Psychiatry*	10:00-10:30

A B S T R A C T S

THE STRUCTURE OF MORALITY *Liane Young, Boston College* – The capacity to process mental states like beliefs and intentions, theory of mind (ToM), is crucial for moral judgment (e.g., distinguishing murder from manslaughter). In this talk, we'll look at the role of ToM not just for moral judgment but also for moral behavior across distinct social contexts (e.g., cooperation vs competition) as well as for distinguishing moral propositions from non-moral propositions (i.e., facts, preferences). We will use the approach of looking at the role of ToM to investigate the structure of morality—to test claims about distinct moral domains, distinct moral motivations, and distinct features of moral versus non-moral processing.

NEUROCOMPUTATIONAL MECHANISMS OF PROSOCIAL LEARNING *Patricia Lockwood, University of Oxford, Matthew Apps, University of Oxford, V. Valton, University College London, E. Viding, University College London, J.P. Roiser, University College London*—Reinforcement learning (RL) is a fundamental mechanism by which animals learn to perform actions, yet it has rarely been applied to understand social behaviour. During reinforcement learning, prediction errors (PEs) - the difference between a predicted and actual outcome of a choice, are the key computation that drives learning. This same framework can be applied to understand how we learn to choose actions that benefit others, a fundamental aspect of learning to be prosocial. Moreover, empathy is thought to be a critical facilitator of prosocial behaviour yet the mechanisms linking the two constructs remain poorly understood. Thirty-one participants performed a reinforcement-learning task during functional magnetic resonance imaging. Critically, they performed this task for themselves (self reinforcement condition), for another participant (prosocial reinforcement condition) or for no-one (no reinforcement, control condition). Using an RL algorithm, we modelled differences in the learning rates between the three conditions and neural responses to PEs. We found that people had a self-bias in their learning rate, learning more quickly about rewards for themselves compared to for the other person and for no one. However, individuals high in empathy had an increased learning rate for other relative to self. The ventral striatum signalled PEs regardless of the agent that received the outcome whilst the subgenual cingulate cortex signalled prosocial PEs exclusively. Overall, we identify a novel framework to understand prosocial behaviour and its variability in humans. These findings could be important for understanding the links between prosocial behaviour and empathy in individuals with social behavioural disorders.

BRAIN SYNCHRONY AND REAL-WORLD DYNAMIC GROUP INTERACTIONS: EVIDENCE FROM A CROWDSOURCING CLASSROOM EEG STUDY *Suzanne Dikker, New York University* –

Clever experimental paradigms, paired with advances in neuroscience technology, have brought us closer to understanding our social brain. But it remains largely unknown to what extent laboratory-based findings can be extrapolated to the real world: How does our brain support everyday dynamic social interactions? In this study, we sought to identify a biomarker—a neural index—of everyday social exchanges. To this end, we used portable EEG to simultaneously record brain activity from a class of high school students throughout the fall semester as they engaged in regular classroom activities (following lectures, watching instructional videos, engaging in group discussions). The research program was integrated with a rigorous neuroscience curriculum both before and after data collection. For example, in the spring semester, the researchers supported the students in conducting their own original social neuroscience experiment. Using a novel analysis technique to assess the coherence of brain activity between students, we found that both student engagement (self-reported focus and class appreciation) and social cohesion (group affinity, closeness, and empathy) predicted the extent to which brain activity was synchronized across students. These findings are suggestive of the role of brain-to-brain synchrony as a possible biomarker for dynamic social interactions, which, we argue, is likely supported by joint attention. More broadly, our crowdsourcing neuroscience approach may provide a promising new method to investigate the neuroscience of group interactions in ecologically valid settings.

TOWARD A SECOND-PERSON NEUROSCIENCE & NEUROPSYCHIATRY *Leonhard Schilbach, Max Planck Institute of Psychiatry* – In spite of the remarkable progress made in the burgeoning field of social neuroscience, the neural mechanisms that underlie social encounters are only beginning to be studied and could – paradoxically – be seen as representing the "dark matter" of social neuroscience. Recent conceptual and empirical developments consistently indicate the need for investigations that allow the study of real-time social encounters in a truly interactive manner. This suggestion is based on the premise that social cognition is fundamentally different when we are in interaction with others rather than merely observing them. In this talk, I will outline the theoretical conception of a second-person approach to other minds and will present evidence from functional neuroimaging studies to argue for the development of a second-person neuroscience, which may help neuroscience to really "go social" and could also be relevant for the transdiagnostic investigation of the neurobiological mechanisms that underlie social impairments in psychiatric disorders.

Posters

Poster Session B & Coffee Break

Friday, April 29, 2016

10:30-11:30 AM

See page 49 for abstracts

Award Address # Distinguished Scholar Address
Through the Lens of Social Isolation

Friday, April 29, 2016

11:35 – 12:20 PM

Introduced by: David Amodio, New York University

Speaker: John Cacioppo

Tiffany and Margaret Blake Distinguished Service Professor at the University of Chicago

A B S T R A C T

Social species are so characterized because they have frequent interactions, typically with conspecifics, and through these interactions they form stable structures that extend beyond the individual. The brain is the key organ for forming, monitoring, maintaining, repairing, and replacing the salutary connections with others that promote survival, reproduction, and a genetic legacy. Investigations of brain and biology through the lens of perceived social isolation have led to insights into the neural, hormonal, cellular, and genomic mechanisms underlying our social nature.

Lunch

Funding Luncheon: The Grant Process
Open to pre-registered attendees

Brief presentations and panel Q&A with representatives from major SANS-area funding agencies

Friday, April 29, 2016

12:30 – 1:30 PM

Janine Simmons, National Institute of Mental Health

Betty K. Tuller, National Science Foundation

Symposium

Emotion Regulation and Stress

Friday, April 24, 2015

2:00 – 3:30 PM

Chaired by: Nim Tottenham, Columbia University

Wendy Berry Mendes, *University of California, San Francisco*	2:00-2:30
Elliot Berkman, *University of Oregon*	2:30-2:45
Tae-Ho Lee, *University of Illinois, Urbana-Champaign*	2:45-3:00
Kevin Ochsner, *Columbia University*	3:00-3:30

A B S T R A C T S

AFFECT CONTAGION: PHYSIOLOGICAL COVARIATION AMONG STRANGERS AND CLOSE OTHERS *Wendy Berry Mendes, University of California, San Francisco* – Emotions, thoughts, and intentions are not simply concepts that live privately in one's minds, but rather, affective states emanate from us via multiple channels – voice, posture, facial expressions, and behavior – and influence those around us. Affect contagion, or the spread of affective states—including stress, emotions, evaluations—from one person to another, is studied in a variety of ways in the social sciences. In this talk I will discuss a series of experiments exploring the antecedents and

consequences of affect contagion using dynamic peripheral psychophysiological measurement. The experiments include ones focusing on mothers and children and explore how infants "catch" their mothers' stress reactivity and how touch potentiates stress contagion. Another series of experiments explore how recently acquainted individuals can catch each others' affective state and how moderators such as racial/ethnic group, social standing, valence and empathetic tendencies moderate affect contagion.

ME, MYSELF, AND (A BETTER) I: NEURAL SYSTEMS AND BEHAVIORAL OUTCOMES OF AN IDENTITY-BASED INTERVENTION TO IMPROVE SELF-REGULATION *Elliot T. Berkman, University of Oregon, Nicole R. Giuliani, University of Oregon, Junaid S Merchant, University of Oregon* – Despite extensive efforts, programs designed to improve self-control and self-regulation generally do not produce meaningful long-term change. One reason for this failure is these programs usually target top-down control, which operates in serial, requires attention, and is vulnerable to depletion. Thus, improvements associated with the programs might disappear when people do not or cannot engage top-down control (which is often). An alternative approach is to target bottom-up processes integral to self-regulation, such as valuation, which operate in parallel, do not require attention, and are less sensitive to prior exertion. The present study tests whether a novel identity-based intervention can alter how people value goal-related stimuli and thereby improve self-regulation. The rationale is that behaviors related to the self-concept have inherently greater value than those that are non-self-related, so increasing the self-relevance of goal-promoting behaviors will increase their value and likelihood of enactment. Currently, N = 40 overweight and obese community adults have completed a longitudinal intervention with neuroimaging (anticipated N = 82 by April 2016). Participants in the experimental condition, which links healthy eating to participants individualized core values, increase their valuation of healthy foods (vs. control participants) as measured by behavioral economics metrics. This effect is mediated by an increase in their implicit association of "self" with "healthy food." Neuroimaging reveals that greater activity in the vmPFC during the self-with-healthy eating manipulation predicts larger intervention effects. These results demonstrate the feasibility and efficacy of an identity-based intervention to increase food-related self-regulation via changes in the vmPFC valuation system.

PARENT-CHILD RELATIONSHIP QUALITY SHAPES NEURAL PATTERN SIMILARITY BETWEEN MOTHERS AND THEIR CHILD *Tae-Ho Lee, University of Illinois, Urbana-Champaign, Yang Qu, University of Illinois, Urbana-Champaign, Eva H. Telzer, University of Illinois, Urbana-Champaign* – The way youth respond to stress may be socialized from parents. However, the mechanisms by which this transmission occurs are not well understood. In the current study, we tested whether parent's neural response to stress predicted their own child's neural response to stress. Both parents and their adolescent child (19 dyads) were scanned while completing a stress-inducing task. We implemented novel methods to examine neural-pattern similarity between dyads. First, using representational-similarity analysis, we found that neural-similarity in the insula between parent and their child varied depending on their relationship for the uncertain cue but not for the informative cue, indicating that dyads with a higher sense of closeness showed more similar neural-patterns when responding to uncertainty. Moreover, this neural similarity in the insula predicted less self-reported stress among adolescents, and mediation analyses confirmed that higher family relationships predicted lower adolescent stress via increased neural similarity between mother-child dyads. Secondly, using a form of multivariate cross-classification, we decoded adolescents' brain pattern from their parents' brain. Although overall decoding-accuracy in the insula was not significant from chance-level, the decoding-accuracy was significantly positively correlated with their relationship level, suggesting that we can predict a teenagers' neural response from their parents' neural response, but only in high relationship families.
This is the first evidence that adolescent's neural-response can be decoded by parent's neural-response, implicating that adolescents' socialization from their parents occurs even at the neural level. Importantly, the quality of their relationship determines the degree of neural-similarity in parent-child dyad.

NEW PERSPECTIVES ON THE REGULATION OF EMOTION *Kevin Oschner, Columbia University* – In laboratory and neuroscience research, the study of emotion regulation has typically concerned the way that individuals alter their own emotions. Recently, however, there has been

increasing appreciation that others may actively influence – and thereby regulate – our emotions. This talk will discuss four examples of the social regulation of emotion. The first involves self-regulating one's own emotions by simulating the way that others would respond to emotional events. The second examines, 'crowd sourced', reappraisal where an individual attempts to reframe affective dilemmas experienced by others and in turn may receive regulatory support from them. The third asks how knowledge of group norms for responding to emotional triggers - e.g., knowing that others find a given event upsetting or not such a big deal - can change the way you respond to these triggers. Implications for models of emotion regulation and translational applications are discussed.

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Posters

Poster Session C & Coffee Break

Friday, April 29, 2016

3:30-4:30 PM

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Data Blitz

Trainee Data Blitz

Friday, April 29, 2016

4:30 – 5:25 PM

Chaired by: Andreas Olsson, Karolinska Institute

Matthew Apps, University of Oxford

Leor Hackel, New York University

Jocelyne Whitehead, McGill University

Mariah DeSerisy, Fordham University

Brent Hughes, Stanford University

Björn Lindström, University of Zurich | Karolinska Institutet

Kristin Brethel-Haurwitz, Georgetown University

Alejandra Sel, University of Oxford

Robb Rutledge, University College London

A B S T R A C T S

THE NEURAL BASIS OF ECONOMIC DECISIONS GUIDED BY A SOCIAL NORM *Matthew Apps, University College London, Narender Ramnani, Royal Holloway, University of London, UK –* Economic decisions are highly subjective and vary considerably between individuals. Neuro-economic accounts have provided considerable insight into the role of the medial Prefontal Cortex (mPFC) in processing the subjective value (SV) of rewards. However, economic behaviors are also often guided by social norms that dictate what behaviors are permissible and preferred by a group.

Yet, the neural or computational mechanisms that underpin economic decisions that are made based on either subjective value (SV) or in order to conform to a socially derived normative valuation (NV) are poorly understood. Do distinct regions of the mPFC process the SV and NV of rewards? Here, subject's made temporal discounting based economic decisions. On each trial they were required to indicate either their own preference (subjective) or what the majority of people would do (normative) – learnt during a training session. Using event-related fMRI and computational modeling, we identified two zones of the mPFC that process value-related signals, but each has a different profile for processing SV and NV. The anterior portions of the dorsal mPFC process the NV of rewards exclusively and not SV. In contrast, the VmPFC processed both SV and NV. However, activity varied positively for SV but negatively for NV. These results highlight some of the key neural and computational mechanisms that underpin socially influenced reward valuation. This may pave the way for understanding why people can make significantly more impulsive economic decisions when such behavior is the norm for a particular social group.

INSTRUMENTAL LEARNING OF TRAITS VERSUS REWARDS: DISSOCIABLE NEURAL CORRELATES AND EFFECTS ON CHOICE *Leor Hackel, New York University, Bradley Doll, New York University, David Amodio, New York University* -- Social life requires learning about others through positive and negative experiences. However, in social encounters, people typically look beyond the immediate rewards of an interaction to also encode trait attributes, and both factors may influence future social behavior. We designed a functional MRI experiment to dissociate reward and trait learning in an economic game. Participants (N = 31) made choices to play with one of four individuals who could share money ("Deciders") or with one of four slot machines. Deciders and slots were each associated with different degrees of reward (magnitude of money shared) and generosity (proportion of available money shared), which were uncorrelated. Computational modeling of behavior indicated that participants learned both generosity and reward information, yet relied more heavily on generosity information in cross-context decisions. For both human and slot targets, reward prediction errors and generosity prediction errors during feedback correlated with BOLD signal in ventral striatum. Only generosity prediction errors correlated additionally with BOLD signal in a broader set of regions previously implicated in social impression updating (ventrolateral prefrontal cortex, posterior cingulate cortex, and inferior parietal lobule). During subsequent interaction choices, BOLD signal in ventromedial prefrontal cortex (vmPFC) correlated with information about rewards and generosity, and individual differences in generosity-based vmPFC responses correlated with differences in generosity-based choice. These results demonstrate the process of instrumental social learning and show that it relies on domain-general neural mechanisms for updating representations of both reward value and more abstract trait inferences.

SPECIFICITY OF NEURAL RESPONSES TO PROCESSING EMOTIONAL INFORMATION ACROSS MODALITIES: AN FMRI-ADAPTATION STUDY *Jocelyne Whitehead, McGill University, Jorge L. Armony, McGill University* -- Social communication relies on input from a variety of sensory modalities (e.g., auditory and visual), using a number of different channels (e.g., face and body expressions, speech and music). In the current literature, it is largely unknown whether within each sensory modality, these unique classes of stimuli are processed by the same neural populations, or rather independent, yet overlapping category-specific neurons. To directly address this question, we employed a functional magnetic resonance imaging (fMRI) adaptation paradigm in a series of experiments designed to measure neural responses to social communicative signals as a function of their sensory modality (visual vs. auditory), affective value (neutral vs. fear) and category (music vs. speech; faces vs. body expressions). We used a fast (TR=529ms), high-resolution (8 mm3 isotropic) multiband sequence to maximize temporal and spatial specificity of the observed responses, as well as statistical power. Our results confirmed modality- and category-specific adaptation effects in cortical regions, which could not be explained solely in terms of

category differences along basic physical properties. Moreover, emotion-specific adaptation effects were identified in both auditory and visual regions. Our findings for music, a powerful emotionally arousing stimulus with no obvious survival or evolutionary relevance, are particularly interesting as they can provide new empirical evidence that can inform the ongoing debate about the nature of the neural representation of such type of stimulus class. Overall, our results support the argument for the existence of independent neuronal sub-populations that are functionally separable in response to specific categories and emotions.

NEURAL CORRELATES OF LANGUAGE ABILITY IMPACTING EMOTION REGULATION IN YOUNG CHILDREN *Mariah DeSerisy, Fordham University, Abigail Collins, Fordham University, Sheina Godovich, Fordham University, Amy K. Roy, Fordham University* -- Appropriate development of expressive language is essential to the acquisition of emotional regulatory skills in young children as it provides socially appropriate means for communicating needs, regulating actions, and providing understanding of the emotional environment (Cole, Armstrong, and Pemberton, 2010; Lindquist, Satpute, and Gendron, 2015). Specifically, difficulties in receptive and expressive language have been linked to deficits in social competence, school adjustment, anger management and externalizing problems (Monopoli and Kingston, 2012; Roben, Cole, and Armstrong). The development of language skills in children is associated with a shift from involvement of the insula and the anterior cingulate to adult language centers, including the inferior and middle frontal, middle temporal, and angular gyri of the left hemisphere and the lingual and inferior temporal gyri of the right hemisphere (Szaflarski et al., 2006). The question remains whether this shift in the neural basis of language processing also underlies the maturation of emotion regulation. The current study evaluated and scanned 162 5-9 year old children. Behaviorally, emotion regulation was positively correlated with language ability across the sample (rs=.41, p<0.01). And, consistent with this, proclivity toward anger and negativity were negatively correlated with language ability (Anger: rs=-.34, p<0.01; Negativity: rs=-0.42, p<0.01). Preliminary resting state fMRI results suggest developmental changes in functional connectivity of language-based regions are associated with emotion regulation ability. Given the putative overlap between early language and emotion brain circuits, it is likely that a delay in the shift toward adult language networks mediates this relationship between language and emotional abilities in children.

WANTING TO LIKE AND BE LIKED: MOTIVATION ALTERS ATTRACTION AND NEURAL REPRESENTATIONS OF SOCIAL REWARD *Brent Hughes, Stanford University, Baba Shiv, Stanford University, Jamil Zaki, Stanford University* -- People typically wish to feel good about themselves, a motivation that powerfully shifts beliefs and behavior. For example, individuals want to be liked by others, and frequently surround themselves with people who provide positive reinforcement and approval. Here, we examined whether people effortlessly "return the favor" by enhancing others who have provided approval in the past. We recruited heterosexual men to participate in a study on interpersonal attraction, took their photograph, and led them to believe that they would be evaluated by a series of women. Male participants then underwent fMRI scanning while they received feedback about their attractiveness from a series of women. When men initially liked a given woman, they later reported more attraction for liked women who had provided them with more positive feedback. When men initially disliked a given woman, they later reported less attraction for the disliked women who had provided them with more positive feedback. These effects were mirrored in the ventral striatum, which is consistent with the social reward gained from desirable positive feedback. Men engaged greater activation in reward-related brain structures, such as ventral striatum, in response to these well-liked and approving women, but reduced activation in such structures to unwanted approving women. Remarkably, this occurred even when men did not remember the specific feedback they received from a given woman. This work suggests that, in the context of interpersonal attraction, people effortlessly shift their preferences towards others who provide social reward, but only when such reward is motivationally valuable or desired.

NEURAL AND COMPUTATIONAL MECHANISMS OF SOCIAL FEAR LEARNING *Björn Lindström, University of Zurich, Karolinska Institutet, Jan Haaker, Karolinska Institutet, Andreas Olsson, Karolinska Institutet --* Learning fear by observing others is widespread in nature, and thought to be key for adaptive behavior in humans. Even so, little is known about the brain basis of learning about dangers by observing others. To address this, we compared behavioral and brain responses (fMRI) during direct fear learning (shock as unconditioned stimulus, US) and social fear learning (video of a person receiving a shock as US) within participants (n=27). Behaviorally, the participants acquired equivalent conditioned responses during the direct and the social conditions. We used computational modeling to characterize the learning mechanisms involved, and found that both the direct and social learning phases were well-explained by a Hybrid model where prediction errors were gated by associability signals, determined by surprise. We found overlapping neural representations of learned fear acquired through direct and observational learning in the amygdala. Moreover, the amygdala, anterior insula (AI), and anterior cingulate cortex (ACC) showed overlapping activity related to the US. The model-derived associability signal was associated with activity in the amygdala and AI. Dynamic causal modeling estimation characterized the common aversive learning network underlying both direct and social fear learning within the amygdala, AI and ACC. The AI was the input region for the social US, while the amygdala was the input for the direct US. Common for both conditions, the amygdala gated the connectivity between the US input region and the ACC based on associability. Together, these findings shed new light on the neural and computational similarities between direct and social learning.

EXTRAORDINARY ALTRUISTS DEMONSTRATE ENHANCED SELF-OTHER OVERLAP IN PAIN PROCESSING IN ANTERIOR INSULA *Kristin Brethel-Haurwitz, Georgetown University, Elise M. Cardinale, Georgetown University, Kruti M. Vekaria, Georgetown University, Emily L. Roberston, Georgetown University, John W. VanMeter, Georgetown University, Abigail A. Marsh, Georgetown University --* Simulation-based empathic resonance of pain has been hypothesized to underlie compassionate and prosocial motivations. This hypothesis is supported by findings that similar neural activations are observed during the first-hand experience of pain and the observation of pain in others (Lamm, Decety, & Singer, 2011; Bernhardt & Singer, 2012), and that this effect predicts low-level helping behavior (Hein, Silani, Preuschoff, Batson, & Singer, 2010). We investigated whether altruistic kidney donors show heightened self-other overlap, relative to matched controls, in an empathy-for-pain fMRI paradigm. In this paradigm, auditory cues indicated safety or potential painful pressure to the right thumbnail during a variable anticipation period, and pain cues were followed by the probabilistic administration of pressure. Participants first watched an unknown confederate undergo the paradigm via live video feed of her hand, then experienced the paradigm first-hand while viewing a live video feed of their own hand. Subjective levels of pain were equalized across participants. In a conjunction analysis of activation during both the personal experience of pain and the observation of pain in another, altruists demonstrated increased self-other overlap throughout the neural pain matrix, including bilateral insula. In a covariation analysis examining individual correspondence between self and other, there was a significant correlation between self and other pain activation in the left anterior insula for altruists but not for controls. Final pressure level was included as a covariate in these analyses because objective pressure levels were significantly higher in altruists than controls.

HEARTFELT SELF: CARDIO-VISUAL STIMULATION AFFECTS SELF-FACE RECOGNITION AND INTEROCEPTIVE CORTICAL PROCESSING *Alejandra Sel, University of Oxford, Ruben Azevedo, Royal Holloway University of London, Manos Tsakiris, University of London --* The sense of body-ownership relies upon the integration of bodily signals conveyed by different sensory modalities (e.g. vision/touch), such that the simultaneous integration of several exteroceptive signals can alter body-ownership. For instance, watching the stroking of an artificial hand

synchronously with one's hand leads to the illusory effect that the artificial hand is part of one's own body. However, still little is known about how the brain integrates multisensory signals from outside and inside the body (interoceptive signals) to produce the sense of body-ownership. Across two experiments, we investigated whether recently described methods of multisensory integration across exteroceptive and interoceptive domains modulate self-identification with the face of another. For that, we projected a pulsing shade mimicking the participant's or another person's heartbeats over morphed photos. In experiment 1, participants performed a face recognition task before and after the cardio-visual stimulation to test for changes in self-face recognition; in experiment 2, participants' heartbeat evoked responses (HEP-electrophysiological index of cardiac cortical processing) were recorded during the cardio-visual stimulation. Results revealed that synchronous (vs. asynchronous) stimulation led to changes in the mental representations of self/other's face, as well as to HEP amplitude reduction associated with the sense of identification with the other's face. Interestingly, the magnitude of illusion-related effects increased linearly with the participants' trait ability to detect own interoceptive signals. These results provide novel evidence that the integration between interoceptive and exteroceptive information can modulate the mental representation of the self-face leading to changes in cortical processing of body-information.

THE SOCIAL CONTINGENCY OF MOMENTARY SUBJECTIVE WELL-BEING *Robb Rutledge, University College London, Archy O. de Berker, University College London, Svenja Espenhah, University College London, Nikolina Skandali, University College London, Peter Dayan, University College London, Raymond Dolan, University College London --* Although social comparison is an important determinant of overall life satisfaction, it is not clear how it affects moment-to-moment variation in emotional state. We developed a series of computational models to examine the relationship between expectations and rewards in both social and non-social settings. We first showed that momentary happiness during a non-social probabilistic reward task depends not on task earnings, but on the combined influence of recent reward expectations and prediction errors arising from those expectations. Happiness depends not on how well things are going, but whether things are going better than expected. Using functional MRI, we found that task-dependent activity in the striatum related to changes in momentary happiness. We then extended our computational model into the social domain using a novel social decision task to investigate the effects of inequality on emotional state. Momentary happiness reflected not only the impact of rewards that subjects receive, but also rewards received by a social partner. Unequal outcomes, whether advantageous or disadvantageous ('guilt' or 'envy', respectively), reduced average happiness. Furthermore, the impact of inequality on happiness at the individual level predicted a subject's generosity in a separate dictator game. These findings demonstrate a powerful social influence upon subjective feelings, with interpersonal variation in this influence predictive of altruistic behavior.

Presidential Keynote

Location: Kimmel Center (60 Washington Sq. South)

Rosenthal Pavilion (10th floor)

When Smart People Do Dumb Things

Friday, April 29, 2016

5:45 – 6:30 PM

Introduced by: Catherine Hartley, Weill Medical College of Cornell University

Speaker: Malcolm Gladwell

Writer, The New Yorker, Author of bestselling books such as "Blink" and "The Tipping Point"

A B S T R A C T

Most efforts to get people to make better decisions are focused on changing their beliefs. But in many cases irrational decisions are made even though the actor knows full well what the rational option would be. Why? I use Mark Granovetter's classic threshold theory to explain the otherwise inexplicable behavior of players, coaches and owners in professional sports.

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Presidential Reception

Location: Kimmel Center, Rosenthal Pavilion

6:30 – 8:00 PM

Saturday, April 30 2016

Social Cognition & Social Groups

Saturday, April 30, 2016

9:00 - 10:30 AM

Chaired by: Jay Van Bavel, New York University

Carsten De Dreu, *Leiden University*	9:00-9:30
Carolyn Parkinson, *University of California, Los Angeles*	9:30-9:45
Lucile Gamond, *Ecole Normale Supérieure de Paris*	9:45-10:00
Emily Falk, *University of Michigan*	10:00-10:30

A B S T R A C T S

OXYTOCIN CONDITIONS HUMAN GROUP-LIVING *Carsten K.W. De Dreu, Leiden University* – Across history, groups have been pivotal to human survival and prosperity, and the strong reliance on groups, in ancestral as well as contemporary times, suggests that humans became biologically prepared to live in groups, to cooperate with others, to trust others and to rely on them. If true, we should be able to find biological foundations for the skills humans needed for group life, such as the ability to mentalize, to set aside personal self-interest, to commit to groups and their norms and values, and to adapt and innovate its practices and technologies needed to perform. Work in biology and social and affective neuroscience converges on the possibility that the neuropeptide oxytocin plays a critical role in such a biological foundation of human group living. Here I review studies examining how hypothalamic release and/or infusion of oxytocin modulates three critical aspects of human group psychology – in-group bounded trust and cooperation, compliance with group norms, and defensive aggression that protects the in-group against rivaling out-groups.

BRAINS OF A FEATHER: SIMILARITY OF NEURAL RESPONSES TO NATURALISTIC STIMULI PREDICTS SOCIAL NETWORK PROXIMITY *Carolyn Parkinson, University of California, Los Angeles, Adam M. Kleinbaum, Dartmouth College, Thalia Wheatley, Dartmouth College* — We resemble our friends on a wide range of dimensions (e.g., age, gender). If similarities between friends actually reflect deeper similarities in how we perceive, interpret, and respond to our surroundings, then friendship should be associated with increased similarity of real-time cognitive responding. Functional magnetic resonance imaging (fMRI) responses during free-viewing of naturalistic stimuli (e.g., movie clips, natural scenes) provide an unobtrusive window into individuals' unconstrained mental processes as they experience the world around them; inter-subject correlations of fMRI response time series during natural viewing have previously been shown to predict similarities in participants' attention to and interpretations of stimuli. Here, we characterized the social network of a cohort of MBA students (n = 279), a subset of whom (n = 42) participated in an fMRI study involving free-viewing of naturalistic video clips. We compared fMRI response time series between corresponding brain regions across pairs of individuals and found that neural response similarity decreased with increasing distance in the social network. These effects persisted after controlling for demographic similarity, but after controlling for neural response similarity, demographic variables no longer predicted social network proximity. Further, it was possible to accurately classify both the distance between individuals in their social network, as well as whether or not they were friends, based solely on the similarity of their fMRI response time series. These results suggest that we are exceptionally similar to our friends in how we perceive

and react to the world around us, with possible implications for interpersonal influence and attraction.

IN-GROUP ADVANTAGE IN EMOTION RECOGNITION: THE CAUSAL ROLE OF THE MENTALIZING NETWORK ASSESSED BY TMS *Lucile Gamond, Ecole Normale Supérieure de Paris, Zaira Cattaneo, University of Milano-Bicocca*– Emotion discrimination is one of the basics of mentalizing processes, contributing to interpret others' states and actions. The ability to discriminate other agents' emotions is modulated by social context: in particular, emotional facial expressions are most accurately recognized when the other agent belongs to the same social group of the viewer (in-group bias). The present study builds on and extends this literature investigating the causal role of the mentalizing neural network in the in-group bias in emotion recognition by means of transcranial magnetic stimulation (TMS). Using minimal color groups (blue/green), we found that the in-group advantage for emotion recognition was reduced when TMS was applied over the right temporo-parietal junction (rTPJ) and canceled when applied over the dorsomedial prefrontal cortex (dmPFC). Our data suggest that both rTPJ and dMPFC, the two main regions of the mentalizing network, are involved (although to a different extent) in the in-group bias in emotional recognition. Furthermore, our results also show that the mere assignment in a trivial group is sufficient to hint bias favoring in-group communication, probably trough motivational and/or attentional mechanisms.

NEW APPROACHES TO UNDERSTANDING THE SPREAD OF IDEAS *Emily Falk, University of Michigan* – What makes people receptive to new ideas and likely to share with others? The immense power of social influence is well documented and may be amplified by social media. Understanding the psychological mechanisms that lead to the effective spread of ideas is critical for many of society's most pressing concerns. I will present a series of studies that address how and why ideas spread from person to person and through social networks. I will present a neurocognitive model of sharing, and empirical validation with large-scale sharing behavior in the population of New York Times readers.

Posters

Poster Session D & Coffee Break

Saturday, April 30, 2016

10:30-11:30 AM

See page 89 for abstracts

Flash talks

Faculty Flash Presentations

Saturday, April 30, 2016

11:35 AM - 12:50 PM

Chaired by: Jon Freeman, New York University

June Gruber, University of Colorado, Boulder

Ruben Azevedo, Royal Holloway University of London

Leah Somerville, Harvard University

Elizabeth R. Losin, University of Miami

Peter Sokol-Hessner, University of Denver

Anne Krendl, Indiana University, Bloomington

Chunliang Feng, Beijing Normal University

Rebecca M. Jones, Weill Cornell Medical College

Daniela Schiller, Icahn School of Medicine at Mount Sinai

A B S T R A C T S

AFFECTIVE NEUROENDOCRINOLOGY APPROACH TO EMOTION DISTURBANCE IN BIPOLAR DISORDER *June Gruber, University of Colorado, Boulder, Keith M. Welker, University of Colorado, Boulder, University of Massachusetts, Boston, Smrithi Prasad, University of Massachusetts, Boston, John Purcell, University of Colorado, Boulder, Bethany Lassetter, University of Massachusetts, Boston, Cassandra Brandes, University of Massachusetts, Boston, Pranjal Mehta, University of Massachusetts, Boston* – The present investigation adopted a novel positive affective neuroendocrinology approach to identify emotion-relevant neuroendocrine profiles (i.e., cortisol and testosterone) that may be sensitive and specific to bipolar disorder, a disorder of emotion dysregulation. Participants were individuals with bipolar I disorder (n = 28), major depressive disorder (n = 28) and non-psychiatric controls (n = 27). Across a three-day consecutive experience sampling procedure, participants provided six 2mL passive saliva samples of 2mL each day for a total of 18 saliva samples per participants. Saliva samples were stored at -80C and assayed to examine diurnal differences in testosterone and cortisol. Results revealed that the bipolar group exhibited decreased diurnal cortisol concentrations and cortisol output throughout the day, as well as a decreased cortisol awakening response, compared to both groups who did not differ from one another. Groups did not differ in diurnal testosterone profiles. Within the BD group, decreased cortisol concentrations were associated with increased positive emotionality as measured using an iEAR device. Decreased cortisol in BD may sustain heightened and context-insensitive positive affectivity. Results underscore the importance of considering psychophysiological mechanisms BD.

RACIAL BIAS IN A HEARTBEAT: CARDIAC AFFERENT ACTIVITY MODULATES THE EXPRESSION OF RACIAL STEREOTYPES *Ruben Azevedo, Royal Holloway University of London, Sarah Garfinkel, Brighton and Sussex Medical School, Hugo Critchley, Sackler Center for Consciousness Science, University of Sussex, Manos Tsakiris, Royal Holloway University of London* – In a common form of negative racial stereotyping a person may associate Black people with threat, even when such a belief is not consciously endorsed. This bias may lead to the tragic misidentification of a harmless object as a weapon held by a Black individual. Physiological arousal can influence threat-related perception, yet little is known about how bodily states impact the expression of racial stereotyping. We demonstrate activation of race-threat stereotypes and subsequent behaviour by cardiovascular afferent information, at the level of individual heartbeats. This was achieved by tapping into the phasic activation of arterial baroreceptors, i.e. pressure sensors within major arteries from the heart, which signal the timing and strength of heartbeats (at systole), yet are quiescent between heartbeats (at diastole). Across two established tasks (Weapons Identification Task and First Person Shooter Task), stimuli depicting Black or White individuals were presented to coincide with these different phases of the cardiac cycle. Results showed that race-driven misidentification of weapons was increased during systole, when baroreceptor afferent firing was maximal, relative to diastole. Importantly a third study examining the positive stereotypical perception of Black individuals as athletic, failed to demonstrate similar modulation by cardiac cycle. Taken together, our results demonstrate that incoming cardiovascular

signals exaggerate the processing of racial cues in a context-dependent way, during salient negative associations. By capitalizing upon spontaneous fluctuations in the representation of bodily arousal, we identify a body-brain interaction wherein a fundamental interoceptive mechanism mediates effects on the appraisal of social stimuli and racially-biased behaviour.

DO INCENTIVES HELP OR HURT ADOLESCENT SELF-REGULATION? *Leah Somerville, Harvard University* -- In high stakes situations, adults often succeed at mobilizing additional cognitive resources to improve their performance. Adolescents are thought to be hypersensitive to reward, a profile subserved by normative brain development. In this talk, I will present data spearheaded by my graduate Catherine Insel that addresses a) whether high reward stakes would improve (or paradoxically impair) adolescents' performance on a cognitively demanding task and b) whether the frontostriatal mechanisms subserving motivation-cognition interactions would exhibit a unique functional profile paralleling a developmental shift in performance. Results showed that whereas high stakes improved adults' performance, adolescents' performance was paradoxically reduced under high stakes conditions, a behavioral profile subserved by biased frontostriatal interactions during adolescence. These findings inform neurodevelopmental theory and hold implications for situational factors that might uniquely shape adolescents' ability to maximize their self-regulatory capabilities.

PSYCHOLOGICAL AND NEURAL MECHANISMS UNDERLYING ETHNIC DIFFERENCES IN PAIN REPORT *Elizabeth R. Losin, University of Miami, Natalia A. Med   University of Miami, Hedwig Eisenbarth, University of Southampton, Southampton, UK, Jessica Andrews-Hanna, University of Colorado, Boulder, Elizabeth Delk, University of Colorado Boulder, Tor D. Wager, University of Colorado Boulder* – Individuals from ethnic minorities have been found to report more pain than ethnic majority individuals, given the same clinical condition or level of experimental stimulation. The psychological and neurobiological mechanisms underlying ethnic differences in pain report remain largely unknown. To investigate these potential mechanisms, we assessed pain rating, brain activity (fMRI), and sociocultural factors related to pain and minority status in a sample of 30 non-Hispanic white, 30 Hispanic, and 28 African American individuals receiving painful thermal stimulation. Consistent with previous studies, we found that African American participants reported more pain than other groups at the same level of thermal stimulation. We found no ethnic differences in the level of expression of a pain-predictive pattern of brain activity previously developed in majority white participants, the neural pain signature (NPS), however, the NPS was less correlated with pain report in the minority groups. Therefore, we compared new whole-brain pain-predictive patterns of brain activity across ethnic groups. We found a shift towards more positive correlations between the ventromedial prefrontal cortex (vmPFC) and pain report in the African American group. This finding converges with prior findings on the contributions of the vmPFC to pain processing to suggest that pain valuation processes may account for higher pain rating in African Americans. Finally, perceived racial discrimination mediated increased pain ratings in African Americans. Together, these findings suggest that the increased pain reported by some marginalized ethnic minority groups may be due to differences in the affective-motivational rather than the sensory-discriminative aspects of the pain experience.

THE ACTOR'S BENEFIT: INTEROCEPTION AND METACOGNITION IN ACTORS *Peter Sokol-Hessner, New York University, Mark Wing-Davey, New York University, Scott Illingsworth, New York University, Elizabeth Phelps, New York University* – Interoception is increasingly understood to be crucial in shaping the contributions of emotion to behavior. Defined as the ability to sense internal bodily states or signals, interoception has been related to interpersonal interactions, drug cravings, the subjective intensity of reported feelings, and risky decision-making, among other phenomena. Separately, the ability to perceive one's own cognition, termed metacognition, has found increasing importance as a critical contributor to behavior in domains like memory or perception, but its extension to the domain of emotion has been less explored. Here, we investigated the intersection

of interoception and metacognition using well-validated signal detection methods and robust Bayesian analyses. Additionally, we sought to identify whether interoception, metacognition, or both varied between actors and non-actors. Participants, who were either experienced actors or non-actor controls, all performed a heartbeat detection task. On each of 160 trials, ten tones were played either synchronously or delayed relative to participants' heartbeats (from a live digital EKG). Participants then indicated whether the tones were in-sync or delayed, and rated their metacognitive confidence on an analog scale. After the heartbeat-detection task, participants completed post-study questionnaires. While actors' interoceptive performance was slightly better than controls', the difference was not significant. However, using a Bayesian analysis approach that pools data to model group- and participant-level parameters, we found that actors had consistently superior metacognitive performance, and that this might be related to measures of acting success. These findings suggest that while actors are not better interoceptors than non-actors, they may have a metacognitive "Actor's Benefit."

STIGMA ON THE MIND: NEURAL RESPONSE TO MENTAL HEALTH STIGMA PREDICTS ATTITUDES TOWARD TREATMENT *Anne Krendl, Indiana University, Bloomington, Brittany Cassidy, Indiana University, Bloomington* – Although approximately 14.8 million Americans suffer from depression, about two-thirds will never seek treatment. Stigma toward mental illness is one of the main barriers to seeking and endorsing mental health treatment. The current study was the first to identify a neural mechanism underlying why stigma reduces the endorsement of mental health treatment. We assessed non-depressed participants' self-reported treatment seeking intentions and affective responses to depression approximately one week prior to an fMRI session. During the fMRI session, those same participants evaluated individuals ostensibly suffering from depression or migraines, or identified as healthy. By collecting these measures in two separate testing sessions, we were able to more clearly link neural activity engaged in response to evaluating depressed individuals (which measured stigmatization) to participants' self-reported intentions to seek mental health treatment. More dorsomedial prefrontal cortex (dmPFC) and ventrolateral prefrontal cortex (vlPFC) activity emerged when participants' evaluated individuals with depression versus migraines, and both (particularly dmPFC) subserved greater self-reported mental health treatment intentions as assessed the prior week. How distressing participants perceived depression to be mediated the relationship between dmPFC and treatment intentions. Reduced anti-depression implicit bias, however, was associated with greater vlPFC activity. These results suggest that self-reported treatment intentions may stem both from affect-driven mentalizing (associated with mentalizing-related activity in dmPFC) and bias-driven attitudes (associated with control-related activity in right vlPFC).

MORTALITY SALIENCE ATTENUATES THE IN-GROUP BIAS OF COSTLY PUNISHMENT: A FUNCTIONAL MRI INVESTIGATION *Chunliang Feng, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, China, Bobby Azarian, The Krasnow Institute for Advanced Study, George Mason University, USA, Tengxiang Tian, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, China, Lili Wang, School of Educational Science, Huaiyin Normal University, Huaian, China, Xue Feng, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, China, Yue-Jia Luo, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, China, Frank Krueger, Molecular Neuroscience Department, George Mason University, USA* – When individuals are reminded of mortality, social norms and worldviews that reflect group membership become more salient. Although the need to defend against conscious awareness of mortality plays a critical role in various aspects of human behaviors, its underlying psychological and neural signatures remain obscure. Here, we combined a second-party punishment task (i.e., ultimatum game) with functional MRI to examine the behavioral and neuropsychological correlates of costly punishment to racial intergroup interactions. After either negative-affect or mortality-salience priming, participants received fair and unfair offers from racial in-group and out-group proposers and decided how much to punish them by reducing their payoffs. Results showed that out-group

members received harsher punishment than in-group members after negative-affect priming, with activation in regions implicated in encoding aversive feelings (anterior insula, thalamus). This in-group bias was attenuated after mortality-salience priming, with stronger functional connectivity between anterior insula and regions important in emotional regulation (ventromedial prefrontal cortex), and between thalamus and mentalizing regions (dorsomedial prefrontal cortex, dmPFC). The stronger the connectivity between thalamus and dmPFC, the less out-group members were punished after mortality reminders. Our findings elucidate the behavioral and neuropsychological underpinnings of the effects of mortality reminders on intergroup interactions and support the notion that socially constructive behaviors such as showing tolerance to out-group members are an important way to buffer existential anxiety. Our findings have significant implications for understanding real-life intergroup interactions in the context of existential threat and provide a neuropsychological mechanism for socially constructive behaviors that can be initiated by mortality salience.

SOCIAL DEVELOPMENT TRAJECTORIES AS A PREDICTOR OF OUTCOME IN AUTISM
Rebecca M Jones, Weill Cornell Medical College, Andrew Pickles, King's College London, Catherine Lord, Weill Cornell Medical College – There are different developmental trajectories for children with autism spectrum disorder (ASD), with a minority of individuals no longer qualifying for a diagnosis of ASD by early adulthood (very positive outcome). The goal of the present longitudinal study was to determine whether 1) joint attention skills - shared focus between two individuals on an object - and 2) the quality of peer interactions as children develop predict ASD outcomes by early adulthood. 133 children were initially diagnosed with ASD at two years old and completed testing at multiple ages. Joint attention abilities were tested at ages two and three, the quality of peer interactions was assessed at ages 9 and 13 and diagnostic testing was completed at age 19. Linear mixed effects models and a mediation analysis were performed to understand the effects of joint attention and peer interactions on outcomes. Joint attention at age three predicted a higher quality of peer interactions at ages 9 and 13. Children and adolescents who had more successful peer interactions at ages 9 and 13 were more likely to have a very positive outcome at age 19. Joint attention as a predictor of very positive outcomes was not significant when peer interactions were included in the model, demonstrating that successful peer interactions at ages 9 and 13 may be sufficient for very positive adult outcomes. Future research to understand the underlying neurobiology of the social interaction impairments at different ages will provide a possible mechanism for very positive outcomes.

A MAP FOR SOCIAL NAVIGATION IN THE HUMAN BRAIN *Daniela Schiller, Icahn School of Medicine at Mount Sinai* – How do we place ourselves within a social structure? Social encounters provide opportunities to become intimate or estranged from others and to gain or lose power over them. The locations of others on the axes of power and intimacy can serve as reference points for our own position in the social space. The goal of our research is to uncover the neural encoding of these social coordinates. In my talk I will describe recent experiments tracking the online neural encoding of the perceived locations of others relative to ourselves, beginning with the first impression and proceeding through dynamic interactions with multiple peers.

Special Luncheon
The Publication Process: Nature Neuroscience
Open to pre-registered attendees

Saturday, April 30, 2016

1:00 – 2:00 PM

Sasha Devore, Associate Editor Nature Neuroscience
Jean Mary Zarate, Associate Editor Nature Neuroscience

Methodological Approaches to Social Neuroscience

Saturday, April 30, 2016

2:40 – 4:10 PM

Chaired by: Elizabeth Tricomi, Rutgers University-Newark

John O'Doherty, California Institute of Technology	2:40-3:10
Tessa West, New York University	3:10-3:40
Tor Wager, University of Colorado, Boulder	3:40-4:10

A B S T R A C T S

COMPUTATIONAL APPROACHES TO SOCIAL NEUROSCIENCE *John O'Doherty, California Institute of Technology* – In this talk I will review the merits of the application of a computational approach to social neuroscience. I will show how the application of simple computational models to behavior and fMRI data makes it possible to render inferences about the nature of the computations being implemented in different brain areas during learning and inference in a social context. I will illustrate this approach with examples ranging from fMRI studies illuminating neural computations mediating learning about the value of stimuli or actions through the observation of other agents, extending to the neural computations involved in more complex situations where it is necessary to make an inference about the hidden preferences, goals or intentions of others.

MOVING BEYOND THE INDIVIDUAL TO THE INTERPERSONAL: PSYCHOPHSYSIOLOGY IN DYADS AND SMALL GROUPS *Tessa West, New York University* – Researchers using psychophysiological methods confront unique challenges when expanding beyond the study of individuals. How can classic psychophysiological paradigms be altered when investigating interactions between two or more people in the lab? What types of analytic models are best suited for different theoretical questions of interest? This talk will provide practical guidelines for addressing theoretical, methodological, and statistical issues when employing physiological measures in dyads and small groups. Topics include interpersonal processes one can test by collecting physiological data from two or more people, and importantly, potential roadblocks when designing and conducting these studies, and how to best address them.

GENERALIZABLE REPRESENTATIONS IN SOCIAL AND AFFECTIVE NEUROSCIENCE

Tor D. Wager, The University of Colorado, Boulder – There has been tremendous growth in the use of pattern recognition to identify neuromarkers or 'signatures' of affective, social, and clinical outcomes. This is a promising development: Such efforts are critical for interpreting what brain findings imply in terms of mental processes. However, neuromarkers are like toothbrushes: No one seems willing to use someone else's. Such markers are typically developed and tested within a single sample in a single study. If neuromarkers were actually like toothbrushes, that would make a lot of sense. But they are not; they are more like assays in molecular biology or functions in complex computer programs. In biology, functional biological assays are robustly replicated and tested across many laboratories. In human neuroscience, few attempts have been made to replicate and generalize neuromarkers to new samples. In this talk, I first describe some advantages of developing neuromarkers that can be prospectively tested across laboratories, and make some recommendations on how to do so. Then, I review progress in developing generalizable brain representations that hold up across studies and can contribute to building a solid foundation for human neuroscience.

Posters

Poster Session E & Coffee Break

Saturday, April 30, 2016

4:10-5:10 PM

See page 106 for abstracts

Farewell

Farewell & TED Style Talk
If on a Winter's Night, a Social Neuroscientist

Saturday, April 30, 2016

5:15 – 6:00 PM

Introduced by: Molly Crockett, University of Oxford

Speaker: Matt Lieberman

Professor, UCLA Department of Psychology, Psychiatry and Behavioral Sciences.

A B S T R A C T

Earth's landscape, shaped by the interplay between tectonics and climate, is a dynamic interface over which many biogeochemical cycles operate. The mass fluxes associated with the physical, biological and chemical processes acting across the landscape involve the transport of particulate sediment and solutes. Sediment is moved from source to sink — from the erosional engine of mountainous regions to its eventual deposition — by the sediment-routing system. The selective long-term preservation of elements of the sediment-routing system to produce the narrative of the geological record is dictated by processes operating in Earth's lithosphere. Making the connection between these two levels of enquiry — between the forces shaping present-day erosional and depositional landscapes and the long-term historical record — requires integration and ingenuity. If successful, we may indeed "see a world in a grain of sand" as the poet William Blake suggested.

Poster Session A

A - 1 **SANS Poster Award winner**

RETRIEVING PERSON INFORMATION VIA A MULTIDIMENSIONAL SWITCHBOARD

Yin Wang - Temple University; Nugiel Tehila - Temple University; Ashley Unger - Temple University; Ingrid Olson - Temple University

Social knowledge of other people is intricate and multidimensional. Although everyone can flexibly retrieve different types of biographical information about others, the neural basis of this ability remains unclear. Previous research in our lab identified a 'person-identity-node' in anterior temporal lobe (ATL) which is sensitive to a wide range of conceptual information about people, as well as faces and names. In current fMRI study, we further investigated whether ATL acts as a 'neural switchboard' to coordinate the retrieval of multidimensional person knowledge (e.g. occupations, personality traits). Participants were trained to learn the biographies associated with 8 male faces for two days. Specific biographic information that was manipulated was: social status (manager/janitor) and personality traits (extroverted/introverted), and memory retrieval tasks were cued either by characters' faces or names. The mass-univariate analysis found inferior parietal lobule (IPL) was strongly engaged during status retrieval and medial prefrontal cortex (mPFC) was engaged during traits retrieval. Psychophysiological interaction analysis further revealed more nuanced mechanisms for person knowledge retrieval: ATL coordinates multidimensional retrieval when cued by names and FFA coordinates multidimensional retrieval when cued by faces. In other words, ATL acts as a semantic 'switchboard' for multidimensional retrieval whereas FFA acts as a perceptual 'switchboard'. These findings support a 'Hub-and-Spoke' model suggesting that social knowledge about a person is distributed throughout the brain (the "spokes") but that two centralized "hubs" (ATL and FFA) are required to bring all the bits together into a coherent semantic or perceptual person concept.

A - 2 **SANS Poster Award winner**

BEYOND EQUALITY: HYPER-ALTRUISM IN GUILT-INDUCED COMPENSATION   *XiaoXue Gao - Peking University, Beijing, China; Hongbo Yu - Peking University, Beijing, China; Ignacio Saez - University of California, Berkeley, USA; Lusha Zhu - Peking University, Beijing, China; Ming Hue - University of California, Berkeley, USA; Xiaolin Zhou - Peking University, Beijing, China*

As an exemplary moral emotion, interpersonal guilt is thought to motivate conciliatory behaviors, such as apology and compensation, that aim at repairing the jeopardized social relationship with the victim. However, important questions remain concerning the specific motivations (restoring fairness vs. generosity towards the victim) underlying guilt-induced compensation. We addressed this question by combing an interpersonal game paradigm, economic games and computational modeling to dissociate two the possible prosocial concerns underlying guilt-induced compensation: (1) the extent to which individuals directly value payoffs of others (i.e., generosity) and (2) the extent to which they are averse to differences between their own payoffs and those of others (i.e., inequity). Participants played a dot-estimation task with anonymous partners. Partners received pain stimulation with 50% probability when anyone responded incorrectly. At the end of each round, participants completed an extended version of dictator game (Experiment 1) or a monetary binary choice task (Experiment 2) which determined payoffs of him/herself and partners. In both experiments, inflicting pain upon partners (i.e. the guilt effect) significantly increased participant's generosity but did not have a significant effect on the inequity between participants and partners. Consistent with these results, computational modeling of choice behavior demonstrated that when inflicting pain upon partners, participants cared more about the inequity befallen on the partner and became more tolerant to the inequity befallen on themselves, which indicated increased generosity and constant general inequity-aversion. These results shed light on the motivation underlying guilt-induced compensation and the relationship between moral emotions and moral behavior.

A - 3 **SANS Poster Award winner**

THE BEHAVIORAL AND NEURAL SIGNATURES OF DISTINCT CONCEPTIONS OF FAIRNESS: IMPARTIALITY, CHARITY, AND RECIPROCITY.

Laura Niemi - Department of Psychology, Harvard University; Liane Young - Department of Psychology, Boston College
The current research uncovers behavioral and neural evidence for divergent patterns of social cognition and theory of mind (ToM) in the processing of distinct conceptions of fairness: impartiality, reciprocity and need-based giving or charity. First, participants evaluated the motives and moral status of protagonists who allocated resources based on (a) impartial procedures, (b) considerations of reciprocity, (c) considerations of need (i.e., charity), and (d) unspecified criteria in two behavioral studies. Reciprocity and charity were the least and most morally praised, respectively, but were rated as equivalently motivated by focus on the unique states of individuals and emotion. Impartiality, by contrast, was perceived as unmotivated by the unique states of individuals, unemotional, based on standard procedures, nearly as moral as charity, and by far, the most fair. In an fMRI study, participants judged the moral praiseworthiness of the protagonists. Judgments of reciprocity and charity, compared to impartiality, recruited significantly more activity in brain regions for ToM, including the precuneus and dorsal and ventral medial prefrontal cortex. Taken together, these findings indicate that prototypical fairness may be best represented by person-blind impartiality. The tendency for person-based allocations (e.g., reciprocity and charity) to trigger ToM may reflect the detection of underlying motives (e.g., personal goals, emotions) that contribute to controversies around issues of fairness.

A - 4

DISSOCIABLE NEURAL SYSTEMS UNDERLYING EMPATHIC CARE AND PERSONAL DISTRESS

Yoni K Ashar - University of Colorado Boulder; Jessica R Andrews-Hanna - University of Colorado Boulder; Sona Dimidjian - University of Colorado Boulder; Tor D Wager - University of Colorado Boulder
Encountering a suffering person can elicit both empathic care—the warm desire to affiliate—and personal distress. The distinct neurobiological basis of these two emotions is not well understood, and it remains unclear whether the intensity of these emotions can be accurately predicted from neural activity. Yet, neural markers of these processes could help advance theory and have translational implications for empathy-related diagnosis and intervention research. Here, we used machine learning analyses to develop whole-brain fMRI markers of empathic care and personal distress, as elicited by true audio biographies describing a broad range of human suffering. In out-of-sample test subjects, empathic care and personal distress predictions derived from neural activity correlated highly with self-report (rs = .59 and .63, respectively, ps < .00001). The empathic care marker demonstrated partial specificity to empathic care, and the personal distress marker was predictive of both empathic care and personal distress. We further identified brain regions preferentially supporting each emotion. Empathic care was associated with ventral striatum, medial orbitofrontal cortex, periaqueductal gray, and anterior insula activity; personal distress was associated with amygdala, parietal operculum, and somatosensory activity. Finally, the response of both neural markers significantly predicted real-money charitable donation amounts made by participants, at a trial-by-trial level, in a multi-level linear model. We conclude that empathic care and personal distress are supported by partially dissociable neural systems, and that reliable population-level neural markers of these two emotions can be developed.

A - 5

GENETIC PREDISPOSITIONS AND PARENTAL ATTACHMENT INTERACT TO SHAPE ADULT PHYSIOLOGICAL RESPONSES TO SOCIAL DISTRESS
Gianluca Esposito - Department of Psychology and Cognitive Science, University of Trento, Rovereto, TN, Italy; Anna Truzzi - Department of Psychology and Cognitive Science, University of Trento, Rovereto, TN, Italy; Peipei Setoh - Division of Psychology, School of Humanities and Social Sciences, Nanyang Technological University, Singapore; Kazuyuki Shinohara - Department of Neurobiology and Behavior, Unit of Basic Medical Sciences, Nagasaki University, Nagasaki, Japan; Marc H Bornstein - Child and Family Research, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, USA
Early life experiences and genetic predispositions influence the long-term social development. Different polymorphisms in genes that code for oxytocin receptors (OXTR) are linked to the development of distinct levels of social abilities, which are also shaped by parental attachment. Here we hypothesized the presence of an interaction between OXTR polymorphisms and parental attachment in shaping adult responses to stressful social stimuli. We assessed physiological responses of 44 non-parent male adults during the presentation of distress vocalizations (human infant cries, human adult female cries, young bonobo cries) measuring participants' heart rate and peripheral temperature (tip of the nose and right hand). These responses index, respectively, state of arousal and promptness to action. Participants' parental attachment was measured using a self-reported questionnaire, the Parental Bonding Instrument. To assess participants' genetic predispositions for oxytocin receptors, buccal mucosa cell samples were

collected, and the region rs2254298 of the oxytocin receptor gene analyzed: previous OXTR gene findings point to associations between the G allele and good social abilities (protective factor) and the A allele and lower sociality (risk factor). People with a genetic protective factor (GG genotype) showed the same physiological responses to stressful stimuli regardless to the parental attachment experienced, whereas people with a genetic risk factor (A carriers) showed different physiological responses to social distress according to their parental attachment experiences. These findings demonstrate a gene * environment interaction for susceptibility to the social environment. This susceptibility could represent an indirect pathway through which genes and experiences interact to shape long-term social responses.

A - 6
IMAGINE THAT: SIMULATED EXTINCTION TRAINING PREVENTS THE RETURN OF FEAR

Marianne Reddan - University of Colorado Boulder; Tor Wager - University of Colorado Boulder; Daniela Schiller - Icahn School of Medicine at Mount Sinai

Imagination is an internal simulation of a stimulus or event. In the clinic, imagination is a tool in the treatment of fear and anxiety, but the mechanisms by which imagination influences learned fear are poorly understood. In this investigation, imagined extinction training reduced a 'fear' response acquired in the real world. Participants first underwent auditory threat conditioning, and then were randomly assigned to a (a) standard (N=22) (b) imagined (N=20), or (c) no extinction session (N=24). The threat memory was then reinstated in all subjects, and recovery was examined. Upon re-exposure, physiological responses to threat were reduced in the standard and imagined extinction groups, relative to control. To examine the brain bases of this effect, we trained a whole brain classifier to identify a threat-related brain signature, and then tested it on each group during re-exposure. The resulting pattern expression was correlated with physiological responses: Threat-related brain responses were reduced in imagined and standard extinction groups relative to control. Furthermore, the ventromedial prefrontal cortex activation increased during standard and imagined extinction, and amygdala activation was reduced in these two groups during re-exposure relative to control. These findings demonstrate that imagined exposures to threatening stimuli is effective in the reduction of both physiological and neural correlates of threat.

A - 7
GENETIC RISK FOR OBESITY ENHANCES REWARD SYSTEM RESPONSIVITY TO REAL-WORLD FOOD CUES IN CHILDREN

Kristina M Rapuano - Psychology and Brain Sciences Department, Dartmouth College; Amanda L Zieselman - Psychology and Brain Sciences Department, Dartmouth College; James D Sargent - Norris Cotton Cancer Center Dartmouth Hitchcock Medical Center; William M Kelley - Psychology and Brain Sciences Department, Dartmouth College; Todd F Heatherton - Psychology and Brain Sciences Department, Dartmouth College; Diane Gilbert-Diamond - Norris Cotton Cancer Center, Dartmouth Hitchcock Medical Center

Rising pediatric obesity rates are a major public health concern. Previous studies have demonstrated a link between neural responsivity to food advertisements and pediatric obesity; however, the factors contributing to this relationship are unclear. The fat-mass-and-obesity associated (FTO) gene has been strongly related to obesity outcomes (Frayling et al., 2007). We hypothesized that the FTO gene may predispose children to obesity by influencing the structural size and functional responsiveness of reward-related regions of the brain. Here, we test this hypothesis by genotyping 78 children (ages 9-12) for the FTO rs9939609 polymorphism. During functional magnetic resonance imaging (fMRI) scanning, children passively viewed food and non-food commercials embedded within an age-appropriate television show, keeping participants naive to the study purpose. High-resolution T1-weighted anatomical images were also collected and segmented using an automated segmentation tool (Freesurfer; Fischl, 1999). Consistent with our previous work (Rapuano et al., 2015), food commercials elicited greater activity than non-food commercials in the nucleus accumbens (NAcc) across all individuals. However, children with a genetically higher risk for obesity were found to have larger NAcc volumes and demonstrated stronger responses to food commercials. Results were consistent independent of body mass or adiposity. Subcortical control structures (e.g., hippocampus) showed no volumetric effect of genotype. Overall, these findings suggest that children at a genetically higher risk for obesity may be predisposed to represent reward signals more strongly which, when combined with ubiquitous exposure to food advertising, may, contribute to unhealthy eating habits later in life.

A - 8
FUNCTIONAL SEGREGATION AND INTEGRATION OF SELF-INTEREST AND OTHER-NEED UNDERLYING ALTRUISTIC HELPING BEHAVIOR

Jie Hu - Peking University, Beijing, China; Yue Li - Peking University, Beijing, China; Yunlu Yin - Peking University, Beijing, China; Hongbo Yu - Peking University, Beijing, China; Xiaolin Zhou - Peking University, Beijing, China
When deciding whether to help others, people usually take into account both their own interests and others' need for help. However, it is unclear how the brain processes and integrates information regarding helpers' personal interest and recipients' need during helping-related decision-making. Here, we developed a novel interactive game combined with functional magnetic resonance imaging (fMRI) and transcranial direct current stimulation (tDCS) to examine the neural substrates underlying the processing and integration of self-interest and other-need. Specifically, we dissociated self-interest and other-need by orthogonally manipulating the risk of hurting oneself and the need of the partner, and assessed the behavioral and neural responses during helping decisions in the game. Behaviorally, high self-risk dampened helping behavior relative to low self-risk and, in spite of high self-risk, high other-need facilitated helping behavior relative to low other-need. Neurally, activity in MPFC and right DLPFC was positively associated with self-risk levels, and activity in right IPS and right DLPFC was negatively associated with other-need levels. Effective connectivity analysis showed that both MPFC and right IPS were intrinsically connected to DLPFC, and high self-risk enhanced the modulatory connectivity from MPFC to DLPFC relative to low self-risk. Moreover, the intrinsic connectivity from IPS to DLPFC positively correlated with participants' other-regarding tendencies (i.e., level of concern for other-need). Inhibiting inferior parietal cortex activity via tDCS causally decreased the participants' other-regarding tendencies. Together, these findings suggest a central role of the MPFC-IPS-DLPFC network in processing and integrating information regarding self-interest and other-need and in making altruistic decisions.

A - 9
NEURAL CORRELATES OF SELECTING AND SHARING INFORMATION
Elisa C. Baek - University of Pennsylvania, Philadelphia, PA, USA; Christin Scholz - University of Pennsylvania, Philadelphia, PA, USA; Matthew B. O'Donnell - University of Pennsylvania, Philadelphia, PA, USA; Emily B. Falk - University of Pennsylvania, Philadelphia, PA, USA
Humans routinely share information with others. What drives us to do so? In the present study, we use neuroimaging methods to test an account of information selection and sharing that emphasizes inherent reward in connecting with others. Participants completed an fMRI session in which neural activity was measured while they considered reading and sharing New York Times articles. Activity in hypothesized neural networks involved in reward, self-related processing and taking the perspective of others was significantly associated with decisions to read and share articles. Activity in all three networks was greater when participants made decisions about sharing with others versus reading articles for themselves. Engagement of these regions was also positively associated with degree of preference for reading and sharing articles. Findings suggest that people consider value not only to self, but also to others when deciding whether to read news articles online and that self and other-related assessments may occur concurrently in evaluating the overall value of information. Further, the process of sharing heightens all three hypothesized pathways, supporting an account of humans deriving value from socially connecting to others via sharing information. Finally, our results suggest that although similar psychological processes underlie the selection and sharing of information, more cognitive resources may be engaged to process social risks and benefits, as well as the overall value of sharing information with others.

A - 10
THE NEURAL CORRELATES OF TEMPORAL DISTANCE TRAVERSAL AND LEVEL OF CONSTRUAL
Paul E Stillman - Ohio State University; Kentaro Fujita - Ohio State University; Hyojin Lee - Ohio State University; Xiaoyan Deng - Ohio State University; William A Cunningham - University of Toronto; Rao Unnava - Ohio State University
The ability to think about future events is one of the most important human psychological achievements. In the present study, we integrate neuroscience work on representations with psychology research on construal level to better understand how we think about the near and distant future. Construal level theory (CLT) proposes that since events in the distant future lack reliable detailed specifics, people focus on the broad, abstract, and essential features of that event that are common across instantiations, a process referred to as high-level construal. As events become more proximal (and details more reliable), CLT suggests people incorporate these details to construct more specific, concrete, and distinctive representations, a process referred to as low-level construal. Further, these construal processes can be directly manipulated independent of changes in psychological distance. The present paper provides the first neural evidence that similar processes underlie temporal distance travel and level of construal. Participants (N = 30) completed two tasks designed to directly induce level of construal (the why/how task and category/exemplars task) as well as a task that manipulated temporal distance (near/distant future) while undergoing

fMRI. We compared activation across task using both univariate conjunction analyses as well as an MVPA in which we trained a classifier on one task and then tested it on another. Across analyses, when comparing activation from the why/how (but not category exemplars) task and temporal distance task, we find evidence of common neural processes for distance and high-level construal (mPFC), as well as proximity and low-level construal (precuneus).

A - 11
THEORY OF INTELLIGENCE INFLUENCES STRIATAL RESPONSE TO FEEDBACK AFTER A DEMANDING TEST

Christina Bejjani - Rutgers University, Newark; Samantha DePasque - University of California, Los Angeles; Elizabeth Tricomi - Rutgers University, Newark

What individuals believe about their intelligence may influence their ability to learn from performance feedback. In our previous study, we found that manipulating the predictability of feedback receipt altered the subjective value and neural processing of negative feedback (Lempert and Tricomi, 2015). A predictable feedback context ("blocked feedback") evoked a punishment response in the striatum to negative feedback, whereas an unpredictable feedback context ("mixed feedback"), which biased participants toward viewing negative feedback as carrying informational rather than evaluative weight, elicited greater striatal activity. Using the same paired-associate learning task, this neuroimaging experiment tested the effects of a competence threat on the striatal response to negative feedback. Prior to performing the task, participants took a 15-item timed computerized test, ostensibly related to verbal and reasoning abilities, and received either no score or a false, but believable, score of the 47th percentile. Theory of Intelligence (TOI) (Blackwell et. al, 2007), which measures how much individuals believe their intelligence to be fluid or fixed, was significantly correlated with striatal activation for "mixed" feedback independent of whether participants received a test score. Compared to participants whose TOI scores indicated a more fluid perception of their intelligence, participants who self-reported a more fixed view of their intelligence had greater striatal activation for positive than negative "mixed" feedback. These participants rated the IQ test as significantly more "demanding." Our results suggest that individual differences in beliefs about intelligence, as well as ability to cope with cognitive demand, may alter the neural processing of negative feedback.

A - 12
FRIEND VERSUS FOE: NEURAL CORRELATES OF SHARING WITH LIKED AND DISLIKED PERSONALLY FAMILIAR PEERS

Elisabeth Schreuders - Leiden University; Eduard T. Klapwijk - Curium - Leiden University Medical Center; Will Geert-Jan - Leiden University; Berna Güroğlu - Leiden University

Although the majority of our social interactions are with people we know, little research has investigated interactions with personally familiar others. In the current functional magnetic resonance imaging study we examined the role of real-life relationships with interaction partners, specifically friends and disliked peers, on sharing-related decisions and their neural correlates. Participants acted in more prosocial ways toward friends compared to disliked and unfamiliar peers. Compared to disliked peers, decisions involving friends elicited more activity in mentalizing-related brain regions, such as the ventromedial prefrontal cortex, precuneus and the temporoparietal junction, and regions associated with regulation, such as the dorsal anterior cingulate cortex and the (dorso)lateral prefrontal cortex. In contrast, decisions regarding disliked peers involved heightened activity in temporal brain regions, such as the anterior temporal lobe, temporal pole and the superior temporal sulcus. As such these results show differentiation within the 'social brain network' for friends and disliked peers, which could reflect differential social motives for future interactions. The current findings provide insights for a better understanding of the underlying processes during social interactions in the context of positive as well as negative real-life relationships.

A - 13
DYNAMIC NEURAL MECHANISMS UNDERLIE RACE DISPARITIES IN SOCIAL COGNITION

Brittany, S. Cassidy - Indiana University; Anne, C. Krendl - Indiana University

Race disparities have been a major focus of race perception research. A key finding from this literature is that implicit bias underlies these disparities. However, race disparities in social cognition may emerge in several ways, with some occurring relatively independently of implicit bias. Unlike bias-driven trustworthiness evaluations of other-race faces, the ability to distinguish (i.e., differentiate) between faces may not be bias-dependent but may still have negative consequences for outgroup members. Because expressing prejudice conflicts with egalitarian social norms, it may be challenging to identify mechanisms for different race disparities using strictly behavioral measures. However, fMRI can provide unique insight by identifying neural mechanisms that underlie different race disparities in social

cognition. To this end, we used fMRI to investigate how neural activity while perceiving race influences later trustworthiness evaluations of Black versus White faces and also the differentiation of Black versus White faces. During fMRI, 30 White college-aged adults performed a standard race perception task (over/under age 24). Participants were unaware that they would later rate faces on their trustworthiness. Replicating previous work, racial trust disparity predicted by implicit bias emerged. However, increased coupling between regions involved in perceptual and affective processing when perceiving Black versus White faces predicted less later racial trust disparity. In contrast, increased functional coupling between regions involved in controlled processing predicted less later racial differentiation disparity with regard to perceived trust. These findings reveal that different race disparities in social cognition emerge from the engagement of regions involved in specific aspects of race perception.

A - 14
THE "MERE AUTHORSHIP" EFFECT: SELF-AUTHORED MESSAGES ROBUSTLY ACTIVATE CORTICAL MIDLINE STRUCTURES

Jordan L. Livingston - University of Oregon; Elliot T. Berkman - University of Oregon

Neuroimaging studies investigating self-relevant processing typically use pronouns (i.e., "me" or "I") or self-referential adjectives ("healthy") to induce thoughts about the self, and find robust activity in cortical midline structures. Few studies of self-processing have pushed the boundaries of this effect beyond directly self-descriptive words despite the rich vocabulary people use in their own "self-talk." We examined the neural activity associated with self-authored messages (compared to non-self-authored messages) that were generated in the context of a smoking cessation study and did not necessarily directly reference the self. Participants (N = 34) were community smokers who reported a desire to quit smoking. First, participants completed a behavioral session in which they generated short text messages that they believed would help them to quit smoking in the subsequent weeks (e.g., "Ew! Avoid those stinky cigarettes"). One week later, in an fMRI session, participants viewed these messages, and messages generated by experts and yoked others, and rated each for helpfulness. Participants were then assigned to a 30-day intervention in which they received messages from one of the three conditions. Quitting success was measured at the end of the intervention. Results demonstrate that viewing self-generated vs. other-generated messages robustly activates the same cortical midlines structures (vmPFC, precuneus) that are typically recruited in direct self-processing. Importantly, only a small percentage of the self-authored messages analyzed included classic, self-referential pronouns, suggesting that a broad array of linguistic cues may prime self-relevant processing. Potential linguistic cues driving the effect will be further discussed.

A - 15
IMPLICIT NEURAL PROCESSING OF HOMOSEXUAL COUPLES: THE EFFECTS OF ENTITATIVITY

JoEllen J. Blass - The College of William and Mary; Nicholas P. Gupta - The College of William and Mary; Catherine A. Forestell - The College of William and Mary; Cheryl L. Dickter - The College of William and Mary

Recent research has suggested that early neural preferential attention toward social outgroup versus ingroup members may lead to differences in person perception. Other research has suggested that perceiving homosexuals as entitative is associated with heterosexuals' antigay bias. Entitativity is defined as the degree to which people are perceived as similar to one another and share common goals. The goal of the current study was to investigate whether manipulating entitativity would affect the neural attentional processing of sexual minorities, as measured with event-related potentials (ERPs). Heterosexual participants (N = 45) read statements suggesting that homosexual couples were either high or low in entitativity. Participants then completed an oddball task in which they viewed a total of 222 images that were mostly heterosexual couples (174 pictures) interspersed with 48 (oddball) matched pictures of homosexual couples. Analyses of ERPs were time-locked to the presentation of the pictures of the homosexual couples. Results revealed that participants in the low entitativity condition had a smaller late positive potential (LPP) amplitude to pictures of homosexuals than did participants in the high entitativity condition. These findings suggest that providing people with information that reduces their perception that sexual outgroup members are entitative reduces neural attention to homosexual images. Because outgroup-ingroup differences in neural attention have been linked to processes involved in stereotype activation, this work suggests that portraying homosexuals as less entitative may reduce implicit bias toward these individuals.

A - 16

REDUCED ORBITOFRONTAL CORTEX STRUCTURAL INTEGRITY IN COCAINE ADDICTION IS ASSOCIATED WITH CHILDHOOD SEXUAL ABUSE AND ADULT STRESS REACTIVITY

Keren Bachi - Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Muhammad A. Parvaz - Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Gabriela Gan - Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Scott J. Moeller - Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Nelly Alia-Klein - Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Rita Z. Goldstein - Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY

The orbitofrontal cortex (OFC) morphological integrity is sensitive to childhood abuse and cumulative adversity. Yet, the relationships between OFC cortical integrity and comorbid environmental stressors or even those that antecede drug use remain unclear in individuals with cocaine use disorder (iCUD). Here, we scanned 40 iCUD and 33 demographically matched healthy controls (HC) using a T1-weighted MPRAGE sequence in a 3T magnetic resonance imaging scanner, and voxel-based morphometry to quantify gray matter concentration (GMC). Early life stress was examined with the Childhood Trauma Questionnaire, and current stress reactivity with the Multidimensional Personality Questionnaire. Whole-brain group comparisons and regressions were controlled for age and total intracranial volume.

Compared to HC, iCUD had significantly higher incidence of childhood sexual abuse (t(71)=-2.16, p=.034), greater stress reactivity (t(71)=-2.57, p=.012), and lower GMC in: medial OFC (T=3.81, pFDR=.025), right temporal cortex (T=4.12, pFDR=.002), left middle temporal cortex (T=4.02, pFDR=.002), and right inferior frontal gyrus (T=3.94, pFDR=.025). Whole-brain multiple regressions across all participants revealed that higher childhood sexual abuse associated with lower GMC in the OFC bilaterally (right: T=5.00, pFDR=.001; left: T=4.65, pFDR=.072), and higher stress reactivity marginally associated with lower GMC in the right OFC (T=5.91, pFDR= .057).

Our results suggest an association of structural variance in the OFC with both current stress and, importantly, with childhood abuse; pointing to potential structural alterations predating drug use. These findings may have important clinical implications as a link between environmental stress and gray matter density in drug addiction, with potential impact for timely intervention and prevention efforts.

A - 17
STIMULUS GENERALIZATION AS A COGNITIVE MECHANISM FOR LEARNING WHO TO TRUST

Oriel FeldmanHall - New York University; Joseph Dunsmoor - New York University; Sandra Lackovic Armstrong - New York University; Lindsay Hunter - Princeton University; Matt Mignosa - New York University; Alex Todorov - Princeton University; Elizabeth Phelps - New York University

Over the course of repeated encounters an individual can learn to trust through trial-and-error. However, in our everyday lives we constantly encounter new individuals where judgments of trustworthiness are blind to reputation. In these cases, what mechanism drives an individual to trust? The ability to generalize across stimuli and situations is an essential feature of survival that has robustly shown to be deployed under numerous cognitive domains. Here we test whether reputations of previously encountered individuals generalize to new individuals as a function of facial resemblance. Subjects completed two tasks: In the first task, subjects played the trust game with three partners, one who was very trustworthy, one who was somewhat trustworthy, and one who was not at all trustworthy. After learning which partners could be trusted, in task 2, participants were able to choose who their partners would be in another trust game. On each trial, participants were presented with a new player who was morphed with one of the original three partners. Participants successfully learned whether the partners in task 1 were trustworthy: results illustrated significantly greater investment with the trustworthy partner compared to the other partners. Subsequent behavior in task 2 revealed robust stimulus generalization effects. As perceptual resemblance became increasingly similar to the original trustworthy partner, participants were significantly more likely to choose to play with them. However, the opposite effect was found for novel players that perceptually resembled the untrustworthy player. Together, these data demonstrate how classic stimulus generalization mechanisms support complex social choice.

A - 18
PREDICTIVE GAZE CUES FACILITATE INSTRUMENTAL AVOIDANCE LEARNING

Philip Pärnamets - Karolinska Institutet; Andreas Olsson - Karolinska Institutet

Learning from others is an efficient way of acquiring survival related information about one's environment. In humans, gaze direction and emotional displays are signals about the value of objects in the environment. Previous work has shown that gaze cues facilitate saccadic programming towards cued locations, and that emotional expressions coupled with gaze towards a single presented object facilitates learning avoidance behaviour towards

that object. It is unknown, however, if gaze cues can facilitate avoidance learning independently of emotional expressions and in the context of multiple object. Here we investigated if predictive gaze cues and fearful emotional expressions facilitated learning in an instrumental avoidance learning task. Participants learnt to avoid one of two abstract objects, probabilistically (high vs. low) paired with shocks while simultaneously being shown neutral and fearful faces. The faces either consistently gazed predictively towards the more dangerous object or gazed randomly towards either. We found enhanced learning to predictive compared to non-predictive gaze cues; participants made a greater proportion of optimal choices and exhibited steeper learning. Choices were also faster for predictive compared to non-predictive faces. Contrary to expectations we only find marginal effects of emotionality, such that fearful faces facilitate learning, but with no interactions between predictive value and gaze cues. Skin conductance and pupillometric analyses further supported these findings. We find that people are highly skilled at learning from observing other people's gaze towards objects, and that they can use this information to quickly optimize avoidance behaviour, independent of emotional cues present.

A - 19
CHILDHOOD MALTREATMENT AFFECTS REWARD AND PUNISHMENT LEARNING IN ADOLESCENCE
Madeline B. Harms - University of Wisconsin, Madison, WI, USA; Katherine E. Shannon Bowen - University of Wisconsin, Madison, WI, USA; Seth D. Pollak - University of Wisconsin, Madison, WI, USA
Research suggests that individuals who experienced child maltreatment show increased risk taking and abnormal responses to reward and punishment in adolescence, as well as structural and functional abnormalities in limbic and frontal brain regions. However, few studies have investigated the neural processes that underlie learning from reward and punishment, or the ability to adapt to changing contingencies, in these individuals. In the current study, 26 adolescents who had been physically abused (PA) and 22 controls completed a passive avoidance reversal-learning task during an fMRI scan. Pressing a button in response to certain stimuli lead to reward (winning points), while pressing in response to other stimuli lead to punishment (losing points). In an "acquisition phase," subjects learned these stimulus-reward associations, and in a "reversal phase," half of these associations switched. Behaviorally, the PA group showed reduced learning in both the acquisition and reversal phase, but the group difference was most apparent in the reversal phase. Furthermore, accuracy for stimuli that switched from reward to punishment in the reversal phase was negatively correlated with behavioral and social problems and with family and parent-child stress. fMRI analyses revealed that accuracy for these stimuli was negatively correlated with anterior cingulate cortex (ACC) activation. In addition, ACC activation during reversal learning was differentially modulated by trial type in PA and control groups. Results suggest that childhood maltreatment has profound negative impacts on emotional learning and cognitive flexibility. This learning deficit is associated with altered neural activity and ongoing social problems in adolescence.

A - 20
IDEOLOGICAL CORRELATES OF SOCIAL COGNITION AND EMOTIONAL PROCESSING DURING FMRI
Woo-Young Ahn - The Ohio State University; Xiangrui Li - The Ohio State University; Nathaniel B. Haines - The Ohio State University; William A. Cunningham - University of Toronto; Zhong-Lin Lu - The Ohio State University
BACKGROUND: We examined the neural correlates of political orientation in the context of emotional perception and social cognition (specifically, theory of mind [ToM]).
METHODS: During fMRI, we investigated neural responses of participants with different political orientation using (1) an affective viewing task in which participants viewed emotional (positive/negative/neutral) pictures, and (2) a ToM task, in which participants read a set of stories requiring an understanding of another person's beliefs. Participants (N=155) reported their political party affiliation outside of the scanner (61 democrats, 50 independent, and 44 republicans). We used SPM8 and the general linear model to compare the neural responses of the three groups.
RESULTS: When viewing negative pictures (Affect task), republicans showed greater activity than the other groups in the bilateral thalamus, replicating results from a previous study (Ahn et al, 2014), and the posterior cingulate cortex (PCC). Democrats had reduced activity in the bilateral thalamus and superior/middle temporal gyrus compared to the other groups. When viewing positive pictures, democrats showed increased activity in the amygdala and hippocampus compared to republicans. During the ToM task, democrats showed greater activity in the ToM network (temporo-parietal junction, MTG/STG, precuneus/PCC) as well as dorsolateral prefrontal cortex than the other groups.
CONCLUSIONS: These results further support the notion that political beliefs are related to emotional processing. Additionally, for the first time to our knowledge, we found neural evidence that the capacity to understand and relate to others may serve to structure people's political orientation."

A - 21

THE EFFECTS OF EARLY ADVERSITY ON AMYGDALA DISCRIMINATION OF POSITIVE AND NEGATIVE EMOTIONAL STIMULI DURING CHILDHOOD AND ADOLESCENCE

Michelle VanTieghem - Columbia University, New York NY; Eva Telzer - University of Illinois at Urbana-Champaign, Champaign IL; Laurel Gabard-Durnam - Columbia University, New York NY; Bonnie Goff - University of California Los Angeles, Los Angeles CA; Jessica Flannery - University of Oregon, Eugene OR; Dylan Gee - Weill Medical College of Cornell University, New York NY; Kathryn Humphreys - Stanford University, Palo Alto CA; Christina Caldera - University of California Los Angeles, Los Angeles CA; Mor Shapiro - University of California Los Angeles, Los Angeles CA; Nim Tottenham - Columbia University, New York NY

Early adverse caregiving represents a potent stressor that has been associated with heightened fear learning and altered amygdala-prefrontal circuit development. Previous research shows that previously institutionalized (PI) youth with a history of orphanage care show heightened amygdala reactivity and altered amygdala-mPFC connectivity when viewing negative stimuli (e.g. fearful faces). However, the effect of early adversity on the neural discrimination of positive relative to negative emotional stimuli has not been well delineated. In the current study, 31 PI children and adolescents (ages 6-16) and 31 age-matched comparisons completed an emotion matching fMRI task designed to probe the neural discrimination of positive, negative, and neutral facial expressions. Participants viewed a target facial expression (e.g. angry) and chose which of the two following facial expressions (e.g. angry, neutral) matched the emotion of the target. Significant group differences were detected in bilateral amygdala/parahippocampal gyrus, such that the comparisons showed greater amygdala discrimination for happy vs. angry faces relative to the PI group. In addition, PPI analyses showed significantly greater positive amygdala-mPFC connectivity in the PI group relative to comparisons when matching angry vs. happy faces. The current results show that PI children and adolescents exhibit heightened amygdala reactivity and altered amygdala-mPFC connectivity when processing both negative and positive facial expressions. These findings have potential implications for elucidating the neural mechanisms underpinning increased risk for emotional difficulties following early adversity. Future analyses will examine how neural discrimination of positive and negative stimuli relates to individual differences in behavioral outcomes (e.g. internalizing symptoms) in PI youth.

A - 22

TARGETING OVERACTIVE ERROR SIGNALS IN OCD WITH ATTENTIONAL BIAS MODIFICATION TRAINING *Julia Klawohn - Humboldt-University Berlin, Berlin, Germany; Anja Riesel - Humboldt-University Berlin, Berlin, Germany; Greg Hajcak - Stony Brook University, New York, USA; Norbert Kathmann - Humboldt-University Berlin, Berlin, Germany*

To detect and correct errors is crucial for adaptive functioning in everyday life. However, an amplified error monitoring seems to be associated with enhanced sensitivity to threat and has been linked to anxiety and anxiety disorders including OCD. One promising approach for an intervention to modulate both symptoms of anxiety and the ERN is attentional bias modification training (ABM). Thus, the present study investigated whether ABM can serve to decrease error monitoring in patients with OCD and healthy controls.
ERN was measured while patients with OCD and healthy controls (HC) performed a flanker task before and after single-session ABM. The training employed a modified dot-probe paradigm, with pairs of negative and neutral words followed by imperative probes. In order to shift attention away from negative stimuli, in the training condition the probe was always presented at the former location of the neutral word. In a control condition, provided for half of the HC participants, probes followed both types of words with equal probability.
Results indicate that ERN amplitudes are reduced in healthy participants after single-session ABM, but not after control condition. Importantly, this reduction in ERN amplitudes is even larger in OCD patients and is correlated with their individual change in attentional bias. These results indicate that directing attention away from negative stimuli might attenuate the processing of negative events like errors. Implications for clinical application will be discussed.

A - 23

LEARNING FROM PLEASURE IN DEPRESSION: LINKING NEUROBIOLOGICAL MECHANISMS TO REAL-LIFE AFFECT AND BEHAVIOUR *Jindra Bakker - School for Mental Health and Neuroscience, Division II: Psychiatry & Neuropsychology, Maastricht University, Maastricht, the Netherlands; Iris Lange - School for Mental Health and Neuroscience, Division II: Psychiatry & Neuropsychology, Maastricht University, Maastricht, the Netherlands; Stijn Michielse - School for Mental Health and Neuroscience, Division II: Psychiatry & Neuropsychology, Maastricht University, Maastricht, the Netherlands; Lies Goossens - School for Mental Health and Neuroscience,*

Division II: Psychiatry & Neuropsychology, Maastricht University, Maastricht, the Netherlands; Jojanneke Bastiaansen - Interdisciplinary Center Psychopathology and Emotion regulation, Department of Psychiatry, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands; M. Wichers - Interdisciplinary Center Psychopathology and Emotion regulation, Department of Psychiatry, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands

BACKGROUND

Anhedonia, is one of the core characteristics of major depression. Evidence is accumulating that anhedonia in depressed patients results from functional impairments in the brain reward system. Reward learning involves the acquisition of incentive motivation based on information from previous rewarding experiences. Suboptimal reinforcement learning in depression has been well documented in neuroimaging studies. However, before this scientific knowledge can be translated to new promising interventions it is necessary to investigate to what extent experimental outcomes correspond to real-life processes of reward learning.

OBJECTIVE

To map neuroimaging outcomes of reward learning on the precise experiential and behavioural patterns in daily life that form part of suboptimal reward processing.

METHOD

Subjects with a Montgomery-Asberg depression rating scale score >10 (n=30) participated in an event-related fMRI study with the Monetary Incentive Learning (MIL) task as wel as the Experience Sampling Method (ESM). Both motivational and behavioural aspects of reward learning were assessed using ESM.

RESULT

BOLD responses during the MIL in brain areas involved in updating reward expectations and action selection were found to be associated with aspects of daily life reinforcement learning respectively as assessed with ESM.

CONCLUSION

The findings in this study contribute to the challenge to move from experimental results to real-life experience in order to identify the precise behavioural patterns in need of therapeutic modification in each individual.

A - 24

GOOD MADE BETTER: DOPAMINERGIC ENHANCEMENT OF HUMAN EXTINCTION MEMORY CONSOLIDATION DEPENDS ON SUCCESSFUL WITHIN-SESSION LEARNING

Anna M. V. Gerlicher - Neuroimaging Center, University Medical Center Mainz; Oliver Tüscher - Department of Psychiatry, University Medical Center Mainz; Raffael Kalisch - Neuroimaging Center, University Medical Center Mainz

A recent rodent study indicated that L-DOPA could be a new enhancer of extinction memory consolidation, with the merit over other substances to not only prevent spontaneous recovery but also reinstatement and renewal of fear. Since the success of other extinction memory consolidation enhancers such as D-cycloserine has been shown to be limited to subjects with good within-session fear extinction, we here investigated in two behavioral studies whether L-DOPA should also be administered after successful extinction only. In a three-day paradigm with fear conditioning (day 1), extinction (day 2) and spontaneous recovery test (day 3), participants were pseudo-randomly assigned to a double-blind post-extinction administration of 150/37,5 mg levodopa-benserazid or placebo. Conditioned fear responding (CR) was assessed using skin conductance responses (SCR), fear potentiated startle (FPS) and fear ratings. After short (10 trials in behavioral study 1; n=40/40 L-DOPA/placebo) as well as long extinction (25 trials in behavioral study 2; n=16/16 L-DOPA/placebo) post-extinction L-DOPA administration selectively decreased spontaneous recovery of fear in participants with low SCR end-fear (last 20% of extinction trials). Conversely, it preserved differential SCRs in participants with high end-fear. These results point towards a common boundary condition for any pharmacological - but potentially also behavioral - interventions targeting extinction memory consolidation and emphasize the importance of limiting their use strictly to successful exposure sessions in anxiety disorder treatment.

A - 25

UNDERSTANDING HOW SOCIAL IDENTITIES SHAPE EMPATHY AND FAILURES TO EMPATHIZE: A SOCIAL NEUROSCIENCE APPROACH

Matt Thomas Richins - University of Exeter, Exeter, UK; Manuela Barreto - University of Exeter, Exeter, UK; Natalia Lawrence - University of Exeter, Exeter, UK; Anke Karl - University of Exeter, Exeter, UK

Researchers that study empathy suggest that self-other merging is necessary for the phenomenon of feeling another's emotion or pain. Indeed, research on pain-empathy has demonstrated that a pain-related area of the right dorsal anterior cingulate cortex (dACC) activates both when experiencing physical pain and when witnessing another

person undergo that same experience. This activity, however, is modulated by whether or not the target appears to belong to the same group as the perceiver. It is unclear whether this depends merely on categorization processes (ingroup/outgroup membership), or whether it depends on what the group membership means to the perceiver. In the present study, participants observed individuals experiencing either a physically painful or neutral event (configured using images of faces, hands, and objects). We manipulated whether the observed targets belonged to the same social group as participants, or to another group that they either did or did not feel competitive with. A combination of self-reports and blood oxygenation level-dependent (BOLD) responses were measured. Across 3 studies, we demonstrated that pain-empathy was not modulated by whether the target was a member of the same or other social group to that of the perceiver, but by whether or not the social group was perceived to be in competition with the perceiver's group. Perceiving the pain of ingroup targets elicited higher self-reported empathy and greater activation in the dACC and portions of the default mode network (associated with self-referential processing), when compared to perceiving the pain of competitive outgroup targets but not non-competitive outgroup targets.

A - 26
THE INFLUENCE OF ACUTE SOCIAL STRESS ON TEMPORAL DISCOUNTING AMONG OLDER ADULTS

Georgina L Moreno - New York University; Natalie L Denburg - University of Iowa

Across the lifespan, individuals are faced with a number of stressful decisions, ranging from small everyday annoyances (e.g., choosing the best commute to work) to catastrophic news (e.g., making a life-altering medical decision). Arguably, the elderly face an increasing number of important, potentially life-altering decisions that can evoke a great deal of stress (e.g., investment of retirement savings). However, little research has examined how stress might influence decision-making preferences, particularly among older adults. We investigated whether exposure to an acute social stressor would impact decision making, specifically temporal discounting, in a sample of healthy older adults. Participants (N = 32) were administered the Trier Social Stress Test (TSST) followed by administration of a temporal discounting task. Affect ratings and cortisol samples were also collected. Temporal discounting was measured in both gain (e.g., gain $20 today or gain $25 in 10 days) and loss (e.g., lose $20 today or lose $25 in 10 days) scenarios. We found that after the social stressor, older adults displayed increased temporal discounting, in that they had a decreased preference for later but larger gains (vs. smaller but sooner gains) and an increased preference for later but larger losses (vs. smaller but sooner losses). In addition, these changes in temporal discounting varied depending on whether or not participants showed a physiological response, as measured by cortisol, to the TSST.

A - 27
FRACTIONAL ANISOTROPY OF UNCINATE FASCICULUS PREDICTS DIFFERENCES IN EMOTIONAL REACTIVITY AND REGULATION IN CHILDREN AND ADULTS.

Theodore Stephano - Department of Psychology, Columbia University, New York, NY, U.S.; Rebecca E. Martin - Department of Psychology, Columbia University, New York, NY, U.S.; Jennifer A. Silvers - Department of Psychology, Columbia University, New York, NY, U.S.; Jochen Weber - Department of Psychology, Columbia University, New York, NY, U.S.; Walter Mischel - Department of Psychology, Columbia University, New York, NY, U.S.; B.J. Casey - Weill Cornell Medical College, New York, NY, U.S.; Kevin N. Ochsner - Department of Psychology, Columbia University, New York, NY, U.S. Previous work has shown that functional connectivity of fronto-limbic circuitry predicts emotional reactivity and reappraisal ability across age (Silvers et al., 2015). The degree to which structural connectivity corresponding to this circuit may predict differences in regulatory ability is less certain.

In the present study children and adults completed a task designed to assess emotional reactivity and reappraisal ability while facing aversive images. Participants were trained to react or reappraise the images, and rate how bad they made them feel on a scale of 1-5, with 5 being the worst.

Diffusion-weighted images were collected during the task and the uncinate fasciculus (UF) was reconstructed using Freesurfer's probabilistic tractography software. Fractional anisotropy (FA), a measure of isotropic diffusion ranging from 0-1 (with 0 reflecting perfect isotropy) was used to measure the integrity of the UF tract. Reappraisal ratings were then regressed over average weighted FA values of the UF along with subject age and a total motion index to control for head movement.

We found that greater FA values of the left hemisphere uncinate fasciculus predicted more reactivity and less successful reappraisal across age. These findings suggest that variability in the structural connectivity of the fronto-limbic pathway predicts differences in sensitivity to and regulation of aversive experience.

A - 28

TOO MUCH INFORMATION OR WARM FUZZY FEELINGS? UNDERSTANDING THE ROLE OF MPFC IN PROCESSING THE SELF VERSUS OTHERS

Jessica E. Koski - University of Texas at Austin, USA; Jacie B. Richardson - University of Texas at Austin, USA; Anastasia E Rigney - University of Texas at Austin, USA; Jennifer S. Beer - University of Texas at Austin, USA
The way we see ourselves and others impacts both our well-being and our social relationships, but the neurocognitive mechanisms of social evaluation remain poorly understood. While prior work implicates the MPFC in self-evaluation, its specific function remains unclear because it is also involved in evaluations of closely related others and even strangers who share self-attributes. One explanation is that the MPFC is sensitive to self-relatedness, though it is uncertain whether this entails 1) a socioemotional connection resulting from self-relatedness; or 2) the informational advantage one has when forming judgments that could benefit from self-representations. The present study teases apart these possibilities to better understand the role of the MPFC. Participants were assigned to minimal groups based on chance. The minimal group manipulation based on chance creates a socioemotional bond in the absence of any informational advantage from self-representations. Participants performed an event-related fMRI task in which they made judgments about themselves, an unfamiliar member of the minimal group, or an unknown member of a different group. For each trial, participants rated themselves, the minimally-related other, or unrelated other on a personality trait, and then subsequently rated themselves on the same trait. An MPFC ROI defined on the basis of self-relevance was examined for three repetition suppression effects: self following self-evaluation, self following minimal-other evaluation, and self following other-evaluation. Discussion focuses on the relation between repetition suppression effects across conditions and the emotional vs cognitive mechanisms associated with MPFC involvement in evaluations of the self and others.

A - 29

FAAH GENOTYPIC DIFFERENCES IN FRONTOLIMBIC CIRCUITRY AND ANXIETY EMERGE DURING ADOLESCENCE IN HUMAN AND MOUSE   *Dylan G Gee - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Robert N Fetcho - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Deqiang Jing - Weill Cornell Medical College; Anfei Li - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Charles E Glatt - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Andrew T Drysdale - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Alexandra O Cohen - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Danielle V Dellarco - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; Rui R. Yang - Weill Cornell Medical College; Anders M. Dale - University of California, San Diego School of Medicine; Department of Cognitive Science; Francis S Lee - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology; BJ Casey - Weill Cornell Medical College; Sackler Institute for Developmental Psychobiology*
Anxiety disorders typically emerge during adolescence, a developmental period that is characterized by dynamic changes in frontoamygdala circuitry, gene expression, and overall tone of the endocannabinoid system. A common human fatty acid amide hydrolase (FAAH) polymorphism reduces FAAH expression and increases levels of the endocannabinoid anandamide (AEA). Parallel studies in humans and knock-in mice modeling FAAH C385A show that this polymorphism is associated with increased frontoamygdala connectivity and less anxiety. In a sample of 1,050 3- to 21-year-old typically developing children, adolescents, and young adults, we show that these genotypic effects on frontolimbic connectivity ($F(1,1031) = 5.893$, p=0.0154) and anxiety ($F(1,198)=6.2269$, p=.0134) emerge during adolescence as AEA levels begin to decrease. This pattern is confirmed for fiber density between the infralimbic cortex and basolateral amygdala ($F(2,36) =58.72$, p < .0001) and anxiety-like behavior ($F(1,45)=4.922$, p=0.0316) in mice by postnatal day 45. Greater regulation via top-down control of the amygdala may mediate the gain of function that A385 allele carriers exhibit in the domain of anxiety. The adolescent emergence of genotypic effects on frontolimbic circuitry in mice and humans suggests that normative developmental processes moderate the effects of the FAAH C385A polymorphism on frontolimbic development. This novel gene by development interaction across species may elucidate mechanisms underlying risk for anxiety disorders and suggest an important step toward precision medicine approaches that tailor interventions based on genetic variation (e.g., FAAH inhibitors) and developmental stage (e.g., adolescence).

A - 30

DEVELOPMENTAL CHANGES IN PROSOCIAL BEHAVIOR AND REWARD CIRCUITRY TO IN- AND OUT-GROUPS FROM CHILDHOOD THROUGH ADOLESCENCE

Kathy T Do - University of Illinois, Urbana-Champaign, Champaign, IL 61820 USA; Ethan M McCormick - University of Illinois, Urbana-Champaign, Champaign, IL 61820 USA; Eva H Telzer - University of Illinois, Urbana-Champaign, Champaign, IL 61820 USA

People are more likely to help someone who is similar (in-group) than dissimilar (out-group). In-group preferences may be particularly pronounced during adolescence when the salience of group belonging increases. Therefore, adolescents may engage in prosocial behaviors to in-group over out-group members as a means to enhance social connection. We sought to examine developmental changes in prosocial behaviors to in- and out-groups. Fifty-one children and adolescents (8-16 years) were assigned to a novel in-group team and introduced to members of their team and an out-group team. During an fMRI scan, participants made decisions to (1) keep or share points with in- or out-group peers at a cost to themselves (costly donation; cost of sharing ranged from 1-5 points), (2) share points with an in- or out-group peer (non-costly donation), and (3) keep points when there was no cost to themselves or benefit to another (pure reward). Behaviorally, we found an Age x Points (i.e., cost of sharing) interaction, such that younger children did not consider point value when making costly donations to in- versus out-groups, whereas adolescents showed greater in-group loyalty when making donations with higher personal costs (3-5 points). At the neural level, we focused on activation in reward circuitry (ventral striatum) when making prosocial decisions to in-groups. We found age-related increases in ventral striatal activity during in-group donations. Our findings suggest that adolescents relative to children are more likely to help in-group members when it involves a greater personal sacrifice, perhaps because they find it more rewarding.

A - 31
NEURAL SIGNATURE OF FEAR-INDUCED BEHAVIOR CHANGE DURING PERSUASIVE MESSAGE VIEWING

Benjamin T Hilton - University of Oregon; Jordan L Livingston - University of Oregon; Elliot T Berkman - University of Oregon

Motivation can arise from the fear of a negative outcome resulting from inaction. People can learn to use this effect of fear to their benefit—there is evidence that people may prefer to increase their feeling of fear in order to achieve a goal (Tamir & Ford, 2009). This study looks at how participants respond to messages involving simple text-based reminders intended to help the participants quit smoking. We hypothesized that regions of the brain typically implicated in fear processing and conflict monitoring would be active during message exposure, considering the grave consequences of inaction. Participants (N=15) were smokers from the community who reported a strong desire to quit smoking. Participants wrote messages they thought would help them quit smoking, and biological measures of smoking byproducts were acquired. An fMRI session was run in which participants viewed self-generated messages and others, written by peers and experts, were viewed and rated for helpfulness. Each participant was then randomized to receive 6 self/peer/expert (depending on group) text messages per day for 30 days, rating each. The biological measures were administered again in a final session to index success in quitting. Initial results reveal that participants who had greater quitting success showed higher activation of the dorsal anterior cingulate cortex (dACC) when viewing self-generated messages compared to viewing expert-generated messages, a region that has been implicated in conflict monitoring and fear appraisal (Maier et al., 2012). The implications of this intervention and alternative explanations for its efficacy will be discussed.

A - 32
OXTR GENOTYPE, LIFE HISTORY, AND SEX ASSOCIATIONS WITH NEURAL REWARD SENSITIVITY

Marlen Z. Gonzalez - University of Virginia; Meghan H. Puglia - University of Virginia; James P. Morris - University of Virginia; Jessica J. Connelly - University of Virginia

Consistent with Life History Theory, our previous work found that participants with low adolescent neighborhood quality showed greater reward related activation in occipital and striatum areas in adulthood. However, little is known about the mechanisms that inculcate the developmental environment into adult neural phenotypes. Loth and colleagues (2014), found that genotype at single nucleotide polymorphism rs237915 for the Oxytocin Receptor Gene (OXTR) interacted with life experience such that "risk" carriers were simultaneously resilient in high stress environments and vulnerable in low stress environments to social-affective problems. In this study we looked at OXTR as a possible mechanism moderating the effects of developmental context on adult neural reward processing in a separate homogeneous sample (N = 92, Male =50, Age: 18 - 30, All Caucasian). Participants retroactively judged economic privilege during their childhood using the Life History Questionnaire and completed the Monetary Incentive Delay task while in an fMRI. We found a main effect of Genotype such that "Resilient" carriers had greater amygdala, anterior cingulate cortex, and insula activation among others (Z = 2.3, p =.05). Interactions between LH and Genotype did not survive correction. Unexpectedly, there was an interaction between gender and LH such that the

right inferior frontal gyrus and the supramarginal gyrus were less active for women as status increased, but more active for men as status increased.

A - 33
ELIMINATE THE NEGATIVE, ACCENTUATE THE POSITIVE: EMOTION REGULATION OF AMBIVALENCE IN A GAMBLING TASK

Emily J. Wu - Swarthmore College; Catherine J. Norris - Swarthmore College

Ambivalence, holding both positive and negative emotions in mind simultaneously, can be an unpleasant state (van Harrenveld, van der Pligt & de Liver, 2009). The current study investigated the effects of instructed positive and negative emotion regulation on ambivalent responses to gamble outcomes. Event-related brain potentials (ERPs) were collected while participants played a gamble task in which they either won or lost one of two different amounts (Larsen, McGraw, Mellers & Cacioppo, 2004). Trials in which participants won or lost the greater of two amounts are purely positive or negative (outright wins and outright losses, respectively); whereas trials in which participants won or lost the lesser of two amounts can be ambivalent (disappointing wins and relieving losses, respectively). Participants were instructed to focus on the positive or negative (counterbalanced) aspects of each gamble. Behavioral results showed that positive and negative regulation decreased self-reported ambivalence to mixed gamble outcomes. In addition, positive and negative regulation decreased the amplitudes of the N100 and the P300 to mixed gamble outcomes, suggesting that self-reported ambivalence is reduced via changes in attention and value assessment. For example, negative regulation of responses to relieving losses decreased N100 amplitudes and decreased self-reported ambivalence; importantly, the change in N100 amplitudes correlated with the change in self-reported ambivalence. In sum, emotion regulation decreases ambivalence to mixed gamble outcomes via modulation of attention and perceived value. Using emotion regulation to reduce ambivalence may help people overcome unpleasant feelings, and improve decision-making abilities when making a difficult choice.

A - 34
COGNITIVE FUNCTIONING AS A MARKER OF RESTING-STATE CONNECTIVITY IN COCAINE ADDICTION

Anna Zilverstand - Icahn School of Medicine at Mount Sinai; Scott J Moeller - Icahn School of Medicine at Mount Sinai; Muhammad P Parvaz - Icahn School of Medicine at Mount Sinai; Rebecca N Preston-Campbell - Icahn School of Medicine at Mount Sinai; Nelly Alia-Klein - Icahn School of Medicine at Mount Sinai; Rita Z Goldstein - Icahn School of Medicine at Mount Sinai

Individuals with cocaine use disorder (iCUD) show deficits in neuropsychological functioning and resting-state connectivity. However, it is not well understood how both are related, and remains unclear if differences in functioning are related to brain states at baseline (when not performing the task).
Here we assessed neuropsychological functioning with the Cambridge Neuropsychological Test Automated Battery (CANTAB) and acquired resting-state functional scans in iCUD (N=44) and IQ-, sex- and race-matched healthy controls (N=31). Factor analysis on ten CANTAB variables of memory and executive function (DMS, SSP, VRM, IED, SST) revealed a group difference (controls>iCUD) in an Inhibitory Control factor (three SST variables, loadings >0.70). Factor scores for Inhibitory Control were used as regressors in a whole-brain resting-state connectivity analysis using a graph theory approach. Measures of interest were local efficiency, which captures local within-region processing, and global efficiency, which indexes processing across large-scale brain networks.
Impaired Inhibitory Control was associated with decreased global/local connectivity in a semantic/cognitive control network and increased global connectivity in parietal/sensory regions in iCUD. These effects partially overlapped with group differences. Brain patterns characteristic of impaired control normalized with longer abstinence/lower craving.
The present results extend previous reports to show that whole-brain connectivity states are altered as a function of Inhibitory Control in iCUD. The link between brain connectivity, craving and abstinence further suggests relevance of connectivity in large-scale brain networks to drug use behaviors. Targeting these whole-brain states by cognitive training (e.g., to enhance Inhibitory Control) may lead to development of novel interventions grounded in neuroscience.

A - 35
IDEAL AFFECT MODULATES HOW NACC ACTIVITY PREDICTS RESOURCE SHARING

BoKyung Park - Stanford, USA; Jeanne L. Tsai - Stanford, USA; Elizabeth Blevins - Stanford, USA; Brian Knutson - Stanford, USA

How does individuals' desired affective states ('ideal affect') shape decisions to give to others? We suggest that givers' ideal affect and receivers' affective expressions jointly determine giving. Specifically, we predict that givers

feel better when viewing receivers whose expressed affect matches their valued affective states, which leads them to offer more money to matching receivers. Moreover, we infer that givers' positive affect, reflected in the activity of reward-associated brain circuits (i.e., Nucleus Accumbens or NAcc), drives giving to receiver faces which match their affective ideal. We tested these predictions with a modified dictator game in the context of FMRI. Results indicated that givers who valued excitement offered more money to excited than calm receivers, but givers valued calm offered more money to calm than excited receivers. Moreover, givers' NAcc activity towards different receiver expressions predicted the amount subsequently offered to receivers. Further, these effects depended on the match between the givers' ideal affect and the receivers' facial expression, such that givers' NAcc activity predicted their offer more strongly after viewing expressions that matched their affective ideal. Together, these results demonstrate that the match between givers' ideal affect and receivers' affective expressions influences the impact of NAcc activity on giving, and have implications for cultural modulation of resource sharing.

A - 36
AUTONOMIC AROUSAL MEDIATES THE EFFECT OF STIMULUS INTENSITY ON PAIN

Dominik Mischkowski - National Center for Complementary and Integrative Health, National Institutes of Health, Bethesda, MD, USA; Troy C Dildine - National Center for Complementary and Integrative Health, National Institutes of Health, Bethesda, MD, USA; Esther Palacios-Barrios - National Center for Complementary and Integrative Health, National Institutes of Health, Bethesda, MD, USA; Lauren Y Atlas - National Center for Complementary and Integrative Health, National Institutes of Health, Bethesda, MD, USA

Skin conductance represents a cardinal measure of autonomic arousal and, as such, consistently correlates with self-reports of physical pain in response to noxious stimulation (e.g., Geuter, Gamer, Onat, & Büchel, 2014; Loggia, Juneau, & Bushnell, 2011). However, it remains unclear whether increased autonomic arousal during pain reflects objective stimulus proprieties (i.e., stimulus intensity) or stimulus-independent psychological factors, such as increased attention to painful stimuli or negative affect. If pain-related psychological processes beyond objective stimulus intensity influence autonomic arousal, skin conductance responses (SCR) should predict trial-by-trial pain reports, controlling for noxious input. We tested whether SCR mediates the effects of stimulus intensity (i.e. temperature) on pain. Participants (N=25) received 24 trials of low, medium, and high painful thermal stimulation, using an adaptive staircase procedure while providing SCR. Following heat offset, participants rated their pain on a 0-10 visual analogue scale. Using multilevel mediation to account for hierarchical data structure, we found that a) SCR increased as a function of temperature, consistent with previous work ($z=3.46$, $p<.001$), b) SCR predicted pain ratings independent of temperature ($z=3.81$, $p<.001$), and c) SCR mediated the effect of temperature on reported pain ($z=2.47$, $p=.013$). Consistent with previous research, these findings suggest that psychological processes in addition to noxious stimulus intensity influence pain, and that measuring fluctuations in arousal during heat may probe these processes. More research is needed to differentiate effects of specific psychological factors (e.g. attention, emotion, and expectation) on SCRs during pain and to investigate the utility of autonomic measures as biomarkers for pain.

A - 37
ATTENTIONAL AND REWARD NETWORKS ARE FUNCTIONALLY CONNECTED DURING FLOW EXPERIENCES

Richard Huskey - University of California Santa Barbara; Britney Craighead - University of California Santa Barbara; Michael Miller - University of California Santa Barbara; Rene Weber - University of California Santa Barbara

Flow is a positively valenced psychological state characterized by focused attention and reward that results from a balance between task challenge and individual skill (Csikszentmihalyi, 1990). The synchronization theory of flow (Weber et al., 2009), which is based on theories of non-linear, self-organizing biological systems, provides reason to believe that flow is an emergent property of a network synchronization process that manifests itself in functional connectivity between attentional and reward structures. This study uses psychophysiological interaction analyses (Friston et al., 1997) to investigate this connectivity hypothesis. Three behavioral experiments validated a procedure for manipulating flow experiences. This included the development of an open-source custom designed video game stimulus that allowed for a high degree of experimental control. Three conditions were experimentally manipulated: (1) boredom – low challenge/high skill, (2) frustration – high challenge/low skill, and (3) flow – balanced challenge and skill. This validated experimental paradigm was then replicated in a brain-imaging context where 20 subjects played the experimental game while undergoing fMRI scanning. Planned contrasts for the flow > boredom/frustration conditions using subcortical reward structures as seed regions revealed functional connections with occipital and prefrontal cortices. When the middle frontal gyrus was used as a seed region, projections were observed among

structures in the temporal and occipital cortices. These findings hint toward further evidence for the synchronization theory of flow and lay a foundation for (1) future investigations into distinguishing flow from other affective experiences, and (2) using the identified flow network in brain-as-predictor studies (Berkman & Falk, 2013).

A - 38
FEELING LEFT OUT: THE IMPACT OF ADOLESCENT DEPRESSION ON NEURAL ACTIVATION PATTERNS DURING SOCIAL EXCLUSION

Kathryn F Jankowski - University of Oregon; Jonathan Batres - University of Minnesota; Hannah Scott - University of Minnesota; Garry Smyda - University of Pittsburgh; Jennifer H Pfeifer - University of Oregon; Karina Quevedo - University of Minnesota

Adolescence represents a period of significant social reorientation, characterized by enhanced sensitivity to peer acceptance and rejection. This shift is catalyzed by social cognitive changes associated with identity development and biological changes associated with neural maturation. While research suggests that depression is associated with atypical self-processing, perspective-taking, and neural functioning, few studies have explored its impact on adolescent social exclusion.

Participants included 126 adolescents with depression and healthy controls (56 males; 11.3-17.8 years; Mage(SD) = 14.75(1.63)) recruited from the University of Minnesota and University of Pittsburgh. Participants completed the Cyberball game and questionnaires assessing maladaptive cognition and negative social contextual factors associated with depression (e.g., self-perception, negative attribution style, emotion reactivity, stress reactivity, and social stress).

Imaging data were acquired using a Siemens Trio 3T scanner and preprocessed/analyzed using SPM8. We conducted one- and two-sample t-tests to investigate activity during social exclusion and follow-up correlation analyses. Adolescents recruited a prototypical network of medial and lateral frontal and superior temporal regions. Depressed adolescents recruited greater left inferior frontal gyrus/insula, which correlated positively with depression severity, negative emotionality, stress reactivity, and social stress, while controls recruited greater left middle temporal gyrus, which correlated positively with self-esteem and negatively with depression severity, negative emotionality, and social stress. These findings suggest that adolescents with depression recruit atypical neural patterns during social exclusion, perhaps representing unique semantic processing and control of salient social evaluative information. These patterns may broadly represent an atypical semantic cognition network, which influences self-perceptions and social interactions in adolescents with depression.

A - 39
INCREASING EXCITABILITY OF PRIMARY SOMATOSENSORY CORTEX IS NOT SUFFICIENT TO INDUCE MIRROR-TOUCH SYNAESTHESIA.

Natalie C. Bowling - Goldsmiths College, University of London; Michael J. Banissy - Goldsmiths College, University of London

Mirror-touch synaesthetes (MTS) experience tactile sensations on their own body in response to viewing another person being touched. Their experiences have been verified using a visuo-tactile interference task in which participants must report the location of a tactile stimulus, whilst observing another person being touched. Observed touch can either be spatially congruent or incongruent with the tactile stimulus. Compared with controls, MTS participants typically make more errors and show a greater congruency effect in their responses. A recent study demonstrated that this congruency effect associated with MTS can be induced in non-synaesthetes by increasing excitability of the primary somatosensory cortex (S1) with transcranial direct current stimulation (tDCS). That study used touch to the hands, but whether similar effects can be observed for other body parts remains to be determined. In view of this, the present study examined the extent to which boosting bilateral cortical excitability in S1 of non-synaesthetes with transcranial random noise stimulation (tRNS) can induce similar behavioural effects using touch to the face. To examine the task specificity of previous findings, two control tasks were included where participants observed light flashes on a face, and touch to an inanimate object. Performance was not significantly influenced by tRNS compared with sham stimulation in any of the tasks. In contrast with previous evidence, these results indicate that increasing excitability in S1 is not sufficient to induce MTS-type performance on this task. The findings will be discussed in relation to the role of S1 in MTS and simulation accounts of empathy.

A - 40
VALUE-BASED VIRALITY: A NEUROCOGNITIVE MODEL OF NEWS RETRANSMISSION

Christin Scholz - Annenberg School for Communication, University of Pennsylvania; Elisa C. Baek - Annenberg School for Communication, University of Pennsylvania; Matthew B. O'Donnell - Annenberg School for Communication, University of Pennsylvania; Hyun S. Kim - Annenberg School for Communication, University of Pennsylvania; Joseph N. Cappella - Annenberg School for Communication, University of Pennsylvania; Emily B. Falk - Annenberg School for Communication, University of Pennsylvania

Modern forms of social content sharing like Facebook posts critically affect reach and impact of ideas and information. Building on current knowledge of brain function, we propose and test a parsimonious, neurocognitive account of virality centered around the value of sharing. Specifically, value-based virality assumes that two types of inputs—a message's self-relevance and its perceived social impact—inform an overall computation of the value in sharing an idea, and that this domain general value signal is directly related to content virality.

We provide empirical evidence for this framework using fMRI data (N = 41) collected during initial exposure to 80 New York Times (NYTimes) articles, and API-derived population-level data on the retransmission counts of these news items (N = 117,611 retransmission instances). As predicted, activity in a priori hypothesized regions of interest associated with self-related, social, and value-related cognitions were significantly associated with population-level retransmission of NYTimes articles. Further, structural equation modeling suggests that the effects of neural activity related to self-related and social cognition on retransmission were fully mediated by valuation-related activity. This model explained 15% of the variance in article retransmission.

Value-based virality unifies prior approaches centered around the involvement of self-related or social cognitions in virality by demonstrating their integration into an overall content value signal which directly affects virality. The generalizability of this model to population-level news virality further demonstrates its value as content design guideline for practitioners, and as vehicle for parsimonious theorizing about one of today's most prominent social phenomena.

A - 41
OXYTOCIN RECEPTOR GENE POLYMORPHISM AFFECTS PROCESSING OF GAZE DIRECTION

Damee Choi - Kyushu University; Takahiro Sekiya - Kyushu University; Natsumi Minote - Kyushu University; Fumi Kishida - Kyushu University; Shigeki Watanuki - Kyushu University

Oxytocin receptor (OXTR) gene polymorphisms are related to individual differences in the emotional processing of social cues. The present study aimed to investigate whether OXTR rs53576 affects the processing of gaze direction. Event-related potentials (ERPs) were recorded while 58 Japanese male participants discriminated direct gaze (target stimuli) from averted gaze (non-target stimuli) under an oddball paradigm. Three ERP components were analyzed: vertex positive potential (VPP), P3, and late positive potential (LPP). For the VPP, GG/GA carriers of OXTR rs53576 (N = 38) showed significantly greater VPP amplitude in response to direct gaze than averted gaze, while AA carriers (N = 20) did not. For the P3, there was no significant difference between GG/GA carriers and AA carriers. For the LPP evoked by direct gaze, GG/GA carriers showed significantly greater LPP amplitude in response to female faces than male faces, while AA carriers did not. For the LPP evoked by averted gaze, neither GG/GA carriers nor AA carriers showed significant differences between their responses to male faces and female faces. The present findings indicate that OXTR gene polymorphism affects the very early (reflected in the VPP) and relatively late (reflected in the LPP) stages of gaze direction processing. Moreover, it is suggested that the effect of OXTR gene polymorphism on relatively late stage (reflected in the LPP) gaze direction processing is different depending on the sex of the face. This might be because of the relationship between oxytocin and mate-searching behaviors.

A - 42
NEURAL CORRELATES OF WANTING TO EAT RATINGS IN A NOVEL FOOD WORD TASK

Leora Benson - Johns Hopkins University School of Medicine; Zhishun Wang - Columbia University Medical Center; Yuankai Huo - Vanderbilt University; Bradley S Peterson - University of Southern California, Keck School of Medicine; Susan Carnell - Johns Hopkins University School of Medicine

Obese and lean individuals demonstrate differential brain responses to foods compared with non-foods, and to high-energy density (ED) compared with low-ED foods, but it is unclear what the activation represents. Using a novel fMRI paradigm, we presented 36 adolescents (14-19 y, mean BMI percentile 64±27, 26 healthy-weight, 4 overweight, 6 obese, 20F, 16M) with two-word names representing high-ED foods (e.g. frosted cupcake), low-ED foods (e.g. cherry tomatoes), and non-foods (e.g. rubber bands). Following each word presentation, participants rated their 'wanting' on a VAS scale ranging from Not at all to Extremely. 'Wanting' scores were higher for food vs. non-food (p<0.001) and high-ED vs. low-ED (p<0.001) words. Bayesian analyses revealed that higher wanting difference scores for food vs. non-food were correlated with decreased food vs. non-food responses in the cingulate cortex (anterior, middle,

posterior), frontal cortex (orbitofrontal, superior prefrontal, medial prefrontal), middle temporal cortex, inferior parietal cortex, hippocampus and putamen. Higher wanting difference scores for high-ED vs. low-ED foods were correlated with decreased high-ED vs. low-ED responses in a different set of frontal regions (orbitofrontal, dorsolateral prefrontal, inferolateral prefrontal), as well as the inferior parietal cortex. These results suggest that greater subjective appetitive responses to foods vs. non-foods could be associated with a relative deactivation of the default mode network, while greater subjective appetitive responses to high-ED vs. low-ED foods are associated with relatively lesser activation of circuits involved in inhibition and cognitive control – a phenomenon which could potentially promote overeating of palatable, high-ED foods, with consequences for body weight.

A - 43

NEURAL OUTCOMES OF RISK DECISION: PREDICTION OF SUBSEQUENT BEHAVIORAL DECISION ACROSS SOCIAL CONTEXTS IN ADOLESCENCE

Jessica Flannery - University of Oregon; Shannon Peake - University of Oregon; John Flournoy - University of Oregon; Sarah Alberti - University of Oregon; Arian Mobasser - University of Oregon; Philip Fisher - University of Oregon; Jennifer Pfeifer - University of Oregon

Risky decision-making is an integrative process, constantly synthesizing information from prior experiences to either promote or inhibit future risk- taking decisions; therefore, predicting future risk behaviors first requires an understanding of how risky decisions are processed. Previous studies have found that adolescents increase risk-taking decisions in the presence of peers, specifically if their peers support risky decisions. Social rejection is highly prevalent in adolescence and social rejection is also associated with higher rates of risk-taking, yet how social rejection influences the feedback of risky decisions has been relatively understudied.

In the current fMRI study (11-17 years old), we adapted the original stoplight game (a driving simulation game designed to measure adaptive risk in the presence of peers) to de-correlate performance with risk and differentiate how the type of peer interaction influences neural feedback following the outcome of the risky (or not risky) decision. We modeled outcomes regressed across: go/stop; positive/negative feedback; and the interactions of these events as a prediction of next behavioral decision. Participants performed the task three times: alone; in the presence of peers after social inclusion; and again after social exclusion. Preliminary data (N=58), suggest there was a main effect of increased retrosplenial activity following social inclusion; however, only retrosplenial activity to negative feedback was associated with more real world risk and increased susceptibility to peer influence. Secondly, there was a main effect of decreased deactivation in the ventral putamen following social exclusion; however, only ventral putamen activity to negative feedback was associated with poorer game performance.

A - 44

EFFECTS OF PSYCHOSOCIAL STRESS ON AUTONOMIC RESPONSE AND COGNITIVE FUNCTION IN SUBJECTS WITH HIGHER AND LOWER PSYCHOPATY SCORES

Laura Espín - University of Murcia; Jesús Gómez-Amor - University of Murcia; Alicia Salvador - University of Valencia; Joao Marques-Teixeira - University of Porto, Laboratory of Neuropsychophysiology; Fernando Barbosa - University of Porto, Laboratory of Neuropsychophysiology

The role of psychopathic traits in the development and manifestation of psychosocial stress has not been yet clarified with controversial reports on the relation between psychopathy and both physiological and cognitive response to stressful situations. The aim of this study was to measure the effects of the exposure to a standardized psychosocial stressor (Trier Social Stress Test) on autonomic and cognitive responses, and their relation to psychopathy. Forty four subjects (ages between 18-35 years) were selected either from a sample of 1000 candidates with variable scores on Triarchic Psychopathy Measure (TriPM, Patrick, 2010), or among university students that filled the TriPM. The sample was divided into the higher and lower psychopathy groups by the median-split of the total TriPM score. In order to assess the cognitive function, we used an emotional memory task based on the recognition of affective pictures; we computed a d-prime index for the analysis of the participants´ sensitivity in the memory task. The autonomic activity was continuously measured and registered with different parameters of heart rate variability during the experiment. Although no differences between groups were found in the memory task, individuals with higher psychopathy scores showed decreased autonomic activity in comparison with those with lower scores in response to stress. Therefore, individuals scoring higher in psychopathy seem to be less affected and may feel less threatened by the exposure to stress. These results point to the possible role of physiological stress response as a marker for high psychopathic traits in community samples.

A - 45

DYNAMIC EMOTION IDENTIFICATION: EFFECTS OF AGE AND OXYTOCIN

Marilyn Horta - University of Florida, Gainesville, USA; Tian Lin - University of Florida, Gainesville, USA; Desiree Gulliford - University of Florida, Gainesville, USA; Ronald A. Cohen - University of Florida, Gainesville, USA; Natalie C. Ebner - University of Florida, Gainesville, USA

Understanding and being able to differentiate the emotions of others is a crucial skill for maintaining healthy interpersonal relationships and guides prosocial behavior across the lifespan. Aging is associated with increased difficulties in emotion identification but the underlying mechanisms of this age-related decline are not well understood (Ruffman et al., 2008). Growing evidence suggests that the neuropeptide oxytocin may play a role in modulating the ability to understand emotions in others though findings are mixed and understudied in aging contexts and brain mechanisms are not well described yet (Ebner et al., 2013). The present study examined 48 young and 54 older men and women who self-administered either intranasal oxytocin or a placebo in a randomized, double-blind procedure prior to undergoing a dynamic emotion identification fMRI task (modified after Lischke et al., 2011). In this task, images of neutral faces that gradually changed into emotional faces (happy, sad, anger, and fear) were presented. Participants viewed each dynamic facial expression and indicated through a button press which facial emotion they believed was displayed. A repeated-measures GLM analysis on reaction time and accuracy showed that older adults exhibited longer response times and were less accurate than young adults in identifying emotions. These effects were particularly pronounced for negative emotions, but did not vary by treatment. fMRI data analysis further explored age and oxytocin effects on brain mechanisms involved in dynamic emotion recognition.

A - 46

MEASURING COGNITIVE FATIGUE IN MULTIPLE SCLEROSIS USING AN ATTENTION TASK

Sarah Wood - Kessler Foundation; Starla Weaver - Oklahoma City University; Ekaterina Dobryakova - Kessler Foundation

Fatigue affects 90% of individuals with Multiple Sclerosis (MS). To develop effective treatments, we must understand the neural mechanisms underlying fatigue. To elucidate the neural mechanisms associated with fatigue, subjects with relapsing-remitting MS and high fatigue completed two Functional Magnetic Resonance Imaging (fMRI) scans. During the first scan, subjects completed a non-fatiguing task (nFT) consisting of a single letter memory cue and single position cue. Rapid presentation of random letters followed, and subjects had to respond whenever the cued letter was in the cued position. During the second scan, subjects did a fatiguing task (FT), in which the memory cue contained two letters and the position cue contained two positions to remember. Participants had to respond whenever either letter was in either position. Between blocks, subjects reported their fatigue level on a 1-10 scale. The behavioral data shows that task accuracy was significantly lower ($p < 0.01$) and response time was significantly slower ($p < 0.01$) for the FT. A significant increase in self-reported fatigue ($p < 0.01$) was noted during the FT as compared with the nFT. Analysis of fMRI data showed greater activation in sensory areas of the brain during the FT. The nFT resulted in widespread activation of regions in the default mode network (DMN). The behavioral and self-report results suggest that the difficult attention task is more fatiguing than the nFT. DMN activation during the nFT suggests that this task is less cognitively taxing than the FT, during which less activation was observed.

A - 47

TOP-DOWN AND BOTTOM-UP MECHANISMS AND THE MAINTENANCE OF THE SELF-CONCEPT

Rachel Amey - University of Delaware, Newark, United States; Chad E. Forbes - University of Delaware, Newark, United States; Jordan Leitner - University of California Berkeley, Berkeley, United States

Individuals constantly encounter feedback from others, both threatening and affirming, and may process this feedback in either a self-driven, top-down, or data-driven, bottom-up manner to protect and maintain their self-concept. While some research suggests only affirming information is attended to in a bottom-up manner, other research suggests in social evaluative situations neither threatening or affirming information will be attended to; a process likely driven by top-down self-protective mechanisms. Existing literature has explored ways in which top-down and bottom-up processing mechanisms affect the encoding of social feedback, however, questions remain about how social information is attended to as a function of top-down and bottom-up processing. Evaluating how individuals process social feedback on-line may shed light on our understanding of these phenomena and how they play a role in the maintenance of one's self-concept. Utilizing a social neuroscience approach the current research sought to inform these conflicting findings by examining how individuals process threatening or affirming feedback during a social evaluative feedback and memory task. Overall results provide evidence that the desire to maintain a

higher self-concept may manifest as a top-down neural interaction that ultimately biases how we encode socially evaluative feedback to protect and maintain our self-concept.

A - 48
GENDER DIFFERENCES IN SOCIAL REJECTION AND ACCEPTANCE: AN FMRI STUDY

Mohammad A Malik - Departments of Psychology and Psychiatry, Stony Brook University; Ashley A Yttredahl - Departments of Psychology and Psychiatry, Stony Brook University; Benjamin J Sanford - Department of Psychiatry, University of Michigan; Erin McRobert - Department of Psychiatry, University of Michigan; Benjamin Sheler - Department of Psychiatry, University of Michigan; Brian J Mickey - Department of Psychiatry, University of Utah; Tiffany M Love - Department of Psychiatry, University of Utah; Robert C Welsh - Department of Psychiatry, University of Michigan; Scott A Langenecker - Department of Psychiatry, University of Illinois at Chicago; Jon-Kar Zubieta - Department of Psychiatry, University of Utah

The need for social acceptance is an innate drive that when thwarted can trigger symptoms of anxiety and depression. Men and women may respond differently to rejection or acceptance, potentially contributing to different rates of psychiatric disorders. The present study compared neural responses to rejection and acceptance in healthy men and women. Participants were 18 men (mean age ± SD: 29 ± 10 years) and 20 women (31 ± 12 years). During fMRI, participants viewed pictures of others of the preferred sex whom they previously rated as highly desirable, and were given feedback that they were liked or not liked. A priori regions of interest included the amygdala, nucleus accumbens, dorsal anterior cingulate cortex, and anterior insula. After scanning, participants performed the task again while answering questions on their emotional state. During rejection, men showed greater activation in the supplementary motor area (SMA) (t = 6.57, PFWE-whole brain = 0.01). Women reported higher perceived family support. (P < 0.02), which was negatively correlated with amygdala activation (left: r = 0.57, P = 0.01; right: r = 0.55, P = .02). During acceptance, women showed greater activation in the right amygdala compared to men (t = 3.57, PFWE-SVC = 0.04). Activation in the SMA may reflect differences in emotion regulation between genders. In women but not men, lower perceived family support may predict higher emotional responses. Results suggest that men and women may respond differently to social rejection and acceptance at the neural level.

A - 49
NEURAL CORRELATES OF RELATIONSHIP REPRESENTATION OUTSIDE OF AWARENESS: AN FMRI STUDY

Katherine R. Surrence - New York State Psychiatric Institute/Columbia University Medical Center; Andrew J. Gerber - Austen Riggs Center/Columbia University Medical Center

This is the first fMRI study of relationship representation using Andersen's (1996) transference paradigm. Participants (N=38) generated sentences to describe significant others, selected adjectives irrelevant to those people, and described celebrities and chose traits irrelevant to them. Months later, they returned to learn about new people (targets). In the scanner, they read sentences about targets. Some targets resembled their significant other (SO), half the sentences from the participant's description, half from irrelevant descriptors. Yoked controls (YC) resembled another participant's SO. Non-descriptive controls (NC) resembled celebrities. Afterward, participants saw sentences and rated whether they'd read them during learning. Lure sentences came from target descriptions, but weren't presented during learning. If SO schemas were activated, participants should endorse lures with higher confidence in the SO condition than the control conditions. In the imaging data, we hypothesized a two-way interaction: the contrast between relevant and irrelevant descriptors would differ between the SO and YC condition, but only in the second half of learning, after the representation was activated. The effect of target (SO, YC, NC) on lure rating was significant, $F(2, 6132) = 3.781$, $p < 0.05$. A planned contrast tested the two-way interaction between Target (SO>YC) and Relevance (R>I) in the second half of learning. The contrast was significant and negative in left BA21 (primary threshold $p < .001$, cluster size ≥ 8 voxels). This difference was driven by a larger Relevant – Irrelevant difference in the YC condition, suggesting that BA21 is differentially recruited in learning new person representations.

Poster Session B

B - 1
THEORIES OF PERSON PERCEPTION PREDICT PATTERNS OF NEURAL ACTIVITY DURING MENTALIZING

Mark A. Thornton - Department of Psychology, Harvard University; Jason P. Mitchell - Department of Psychology, Harvard University

How do people spontaneously organize their perceptions of others? Many theories propose that perceivers implicitly array others on a set of psychological dimensions, such as warmth and competence or agency and experience. However, we know little about the extent to which perceivers spontaneously draw upon the dimensions of such theories as a basis for making inferences about others. When asked to make an educated guess about another's thoughts, feelings, or preferences, do perceivers rely on the target person's coordinates in a social 'space' to formulate a response? To answer this question, we applied feature space modelling to test how well four theories predicted patterns of neural activity elicited when perceivers think about others. The theories in question were drawn from diverse corners of the social and personality literature, and included the stereotype content model, the five factor model of personality, the agency and experience model of mind perception, and the trustworthiness and dominance model of face perception. While undergoing functional magnetic resonance imaging (fMRI), participants made social judgments about an extensive set of well-known public figures. Patterns of brain activity were then predicted using independent ratings of the targets' positions on the dimensions of the four theories under study. All four theories predicted patterns of neural activity above chance. In addition, the stereotype content model significantly outperformed the other three theories. Together, these results suggest that perceivers do indeed encode others' coordinates on theory-described social dimensions.

B - 2 *SANS Poster Award winner*
LARGE-SCALE DATA MINING REVEALS DISTINCT NEURAL NETWORKS SUPPORTING EMOTIONAL PROCESSING: A META-ANALYTIC STUDY

Julio A. Yanes - Auburn University; Michael C. Riedel - Florida International University; Kimberly L. Ray - University of California, Davis; Peter T. Fox - University of Texas Health Science Center, San Antonio; Matthew T. Sutherland - Florida International University; Angela R. Laird - Florida International University

A considerable effort has been directed toward understanding the neuropsychological mechanisms of affective processing, yet there are many conflicting theories describing this complex construct, and a high degree of variability exists across neuroimaging paradigms used in experimental settings. Here, we leveraged a computational data mining approach to further our understanding of the task-dependent recruitment of neural regions during emotional processing from an objective, network-based perspective. We utilized a hierarchical clustering approach to classify published activation patterns into similar groups to identify dissociable networks recruited during emotion generation and regulation. The BrainMap database was searched to identify archived experiments associated with emotional processing. Peak-activation coordinates were extracted from each contrast and smoothed to create modeled activation images. Mining the database identified 1,747 contrasts from 905 papers, with 22,760 peak-activation coordinates from 27,542 subjects. An experiment-by-experiment correlation matrix was generated using pair-wise Pearson correlation coefficients, and hierarchical clustering methods were applied. Resulting clusters delineated subsets of experiments with spatially similar modeled activation patterns. Clustered peak-activation coordinates were meta-analyzed using activation likelihood estimation (ALE), and quantitative functional decoding was performed on each cluster via forward and reverse inference analyses. Topological assessment and functional decoding revealed five distinct systems, including visual, auditory, salience, default-mode, and emotion-generation networks. These findings show strong correspondence to widely known models of the cognitive control of emotion. When taken together, our results demonstrate that large-scale meta-analysis can facilitate the evaluation of theoretical mental models by probing the range of behavioral manipulations across a diverse range of emotion tasks.

B - 3
NEURAL MECHANISMS OF SOCIAL INFLUENCE: LINKING FMRI FINDINGS TO REAL-WORLD SOCIAL INFLUENCE

Elizabeth C. Beard - University of Pennsylvania; Christopher N. Cascio - University of Pennsylvania; Matthew B. O'Donnell - University of Pennsylvania; C. Raymond Bingham - University of Michigan;

Bruce G. Simons-Morton - National Institute of Child Health and Human Development; Anuj K. Pradhan - University of Michigan; Jean T. Shope - University of Michigan; Farideh Almani - University of Michigan; Emily B. Falk - University of Pennsylvania

Social influence is pervasive throughout life and adolescents are often the most susceptible. Past research has found that neural regions associated with positive valuation, and mentalizing are most often associated with social influence in adolescents. Few extant studies, however, link neural mechanisms of peer influence to real-world outcomes. Therefore, it remains unclear which neural mechanisms associated with social influence observed in the neuroimaging environment are related to behavioral outcomes in response to social influence during real-world decision making during adolescence. We tested whether individual differences in neural regions previously shown to be involved in susceptibility to social influence on recommendation behavior also predicted driving risk associated with social influence one week later in a full-cab driving simulator among adolescent boys (N=71). Individual differences in behavioral responses to the two influence tasks were uncorrelated. By contrast, neural activity functionally defined by conformity in the fMRI recommendation task (VS+VMPFC+ITG) predicted risky behavior in the presence of a risky peer, relative to solo driving and safe peers, p=.013. In addition, individual differences in mentalizing (rTPJ) activity was significantly associated with safer behavior in the presence of a safe peer (relative to solo driving and risky peers) during the driving simulator session, p=.009. These data provide evidence for convergence between hypothesized neural mechanisms of social influence and real-world behavior change, and provide information not apparent from observing behavior in the tasks alone. These data also highlight important interactions between individual differences in neural sensitivity to influence and social contexts of real world decision making.

B - 4
EVERYDAY DECISION-MAKING UNDER SCARCITY

Inge Huijsmans - Donders Institute for Brain, Cognition and Behavior, Centre for Cognitive Neuroimaging, Radboud University Nijmegen, Nijmegen, The Netherlands.; Leticia Rettore Micheli - Maastricht University, Maastricht, The Netherlands; Wenwen Xie - Department of Psychology, Sun Yat-sen University, Guangzhou, China.; Mirre Stallen - Stanford University, Stanford, CA, USA.; Allan Sanfey - Donders Institute for Brain, Cognition and Behavior, Centre for Cognitive Neuroimaging, Radboud University Nijmegen, Nijmegen, The Netherlands Behavioral Science Institute, Radboud University Nijmegen, Nijmegen, The Netherlands.

Scarcity, defined here as the feeling of not having enough of what one needs, can have far-reaching consequences: difficulty in making optimal decisions under conditions of poverty is well documented, and indeed recent work from our lab has demonstrated that a scarcity mind-set leads to impairment on a variety of fundamental cognitive tasks. The current study explores the question of whether resource scarcity in one domain can impact both choice behaviour and neural mechanisms in an unrelated domain. While undergoing fMRI, participants (N = 47) were consecutively placed in mindsets of both scarcity and abundance. During each phase, participants performed an ostensibly unrelated shopping task, indicating how much they were willing to bid to purchase various supermarket products. These auctions were resolved, and participants actually obtained the items purchased. Results from fMRI analyses show that exposure to products was associated with greater activation in the VMPFC when in a scarcity mindset as compared to when in an abundance mindset (whole brain .001 uncorrected, cluster level FWE p<.001, k = 254), suggesting that products are valued more in a scarcity context. Additionally, participants showed diminished DLPFC activation when bidding in a scarcity mindset compared to abundance (whole brain .001 uncorrected, cluster level FWE p=.044, k = 63), indicating potentially impaired cognitive resources under scarcity. These results are notable because they demonstrate a significant impact of scarcity in an unrelated domain, clearly outlining the potential wide-reaching effects on decision-making of the perception of not having enough.

B - 5
FAST AND PRE-ATTENTIVE ORIENTING TO DIRECT GAZE AND ITS POSSIBLE RELIANCE ON LOW SPATIAL FREQUENCY INFORMATION

Ines Mares - Centre for Brain and Cognitive Development, Birkbeck College, University of London; Marie L. Smith - Centre for Brain and Cognitive Development, Birkbeck College, University of London; Department of Psychological Sciences, Birkebeck College, University of London; Mark H. Johnson - Centre for Brain and Cognitive Development, Birkbeck College, University of London; Miguel Leal-Rato - Language Research Laboratory, Faculty of Medicine and IMM, University of Lisbon; Isabel Pavão Martins - Language Research Laboratory, Faculty of Medicine and IMM, University of Lisbon; Atsushi Senju - Centre for Brain and Cognitive Development, Birkbeck College, University of London

Direct gaze signals another person's attention to oneself, which attracts observer's visual attention. In three studies we tested the mechanisms underlying attentional capture by perceived direct gaze. Firstly, to assess rapid orienting to direct gaze, participants were instructed to saccade to peripherally presented faces and buildings. Faces with direct gaze elicited shorter express saccade latencies, compared to faces with averted gaze or buildings. Secondly, to test if attentional capture by direct gaze occurs pre-attentively, patients with Hemispatial Neglect were instructed to cross targets with direct or averted gaze amidst closed eyed distractors. The patients were better at detecting targets with direct gaze than those with averted gaze. Thirdly, since rapid and pre-attentive processing of direct gaze is hypothesized to depend on a subcortical visual pathway, which is reliant on low spatial frequency (LSF) information, we manipulated the spatial frequency content of dynamic gaze shifts and buildings with apparent motion while collecting participant's event related potentials (ERP). We included LSF, high (HSF) and broad spatial frequency (BSF) stimuli. Two distinct peaks in ERP were observed, N170 and N240. General face motion processing relied on HSF information in the N170 component, but was not modulated by spatial frequency in the N240. In contrast, direct gaze discrimination was observed in the N170 component not modulated by spatial frequency, but depended of LSF information in the N240 component. Direct gaze was thus shown to benefit from fast, pre-attentive processing, although the importance of LSF for this fast processing needs to be further investigated.

B - 6

BOLD ACTIVITY DURING AN ATTENTIONAL CONTROL TASK PREDICTS DISINHIBITED EATING IN THE LAB AND FAILURE TO CURB FOOD DESIRES IN DAILY LIFE

Richard B. Lopez - Dartmouth College, Hanover, NH, USA; Andrea L. Worsham Courtney - Dartmouth College, Hanover, NH, USA; Pin-Hao A. Chen - Dartmouth College, Hanover, NH, USA; William M. Kelley - Dartmouth College, Hanover, NH, USA; Todd F. Heatherton - Dartmouth College, Hanover, NH, USA

Self-regulation has been theorized to draw upon limited cognitive resources, whereby initial acts of effortful control threaten self-regulatory capacity in subsequent tasks. This account has received empirical support in behavioral paradigms, but neural correlates of susceptibility to self-regulatory depletion and downstream effects on eating behavior have not been well characterized. In the present work, we examined brain-behavior relationships in chronic dieters, a population motivated to restrain food intake but who nonetheless experience lapses in self-control. During an fMRI scanning session, participants completed an attentional control task that required them to ignore salient distractor words overlaid on an emotionally neutral video clip of a nature documentary. Participants then returned for a follow-up session in which we measured disinhibited eating of ice cream. We conducted a region-of-interest (ROI) analysis in which we regressed parameter estimates from the attentional control task (i.e., when distractors were present on the screen) on grams of ice cream consumed. We defined regions of interest based on nodes in the cingulo-opercular network, a brain system associated with cognitive control across task epochs. We found that activity in one ROI (dorsal anterior cingulate cortex, dACC) was associated with greater ice cream consumption. Next, in an independent sample of dieters who underwent the same attentional control paradigm, we found that higher activity in the same dACC ROI predicted weaker resistance to food desires in daily life, and in turn more food consumed. These results suggest that some dieters are especially prone to experience self-regulatory depletion and attendant failure.

B - 7

OBSERVATIONAL FEAR LEARNING IS DETERMINED BY SOCIAL GROUP

Armita Golkar - Karolinska Institutet, Stockholm, Sweden; Andreas Olsson - Karolinska Institutet, Stockholm, Sweden

Learning from other individuals inherently relies on the transmission of social information and is therefore subjected to social biases affecting whom to learn from. Humans have a tendency to categorize other individuals into social groups to distinguish between those that belong to the own (in-group) and other (out-group) groups. Consistent with research in animals showing similarity-based learning biases, and a general tendency to display greater empathic and otherwise pro-social responses to in-group individuals, we recently demonstrated that both social fear and social safety learning was superior (as measured by the skin conductance response, SCR) when learning from an individual from the racial in-group compared to the out-group (Golkar et al., 2015). Here we extend the generalizability of the mechanisms underlying racial biases in social fear learning by distinguishing between groups based on soccer supportership. In this paradigm, we recruited male supporters of two local soccer teams who were informed that they would observe a fellow supporter of the same or the rival team. We found that conditioned SCRs were significantly higher when information about danger was transmitted by an in-group (same team) as compared to an out-group (different team) demonstrator, and that the level of conditioned SCRs were related to the degree of in-group identification. Our findings suggest that social fear learning in an intergroup context is not limited to racial

categories, and might reflect a more general system biasing social learning towards individuals belonging to one's own group.

B - 8
REDUCING REWARD REACTIVITY AND FOOD DESIRE THROUGH DOMAIN-SPECIFIC TRAINING

Pin-Hao A. Chen - Department of Psychological & Brain Sciences, Dartmouth College, Hanover, NH; Richard B. Lopez - Department of Psychological & Brain Sciences, Dartmouth College, Hanover, NH; William M. Kelley - Department of Psychological & Brain Sciences, Dartmouth College, Hanover, NH; Wilhelm Hofmann - Social Cognition Center, University of Cologne, Cologne, Germany; Todd F. Heatherton - Department of Psychological & Brain Sciences, Dartmouth College, Hanover, NH

According to the strength model, self-regulatory capacity is a domain-general resource that can be expanded by training. From this perspective, training self-regulation in one domain (i.e. inhibiting a response to sound cues) may transfer to another domain (i.e. inhibiting responses to food cues). In this study, we used a stop-signal paradigm with chronic dieters to compare the effect of sound-cue inhibitory training with food-cue inhibitory training on participants' brain reward reactivity to food cues as well as eating urges in their daily life. Functional magnetic resonance imaging was used before and after the training to assess food-cue reactivity. Participants also completed one week of experience sampling before and after the training to examine their eating urges and behavior. Food-cue inhibitory training was more successful in reducing food-cue reactivity in the reward network and desires to eat during daily life than the sound-cue training. This suggests that self-regulatory training may not transfer across domains. Domain-specific training may be an effective method for building self-regulation.

B - 9
RECRUITMENT OF PREFRONTAL CONTROL REGIONS DURING HIGH STAKES INCENTIVES PREDICTS PERSISTENT IMPROVEMENTS IN COGNITIVE CONTROL

Catherine Insel - Harvard University, Cambridge, MA; Catherine R Glenn - University of Rochester, Rochester, NY; Erik K Kastman - Harvard University, Cambridge MA; Megan C Garrad - Harvard University, Cambridge MA; Stephanie F Sasse - Harvard University, Cambridge MA; Matthew K Nock - Harvard University, Cambridge MA; Leah H Somerville - Harvard University, Cambridge MA

Prior work suggests that the prospect of incentives can temporarily improve cognitive control. This effect is most prominent when incentive contingencies are cued in advance, allowing an individual to capitalize on preparatory processes via coordinated recruitment of prefrontal control regions. However, it remains unknown whether cue-related PFC recruitment forms a persistent representation of incentivized-control that produces a lasting and preferential effect on control performance. To investigate this question, participants (N=29) performed two cognitive control tasks. The first was an incentivized go/no-go fMRI task with intermixed low and high stakes conditions. Before each stakes block, participants viewed a preparatory cue indicating either high (correct +$1/incorrect -$.50) or low (correct +$.20/incorrect -$.10) financial prospects. After scanning, participants completed a second non-incentivized go/no-go task in which the stakes cues from the previous task became the targets, and participants were asked to withhold responses to low and high stakes cues. Behavioral results demonstrated that participants were better able to implement inhibitory control over cues previously associated with high stakes incentives. In addition, the degree of PFC recruitment for high vs. low stakes cues in the first task influenced subsequent performance in the second task. Specifically, participants who exhibited more PFC recruitment for high relative to low stakes cues displayed enhanced control performance for high stakes no-go cues in the subsequent task. These findings reveal that PFC recruitment integrates cue-incentive-control associations, forming lasting representations that continue to improve performance, even when incentives are no longer at stake.

B - 10
OXYTOCIN-BASED PHARMACOTHERAPY FOR AUTISM SPECTRUM DISORDERS: INVESTIGATING THE IMMEDIATE AND LONG-TERM EFFECTS FROM A NEURAL AND BEHAVIORAL PERSPECTIVE.

Prinsen Jellina - University of Leuven, Leuven, Belgium; Sylvie Bernaerts - University of Leuven, Leuven, Belgium; Claudia Dillen - University of Leuven, Leuven, Belgium; Emmely Berra - University of Leuven, Leuven, Belgium; Stephanie Brams - University of Leuven, Leuven, Belgium; Nicole Wenderoth - ETH Zurich, Zurich, Switserland; Kaat Alaerts - University of Leuven, Leuven, Belgium

Background. Autism spectrum disorders (ASD) are characterized by impairments in social communication and interaction. To date, no pharmacological treatments exists targeting the core symptoms of ASD. The past years, the

pharmacological use oxytocin (OT) has gained increasing interest to explore its potential for elevating the core social deficits in ASD.

Objectives. We evaluated immediate (single-dose) and long-term (multiple dose) effects of OT administration in adult male patients with ASD in a double-blind randomized placebo-controlled trial.

Methods. A multi-modal neuroimaging approach is adopted to assess neural effects (i) at baseline; (ii) after a single-dose (24 IU) of nasal spray administration (OT or placebo); (iii) after 4 weeks of daily nasal spray administration; and (iv) one month post-trial to assess potential retention effects. Behavioral changes are assessed using emotion processing tasks and questionnaires.

Results. Preliminary data on resting-state functional connectivity revealed changes in whole-brain network connectivity for several regions of the social brain (e.g. fusiform gyrus, orbito-frontal cortex, frontal operculum, insula). Interestingly, changes in network connectivity of these regions were evident both immediately after a single dose of OT, as well as after 4-weeks of daily OT administration. After long-term OT administration (not after a single-dose) connectivity changes were additionally identified for the thalamus and middle/superior temporal gyri. These preliminary results are in agreement with results of a recent voxel-based meta-analysis (Wigton et al., 2015).

Conclusion. Our highly preliminary results provide first indications that OT can induce changes in network connectivity of the social brain in patients with ASD.

B - 11
EARLY EXPERIENCE TUNES AMYGDALA RESPONSE AND VIGILANCE FOR THREAT

Jennifer A Silvers - Columbia University, UCLA; Bonnie Goff - UCLA; Laurel Gabard-Durnam - Columbia University; Dylan G. Gee - Weill Cornell Medical College; Dominic S. Fareri - Adelphi University; Christina Caldera - UCLA; Nim Tottenham - Columbia University

Early life adversity is commonly associated with alterations of prefrontal-amygdala circuitry and elevated anxiety. While many theoretical and clinical accounts of early adversity suggest that it is associated with increased vigilance for threat, little empirical work has examined this possibility and whether enhanced vigilance may help explain the relationship between early adversity and anxiety. The present study sought to examine vigilance for affective stimuli in a sample of children and adolescents who experienced early adversity in the form of previous institutionalization (PI) (n=37, mean age=13.31 years) and a comparison group of children and adolescents who were reared by their biological parents since birth (n=45, mean age=13.47 years). Participants underwent fMRI scanning while completing a visual search task that involved locating either a fearful or happy face amidst numerous neutral faces. Overall, participants were more accurate and faster to detect happy than fear faces and performance for both trial types improved with age. Intriguingly, behavioral accuracy for detecting fear faces – a measure of vigilance – was associated with higher anxiety among PI youth, who as a group scored higher on the SCARED Anxiety measure. This enhanced detection of fear faces was tracked by heightened amygdala reactivity. Together, these findings suggest that early experiences impact amygdala reactivity and anxiety, which tune individuals' vigilance for threat.

B - 12
EMOTION REGULATION AND RESPONSE TO SOCIAL STIMULI IN CHILDREN AND ADOLESCENTS WITH DEPRESSIVE SYMPTOMS

Emilia Ninova - Columbia University; Jennifer Silvers - Columbia University; Rebecca Martin - Columbia University; Peter Franz - Harvard University; Catherine Insel - Harvard University; Alisa Powers - Long Island University; Jochen Weber - Columbia University; Walter Mischel - Columbia University; B.J. Casey - Weill Cornell Medical College; Kevin Ochsner - Columbia University

A core feature of depression is the dysregulation of emotion. Although depression rates rise dramatically from childhood to late adolescence (Avenevoli et al., 2015), relatively little is known about how depressive symptoms relate to measures of emotion regulation within this age range. To characterize this relationship and the neural mechanisms involved, the present study tested 65 healthy children and adolescents (age 8-18, 37F) on an fMRI paradigm wherein participants viewed negative and neutral social images and rated their negative affect on a trial-by-trial basis. Participants were instructed to either respond naturally, distance themselves from (reappraise), or immerse themselves in the social scenes. Depressive symptomatology was not related to participants' self-reported negative affect for any of the task conditions. However, across all trial types, higher depression scores correlated with less recruitment of the left ventromedial prefrontal cortex, a region implicated in emotion regulation, and less recruitment of the bilateral parahippocampal gyrus and hippocampus, regions that are associated with memory and have been identified as potential biomarkers for depression (Cole et al., 2011). Additionally, during trials where participants responded naturally, higher depression scores correlated with greater activation in the dorsolateral

prefrontal cortex, a region that supports cognitive representations of emotional states. Taken together, these results shed light on the neurobiological substrates of individual differences in depressive symptoms during childhood and adolescence, which may provide important insight into what confers risk and resilience with regards to the development of depression.

B - 13
ATTENTIONAL UNDERPINNINGS OF PREOCCUPATION WITH BODY IMAGE AND WEIGHT: AN ERP STUDY

Helen Uusberg - University of Tartu, Tartu, Estonia; Krista Peet - University of Tartu, Tartu, Estonia; Andero Uusberg - Stanford University, Stanford, USA & University of Tartu, Tartu, Estonia; Kirsti Akkermann - University of Tartu, Tartu, Estonia

Misjudging one's body size is a key mechanism in the etiology of eating disorders. We used EEG to investigate the attentional underpinnings of this risk factor in a social comparison setting. 36 women (age M=20.31, SD=2.01; BMI M=21.70, SD=2.56) varying in self-reported preoccupation with body image and weight viewed a series of digitally size-modified images (from -10% to +10% in 2% intervals) of themselves and a size-matched model with the task to compare each image to their actual body size ("smaller/bigger than me"). The 50% psychometric threshold was used to estimate perceived body size while the Late Positive Potential (LPP) was considered an index of attentional deployment towards the stimuli. In women with low preoccupation, LPP amplitudes differentiated body sizes for the self and the model alike – reduced (-10% to -4%) and in particular enlarged (+4% to +10%) stimuli amplified the LPP relative to realistic stimuli (-2%, 0, +2%). High preoccupation first of all enhanced a general tendency to attend preferentially to one's own body. However, its effect on size processing depended on stimulus identity – preoccupation enlarged LPP differences between body sizes for images of the self, but removed them for images of the model. Behaviorally, preoccupation also enhanced the tendency to overestimate one's body size in relation to the model. Collectively, these results indicate that preoccupation with body image may involve an attentional bias towards one's own body that interferes with adequate social comparisons and as a result biases ones' body size perception in relation to others.

B - 14
NEURAL CORRELATES OF THE DEVELOPMENT OF THE EVALUATION OF SOCIAL VS. NON-SOCIAL INFORMATION DURING ADOLESCENCE

Lucia M Weinberg - Dept of Experimental Psychology, University College London; Iroise Dumontheil - Department of Psychological Sciences, Birkbeck, University of London; Sarah-Jayne Blakemore - Institute of Cognitive Neuroscience, University College London

Social cognition undergoes profound changes during adolescence, which might in part be determined by the development of two neural networks: the social brain and the executive control network. In a developmental fMRI study we investigated BOLD signal in 39 participants (aged 11–31 years) while they evaluated and manipulated social or non-social information. In the social task, participants evaluated themselves, a friend, or compared themselves with their friend. In the non-social task, participants evaluated their hometown, another town, or compared the two. The consistency of participants' responses marginally increased with age, and was greater for non-social information. Activation of the relational integration network, including the rostrolateral PFC (RLPFC), was observed in the comparison condition of both the social and non-social tasks. Medial prefrontal cortex (MPFC) showed greater activation when participants evaluated social as opposed to non-social information. There was no further increase in social brain activation when participants compared themselves to their friend as opposed to when they rated either themselves or their friend separately. The only developmental change observed was that of greater activation in the right anterior insula in adolescents compared to adults during the comparison of non-social information (as opposed to social). This study demonstrates parallel recruitment of the social brain and the executive function network during the manipulation of social information, with similar activation patterns observed in adolescents and adults.

B - 15
PRELIMINARY MATERIALS TOWARD A LIBRARY OF AFFECTIVE FILMS: STANDARDIZATION AND PSYCHOPHYSIOLOGICAL VALIDATION

Lauren A J Kirby - Department of Psychology, Auburn University; John H Gray - Department of Psychology, Auburn University; Jessica R Bloom - Department of Psychology, Auburn University; Julio A Yanes - Department of Psychology, Auburn University; Jennifer L Robinson - Department of Psychology, Auburn University

Films elicit strong physiological as well as psychological effects. Many extant film emotion elicitation stimulus sets vary across factors such as inclusion of audio, dialogue, valence, and simulation, while others have failed to control for variables not unique to the medium of film such as fame or musical score. The current study seeks to develop a new film stimulus set for elicitation across the spectrum of emotional valence and arousal and provide psychophysiological validation of the films. Participants watched a series of 16 film clips under two minutes long from commercially available yet relatively unknown films. We collected near-continuous dynamic valence and arousal data throughout the duration of the films alongside six physiological measures: electrodermal activity (EDA), electrocardiography (ECG) (for heart rate variability measurements), non-invasive cardiac output (NICO), respiration (for accurate respiratory sinus arrhythmia analyses), and two channels of facial electromyography (EMG) data. Self-report ratings revealed two films to be effectively neutral conditions and 14 of the segments were significantly more affective than no arousal and neutral valance. Psychophysiological measurements have characterized the sympathetic and parasympathetic activity associated with viewing each film and are expected to track self-report changes throughout the films. We plan to publish the film clips in an open-source format alongside the dynamic self-report and psychophysiological data to provide a uniquely validated film-based emotion elicitation stimulus set.

B - 16
FACING MIXED EMOTIONS: ANALYTIC AND HOLISTIC PERCEPTION OF FACIAL EMOTION EXPRESSIONS ENGAGES SEPARATE BRAIN NETWORKS

Emilie Meaux - (1) Laboratory for Behavioral Neurology and Imaging of Cognition, Department of Neuroscience (2) Swiss Center for Affective Sciences, University of Geneva, Switzerland; Patrik Vuilleumier - (1) Laboratory for Behavioral Neurology and Imaging of Cognition, Department of Neuroscience (2) Department of Clinical Neurology, University Hospital of Geneva, Switzerland.

The ability to decode facial emotions is of primary importance for human social interactions; yet, it is still debated how we analyze faces to determine their expression. Here we compared the processing of emotional face expressions through holistic integration and/or local analysis of visual features, and determined which brain systems mediate these distinct processes.

Behavioral, physiological, and brain responses to happy and angry faces were assessed by presenting congruent global configurations of expressions (e.g., happy top + happy bottom), incongruent composite configurations (e.g., angry top + happy bottom), and isolated features (e.g. happy top only). Twenty-six healthy volunteers were scanned using fMRI while they classified the expression in either the top or the bottom face part but ignored information in the other non-target part.

Results indicate that the recognition of happy and anger expressions is neither strictly holistic nor analytic. Dissociable neural pathways subserve feature-based analysis, their combination in a whole-face configuration, and holistic representation of facial expressions of emotion. In particular, regions within the face processing network differed in their sensitivity to holistic expression information, which predominantly engaged fusiform and inferior occipital areas, whereas more local visual analytic information processing preferentially engaged STS and prefrontal areas (IFG/OFC) in the context of full face configurations (i.e. grouping process), but early visual areas and pulvinar when seen in isolated parts. Collectively, these findings suggest that facial emotion processes engage separate, but interactive routes within the face processing networks, whose engagement may be shaped by reciprocal interactions and modulated by task demands.

B - 17
REMINISCING ABOUT POSITIVE MEMORIES DAMPENS ACUTE STRESS RESPONSES AND ENGAGES REGIONS ASSOCIATED WITH EMOTION REGULATION

Megan E. Speer - Rutgers University, Newark NJ, USA; Heena Manglani - Rutgers University, Newark NJ, USA; Eunbin S. Kim - Rutgers University, Newark NJ, USA; Mauricio R. Delgado - Rutgers University, Newark NJ, USA

Recalling happy memories elicits positive feelings and enhances an individual's wellbeing. Thus, one potential adaptive function may be the ability to cope with stressors in daily life. In two studies (Behavioral=134; fMRI=43), we explored whether recalling autobiographical memories that have a positive content – i.e., remembering the good times – can dampen the hypothalamic-pituitary-adrenal (HPA) axis stress response, such as reducing cortisol levels. Healthy participants first underwent an acute stressor (i.e., socially evaluative cold pressor task) or a control task. Afterwards, they were asked to retrieve memories of only positive valence (e.g., Family Vacation) or only neutral valence (e.g., Packing for a trip) and then make subjective emotion ratings. To measure changes in stress responses, we collected salivary cortisol at baseline (before stress/control task), peak (after recalling memories, 20min), and recovery (50min). Across both studies, recalling positive memories under stress – but not neutral memories –

resulted in a dampened cortisol rise and reduced negative affect, resembling the nonstressed control groups. Recalling positive memories also served to enhance mood despite stress exposure, but only for individuals with greater resilience. In the fMRI study, a parametric modulation of emotion ratings during memory recall contrasting Stress-Positive > Stress-Neutral individuals revealed greater activity in regions previously implicated in emotion regulation (VLPFC and DLPFC). Further, greater VLPFC-DLPFC connectivity as a function of positive emotion was associated with lower cortisol responses in Stress-Positive individuals. Together, these findings highlight the restorative and protective function of self-generated positive emotions via memory recall in the face of stress.

B - 18
DIFFERENTIAL BEHAVIORAL AND MOLECULAR EFFECTS OF POSTNATAL AND JUVENILE FLUOXETINE TREATMENT

Parul Chachra - Tata Institute of Fundamental Research; Ambalika Sarkar - Tata Institute of Fundamental Research; Megha Maheshwari - Tata Institute of Fundamental Research; Vivek Singh - Tata Institute of Fundamental Research; A. Vaidya Vidita - Tata Institute of Fundamental Research

Serotonin neurotransmission in the early-life temporal windows is critical for the development of emotionality. Genetic and pharmacological studies have implicated the serotonergic system in regulating critical period plasticity, gene expression and neuronal patterning, thus leading to persistent consequences on behavior. Fluoxetine (Prozac), a selective serotonin reuptake inhibitor (SSRI), is the drug of choice for gestational/postpartum depression and children/adolescents with mood disorders, given its perceived favourable risk to benefit ratio. However, preclinical and clinical studies have raised concerns about early fluoxetine exposure and its long-term consequences. In our study, we examined the effects of fluoxetine during the postnatal and juvenile window periods on mood related behavior and the underlying molecular mechanisms within the medial prefrontal cortex (mPFC), a key limbic region responsible for top down control over several subcortical structures implicated in regulation of emotional behavior. Our findings reveal that postnatal fluoxetine (PNFlx) treatment in rats from postnatal day 2-21 has long-term anxiogenic and prodepressive-like effects, while juvenile fluoxetine (JFlx) treatment from postnatal day 28-48 causes long-lasting anxiolytic and antidepressant-like effects. These treatments vary from adult fluoxetine treatment, which shows transient decreases in anxiety and depression-like behavior. We find that PNFlx and JFlx treatment-evoked transcriptomes in the mPFC show minimal overlap. Experiments are underway to characterize the mechanism of molecular changes in detail.

Our results suggest that early-life fluoxetine treatments might have varied clinical implications contingent on the temporal windows, evoking distinct behavior and molecular changes.

B - 19
CHILDHOOD AS A SENSITIVE PERIOD FOR HUMAN MEDIAL PREFRONTAL CORTEX LEARNING

Laurel Gabard-Durnam - Columbia University; Nim Tottenham - Columbia University

The medial prefrontal cortex (mPFC) is critical to the regulation of affective stimuli, but the timing and mechanisms of the human functional ontogeny of this region remain largely uncharacterized. Evidence in the rodent suggests that there is a sensitive period before puberty, when complex stimuli (e.g., music) can be encoded by the mPFC that have anxiolytic effects in adulthood. The present study aimed to examine whether a homologous sensitive period for mPFC learning occurs during human childhood. Pop music was used as the environmental signal with temporally discrete developmental exposure. Two groups of adults, those raised in the USA with varying exposure to pop during childhood, and adult immigrants to the USA (no exposure to USA pop during childhood), were given a music preference test with childhood and adolescence music and a modified Trier stress test. After the stressor, only the childhood-exposed group preferred listening to the childhood music, which was accompanied by reduced reported anxiety and lowered arousal as measured by galvanic skin responses. The immigrant group did not exhibit any anxiolytic effects for either song category. Functional resonance magnetic imaging revealed greater mPFC activation to childhood music relative to the adolescent music for the childhood-exposed group compared to the immigrant group, and this mPFC activity was predictive of lower anxiety ratings following childhood songs for the exposed group. These behavioral, physiological, and fMRI results suggest that a human sensitive period may occur during childhood for mPFC learning with important implications for emotion regulation in adulthood.

B - 20
EXPLORING THE RELATIONSHIP BETWEEN DEPRESSION, MOTIVATION AND PERCEPTION OF REWARDING OUTCOMES IN TRAUMATIC BRAIN INJURY

Angela Spirou - Kessler Foundation; Ekaterina Dobryakova - Kessler Foundation

Individuals with traumatic brain injury (TBI) have been shown to suffer from depression. Feedback processing deficits have been shown to be associated with depression, since both constructs rely on the fronto-striatal network. In this study, we examined depressive symptomology, motivational tendencies and striatal activation during wins and losses in individuals with TBI.Participants (TBI and healthy controls (HC)) completed a gambling task in an MRI scanner. Depressive symptomology was assessed with the Chicago Multiscale Depression Inventory (CMDI). Motivational tendencies were assessed with the Behavioral Inhibition/Behavioral Activation (BIS/BAS) scale. Significant between-group differences in BAS (p=.016) and CMDI's subscales (Mood: p=.008; Evaluative: p=0.36; Vegetative: p=.006) were observed, with a marginal difference between groups for BIS (p=.08). Using an independent ROI, a negative correlation was found in the TBI group between the BIS subscale and the striatal activation during wins, bilaterally (right: r=-8.52, p=.004; left: r=-.641, p=.063). A strong positive correlation in the TBI group was found between the BAS Fun Seeking subscale and the activation of the right striatum during wins (r=.658, p=.054). A strong negative correlation was found for the HC group between both the BAS subscale and the activation of the right striatum during losses (r=-.755, p=.019), and the CMDI Vegetative subscale and the activation of the left striatum during wins (r=-.769, p=.015). No demographic between-group differences were detected. The current study replicates previous evidence in HC, as well as provides pioneering evidence on the existence of the association between striatal engagement in depressive symptomology and motivation in individuals with TBI.

B - 21
SOCIAL NETWORK DYNAMICS SHAPE NEURAL SENSITIVITY TO VICARIOUS REWARD

Ryan W. Carlson - Stanford University; Sylvia A. Morelli - University of Illinois - Chicago; Monica Kullar - Stanford University; Jamil Zaki - Stanford University

Humans are a profoundly social species. Our social nature is evident from the vast and complex social networks we form with others. Thus studying individuals with respect to their greater social networks could offer valuable insights into why individuals empathize with and help some network members, but not others. Here, we investigate how social network dynamics shape our experience of vicarious reward – the pleasure we derive from observing positive outcomes for others (Morelli et al., 2015). In particular, within two real-life social networks, we explored how individual-, dyadic-, and network-level factors could potentially shape one's neural sensitivity to vicarious reward. Freshman (N=52) spanning two dorms at Stanford University underwent fMRI scanning while winning money for members of their social network during a card-guessing game. To identify modulators of neural sensitivity to vicarious reward, participants provided a series of ratings about each social network member and their relationship to them (e.g., perceived empathy, closeness). Results confirmed that winning for other network members activated brain structures implicated in vicarious reward, including the ventral striatum and ventromedial prefrontal cortex. Further analyses revealed how individuals' neural sensitivity to vicarious reward varied with respect to their personal ratings of a network member and how the network as a whole perceived this person. This work offers important new insights about the roots of human prosociality, and how vicarious reward experiences vary within our dynamic social world.

B - 22
THE NON-LINEAR PROCESSING OF FACIAL EXPRESSIONS OF EMOTION: BEHAVIORAL AND ERP EVIDENCE

Tiago O Paiva - Laboratory of Neuropsychophysiology, Faculty of Psychology and Educational Sciences of the University of Porto; Pedro R Almeida - Faculty of Law of the University of Porto; Fernando Ferreira-Santos - Laboratory of Neuropsychophysiology, Faculty of Psychology and Educational Sciences of the University of Porto; João Marques-Teixeira - Laboratory of Neuropsychophysiology, Faculty of Psychology and Educational Sciences of the University of Porto; Fernando Barbosa - Laboratory of Neuropsychophysiology, Faculty of Psychology and Educational Sciences of the University of Porto

The processing of facial expressions of emotion has been extensively studied. However the mechanisms underlying the processing of dynamic transitions between different emotional expressions are not fully understood. Recent studies based on non-linear approaches to emotional processing are reporting "perceptive jumps" when continua of morphed expressions are presented. In this study we explored the non-linear properties of facial expressions of emotion processing and examine its EEG correlates.
Participants (N=55) were exposed to an EEG/ERP experiment where averaged facial expressions of fear, happiness, sadness and anger were morphed into 6 continua with eleven frames that changed linearly between prototypical expressions of emotion (e.g. from fear to sadness). Each continuum was presented in random order, or from one prototypical expression to the other. Participants performed a forced-choice task, in which they were instructed to

classify the facial expression in each frame as one of the prototypical emotions within the continuum. ERPs to the presentation of each frame were extracted in order to analyze the N170 and the attentional LPP components.

The behavioral results evidenced a remanence effect where the response to the first prototypical expression of emotion in non-random continua remained beyond the middle of the continuum. At the cortical level, the amplitudes of the N170 and LPP components to the behavioral transition frames differ when considering the stimuli presentation order (e.g. Fear-Sadness and Sadness-Fear).

These results support the idea that the processing of continuously changing facial expressions of emotion is made within the frame of non-linear dynamic systems theory.

B - 23
AGE DIFFERENCES IN JUDGMENTS OF ATTRACTIVENESS, LIKEABILITY, AND TRUSTWORTHINESS OF FACES

Diana Sanchez Cortes - Department of Psychology, Stockholm University, Stockholm, Sweden; Petri Laukka - Department of Psychology, Stockholm University, Stockholm, Sweden; Håkan Fischer - Department of Psychology, Stockholm University, Stockholm, Sweden

People constantly evaluate faces to obtain social information. However, the link between aging and social evaluation of faces is not well understood. Todorov and colleagues introduced a data-driven model defined by valence and dominance as the two main components underlying social judgments of faces. They also created a stimulus set consisting of computer-generated faces which systematically vary along various social dimensions (e.g., Todorov et al., 2013, Emotion, 13, 724-38). We utilized a selection of these facial stimuli to investigate age-related differences in judgments of the following dimensions: attractiveness, competence, dominance, extraversion, likeability, threat, and trustworthiness. Participants rated how well the faces represented the intended social dimensions on 9-point scales ranging from not at all to extremely well. Results from 71 younger (YA; mean age = 23.42 years) and 60 older adults (OA; mean age = 69.19 years) showed that OA evaluated untrustworthy faces as more trustworthy, dislikeable faces as more likeable, and unattractive faces as more attractive compared to YA. OA also evaluated attractive faces as more attractive compared to YA, whereas YA did rate likeable and trustworthy faces as more likeable and trustworthy than did OA. In summary, our findings showed that OA evaluated negative social features less negatively compared to YA. This suggests that older and younger persons may use different cues for social evaluation of faces, and is in line with prior research suggesting age-related decline in the ability to recognize negative emotion expressions.

B - 24
RESTING-STATE FUNCTIONAL CONNECTIVITY IN HUMAN REACTIVE AGGRESSION

Gabriela Gan - Icahn School of Medicine at Mount Sinai

Intermittent-explosive disorder (IED) is characterized by reactive aggression, low self-control, and elevated stress reactivity. Previously, we reported that aggressive individuals exhibit altered resting glucose metabolism in the default-mode network (DMN), measured with FDG-PET. Here, we investigated the effects of reactive aggression on DMN resting-state functional connectivity (rsFC) using seed-based fMRI and graph theory analyses.

Twenty-four male participants (n=12, reactive aggressive [RA, including 4/8 subclinical/full IED]; n=12, matched low aggressive controls) underwent resting-state fMRI, and completed the Multidimensional Personality Questionnaire. We investigated group differences in seed-based rsFC of the precuneus, a central DMN node, and in whole-brain connectivity to assess clustering coefficient, a measure of local connectivity between neighboring nodes. Connectivity-personality trait correlations were also explored.

Relative to controls, RA individuals reported elevated stress reactivity (p<.001) and low self-control (p<.05). For the precuneus seed, controls but not RA individuals exhibited conventional negative connectivity with 'task-positive' regions, which are linked to task performance (pcluster-corrected<.05, -68 voxels). Graph theory analyses revealed decreased clustering coefficient in sensorimotor network nodes (pre-motor, mid-cingulate, paracentral lobule, precuneus) for RA individuals vs. controls (pFDR-corrected<.05). Aberrant rsFC for both measures was correlated with increased stress reactivity across participants (p<.01), a result reflected by group differences.

Our findings suggest that heightened stress reactivity and low self-control in RA individuals, vulnerability factors for over-reaction to salient events (e.g., provocation), may be linked to impaired inhibition of task-positive regions at rest, and to disrupted local connectivity in the sensorimotor network, a crucial system for the control and monitoring of motoric responses.

B - 25
UNAVAILABILITY AS AN AFFECT REGULATION STRATEGY

Laura Martin Braunstein - Columbia University, New York, USA; Michael Grosz - Columbia University, New York, USA; Esther Kim - Columbia University, New York, USA; Melanie Silverman - Columbia University, New York, USA; Jon Morgenstern - The North Shore Long Island Jewish Health System, Great Neck, USA; Kevin N Ochsner - Columbia University, New York, USA

Everyday, we encounter cues signaling the opportunity to enjoy rewards like delicious, unhealthy foods. When our goal is to not indulge, we must find ways to control our craving. Although we know a great deal about explicit affect regulation strategies such as reappraisal, little is known about less explicit strategies like stimulus availability (i.e., is the food present and accessible). To understand whether and how stimulus unavailability regulates craving, we conducted two experiments. In the first, we examined the effect of unavailability on craving for unhealthy foods and compared unavailability to reappraisal within-subjects. Prior to the task, participants were shown the available foods, and during the task, a colored border reminded them which foods were available. Participants rated craving for available and unavailable foods, while engaging in distancing reappraisal or responding naturally. We predicted that unavailability and reappraisal would reduce craving. The results confirmed this prediction and critically, showed that unavailability-related decreases were not correlated with reappraisal-related decreases, suggesting they involve different mechanisms. The second experiment further probed the mechanism of unavailability by examining it under cognitive load. We posit that the effect of unavailability does not depend on active manipulation of information; therefore, we predicted unavailability would be associated with lower craving, regardless of load. The results were consistent with this prediction. Taken together, these findings suggest that unavailability dampens craving without relying on active cognitive processes that engage dlpfc and instead may involve integration of contextual information supported by the vmpfc. Future neuroimaging work will test this hypothesis.

B - 26
POSITIVE EMOTIONS ELICIT UNIQUE NEURAL MECHANISMS DURING MODULATION OF PAIN

Jennifer Kornelsen - University of Manitoba, Winnipeg, Canada; Theresa A. McIver - Queen's University, Kingston, Canada; Patrick W. Stroman - Queen's University, Kingston, Canada

Studies have shown an amplification of pain perception when a nociceptive stimulus is combined with negative emotion-evoking stimuli. Conversely, combining the same painful stimulus with positive emotion-evoking stimuli results in reduced pain perception. The neural mechanisms underlying the emotional modulation of pain are unclear. The investigation of this phenomenon using functional magnetic resonance imaging is a growing body of research that shows promise in revealing these neural mechanisms. The current research studied the neuronal response to an acute pain stimulation combined with negative, neutral, and positive emotion-evoking stimuli. Consistent differences in the brain's activity during the positive emotion-evoking condition as compared to both the negative and neutral conditions were found. During positive emotional manipulation, significant increases occurred in the limbic cortex (bilateral parahippocampal gyrus Brodmann Area (BA) 36) and in multiple secondary somatosensory cortex regions (inferior parietal lobule BA40, superior parietal lobule/precuneus BA7, and postcentral gyrus BA5). Given the consistent activation of these brain regions during the positive emotion condition alone, and in contrast with negative and neutral emotion manipulations, this work suggests that a different neural mechanism underlies emotional pain modulation for positive emotions. This work has implications for basic affective neuroscience and pain research, and clinically for pain treatment and intervention.

B - 27
PERCEIVED UNTRUSTWORTHINESS OF A FACE GOES BEYOND ITS RACE WHEN IT COMES TO EMPATHIZING WITH OTHERS' PAIN

Federica Meconi - University of Padova; Paola Sessa - University of Padova

As it might be expected, neural empathic responses can be shaped by the affective/social relationship between the observer and the suffering person. Previous studies have shown that neural responses to others' pain can be modulated also by the very first impression derived from other's physical facial features, such as the race and the perceived trustworthiness of a face. Similarly to the race of a face, previous studies have shown that perceived trustworthiness is implicitly processed even when task-irrelevant. In the present study, we were interested in understanding the impact of both dimensions, race and perceived trustworthiness, when concurrently present in shaping empathy. By means of event-related potentials technique, we monitored the neural empathic responses associated with the pain of own- and other-race faces perceived as trustworthy or untrustworthy. We observed P3 empathic reactions towards individuals looking trustworthy regardless of the race whereas the reactions towards individuals looking untrustworthy were reduced to nil. Moreover, differential P3 empathic reaction to own- and other-race trustworthy faces were associated with individual scores of implicit racial prejudice such that higher prejudiced

participants showed higher P3 empathic reactions to own- when compared to other-race individuals' pain. Taken together this pattern of results suggest that when an observer is exposed to a face of an individual in pain, perceived (un)trustworthiness is such a relevant dimension that goes beyond its race.

B - 28
NEURAL CORRELATES OF SOCIAL WELL-BEING DURING RESTING STATE: AMPLITUDE OF SPONTANEOUS LOW FREQUENCY flUCTUATIONS PREDICTS SOCIAL WELL-BEING

Kong Feng - Bejing normal university

Social well-being represents primarily public phenomena, and reflects individuals' assessments of their circumstance and functioning in society. However, little is known about the precise neural basis of this construct, especially how it is maintained in the resting state. Here we explored the neural correlates of social well-being by correlating the regional fractional amplitude of low frequency fluctuations (fALFF) with the scores of social well-being of healthy individuals. We found that the fALFF in the bilateral posterior superior temporal gyrus (pSTG), right anterior cingulate cortex (ACC), right thalamus and right insula positively predicted individual differences in social well-being. Furthermore, we demonstrated the different role of three pursuits of human well-being (i.e., pleasure, meaning and engagement) in these associations. Specifically, the pursuits of meaning and engagement, not pleasure mediated the effect of the fALFF in right pSTG on social well-being, whereas the pursuit of engagement mediated the effect of the fALFF in right thalamus on social well-being. Taken together, we provide the first evidence that spontaneous brain activity in multiple regions related to self-regulatory and social-cognitive processes contributes to social well-being, suggesting that the spontaneous activity of the human brain reflect the efficiency of social well-being.

B - 29
CHOOSING TO REGULATE: AUTONOMY ALTERS NEURAL RESPONSES DURING CRAVING REGULATION

Danielle Cosme - University of Oregon; Arian Mobasser - University of Oregon; Elliot T. Berkman - University of Oregon; Jennifer H. Pfeifer - University of Oregon

Learning to resist appetitive temptations (e.g., food craving) is a vital aspect of healthy development. Self-regulation is often studied using cued paradigms in which participants are instructed to self-regulate. Despite the strong theoretical prediction that autonomous choice will enhance self-regulation, little is known empirically about whether and how self-regulation is different when participants choose to exert control. Autonomous self-regulation may be particularly important during periods of life when regulatory scaffolding is reduced, such as during the transition to college. To investigate the role of autonomy in self-regulation during this period, we conducted an fMRI study in which incoming freshman (N = 31) performed a craving reappraisal task. The task structure was a 2 x 2 within-subjects factorial design with Instruction (look or reappraise) and Autonomy (low or high) as factors. During the look condition, participants actively viewed images of personally desired foods, whereas during the reappraise condition, they reappraised their desire for the foods by thinking about the negative health consequences of consumption. For low autonomy trials, participants were told whether to look or reappraise, whereas for high autonomy trials, participants freely chose whether to look or reappraise. Preliminary results replicated previous findings, with robust activity in the left frontoparietal network for the main effect of reappraisal > look (e.g., dmPFC, dlPFC, IFG, IPL). Interestingly, contrasting high > low autonomy reappraisal yielded additional activity in the right dmPFC, dlPFC, and IPL. These results suggest that autonomous self-regulation is associated with increased regulatory activity in regions associated with emotion regulation.

B - 30
DEFAULT MODE NETWORK NEURAL CORRELATES OF TRAIT MINDFULNESS: AN FMRI STUDY

Elena M. Bilevicius - University of Manitoba, Winnipeg, Canada; Stephen D. Smith - University of Winnipeg, Winnipeg, Canada; Jennifer Kornelsen - University of Manitoba, Winnipeg, Canada

Mindfulness can be defined as purposeful attention to moment-to-moment experiences with an accepting and nonjudgmental stance. Research has shown that being mindful can improve psychological well-being as well as produce anatomical and physiological changes. Many neuroimaging investigations of mindfulness have looked at structural and task-based functional changes that accompany mindfulness. Additionally, most studies have compared experienced meditators and non-meditators; relatively few studies have examined the neural substrates associated with trait mindfulness. In the current experiment, we examined whether differences in trait mindfulness were related to functional connectivity in one of the brain's resting state networks, the default mode network (DMN). Thirty-two undergraduate students completed the Mindfulness Awareness and Attention Scale (MAAS) before undergoing a 7-minute resting state fMRI scan. An independent components analysis was conducted to identify and create maps of

the DMN. Participants' scores on the MAAS were entered as variables in order to determine how mindfulness influenced functional connectivity within the brain's DMN. The results demonstrated that individuals with high trait mindfulness had greater functional connectivity in the anterior and posterior cingulate cortex and less functional connectivity in the precuneus compared to individuals with low-trait mindfulness. This connectivity is consistent with previous structural neuroimaging studies showing increased white-matter density in the anterior cingulate region occurring after mindfulness training. Our findings, therefore, suggest that there is consistency between the structural and functional neural bases of mindfulness.

B - 31
FLEXIBLE BEHAVIORAL AND NEURAL RESPONSES TO A SOCIAL INTERACTION: A COMPARISON OF CHINESE AND CANADIAN COHORTS

Daina Crafa - McGill University, Montreal, Canada; Caitlin Stoddart - McGill University, Montreal, Canada; Veronica He - McGill University, Montreal, Canada; Angela Shen - McGill University, Montreal, Canada; Gan Zhen Liang - College Jean-de-Brebeuf, Montreal, Canada; Mathieu, B. Brodeur - McGill University, Montreal, Canada

Background: Social interaction requires flexible behavioral and brain responses in order to adapt to continuously changing situations. Previous studies have demonstrated that exposure to different social values via self-construal priming modulates empathy and ERP responses, which also varied as a function of cultural background. However, it remains unclear whether findings from these priming studies reflect real-world social interactions. Our study investigated changes in reported empathy and corresponding brain responses after interacting with someone who expresses opposite social values. We also investigated whether participants' own self-construals changed after these social interactions. Methods: Chinese- and Canadian-born participants rated how much they empathized with emotional faces while attached to an EEG. They then interacted with someone who expressed opposite social values from their own before rating their empathy for each face a second time. A separate cohort of participants completed this study without participating in a social interaction to control for repetition effects. Results: Early ERPs associated with processing facial emotions and social contexts emerged after priming for both cultural groups; however, amplitudes varied by cultural group. Empathy also varied as a function of culture. A majority of participants reported holding more values associated with their interlocutor's self-construal after the social interaction. Discussion: These findings identify signatures of flexibility after a social interaction, and demonstrate the influence of cultural identity in shaping neural and behavioral responses. They also suggest a possible disconnect between empathy and perspective-taking processes. Implications for cultural learning will be discussed.

B - 32
SEX DIFFERENCES IN SOCIAL PERCEPTION: NEURAL SUBSTRATES AND INTERACTIONS WITH EMOTIONAL REACTIVITY

Katie Lancaster - University of Virginia; Jessica J Connelly - University of Virginia; James P Morris - University of Virginia

The Reading the Mind in the Eyes Test (RMET) is a commonly used task to identify social perceptual deficits, and involves deducing a target's emotional state from a photo of their eye region. Women tend to perform better than men on this task, but the mechanisms contributing to this sex difference are poorly understood. Given that the task necessitates cogitating about emotional states, a potential mediating factor may be differences in the experience of emotion. In a sample of 79 participants (40 male), we observed that women outperformed men on the RMET, and also reported greater emotional reactivity (ER). Further, there was an interaction between sex and ER on RMET, such that women's ER scores were unrelated to RMET, while men's ER scores were strongly positively correlated with RMET performance, demonstrating that men with higher ER perform better on this task. In line with predictions, ER mediates the sex difference in RMET performance. At the neural level, we find evidence for sexually dimorphic functional associations in an aversive-faces fMRI paradigm. Interactions between sex and RMET performance & sex and ER overlap within a cluster spanning left insula, putamen, and amygdala, and demonstrate the same pattern of results: Men with higher ER and RMET have greater BOLD response in this region, while women with higher ER and RMET have less BOLD response. These results suggest that sex differences in an emotionally-laden social perceptual task are associated with complex interactions of emotional reactivity and activity in brain regions involved in processing emotion.

B - 33
THE AFTERMATH OF INTERGROUP THREAT: FRONTAL ALPHA ASYMMETRY IN RESPONSE TO SEXISM

Zachary W. Petzel - University of Missouri - St. Louis; Melinda Siebert - University of Missouri - St. Louis; Bettina J. Casad - University of Missouri - St. Louis
Research finds that resting frontal alpha asymmetry reflects approach-avoidance motivation. Greater left hemisphere activation indicates approach whereas greater right activation indicates avoidance. These motivational states have been examined in studies of depression, social anxiety, and self-regulation of prejudice, but not in intergroup contexts. We examined approach-avoidance motivation after intergroup threat among women in science, technology, engineering, and math (STEM). Participants were 24 Caucasian undergraduate students majoring in STEM. Participants completed a science task in which they worked together to solve a problem. The group comprised of one female and one male participant and two male confederates. In the threat condition, one of the confederates made a sexist comment to the female during the task. In the control condition, no sexist comment was made. Hemispheric asymmetry was computed after the task by subtracting left alpha power from right alpha power (F4-F3) such that positive values represented higher left activation and negative values indicated higher right activation. An independent-samples t-test showed a significant difference in frontal alpha asymmetry between conditions among females, $t(12) = 2.48$, $p = .029$. Those in the threat condition showed significant right over left activation ($M = -.111$, $SD = .218$, $n = 8$) indicating avoidance, compared to controls who displayed greater left over right activation ($M = .227$, $SD = .294$, $n = 6$), indicating approach. There were no differences among male participants. Results suggest that negative intergroup interactions may lead to avoidance motivational states among women. This has implications for women's experiences in male-dominated educational environments.

B - 34

FUNCTIONAL CONNECTIVITY DURING MEMORY RETRIEVAL CORRELATES WITH SELF-DISTANCING SUCCESS IN PATIENTS WITH MAJOR DEPRESSIVE DISORDER

Chelsea Boccagno - Columbia University; Bruce Dore - Columbia University; Damaris Fuster - New York State Psychiatric Institute; Tanya Singh - New York State Psychiatric Institute; Jochen Weber - Columbia University; Barbara Stanley - New York State Psychiatric Institute; Maria Oquendo - New York State Psychiatric Institute; Jeffrey Miller - New York State Psychiatric Institute; John Mann - New York State Psychiatric Institute; Kevin Ochsner - Columbia University
Disturbances in autobiographical memory reflection have been linked to the onset and maintenance of major depressive disorder (MDD). Specifically, individuals suffering from MDD often ruminate about their upsetting autobiographical memories, and consequently experience heightened negative affect. Recent research indicates that self-distancing—or viewing one's experience as a third-person observer—can buffer against the emotional impact of negative autobiographical memories in individuals suffering from MDD (Kross, Gard, Deldin, Clifton, & Ayduk, 2012). Though this line of work has begun to identify the brain regions associated with self-distancing, little is known about how the brain regions involved in initially bringing a memory to mind might relate to one's ability to use self-distancing successfully. Accordingly, the present study sought to identify whether and how memory retrieval relates to self-distancing success in patients suffering from MDD. While undergoing an fMRI scan, 12 patients with MDD recalled eight upsetting autobiographical memories. Following memory recall, patients were asked to view the memory from a self-distanced perspective. Consistent with previous memory research, analyses showed that memory retrieval was associated with functional connectivity between the hippocampus and inferior frontal gyrus. Furthermore, increased connectivity between these regions correlated with increased self-distancing success. These results suggest that functional connectivity during memory retrieval can impact one's ability to engage in self-distancing, and more generally provide preliminary support for the notion that memory retrieval impacts the ability to adopt a certain perspective while reflecting on the memory.

B - 35

MISUNDERSTANDING BREEDS VIGILANCE: THE IMPACT OF FELT MISUNDERSTANDING ON SELF-REGULATION AND THE NEUROPHYSIOLOGICAL RESPONSE TO ERRORS

Brandon W. Ng - University of Virginia; George A. Knaysi - University of Virginia; James P. Morris - University of Virginia; Shigehiro Oishi - University of Virginia
Felt misunderstanding, the feeling that one has been misperceived or invalidated by others, is stressful and has been shown to engender an array of negative physical and psychological states, such as adverse health (stomach aches, self-reported illnesses), impaired motivation, and generally causing one to perceive the world as unsupportive and difficult to navigate. Prior work on the social regulation of emotion and economy of action has demonstrated that social support is essential from a resource allocation perspective—having other people as resources to support oneself in times of need requires less use of one's own cognitive resources, thus allowing for resource conservation.

Conversely, feeling that one is misunderstood and construing the world as unpredictable should heightened anxiety and vigilance. The present study investigated the effect of felt misunderstanding per se on self-control and performance monitoring. Participants were randomly assigned to either an understanding or a misunderstanding experimental condition and subsequently engaged in a short conversation with an interaction partner (who was really a confederate), and received either real or false feedback about how they were perceived. They then completed a Go/No-Go Task to assess self-control, while EEG was recorded. Results showed that misunderstood participants demonstrated potentiated amplitudes of the error-related negativity (ERN), relative to understood participants, demonstrating more vigilant performance monitoring.

B - 36
WHEN STICKS HURT MORE THAN STONES: HEIGHTENED NEURAL RESPONSE TO UNPREDICTABLE NEGATIVE FEEDBACK IN SOCIALLY ANXIOUS ADOLESCENTS

Johanna M Jarcho - Stony Brook University; Ashley, R Smith - NIMH; B Rappaport - NIMH; Daniel S Pine - NIMH; Eric E Nelson – NIMH

Social anxiety (SA) increases during adolescence, when the salience of peer rejection peaks. Isolating neural circuits engaged by symptom-eliciting contexts may elucidate the pathophysiology of SA. Yet, unpredictable social situations, known to elicit SA symptoms, are poorly modeled by existing fMRI paradigms. We developed a novel paradigm that uses a virtual school setting to determine whether dysregulated neural response in SA-vs-healthy adolescents varies during predictable and unpredictable social interactions. Healthy (n=18) and SAD (n=14) adolescents (12.52±2.97 years) were told they would visit a Virtual School and interact with purported "Other Students." Before completing the fMRI paradigm, participants learned each student had a reputation for being 'nice,' 'unpredictable,' or 'mean.' While scanning, participants entered classrooms with the Other Students and were cued to anticipate social evaluation when "Typing..." appeared above one of them. Unpredictable peers provided 50% positive and negative feedback, while Nice and Mean peers respectively provided 100% positive or negative feedback. Participants learned Other Student reputations and believed they interacted with real peers. Group differences in brain activity emerged during negative feedback from Unpredictable, relative to predictably Mean peers. Specifically, SA-vs-healthy adolescents exhibited heightened activity in anterior cingulate cortex (-11,23,25; ke>700), insula (26,26,11; ke>25), striatum (26,14,5; ke>140), and dorsolateral prefrontal cortex (46,13,21; ke>50; p's<.005). SAD-vs-healthy adolescents have heightened engagement in brain regions implicated in social pain, distress, and salience during negative feedback, but only from unpredictable peers. These preliminary data demonstrate that peer-related uncertainty may play a more central role in potentiating neural dysregulation in SA than rejection alone.

B - 37
MODULATION OF BRAIN ACTIVITY IN THE INFERIOR FRONTAL GYRUS DURING THE GENERATION OF MANUAL ACTIONS IN A SOCIAL CONTEXT

Lena M Schliephake - Max Planck Institute of Psychiatry, Munich, Germany; Marie-Luise Brandi - Max Planck Institute of Psychiatry, Munich, Germany; Leonhard Schilbach - Max Planck Institute of Psychiatry, Munich, Germany

Observing actions can elicit motor activations in a human observer that - were they executed - would generate actions similar to the observed ones. A prominent explanation for this phenomenon has been that such 'action mirroring' is generated by a bottom-up process of direct matching, which helps to integrate sensory input and motor output thereby helping to understand actions in terms of their underlying goals (Rizzolatti & Sinigaglia, 2010). An alternative account, however, suggests that motor activations during action perception are generated via top-down modulation of the so-called 'mirror neuron system' (MNS) by brain regions outside this system (Csibra, 2007). In order to evaluate this, we performed connectivity analyses of fMRI data from a study which had investigated the effect of a gaze-based social context on the neural correlates of action control (Schilbach et al., 2010). Of main interest in the connectivity analysis was the connection of inferior frontal gyrus (IFG), commonly associated with the MNS, and dorsomedial prefrontal cortex (dmPFC), thought to be part of the mentalizing network. The results of this analysis show that the activation-related interaction effect between social context and action control is based on altered coupling between both brain areas, depending on the experimental condition. Therefore, our study provides new insights into the modulation and interaction of the MNS during action control in a social context.

B - 38
INVESTIGATING THE TEMPORAL STRUCTURE OF SPONTANEOUS BRAIN ACTIVITY IN SCHIZOPHRENIA

Fumika Kondo - Royal Ottawa Mental Health Centre, University of Ottawa; Zirui Huang - Royal Ottawa Mental Health Centre; Georg Northoff - Royal Ottawa Mental Health Centre
Background:

Schizophrenia is one of the most unclear psychiatric disorders. Several studies investigated the blood-oxygen-level dependent (BOLD) signal of schizophrenia by analysing resting-state fMRI (e.g., Yang et al., 2014), but the results are inconsistent across studies and it is still unknown what kind of temporal structure schizophrenic BOLD signals have. A comparison between temporal structure of schizophrenic brains and that of healthy controls will contribute to better understandings of abnormality of schizophrenic brain.

Methods:

The current study involved 10 healthy subjects and 28 schizophrenic patients (9 females). Each subject's resting-state brain was scanned in Siemens 3T fMRI scanner. 156 scans with a TR of 2s per brain volume were acquired, resulting in 312s for the resting state run. The data preprocessing was conducted with AFNI. We firstly investigated the temporal variability of whole brain voxel-wise BOLD signal for common frequency (0.01-0.08Hz), the ratio of slow5/slow4, slow5 (0.01-0.027Hz), and slow4 (0.027-0.073Hz) respectively. We will then calculate power law exponent (PLE) to examine the temporal structure to see the pattern of the signal.

Results:

Schizophrenia subjects showed significantly less temporal variability than healthy controls for slow5/slow4 ratio and slow5-z in vmPFC (>30 voxels, p< .01), which is involved in Brodmann area 10. Additionally, schizophrenic brains showed higher functional connectivity with orbitofrontal cortex and PCC for slow 4.

Conclusions:

Our preliminary results suggest that schizophrenia has abnormal temporal variability in vmPFC and Brodmann area 10, suggesting abnormal self-awareness and emotion regulation. These results will be useful to improve diagnosis and therapy for schizophrenia.

B - 39

RESTING-STATE FUNCTIONAL CONNECTIVITY IN ADOLESCENTS WITH DEPRESSIVE SYMPTOMATOLOGY   *Ewelina Rzepa - University of Reading; Ciara McCabe - University of Reading*

Previous studies have shown that individuals with Major Depressive Disorder and those at increased familial risk for depression present abnormalities in their resting-state functional connectivity (RSFC) networks. This study investigated whether changes in RSFC networks would be observed in adolescents at high risk of depression by virtue of increased depression symptomatology.

35 adolescents took part in the study. 17 scoring high on the Mood and Feeling Questionnaire (MFQ) > 27 (High Risk, HR), and 18 adolescents scoring low on the MFQ < 15 (Low Risk, LR) matched for age (13-18 yrs.) and gender. We examined seed based RSFC with regions of interest in the amygdala, pregenual anterior cingulate cortex (pgACC) and dorsomedial prefrontal cortex (dmPFC).

Compared to LR, the HR adolescents had decreased RSFC between the right amygdala seed and the hippocampus and between the left amygdala seed and the precuneus and posterior cingulate and between the right DMPFC and precuneus- key nodes of the Default Mode Network. We also observed increased RSFC between the pgACC seed and the brain stem, orbitofrontal cortex and insula in the HR compared to LR group, parts of the brain involved in the Salience Network.

Our findings are the first to show that adolescents with depression symptoms have abnormalities in RSFC networks similar to clinically depressed adults and adolescents. As these brain regions are involved in the processing, integration and regulation of emotional information our results suggest that dysfunctional RSFC networks might be predictors of increased risk for depression.

B - 40

VISUAL SEARCH FOR EMOTIONAL FACES IS SERIAL, REGARDLESS OF PSYCHOPATHIC PERSONALITY TRAITS

Patrick L Carolan - Simon Fraser University, Burnaby, Canada; Megan Liau - Simon Fraser University, Burnaby, Canada; Mario Liotti - Simon Fraser University, Burnaby, Canada

Low-level "pop-out" features such as color, orientation, and size are rapidly detected during visual search. Early studies suggested that detection of emotional faces (an emergent property of low-level features) may also be rapid and thus indicative of automatic/preferential processing, but those results have been difficult to replicate. The current study tested automaticity of emotional face detection, and examined whether this effect is moderated by psychopathic personality. Undergraduate participants (n=77) identified emotional singleton faces (angry, fearful, or

happy) embedded within circular arrays of neutral-expression distractors as male or female. Across blocks, displays varied in the number of items (set size: 4, 6, 8, or 10). Repeated measures ANOVA indicated that median reaction time (RT) varied significantly across set sizes, $F_{(2,225)}=23.72$, and singleton emotions, $F_{(2,150)}=41.54$. Search slopes (i.e. RT increase per display item) calculated across set sizes suggested that search was serial rather than pop-out regardless of singleton emotional expression (all slopes exceeded 54ms/item). Subsequent repeated measures ANOVA on search slopes for angry, fearful, and happy expressions showed a significant effect of emotion type, with the smallest search slope for angry faces, $F_{(2,152)}=6.04$. Contrary to predictions, effects were not moderated by total or factor scores on the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005) when added as covariates in repeated measures ANCOVA. Correlations between the PPI-R and search slopes were non-significant, with small absolute values (all <|-.214|) suggesting that psychopathy has only a small influence, if any, on the pop-out status of emotional faces.

B - 41

NOT DEFICIENT, JUST DIFFERENT: INCREASED ACTIVATION OF SALIENCE NETWORKS FOR BULLIES WHEN VIEWING SOCIAL EXCLUSION

Michael T Perino - UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN; Joao F Guassi Moreira - UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN; Eva H Telzer - UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN

While rates of aggressive behavior tend to decrease as children age and gain greater emotional control, a small portion of the population continues to engage in high rates of delinquent, violent behavior through their adolescence and adulthood. One proposed mechanism explaining their elevated engagement in violence has been the presence of social information processing deficits; specifically, individuals who repetitively engage in violence may have muted recognition of the effects of harmful actions towards others. Using a modified cyberball paradigm, where subjects passively viewed social bullying and social inclusion, we tested whether a high-offending adolescent sample (n=24) would show increased or decreased neural activation in social salience networks (e.g. amygdala, ventral striatum, insula) when viewing others being bullied as a function of their own self-reported engagement in bullying behaviors. Contrary to a deficit account, we found that greater endorsement of bullying was significantly correlated with increased activation in the amygdala, ventral striatum, insula, and orbitofrontal cortex, neural networks associated with motivation, valuation, affective processing and salience monitoring. These findings support a growing body of evidence that aberrant social information processing, rather than deficient processing, is likely involved in habitual offending and that engaging in predatory social behavior may provide enhanced attention towards individuals who are victims of social exclusion and bullying.

B - 42

NEURAL RESPONSES TO FOOD PICTURES IN HEALTHY-WEIGHT AND OVERWEIGHT TEENAGERS

Susan Carnell - Johns Hopkins University School of Medicine; Leora Benson - Johns Hopkins University School of Medicine; Aparna Pisupati - Johns Hopkins University School of Medicine; Afroditi Papantoni - Johns Hopkins University

Child and adolescent obesity are prevalent and associated with poor health outcomes. Identifying neurobehavioral factors associated with excess weight could aid the development of novel interventions. As part of an ongoing study of familial obesity risk, 22 adolescents (14-19y, 13 healthy-weight, 9 obese/overweight) underwent fMRI scanning while viewing pictures of high energy-density (ED) foods, low-ED foods and non-foods, and rating their desire to eat/use each item, in fed and fasted conditions. Wanting scores were higher for foods vs. non-foods in both fasted and fed states (both p<.001), with higher food wanting scores in the fasted state (p<.01). Preliminary whole-brain analyses revealed that, in the fasted condition, all adolescents demonstrated robust occipital cortex responses to food vs. non-food stimuli, with some evidence for decreased IFG responses to both foods vs. non-foods and high-ED vs. low-ED foods in the overweight group. Fed vs. fasted comparisons suggested satiety-related modulation of food vs. non-food responses among healthy-weight adolescents, with evidence for greater ACC responses to foods vs. non-foods, and IFG responses to high-ED vs. low-ED foods, in the fed state. Feeding-related modulation was also apparent for the overweight adolescents, who showed greater insula and caudate responses to high-ED vs. low-ED foods in the fed condition. Our results so far are consistent with previous findings suggesting that obese/overweight adolescents show decreased activation in neural circuits involved in self-regulation, and further suggest weight-related differences in patterns of satiety-related modulation. Future analyses will examine effects of familial risk for obesity as assessed by maternal weight status.

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DON'T SAVE THE WORST FOR LAST: AFFECTIVE CONSEQUENCES OF TASK ORDERING

Seth J Kallman - Columbia University; Jochen Weber - Columbia University; Kevin N Ochsner - Columbia University
Previous studies across multiple domains (e.g. pain, learning word lists, and material goods) have established that the end of an experience is heavily weighted when making summary judgments. While these studies have been influential, they do not generally involve the types of tasks that individuals complete in daily life. Furthermore, they typically focus on retrospective evaluations of the experience rather than its immediate affective impact. For example, if one needs to buy groceries, work on a grant proposal, and call in a prescription, will they feel better or worse after they're finished if the most difficult and aversive task is completed at the beginning, middle, or end? With this in mind, we designed a between-subjects study where participants completed everyday tasks in different orders. Each participant completed three tasks, with two normed to be neutral (making a grocery list and a list of purchases) and one considered moderately aversive (giving step-by-step directions). We systematically varied whether the aversive tasks occurred first, second, or last in the sequence and collected affect ratings before and after the tasks. We found that participants who completed the most aversive task at the end of a sequence (rather than in the beginning or middle) had the greatest increase in negative affect. Additionally, multiple regression across all orders revealed that, aside from initial affect, enjoyment and difficulty ratings of the final task were the most predictive of final affect. These results suggest that task order has affective consequences that may be due to an end effect.

B - 44

BREAKDOWN OF INTER-HEMISPHERIC CONNECTIVITY IS ASSOCIATED WITH POSTTRAUMATIC SYMPTOMATOLOGY AND MEMORY IMPAIRMENT

Rotem Saar-Ashkenazy - Department of Brain and Cognitive Neuroscience, The Zlotowski center for Neuroscience Ben-Gurion University of the Negev, Beer-Sheva, Israel; Ronel Veksler - Department of Physiology and Cell Biology, Ben-Gurion University of the Negev, Beer-Sheva, Israel; Jonathan Guez - Department of Psychology, Achva Academic College, Beer-Tuvia regional council, Israel; Yael Jacob - Sagol School of Neuroscience and The Functional Brain Imaging Unit, Wohl Institute for Advanced Imaging, Tel Aviv University, Israel; Ilan Shelef - Department of Radiology, Soroka University Medical Center, Beer-Sheva, Israel; Hadar Shalev - Department of Psychiatry, Soroka University Medical Center, Beer-Sheva, Israel; Alon Friedman - Department of Brain and Cognitive Neuroscience, The Zlotowski center for Neuroscience Ben-Gurion University of the Negev, Beer-Sheva, Israel; Jonathan Eliezer Cohen - Sharett Institute of Oncology, Hadassah Hebrew University Medical Center, Jerusalem, Israel
Altered brain anatomy in specific gray-matter regions has been shown in patients with posttraumatic-stress disorder (PTSD). Recently, white-matter tracts have become a focus of research in PTSD. The corpus callosum (CC) is the principal white-matter fiber bundle, crucial in relaying sensory, motor and cognitive information between hemispheres. Alterations in CC fibers have been reported in PTSD and might be assumed to underlie substantial behavioral and cognitive sequelae; however most diffusion tensor imaging (DTI) studies in adult-onset PTSD failed to address the clinical correlates between imaging and PTSD symptoms severity, behavioral manifestation and cognitive functions. In the current study we examined to what extent microstructural integrity of the CC is associated with PTSD symptom severity and memory performance. DTI data were computed for 16 patients and 14 controls. PTSD symptom severity was assessed by employing the clinician administered PTSD scale (CAPS) and memory was tested using a task probing item and associative memory for words and pictures. Significant differences in FA between the extremely-severe and mild-severe patients, as well as between extremely-severe patients and controls were evident in specific CC portions. Moreover, we found specific correlations in the PTSD group between reaction-time and memory accuracy to CC FA values. This study is the first to show a clear distinction between extremely-severe and mild-severe PTSD patients, based on white-matter architecture of the CC and demonstrates meaningful clinical and cognitive correlates of microstructural connectivity. These results have implications for diagnostic tools and future studies aimed at identifying individuals at risk for severe PTSD.

B - 45

EFFECTS OF SELF-RELEVANCE IN FOOD ATTENTIONAL BIAS

Alejandra Sel - Department of Experimental Psychology, University of Oxford; Jie Sui - Department of Experimental Psychology, University of Oxford; Glyn Humphreys - Department of Experimental Psychology, University of Oxford
Recent models of attentional control have suggested that self-related information has a large impact on the attention allocation altering stimulus saliency in a manner that mimics the effects of perceptual saliency. Furthermore, recent evidence suggests that the association of simple geometrical shapes to the self leads to attentional biases towards the self-associated shapes in comparison to shapes associated with another person. We investigated whether these self-bias effects may extend beyond simple visual stimuli to more naturalistic stimuli, i.e. food items as key stimuli

with direct real-life application. Three types of food items, low-caloric, high-caloric and rotten food items, were presented embedded in coloured frames. We asked participants to associate labels for themselves, a friend, or a stranger with the colours of the picture frame by judging whether subsequent label-colour pairings were matched. We found a reliable self-prioritization benefit on participants' performance to food items that were framed in the self-related colour in contrast to food items framed in the friend or stranger-related colour. In addition, results showed that the presentation of high vs. low –caloric food items was associated to a reduced performance in both the friend and the stranger- related condition. Importantly, this difference was suppressed when the food item was presented in the self-associated coloured frame. Overall, these results indicate that the association of a food item to oneself implicitly modulates its subsequent perceptual processing. They extend previous evidence of self-association effect on simple visual items, with potential applications to attentional and motivational control towards food.

B - 46
TELL ME TWICE: A MULTI-STUDY ANALYSIS OF THE FUNCTIONAL CONNECTIVITY BETWEEN THE CEREBRUM AND CEREBELLUM AFTER REPEATED TRAIT INFORMATION

Frank Van Overwalle - Vrije Universiteit Brussel; Elien Heleven - Vrije Universiteit Brussel; Ning Ma - School of Psychology, South China Normal University; Peter Mariën - Clinical and Experimental Neurolinguistics, CLIN, Vrije Universiteit Brussel, Belgium & Department of Neurology and Memory Clinic, ZNA Middelheim Hospital

This multi-study analysis (6 fMRI studies; 142 participants) explores the functional activation and connectivity of the cerebellum with the cerebrum during repeated behavioral information uptake informing about personality traits of other persons. The results suggest that trait updating recruits activity in areas belonging to the mentalizing and executive control networks in the cerebrum, and the executive control areas in the cerebellum. Cerebral activation was observed in the executive control network including the posterior medial frontal cortex (pmFC), the bilateral prefrontal cortex (PFC) and bilateral inferior parietal cortex (IPC), in the mentalizing network including the bilateral middle temporal cortex (MTC) extending to the right superior temporal cortex (STC), as well as in the visual network including the left cuneus (Cun) and the left inferior occipital cortex. Moreover, cerebellar activation was found bilaterally in lobules VI and VII belonging to the executive control network. Importantly, significant patterns of functional connectivity were found linking these cerebellar executive areas with cerebral executive areas in the medial pmFC, the left PFC and the left IPC, and mentalizing areas in the left MTC. In addition, connectivity was found through links between the cerebral areas in the left hemisphere involved in the executive and mentalizing networks, as well as with their homologue areas in the right hemisphere. The discussion centers on the role of these cerebello-cerebral connections in matching internal predictions generated by the cerebellum with external information from the cerebrum, presumably involving the sequencing of behaviors.

B - 47
THE ROLE OF UNCERTAINTY IN THE PERCEPTION OF PAIN

Troy C. Dildine - National Center for Complementary & Integrative Health, Bethesda, MD; Dominik Mischkowski - National Center for Complementary & Integrative Health, Bethesda, MD; Lauren Y. Atlas - National Center for Complementary & Integrative Health, Bethesda, MD

Metacognitive measures, such as confidence and uncertainty, have been used to study conscious awareness of sensory processes (e.g., vision; Lau, 2008). However, no studies have investigated meta-cognition and the perceptual judgment of pain. We introduced an explicit measure of uncertainty about pain rating, and investigated whether eye movement can be used as an implicit measure of uncertainty. Previous studies have shown that decisions are preceded by focused and attentive eye positions (Blair et al., 2010; Patalano et al., 2010). If eye movements index decision-making, then participants should exhibit greater eye movements when uncertain. We tested whether eye gaze variance was related to confidence in pain. Participants (n=36) received painful heat on the left volar forearm. After stimulus offset, participants viewed a pain scale for three seconds and we measured eye position. Next, participants made pain ratings. Finally, they used a 0-100 scale to rate uncertainty about each pain rating. We used multi-level models to test the relationship between explicit uncertainty and gaze variance and whether this depends on reliability in the temperature-pain relationship (r2). We found no relationship between explicit uncertainty and eye movements (z=-0.89, p=0.18), but we did find a marginal correlation between subject reliability and explicit certainty (r=-.29, p=0.06) such that individuals who showed a stronger relationship between temperature and pain reported higher certainty. These findings suggest that participants have access to the accuracy of their perceptual judgments about pain, similar to other sensory domains. Future studies should investigate factors that impact uncertainty as it relates to pain.

B - 48

IMPLICIT EMOTION REGULATION WHEN VIEWING ARTWORKS: ERP EVIDENCE IN RESPONSE TO AFFECTIVE PICTURES

Jan W. Van Strien - Erasmus University Rotterdam, Netherlands; Noah N.N. Van Dongen - Erasmus University Rotterdam, Netherlands; Katinka Dijkstra - Erasmus University Rotterdam, Netherlands
Presenting affective pictures as a work of art could change perceivers' judgment and strength of emotional reactions. Aesthetic theory states that perceivers of art emotionally distance themselves, allowing them to appreciate works of art depicting gruesome events. To examine implicit emotion regulation induced by an art context, we assessed whether presenting pleasant and unpleasant IAPS pictures either as "works of art" or as "photographs depicting real events" modulated perceivers' Late Positive Potentials (LPPs) and likability ratings. All IAPS pictures were edited to look more aesthetically pleasing. The arrangement of IAPs pictures into artworks and photographs was counterbalanced across participants (N=24). In line with previous research and aesthetic theory, participants evaluated the IAPS pictures as more pleasant when they were presented as artworks than when they were presented as photographs. Moreover, participants' LPP amplitudes (600 – 900 ms post picture onset) were attenuated in the art-context condition. These results provide evidence for an implicit down-regulation of emotional responses to affective pictures induced by an art context.

B - 49

THE AGING BRAIN AND SOCIAL AND ECONOMIC DECISION-MAKING: A SYSTEMATIC REVIEW

Carina Fernandes - University of Porto, Faculty of Medicine; Ana, Ribeiro Gonçalves - University of Porto, Laboratory of Neuropsychophysiology; Fernando Ferreira-Santos - University of Porto, Laboratory of Neuropsychophysiology; Fernando Barbosa - University of Porto, Laboratory of Neuropsychophysiology; Isabel Pavão Martins - University of Lisbon, Institute of Molecular Medicine; João Marques-Teixeira - University of Porto, Laboratory of Neuropsychophysiology
Older adults are an increasingly significant proportion of the global population, amplifying the impact of their financial decisions on society. However, the effect of well-documented neurobiological and neurocognitive age-related changes on social and economic decision-making is relatively unknown. We conducted a systematic review of the literature in order to clarify a possible vulnerability in social and economic decision-making on healthy aging, highlighting its underlying neurocognitive and affective mechanisms.

A systematic search was conducted on PubMed, Web of Knowledge, and EBSCOhost, using the expression "(aging OR ageing OR ""older adults"" OR elderly)" AND "("social decision*" OR "economic decision*")". Only papers published in English in the last ten years were reviewed. Studies assessing decision-making in older healthy adults, with mean age equal or superior to 55 years old were included. Studies missing details about the inclusion/exclusion criteria of the participants were excluded. A total of 25 studies were analyzed, comprising 41 decision-making experiments that assessed (a) decision-making under risk (with or without complete information) (b) under uncertainty, (c) and in social contexts.

The majority of results evidenced impaired decision-making performance in older adults, with increased vulnerability when decisions are made in social context and under uncertainty. Older adults' performance appears to be more preserved when there in more information about the alternatives and outcomes; in cases in which full information is presented, older participants can have similar or even better performance than younger adults. Empathy in social contexts and deficits in reinforcement learning under uncertainty may underlie decision-making impairments of older adults.

Poster Session C

C - 1
REPRESENTATIONAL SIMILARITY ANALYSES REVEALS WHERE INTENT INFORMATION IS ENCODED DURING JUDGMENTS OF HARMFUL AND IMPURE ACTS

Emily A. Wasserman - Boston College, Boston, MA; Alek Chakroff - Boston College; Haerin Chung - Boston College; Liane Young - Boston College

When judging whether or not an agent has committed an immoral act, their mental states matter: did they mean to do it? However, past research has shown that intentions are not emphasized equally during moral judgments of all kinds of moral violations. In particular, intentions are considered more during judgments of harmful acts (e.g. assault) versus impure acts (e.g. incest). With multivoxel pattern analysis, convergent functional neuroimaging research showed that the right temporoparietal junction (RTPJ) encodes intent information during moral judgments of harmful but not impure acts. The present work expands these findings, using fMRI and representational similarity analysis (RSA) in a searchlight approach to discover where intention information is encoded during judgments of harmful acts, impure acts, or both.

Participants (n=39) read scenarios involving an agent that committed harmful or impure acts intentionally or unintentionally. Patterns of BOLD activity associated with individual scenarios were extracted from spheres around each voxel, and scenarios were correlated with one another based on these patterns to highlight the primary scenario features reflected in patterns of activity throughout the brain. The RSA searchlight revealed that intentional and unintentional impure acts are distinguished within a unique region: the left inferior frontal gyrus. In addition, the searchlight illuminates an expanded neural map of moral cognition, extending past the RTPJ to encompass other social-cognitive regions including the precuneus and dorsomedial prefrontal cortex. Thus, the present work broadens both our understanding of the dimensions that influence moral judgments and of how these dimensions are encoded across the brain.

C - 2 **SANS Poster Award winner**
COMPUTATIONAL AND NEUROBIOLOGICAL MECHANISMS OF SOCIAL IMPRESSION FORMATION

Jenifer Z Siegel - University of Oxford; Christoph Mathys - University College London; Molly J Crockett - University of Oxford

Forming accurate impressions of others' moral character is a fundamental social skill. Through recurrent encounters we must learn to distinguish those who might harm us from those who might help us. In two studies, we investigated whether the underlying mechanisms for social impression formation are dynamically related to the inferred belief about an agent (study 1), and how serotonin influences these mechanisms (study 2). In both studies participants observed and tried to predict sequences of moral decisions made by two agents – one characteristically bad and one characteristically good – where each decision involved choosing whether to gain money by harming a third-party victim. We used a hierarchical Bayesian reinforcement learning model to describe participants' evolving beliefs about the moral character of the good and bad agents. In Study 1 we found that participants' beliefs about the bad agent were more uncertain than their beliefs about the good agent. Consequently, participants' learning rates were faster for bad than good agents. In study 2 we found that enhancing serotonin function using the selective serotonin reuptake inhibitor, citalopram, increased uncertainty and learning rates, but only for the good agent. Notably, citalopram did not affect inferred beliefs about the good agent or accuracy of predictions. Our findings have implications for understanding interpersonal dysfunction in psychiatric disorders associated with abnormal serotonin function.

C - 3 **SANS Poster Award winner**
BRAIN PREDICTORS OF NEGATIVE AFFECT DYNAMICS IN DAILY LIFE

Jojanneke A Bastiaansen - Interdisciplinary Center Psychopathology and Emotion regulation, Department of Psychiatry, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands; Elise C Bennik - Department of Psychology, University of Groningen, Groningen, The Netherlands; Jan Bernard Marsman - Neuroimaging Center, Department of Neuroscience, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands; André Aleman - Neuroimaging Center, Department of Neuroscience, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands; Johan Ormel - Interdisciplinary Center

Psychopathology and Emotion regulation, Department of Psychiatry, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands; Tineke J Oldehinkel - Interdisciplinary Center Psychopathology and Emotion regulation, Department of Psychiatry, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands

Background: The neural substrate of emotion regulation has been well-mapped. Individuals that are more successful in downregulating negative affect (NA) show augmented activity in prefrontal regions, together with more attenuated activity in the amygdala. Here, we combined functional neuroimaging (fMRI) and experience sampling (ESM) to determine whether brain activation during the emotion regulation task can also predict NA dynamics in daily life.

Methods: 71 female students aged 18-25 years performed repeated assessments (5 per day during 14 days) of affect and minor events in daily life, and an emotion regulation task in the MRI scanner. Following standard preprocessing and GLM analysis, individual t-maps were created for two contrasts: 1) attend negative – attend neutral, 2) downregulate negative – attend negative. Mean beta values were extracted from a priori defined regions of interest in bilateral amygdala, and frontal regulation clusters (based on a recent meta-analysis by Frank et al., 2014). Correlational analyses were performed between these brain measures and measures derived from the ESM study: mean NA, NA variability, and NA reactivity to minor negative events.

Results: For the amygdalae, only the correlation between NA reactivity and left amygdala downregulation reached significance. Activation of frontal regulation clusters explained 11% of the variance in NA reactivity; stronger activation during the attend negative (not downregulate) condition coincided with higher NA reactivity.

Conclusion: Activation of frontal regulation clusters in response to negative stimuli relates to NA dynamics in daily life. Experimental tasks in the MRI seem to have a bearing on real-life behaviors.

C - 4

ANTERIOR CINGULATE ACTIVITY DURING A PASSIVE DONATION TASK PREDICTS ACTUAL DONATION BEHAVIOR

Emma Templeton - Stanford University, Stanford, USA; Diana Tamir - Princeton University, Princeton, USA; Jamil Zaki - Stanford University, Stanford, USA

A donation to a charity can be framed as either a gain for the charity or a loss to the self. Prior work largely focuses on the reward associated with donating to a charity, without investigating the cost associated with losing money. The present study used a two-stage donation paradigm to address this gap. Participants (n=38) in an fMRI scanner watched as donations to a charity were made on their behalf and on behalf of a computer. After each donation was made, participants learned whether the charity successfully received the donation or not. Half of all donations were successful. Overall, regions associated with disutility (ACC and insula) were activated during trials when participants' own money was at stake, as compared to trials when the computer's money was at stake. Participants with lower ACC activation during these trials voluntarily donated more money in a post-scan task and reported engaging in more prosocial behaviors in their daily lives. Regions associated with reward were activated when passive donations were successfully received. However, these regions were more active when successful donations came from the computer, as compared to donations from the participants themselves, suggesting that people prefer when donations come from a third party. Notably, NAcc activation during trials when the charity received donations did not predict voluntary donation behavior. Taken together, these data suggest that people who feel less apprehensive when their money is at stake – not people who feel happier after donating – may be more likely to make financial donations.

C - 5

EXAMINING THE CAUSAL ROLE OF AMYGDALA FUNCTION ON PERCEPTIONS OF EMOTIONAL CONSEQUENCES OF SOCIAL ACTIONS.

Elise Cardinale - Georgetown University; Justin Reber - University of Iowa; Rachael Harrington - Georgetown University; Michelle Harris-Love - National Rehabilitation Hospital; Peter Turkeltaub - Georgetown University; Tony Buchanan - St. Louis University; Abigail Marsh - Georgetown University

The amygdala plays a critical role in the perception of others' fear from, for example, facial expressions. However, the specific role the amygdala plays in interpreting others' fear remains unclear. One hypothesis is that the amygdala's role in recognizing fear reflects low-level emotional processes. Alternately, the amygdala may primarily direct attention to diagnostic perceptual cues. Evidence to support the first hypothesis comes from studies of psychopathy, a condition characterized by amygdala dysfunction that impairs the use of verbal information (which provides no diagnostic perceptual cues) to infer others' experiences of fear, an impairment linked to amygdala hypoactivity and judgments that causing others fear is morally permissible. To more directly examine the role of the amygdala in understanding others' fear, we evaluated the ability of the patient SM, who has complete bilateral

amygdala lesions, to judge the likely emotional outcomes of a series of emotionally evocative statements. SM correctly identified statements that elicit anger, disgust and happiness. However, her ability to identify fear and sadness-causing statements was nearly 2.5 SD below controls. SM also rated anger, disgust, fear and sadness-causing statements as less morally permissible than healthy controls. Only ratings for sadness exceeded 2 SD. In healthy controls, a significant negative relationship between recognition of fear and perceived permissibility of causing fear was also observed, consistent with prior findings. However, including SM's data reduced this relationship to non-significance. These results support the amygdala's role in inferring others' fear and sadness from social actions that evoke them.

C - 6
THE ROLE OF EMPATHY IN UNDERSTANDING NEURAL RESPONSES TO PROSOCIAL BEHAVIOR DURING ADOLESCENCE

Jorien van Hoorn - 1 Institute of Psychology, Brain and Development Lab, Leiden University, the Netherlands. 2 Leiden Institute for Brain and Cognition, Leiden, the Netherlands; Eveline Crone - 1 Institute of Psychology, Brain and Development Lab, Leiden University, the Netherlands. 2 Leiden Institute for Brain and Cognition, Leiden, the Netherlands

Empathy has been consistently associated with prosocial behavior across development. Moreover, emerging evidence indicates that peer influence can reinforce prosocial behavior during adolescence. The present fMRI-study set out to examine how individual differences in empathy and peer effects interact to shape prosocial behavior and how this is related to brain development during early to middle adolescence.

Participants (age 12-16 years; N = 61) made decisions in anonymous groups about the allocation of tokens between themselves and the group in a public goods game. Two spectator groups of same-age peers – in fact youth actors – were allegedly online during some of the decisions. The task had a within-subjects design with three conditions: (1) Evaluation: spectators evaluated decisions with likes for large donations to the group, (2) Spectator: spectators were present but no evaluative feedback was displayed, and (3) Alone: no spectators nor feedback.

Higher self-reported prosocial motivation was related to larger donations in the alone condition. Donations increased in the presence of peers, and even more when participants received evaluative feedback from peers. Peer presence during donating decisions resulted in enhanced activity in social brain regions including mPFC, TPJ, precuneus, and STS. We found developmental differences in the mPFC, suggesting that the mPFC differentiates more between forms of peer influence in 12-13 year olds than 15-16 year olds. Individual differences in empathic concern, perspective-taking and prosocial motivation are related to these neural findings.

C - 7
BLOCKADE OF ENDOGENOUS OPIOIDS ENHANCE OBSERVATIONAL FEAR LEARNING VIA TEACHING SIGNALS IN THE AMYGDALA AND PAG

Jan Haaker - Department of Clinical Neuroscience, Division of Psychology, Karolinska Institutet, Stockholm, Sweden; Jonathan Yi - Department of Clinical Neuroscience, Division of Psychology, Karolinska Institutet, Stockholm, Sweden; Andreas Olsson - Department of Clinical Neuroscience, Division of Psychology, Karolinska Institutet, Stockholm, Sweden

Fearful expectations of aversive outcomes can be shaped by observation of aversive outcomes to others. During direct (Pavlovian) fear learning, information about personally experienced outcomes is relayed within an amygdala-centered circuitry, regulated by the release of endogenous opioids. Yet, it is unclear if this opioidergic circuitry is involved in fear learning through observation.

Here we show that blockade of opioid receptors (150mg Naltrexone N=22, Placebo N=21) enhanced fear learning through the observation of pain in others (observational fear learning). Blockade of opioid receptors in the Naltrexone group enhanced prediction-error based learning through pain in others, indicated by skin-conductance responses (SCR), and activity in the periaqueductal gray (PAG), as compared to Placebo. Additionally, the Naltrexone group, displayed enhanced responses towards pain in others in the PAG, amygdala, and the midline Thalamus. PAG responses in the placebo group towards pain in others declined as learning proceeded, which was prevented in the Naltrexone group. Consistently with this enhancement of fear learning, we found that the expression of learned fear in the amygdala was sustained in the Naltrexone group, but rapidly extinguished in the placebo group. Notably, drug-free testing (3 days after learning) revealed enhanced expression of fear (SCR) in the Naltrexone, as compared to Placebo, group, and this enhanced fear expression was predicted by amygdala responses towards pain in others during observational learning.

Our results provide the first evidence for opioidergic signaling in observational fear learning, suggesting common neurobiological substrates underlying learning from direct painful experiences and pain in others.

C - 8
CONTEXT-DEPENDENT COUPLING DEFINES THE RTPJ'S FUNCTION IN ATTENTION AND THEORY OF MIND

Tobias Schuwerk - Ludwig-Maximilians- University, Munich, Germany; Matthias Schurz - Centre for Cognitive Neuroscience, University of Salzburg, Salzburg, Austria; Fabian Müller - Department of Psychology, Ludwig-Maximilians-University, Munich, Germany; Rainer Rupprecht - Department of Psychiatry and Psychotherapy, University of Regensburg, Regensburg, Germany; Monika Sommer - Department of Psychiatry and Psychotherapy, University of Regensburg, Regensburg, Germany

Cortical networks underpinning higher cognitive processes converge at the right temporoparietal junction (rTPJ). Seemingly controversial findings on the rTPJ's involvement in attentional control, but also in reasoning about other individuals' mental states, termed mentalizing, caused a long- standing debate about its cognitive function. Here, we combined attentional control and mentalizing in a factorial design. We added a social context condition, in which another individual's mental states became apparently task-relevant, to a spatial cueing paradigm. This allowed for assessing cue validity- and context-dependent functional activity and effective connectivity of the rTPJ within corresponding cortical networks. The results showed that the rTPJ is part of both the ventral attention and the ToM network and that its function is defined by context- dependent coupling with the respective network. In sum, our findings support the idea that the rTPJ as a functional unit underpins a common cognitive mechanism in attentional control and mentalizing, namely the contextual updating of internal models of environmental and mental states.

C - 9
NEURAL AND FACIAL CORRELATES OF AFFECTIVE DISPOSITION DURING MORALLY-SALIENT NARRATIVES

J. Michael Mangus - UC Santa Barbara; Rene Weber - UC Santa Barbara

This study employs a combination of fMRI and automated face-tracking to explore affective disposition theory (ADT), which predicts that viewers prefer narratives in which virtuous characters are rewarded and immoral characters are punished. Previous work has shown that inter-subject correlations (ISC) in brain activity are highest when viewing disposition-consistent narrative outcomes -- specifically, the punishment of immoral characters. The present study partially replicates these findings and also uses psychophysiological interaction (PPI) analysis to augment the notion that punishment of immoral characters yields discernibly different patterns of brain activity than other narrative content. To directly address the affective component of ADT, further PPI analyses compared high- and low-empathy participants. Results indicate that the patterns of co-activation between brain regions are moderated by trait empathy.

To provide another window into affective processing, automated face-tracking is used to evaluate whether greater ISCs in brain activity also yield greater similarities in the time-course of emotive facial expressions. Results indicate that correlations in facial expression vary systematically by experimental condition, but, contrary to the pattern of neuronal ISC, facial expressions exhibit the greatest correlation in disposition-inconsistent conditions. Furthermore, unlike neuronal ISC, correlations in facial expressions are significantly higher among high-empathy pairs of participants. These results demonstrate that shared brain activity alone does not yield correlated displays of emotion; instead, emotive displays are moderated by empathy and may play a communicative role in expressing dissatisfaction with disposition-inconsistent narratives. The implications of these findings for further research into the affective component of ADT are discussed.

C - 10
THE POSITIVE SIDE OF PAST FAILURES: EXPRESSIVE WRITING REDUCES CORTISOL LEVELS AND IMPROVES ATTENTIONAL PERFORMANCE

Brynne C DiMenichi - Rutgers University, Newark; Elizabeth Tricomi - Rutgers University, Newark

Writing about stressful events has been shown to improve physical health, decrease anxiety, depression, and rumination, and improve cognitive functioning. Psychological stress has been found to increase activation in brain regions associated with self-referential thought, so one hypothesis is that expressive writing may help to clear negative or intrusive self-referential thoughts, thereby reducing psychosocial stress. Previously, our lab found that performance is negatively correlated with activation in brain areas associated with task-unrelated thoughts, such as the posterior cingulate and precuneus. However, it remains unknown whether findings such as these relate to the

effect that stress can have on attention. In this experiment, we studied the effects of psychosocial stress produced by the Trier Social Stress Test on attentional performance and salivary cortisol; additionally, we investigated whether an expressive writing task could reduce the detrimental effects of stress on performance and subsequent increases to salivary cortisol. We found that asking individuals to write about a difficult time in their life in which they did not succeed significantly reduced the response of cortisol and significantly improved performance on a task requiring persistent sustained attention. Our results suggest that disclosing about past failures may attenuate one's cortisol response to stress, though individual differences may exist. Broadly speaking, our results also suggest that stress may contribute to task-unrelated thoughts, which may help to explain previous findings of increases in activation in attention-related brain regions accompanying decreases in performance.

C - 11
NEURAL AND BEHAVIORAL EFFECTS OF INCENTIVES ON THE MODIFICATION OF COOPERATIVE DECISION-MAKING IN GAIN AND LOSS CONTEXT

Xu Gong - 1 National Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing, China, 100875 2 Donders Institute for Brain, Cognition and Behaviour, Radboud University Nijmegen, Nijmegen, The Netherlands, 6525 EN; Teng-Xiang Tian - National Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing, China, 100875; Yue-Jia Luo - Institute of Affective and Social Neuroscience, Shenzhen University, Shenzhen, China, 518060

Cooperative behaviors, essentially for the functioning of human societies, are affected by both social norms and economic incentives. However, few study has been engaged in how inner structure of incentives interact with a given social norm can affect human cooperative decision-making and the underlying relevant neural mechanisms. The present study aims to investigate how gradual incentives influences human cooperative decision-making in gain and loss social context. Thirty-seven participants recruited from Beijing Normal University. Subjects were scanned using 3T fMRI while they played a modified public goods game (PGG), a standard experimental measure of cooperation, with a gradient variation of incentives that symmetrically manipulated in gain and loss context. The neuroimaging data was analyzed by using a general linear model with a trail-wise parametric modulation analysis. Behaviorally, incentives largely gradually modulated the individuals' contribution in PGG, especially in loss context. However, non-proportionately gradual reversed effects were found in the gain context, which indicated that individuals were more sensitive to the incentives in the gain than the loss context. Regarding neural activation, cooperative decision in gain context versus non-cooperative decision in loss context was positively correlated with the activation in the brain area of the bilateral ventral striatum (VS), anterior cingulate cortex (ACC), and temporal parietal junction (TPJ). In summary, the present research firstly shows that different effects of the gradual incentives effects on cooperative behavior in gain and loss context, and that the motivation to cooperate may be associated with both reward processing as well as with theory of mind mechanisms.

C - 12
INTER-INDIVIDUAL DIFFERENCES IN EMPATHY PREDICT PHYSIOLOGICAL RESPONSES TO THE STRESS OF OTHERS

Stephanie J Dimitroff - University of Chicago; Elizabeth A Necka - University of Chicago; Greg J Norman - University of Chicago

The experience of stress has been shown to be contagious between individuals (Bolger et al., 1989). However, little research has been done on the physiological processes that underlie such contagion. The current study examined how adult strangers react physiologically when viewing others experiencing varying degrees of stress. Twenty-one individuals were filmed while speaking in one of three different conditions: individuals were either instructed to talk about a pre-assigned neutral topic (low stress condition), performed the Trier Social Stress Test (high stress condition; Kirschbaum et al., 1994), or talked about a pre-assigned neutral topic after having completed the Trier Social Stress Task (intermediate stress condition). Physiological activity of all individuals was recorded via electrocardiogram and cardiac impedance. From these films, seven videos from each condition were created (each featuring a separate speaker). Another group of participants (viewers) was then recruited to watch the set of twenty-one videos, while their corresponding physiological activity was recorded. Viewers were asked to rate how anxious they believed each speaker to be. Viewers' ratings of speakers' anxiety levels accurately distinguished between speakers from different conditions, rating high stress videos as the highest on anxiety, intermediate stress videos as the second highest, and low stress videos as the lowest on anxiety. Furthermore, results revealed that individuals who scored high on measures of empathy displayed the greatest changes in autonomic nervous system activity in response to viewing others in the high stress condition.

C - 13
THE ROLE OF STATISTICAL LEARNING IN THE DEVELOPMENT OF MODEL-BASED CHOICE

Nessa V. Bryce - Weill Cornell Medicine; Tracey C. Shi - Weill Cornell Medicine; Catherine A. Hartley - Weill Cornell Medicine

Throughout our lives, we try to make choices that lead to good outcomes. Reinforcement learning theory distinguishes two learning strategies that can inform our decisions. A "model-free" strategy simply fosters repetition of previously rewarded actions, whereas a "model-based" strategy recruits an internal model of the environment to select goal-directed actions. Recent research suggests that whereas model-free learning is evident across development, model-based learning emerges with age, increasing from childhood to adulthood. However, the cognitive processes underlying the development of model-based learning remain poorly characterized. The formation of an internal model of the environment is proposed to involve the ability to deduce the sequential structure of the environment through statistical learning. Here, we tested a cohort of child, adolescent, and adult participants to examine whether developmental changes in statistical learning, assessed in an independent behavioral task, predicted model-based choice. We found that all age groups showed evidence of statistical learning ability, but that performance improved with age. Statistical learning interacted with age to predict model-based choice, such that no relationship between statistical learning and model-based choice was evident in childhood, but a positive association emerged in adolescence and strengthened into adulthood. This suggests that while the ability to build a model using environmental statistics may be an important component process of model-based learning, additional age-associated cognitive processes are required to yield model-based choices. This work highlights a temporal dissociation between when individuals acquire knowledge of the structure of their world, and when this information is readily recruited to inform their actions.

C - 14
AMBIGUOUS SITUATIONS INCREASE SENSITIVITY TO HIGH STATUS TRUSTWORTHINESS BEHAVIOR

Philip R. Blue - Peking University, Beijing, China; Jie Hu - Peking University, Beijing, China; Xiaolin Zhou - Peking University, Beijing, China

Social status influences almost all social interactions, yet its influence on trust is far from understood. Recent work suggests that in one-shot situations where expectations are explicit (e.g., promises), people tend to trust high status more than low status others. In order to test this effect in ambiguous situations and to understand its neural timing, in the current study participants' event-related potentials (ERPs) were recorded while acting as Trustors with high and low status partners (i.e., Trustees) in a modified version of Trust Game, in which Trustees had the opportunity to promise (i.e., explicit situation) or not (i.e., ambiguous situation) to return the investment. Behaviorally, in ambiguous situations, participants were more likely to trust a high status partner if, on the previous trial with that partner, he/she acted trustworthy, whereas participants were less likely to trust low status partners if, on the previous trial with that partner, he/she acted trustworthy; in explicit situations, there was no difference in response to low and high status behavior. Neurally, in ambiguous situations, there was a greater difference in medial frontal negativity (MFN, 240-310 ms) between untrustworthy and trustworthy feedback for high status partners than for low status partners, whereas in explicit situations there was no difference in MFN for high and low status feedback. Taken together, these findings demonstrate that in ambiguous situations, people may be more sensitive to high status than low status trustworthiness behavior, and that this bias may occur at an early stage of evaluative processing.

C - 15
ELECTROPHYSIOLOGICAL INDICES OF ATTENTION AND WORKING MEMORY PREDICT THE MAGNITUDE OF DISTRACTOR DEVALUATION FOR ITEMS IGNORED DURING MEMORY MAINTENANCE

David De Vito - University of Guelph, Guelph, Ontario, Canada; Mark J. Fenske - University of Guelph, Guelph, Ontario, Canada; Naseem Al-Aidroos - University of Guelph, Guelph, Ontario, Canada

Mechanisms of emotion and selective attention are highly interactive. The emotional significance of sensory stimuli can preferentially attract attention. And whether a stimulus is selectively attended or ignored can impact its emotional tone. While many studies have specifically shown that ignoring an external sensory stimulus leads to its affective devaluation, little is known about such distractor-devaluation effects when attention is focused internally to select among items within working memory. We addressed this void by investigating how changes in an electrophysiological index of working memory— contralateral delay activity (CDA)— correspond with the magnitude of stimulus devaluation for items that were ignored (vs. attended) in working memory. A working memory test on

each trial required participants to maintain three uniquely-colored stimuli in working memory. A cue presented during the retention interval specified the exact item about which a delayed-match-to-sample judgment would be required, and thus encouraged uncued items to be ignored. Affective evaluations following each working-memory test revealed more negative ratings for ignored uncued items than cued items, similar to the standard distractor-devaluation effect. Also, individual differences in the magnitude of this devaluation effect were correlated with the amplitude of the post-cue CDA (r=-.60), and with an earlier negative-going event-related potential (r=-.59). Components prior to the cue did not correlate with devaluation. These results extend our recent findings of stimulus devaluation for items whose representations are ignored in working memory and suggest that the interplay between attention and emotion is similar for working memory representations to that for external sensory information.

C - 16
PARSING THE BEHAVIORAL AND BRAIN MECHANISMS OF THIRD-PARTY PUNISHMENT

Matthew R Ginther - Vanderbilt Law School & Vanderbilt Neuroscience Graduate Program; Richard J Bonnie - University of Virginia School of Law; Morris B Hoffman - District Judge, Second Judicial District Court; Francis X Shen - University of Minnesota Law School; Kenneth W Simons - University of California, Irvine School of Law; Owen D Jones - Vanderbilt Law School & Department of Biological Sciences; René Marois - Vanderbilt University Department of Psychology

The evolved capacity for third-party punishment is considered crucial to the emergence and maintenance of elaborate human social organization and is central to the modern provision of fairness and justice within society. While it is well-established that the mental state of the offender and the severity of the harm he caused are the two primary predictors of punishment decisions, the precise cognitive and brain mechanisms by which these distinct components are evaluated and integrated into a punishment decision are poorly understood. Using fMRI, here we implement a novel experimental design to functionally dissociate the mechanisms underlying evaluation, integration, and decision that were conflated in previous studies of third-party punishment. Behaviorally, the punishment decision is primarily defined by a super-additive interaction between harm and mental state, with subjects weighing the interaction factor more than the single factors of harm and mental state. On a neural level, evaluation of harms engaged brain areas associated with affective and somatosensory processing, while mental state evaluation primarily recruited circuitry involved in mentalization. Harm and mental state evaluations are integrated in medial prefrontal and posterior cingulate structures, with the amygdala acting as a pivotal hub of the interaction between harm and mental state. This integrated information is used by the right dorsolateral prefrontal cortex at the time of the decision to assign an appropriate punishment through a distributed coding system. Taken together, these findings provide a blueprint of the brain mechanisms by which neutral third-parties render punishment decisions.

C - 17
EMOTION AND PERSONAL SPACE REGULATION: FMRI CORRELATES OF APPROACH-AVOIDANCE TENDENCIES TO DISTINCT FACIAL EXPRESSIONS

Joana B. Vieira - Brain and Mind Institute, University of Western Ontario; Tamara Tavares - Brain and Mind Institute, University of Western Ontario; Derek G.V. Mitchell - Brain and Mind Institute, University of Western Ontario

The distance kept between people during social interactions is a meaningful communication cue that is likely influenced by both individual and situational factors. Yet, neural mechanisms implicated in interpersonal distance remain poorly understood. We characterized the behavioural and neural response patterns associated with approaching vs avoiding different facial expressions of emotion. Eighteen healthy volunteers underwent fMRI scanning while being presented with approaching or withdrawing angry, fearful, happy, sad and neutral faces, and rated their level of discomfort upon watching them. Interpersonal distance preferences were assessed behaviourally by asking participants to adjust the distance of the same faces in a separate run. Finally, participants performed a "Stop-distance task" where they adjusted the distance between themselves and an experimenter outside the scanner. Results showed that preferred distance from the experimenter significantly predicted distance from neutral faces in the task (r = .50, p <.05). Distance and level of discomfort were both affected by emotional expression (p <.001), with anger associated with greatest distance and discomfort, followed by fear and sadness (which did not differ), neutral, and happiness. Multiple regression analyses (FDR p < .05) revealed a network of regions including ACC, anterior insula, TPJ and dlPFC predicted shorter distances to happy, sad and neutral, but not angry faces. Increased amygdala activation was associated with shorter distances to happy and sad faces only. Finally, increased dlPFC activation predicted shorter distances to fearful faces. These findings shed light on the neural bases of social approach-avoidance mechanisms and how they are affected by emotional content.

C - 18

NEURAL AND COMPUTATIONAL MECHANISMS OF COGNITIVE REGULATION IN SOCIAL AND NON-SOCIAL CHOICE

Anita Tusche - Caltech; Cendri Hutcherson - University of Toronto; Ralph Adolphs - Caltech

Most decisions that we face involve trade-offs between different choice attributes. Should I eat a delicious but unhealthy cookie? Should I give money to help another person or mind my own earnings? The ability to weight these different considerations in a context-sensitive manner is fundamental to goal-directed choice and self-control, yet remains poorly understood. We combined computational modeling with multivariate decoding of fMRI data to answer two questions: 1) what neural and computational mechanisms underlie the ability to flexibly weight different choice attributes and 2) are these mechanisms domain-general or specific? We scanned 36 healthy subjects on separate days while they completed two choice tasks involving either foods that varied in healthiness and tastiness or monetary proposals that varied in benefits for the self and another. In both tasks, participants made choices under "natural" and "attention regulation" conditions (e.g., "focus on the food's healthiness", "focus on your partner's feelings"). Computational modeling confirmed that attention modified the weights assigned to different attributes (e.g., increased health weight; decreased self weight), resulting in healthier and more generous choices. On the neural level, we observed that attention enhanced target attribute representations and inhibited non-target attributes in both overlapping and non-overlapping ways. Key areas for flexible representation included brain regions associated with regulatory and attentional processes (DLPFC, VLPFC) and social cognition (DMPFC, TPJ). Our results suggest that attentional control may result from the complex interaction between general control and value mechanisms and neural circuits that preferentially represent task-specific information.

C - 19

THE HUMAN M-OPIOID SYSTEM PROMOTES MOTIVATION AND PREFERENCE FOR THE EVOLUTIONARILY MOST VALUABLE REWARDS

Guro E. Loseth - University of Oslo, Oslo, Norway; Eikemo Marie - University of Oslo, Oslo, Norway; Chelnokova Olga - University of Oslo, Oslo, Norway; Laeng Bruno - University of Oslo, Oslo, Norway; Willoch Frode - University of Oslo, Oslo, Norway; Siri Leknes - University of Oslo, Oslo, Norway

Choosing among options with unequal reward outcomes is essential in our daily lives. In rodents, μ-opioid receptor (MOR) activation promotes motivation and preference for high-value rewards. To assess whether the MOR system similarly promotes value-based choice in humans, we used a placebo-controlled cross-over design with a bidirectional drug manipulation to investigate MOR effects on a range of reward behaviors in healthy males. The MOR agonist morphine (10mg), the non-selective opioid antagonist naltrexone (50mg) or placebo was administered orally before participants completed a battery of reward tasks presented in a pseudo-randomized counterbalanced order. Across tasks, morphine increased and naltrexone decreased i) the effort exerted to obtain rewards and ii) preference for the high-value option. Specifically, performance in a decision making test with monetary rewards showed that MOR activation promoted and blockade decreased reward sensitivity and effort exerted in the task. In a social reward task, MOR activation specifically increasing time spent looking at the region of neutral faces which contains the most socially valuable information, namely the eyes. MOR activation also increased attractiveness ratings and the effort exerted to keep viewing pictures of the most attractive females specifically. Again, these behaviors were reduced by MOR blockade. In a sucrose preference task, MOR activation enhanced and blockade decreased pleasantness ratings for the sweetest sucrose solution specifically. Importantly, this effect was present regardless of whether participants liked or disliked the sweetest drink. Together, our results suggest that the human MOR system promotes motivation and preference for the rewards that are evolutionarily more valuable.

C - 20

WHAT YOU DON'T REMEMBER CAN HURT YOU: UNWANTED AND "FORGOTTEN" SELF-RELEVANT MEMORIES ELICIT DISTINCT ERP MEMORY TRACE

Anastasia E. Rigney - The University of Texas, Austin; David M. Schnyer - The University of Texas, Austin; Xiaoqing Hu - The University of Texas, Austin; Jennifer, S. Beer - The University of Texas, Austin

People claim to have poor memory for negative feedback about themselves; this effect is thought to be a hallmark of the motivation to feel good about oneself (i.e., self-enhancement). However, it is unclear if negative information is not encoded in the first place or encoded but suppressed at the time of retrieval. One way to address this question is to examine whether "forgotten" negative self feedback shows a neural marker that is different than truly new negative information. In an ERP study, participants viewed positive and negative feedback about their personality and then performed a surprise recognition test. ERP data were collected both while participants received feedback

(i.e., encoding) and during the recognition test (i.e., retrieval). Results suggest that "forgotten" negative information about the self still manifested at a neural level that may indicate implicit memory. At the time of retrieval, old negative "forgotten" words elicited a more negative FN400 (indicative of implicit memory) in the right Frontal Cortex (FT10 site) in comparison to new negative words that were correctly rejected (t(31) = -2.10, p < 0.05). No such effects were found for positive feedback at retrieval. This finding suggests that there may still be a memory trace for "forgotten" negative self feedback. Furthermore, a follow-up behavioral study suggests that unwanted, negative self-information may be difficult for participants to retrieve even once self-enhancement pressures are removed.

C - 21
A VALUES INTERVENTION TO CHANGE FOOD-RELATED REACTIVITY AND REGULATION

Nicole R. Giuliani - University of Oregon; Junaid Merchant - University of Oregon; Elliot T. Berkman - University of Oregon
Unhealthy eating can be reduced by decreasing reactivity to unhealthy foods as well as by increasing the regulation of that desire. Forty overweight (BMI 25-35) adults performed a food craving regulation task in the MRI, where they saw pictures of their most and least craved foods under look and regulate instructions. Reactivity (look craved > look not craved) recruited the mesolimbic dopamine system, while regulating (regulate craved > look craved) recruited the cognitive control network. Post-scanning, half of the participants performed a healthy eating intervention by writing messages to themselves that aligned healthy eating with their core values (experimental group), and half wrote about general healthy eating (control). All participants then repeated the task. The intervention had a significant effect in reducing reactivity (revealed by a group x time interaction), and BMI related to significantly more pre-to-post change. Interestingly, there was also a group x BMI interaction (p=.035) such that only the experimental group showed a relationship between reactivity and BMI: greater BMIs predicted pre-to-post increases in reactivity whereas smaller BMIs predicted decreases. The intervention and BMI also related to regulation, and there was a group x BMI interaction (p=.041), where only the control group showed a negative correlation between regulation and BMI: a larger BMI predicted a pre-to-post decrease in regulation ability. This pattern suggests that the intervention buffers against the decrease in regulation seen in higher BMI individuals. The mechanisms by which brain activity underlying reactivity and regulation predict intervention success will be discussed.

C - 22
FROM WORDS TO NARRATIVES: AMPLIFICATION OF GLOBAL MEANING IN THE BRAIN

Yaara Yeshurun - Department of Psychology and Princeton Neuroscience Institute, Princeton University; Janice Chen - Department of Psychology and Princeton Neuroscience Institute, Princeton University; Uri Hasson - Department of Psychology and Princeton Neuroscience Institute, Princeton University
Small local changes of the words used can create a big change in the overall narrative. Thus, as a story unfolds over time, the brain has to simultaneously process each incoming word while embedding it within the overall context. Recently, we suggested a hierarchy of timescales in the brain; from early sensory areas with short processing timescales (10s to 100s of milliseconds) to high-order areas with long processing timescales (many seconds to minutes). In this fMRI study, we hypothesize that short processing timescale regions would be sensitive to local changes in the words used (e.g. "she" vs "he"), whereas regions with long processing timescales would accumulate and amplify these local changes. In order to test this hypothesis, we generated two different stories that differed in 33% of words; keeping the overall structure constant, while creating two coherent yet distinct narratives. Fourteen subjects listened to each story (N = 28). To measure differences in the neural representations of the stories we calculated the Euclidean distance between neural responses to the two stories in each voxel. In line with our hypothesis, we found that the neural distance between the stories was amplified as the information transferred from low-level regions (e.g. early auditory cortex) to high-level regions (e.g precuneus and dorso-medial prefrontal cortex). Our results suggest that small differences in the words used are gradually accumulated and amplified as the information is transmitted from one level of the processing hierarchy to the next, to produce a distinctive neural representation for each narrative.

C - 23
NONCONSCIOUS EXTINCTION OF CONDITIONED THREAT RESPONSES IN HUMANS

Candace, M Raio - New York University; Joseph E LeDoux - New York University; Nathan Kline Institute for Psychiatric Research; Cesar Augusto - Universidade Federal de São Paulo; Temidayo Orederu - Mount Sinai School of Medicine; Sandra, F Lackovic Armstrong - New York University; Elizabeth A Phelps - New York University; Nathan Kline Institute for Psychiatric Research

Cognitive behavioral therapeutic techniques (e.g., exposure) used to treat anxiety disorders rely on principles of extinction learning, in which responses to learned threatening aversive cues are diminished when presented under safe circumstances. However, a major impediment to the success of these techniques is the discomfort individuals experience during exposure. Presentation of the cues without awareness could potentially circumvent this obstacle. However, it remains unclear whether threat associations can be extinguished without consciously perceiving aversive stimuli. We tested this using aversive learning, in which extinction was done either with full awareness or without awareness of the stimuli. Skin conductance responses served as an index of conditioned responding. Participants first learned that one cue was probabilistically paired with shock, while another was never paired with shock. This learning phase transitioned to extinction, where shocks were omitted. An 'aware' group experienced extinction with full awareness of CSs, while an 'unaware' group experienced it while CS were suppressed from awareness using continuous flash suppression. A day later, participants returned to test expression of extinction learning during aware CS presentations. Results revealed that unaware extinction learning developed faster and was stronger in magnitude than in the aware group. Despite this, expression of extinction a day later did not differ between groups. Therefore, threat responses are amendable to extinction without awareness, but are still vulnerable to recovery, suggesting that interventions to bolster this unaware extinction learning could be a promising next step to facilitating treatment for anxious populations.

C - 24
THE NEUROCOGNITIVE CORRELATES OF DISTINCT FACETS OF EMPATHY: MIRROR REGIONS RECRUITED DURING COGNITIVE AND EMOTIONAL EMPATHY

Lindsay D Oliver - University of Western Ontario, London, Canada; Joana B Vieira - University of Western Ontario, London, Canada; Derek GV Mitchell - University of Western Ontario, London, Canada
Empathy is a crucial component of successful interpersonal interactions, and many debilitating disorders feature empathy deficits. Empathy is largely considered to be a multidimensional construct, including cognitive empathy (the ability to adopt another's perspective) and emotional empathy (the capacity to share another's emotional experience). It has been suggested that the putative mirror neuron system (MNS) may facilitate empathy by supporting the simulation of perceived experience in others; however, its role in empathy remains controversial, and whether the MNS is involved in the experience of cognitive or emotional empathy remains unclear. Presently, healthy adults underwent fMRI while completing a false belief task targeting cognitive empathy, and an emotional empathy task that assessed how strongly they felt for people in emotionally-charged images. Further, mirror regions were localized using a button-pressing observation and execution task. Conjunction analyses revealed overlap between mirror areas and those activated during cognitive empathy, including the posterior superior temporal gyrus/superior temporal sulcus (STG/STS) bilaterally. Emotional empathy also resulted in increased activation in identified mirror regions, including the left posterior STG/STS. Additionally, areas activated by cognitive and emotional empathy were found to be fairly distinct. Thus, regions of the MNS appear to be recruited during the experience of both cognitive and emotional empathy. However, critically, within left STG/STS and premotor regions identified using the MNS localizer, greater activation was observed during the emotional empathy task than the cognitive empathy task. Thus, mirror areas appear to be recruited to a greater degree during the experience of emotional versus cognitive empathy.

C - 25
SOCIAL NETWORK STRUCTURE MODULATES THE INFLUENCE OF NEURAL REPRESENTATIONS OF MESSAGE CONTENT ON SMOKING BEHAVIOR

Teresa K. Pegors - Azusa Pacific University; Steve Tompson - University of Michigan; Matthew B. O'Donnell - University of Pennsylvania; Emily B. Falk - University of Pennsylvania
Although health behavior change can be predicted by univariate levels of activity in ventromedial prefrontal cortex (VMPFC), we do not yet know how representational content in this region may affect behavior differently based on factors such a social network structure. For example, social norms and perception of risk around smoking, and consequent receptivity to anti-smoking messaging, may differ between networks that have many smokers versus few. To test this, smokers (n=42) underwent fMRI while viewing 60 antismoking images, containing either health or social reasons. Half portrayed negative consequences of smoking; the remaining 30 images were compositionally similar but emotionally neutral. Using representational similarity analyses (RSA), our results showed that that a smoker's social network did change how content influenced behavior: the greater ratio of smokers a person had in their social network, the more likely it was that the representation of social or health content in VMPFC had a positive influence on reducing their smoking over the following month. By contrast, those who had fewer smokers in their

networks were more likely to maintain or even increase their smoking behavior when social or health content was strongly represented in VMPFC. Smokers may look for confirmation of consequences within their own social network: the more negative examples come to mind, the more likely they are to reduce smoking behavior, and vice versa. More broadly, these results show that RSA can help predict behavior change and reveal deeper information about the role of VMPFC in decision-making.

C - 26

HOW STRESS IMPACTS ON EMOTIONAL PROSODY DE- AND ENCODING

Silke Paulmann - University of Essex; Desire Nilsen - University of Essex

Work on the effects of stress on how vocal emotions are communicated is limited. The current project is first to report evidence that experimentally induced stress affects both the production and recognition of emotional sentences. In Study 1a, we demonstrate that emotional materials spoken by stressed speakers can be identified as sounding more stressed than materials spoken by non-stressed speakers. This suggests listeners pay attention to acoustic cues signalling stress in the voice. In Study 1b, we demonstrate that negative emotional sentences produced by speakers who were stressed before their audio recording session are generally less well recognized than negative stimuli produced by speakers who were not put under stress. In contrast, sentences expressing positive intentions were better recognized when uttered by stressed speakers. Together, this suggests that the stress level of the speaker affects judgements made by the receiver. In Study 2, we explored how stress can impact on the receiver end. To this aim, half of the participants were induced with a feeling of stress before carrying out an emotional prosody recognition task. Results revealed that listeners who were induced with stress before the start of the experiment performed significantly worse in the task than participants who were not stressed. Overall, findings suggest detrimental effects of induced stress on interpersonal sensitivity.

C - 27

LONELINESS, AMYLOID AND TAU IN COGNITIVELY NORMAL OLDER ADULTS

Nancy J Donovan - Brigham and Women's Hospital, Harvard Medical School; Patrizia Vannini - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School; Aaron P Schultz - Massachusetts General Hospital, Harvard Medical School; Elizabeth C Mormino - Massachusetts General Hospital, Harvard Medical School; Rebecca E Amariglio - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School; Dorene M Rentz - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School; Olivia I Okereke - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School; Gad A Marshall - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School; Keith A Johnson - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School; Reisa A Sperling - Brigham and Women's Hospital, Massachusetts General Hospital, Harvard Medical School

BACKGROUND: Loneliness is a perceived state of social and emotional isolation that has been associated with cognitive decline. Loneliness may be a sensitive symptom of brain changes related to preclinical Alzheimer's Disease (AD) in older people.

OBJECTIVE: To determine whether in vivo measures of cortical amyloid and entorhinal tau (ET), are associated with greater loneliness in cognitively normal (CN) older adults.

METHODS: Cross-sectional analyses using data from 89 CN, community-dwelling men and women, age 69-89, participating in the Harvard Aging Brain Study. Loneliness was assessed using the 3-item UCLA loneliness scale. A continuous, aggregate measure of amyloid, determined by Pittsburgh Compound B-PET was used as a predictor of loneliness in regression models adjusting for age, sex, APOEε4 genotype, socioeconomic status, depression, anxiety and social network. A second model included the interaction of amyloid with APOEε4 as a predictor. The primary analysis was repeated using ET, measured by T807 (AV1451) PET, as the predictor for loneliness, using the same covariates, without and with amyloid.

RESULTS: Higher amyloid predicted greater loneliness (β=0.4, p=0.002; for the model R^2=0.3, p=0.001). Furthermore, the interaction of high amyloid and the presence of the APOEε4 allele was associated with greater loneliness (β= 0.6, p<0.0001; for the model R^2=0.3, p<0.0001). ET also predicted loneliness in the analogous model (β=0.2, p=0.04; for the model R^2=0.21, p=0.015) but not when controlling for amyloid.

CONCLUSIONS: We report novel associations of loneliness with cortical amyloid and ET and present loneliness as a neuropsychiatric symptom relevant to preclinical AD in CN older people.

C - 28

MATH ANXIETY: NEURAL EVIDENCE FOR REDUCED MATH COMPUTATION AND INCREASED ANXIOUS EMOTION

Rachel G. Pizzie - Dartmouth College; Nikita Raman - Dartmouth College; David J.M. Kraemer - Dartmouth College

Math anxiety – aversive and anxious feelings toward performing mathematics – is associated with avoidance toward performing math problems and pursuing math-related classes and careers (Ashcraft, 2002; Beilock & Maloney, 2015). Previous work has suggested the importance of emotion regulation in math performance for highly math anxious (HMA) individuals, indicating that controlling negative emotional responses to math stimuli can improve math performance (Lyons & Beilock, 2011). In this experiment, we used fMRI to investigate the influence of math anxiety and emotion regulation (ER) strategies on math-related and affective neural regions, while participants completed math problems. Math anxiety was inversely associated with BOLD activity in bilateral intraparietal sulcus, a region involved in math calculation, indicating that HMA individuals are less likely to engage this processing network during a math task. Math anxiety and use of ER strategies were associated with differential activity in neural regions involved in anxious affect. Left amygdala activity showed an interaction between math anxiety and habitual use of cognitive reappraisal as an ER strategy. For HMA individuals, those who were more likely to use reappraisal showed decreased amygdala reactivity to the math stimuli, whereas those who were less likely to reappraise displayed greater amygdala reactivity. Low math anxious individuals did not show this pattern. These findings indicate that math anxiety influences neural activity underlying math calculations and affective processing. Changes in neural activity associated with reappraisal suggest that ER strategies may provide a promising intervention to improve processing deficits caused by math anxiety.

C - 29
REPUTATION AND THE SOCIAL REGULATION OF PERCEPTION AND ANXIETY

Owen Footer - Columbia University; Dean Mobbs - Columbia University

Most threatening situations in the real world are experienced in the context of other people, yet not all others are equal in their ability to provide protection and prevent harm. In this study, we investigated how one common index of another's competence, reputation, influences affective and cognitive processes in the context of a collaborative task involving threat. Participants were paired up with different virtual partners to collaborate with on a motion perception game that included a risk of electric shock based on joint performance. Each partner had a star rating indicating their reputation, or how their friends evaluated their skill at the game. Participants also got information about their partner's competence through first-hand observation of performance in the game. The partner's reputation influenced behavioral measures of perception and anxiety, as well as brain activity in regions associated with motion perception and threat processing. Having a high-, compared to low-, reputation partner led to reduced measures of anxiety, increased perceptual accuracy, and increased conformity to the partner's responses. First-hand observation of high-quality performance from the partner also led to similar effects on perception and anxiety, though less so for partners with low reputations. An independent measure of "reputation-focus", or how much one values social evaluations of another's competence compared to fact-based evaluations, moderated these effects. Together these results provide insight into common mechanisms and individual differences in how cues about the quality of protection in the social environment influence cognition and anxiety.

C - 30
ENCODING OF VICARIOUS REWARD PREDICTION IN ANTERIOR CINGULATE CORTEX AND RELATIONSHIP WITH TRAIT EMPATHY

Patricia L. Lockwood - University College London; Matthew A. J. Apps - University of Oxford; Jonathan P. Roiser - University College London; Essi Viding - University College London

Empathy—the capacity to understand and resonate with the experiences of others—can depend on the ability to predict when others are likely to receive rewards. However, although a plethora of research has examined the neural basis of predictions about the likelihood of receiving rewards ourselves, very little is known about the mechanisms that underpin variability in vicarious reward prediction. Human neuroimaging and nonhuman primate studies suggest that a subregion of the anterior cingulate cortex in the gyrus (ACCg) is engaged when others receive rewards. Does the ACCg show specialization for processing predictions about others' rewards and not one's own and does this specialization vary with empathic abilities? We examined hemodynamic responses in the human brain time-locked to cues that were predictive of a high or low probability of a reward either for the subject themselves or another person. We found that the ACCg robustly signaled the likelihood of a reward being delivered to another. In addition, ACCg response significantly covaried with trait emotion contagion, a necessary foundation for empathizing with other individuals. In individuals high in emotion contagion, the ACCg was specialized for processing others' rewards

exclusively, but for those low in emotion contagion, this region also responded to information about the subject's own rewards. Our results are the first to show that the ACCg signals probabilistic predictions about rewards for other people and that the substantial individual variability in the degree to which the ACCg is specialized for processing others' rewards is related to trait empathy.

C - 31
NEURAL REPRESENTATIONS OF ADULT ATTACHMENT

Anne C. Laurita - Cornell University; R., Nathan Spreng - Cornell University

The human brain tracks dynamic changes within the social environment and continually updates the representation of individuals. Within this social environment, critical information is updated regarding the representation of persons with whom we form attachments and dependencies. We used fMRI to examine the neural representation of other people along a continuum of personal attachment while participants made trait judgments for a romantic partner, a parent, close friend, and a familiar acquaintance. Thirty heterosexual adults (M age = 25 years, SD = 4 years; 15 women) currently in a romantic relationship completed a survey about their personal relationships. This survey included self-report measures of attachment, perceived closeness, and relationship length. Neuroimages were analyzed with the multivariate approach partial least squares. Overall, trait judgments about other people engaged the default network relative to a matched control condition. A "dose-dependent" step function in activity was observed as a function of attachment. To interrogate this effect further, we assessed the covariance of self-reported attachment with BOLD signal during trait judgment. We found that partner attachment, closeness, and relationship length were strongly, positively correlated with default network activity. These results provide evidence for the accessibility of attachment figure cognitive representations, supported by the default network, particularly within medial prefrontal cortex.

C - 32
POSITIVE VALENCE BIAS IS ASSOCIATED WITH EMOTION REGULATION ABILITY

Catherine C Brown - University of Nebraska - Lincoln; Tien T. Tong - University of Nebraska - Lincoln; Alex Enersen - University of Nebraska - Lincoln; Ryan P. Kirkpatrick - University of Nebraska - Lincoln; Aaron Z. Hoagland - University of Nebraska - Lincoln; Maital Neta - University of Nebraska – Lincoln

Surprised faces are ambiguous in that they have predicted both positive (e.g., birthday party) and negative (e.g., car accident) outcomes. Previous research has shown that some people tend to judge ambiguous stimuli as positive, while others tend to judge them as negative. These individual differences in valence interpretations constitute an individual's valence bias. Furthermore, it has been proposed that negative interpretations are more automatic and that individuals with a positive valence bias are recruiting an additional regulatory mechanism. The current study tested this hypothesis by exploring the relationship between valence bias and emotion regulation ability. Sixty participants rated clearly and ambiguously valenced pictures as positive or negative, and ratings of the ambiguous items were used to determine the valence bias for each participant. Twenty-nine participants viewed faces (clear valence: angry, happy; ambiguous: surprise), and 31 participants viewed clearly positive, clearly negative, and ambiguous scenes. Next, participants learned about and practiced regulating their emotions in response to negative scenes, using a reappraisal strategy. Finally, they rated a new set of pictures from the same category (29 participants viewed a new set of faces and 31 participants viewed a new set of scenes). Ratings of ambiguous items were more positive after practicing reappraisal than before (faces: p = 0.004, scenes: p = 0.001). Moreover, there were individual differences such that participants with a more positive valence bias were better at emotion regulation (p = 0.008). These results provide support for the hypothesis that valence bias is associated with emotion regulation ability.

C - 33
PRIOR BELIEFS ABOUT OTHERS' ABILITY CORRUPT AVOIDANCE LEARNING FROM OBSERVING THEIR BEHAVIOR

Ida Selbing - Karolinska Institutet; Andreas Olsson - Karolinska Institutet

Observational avoidance learning can be safer and more efficient than individual learning. However, observational information should be used flexibly as a function of the ability/skill of the observed demonstrator, for instance to avoid copying poor behavior. Here, we investigated how the interaction of described and actual abilities of the demonstrator influenced performance and psychophysiology during learning of an observational aversive task. Participants performed the task themselves and observed two demonstrators that learned the same task. Participants were divided into two groups, where demonstrators' abilities were described as either high (Described-High) or low

(Described-Low). Unbeknownst to the participants in both groups, one demonstrator performed well (Actual-High) while the other behaved randomly and performed poorly (Actual-Low). Results showed that participants performed better when observing the Described-High compared to the Described-Low demonstrators. Moreover, described ability interacted with actual ability resulting in worst performance during observation of the Described-Low and Actual-Low demonstrator, although the described ability was accurate in this condition. Analyses of pupil dilation and behavioral data combined with reinforcement learning modeling suggest that described ability influenced performance by affecting attention towards the observational information. In addition, pupil dilation and skin conductance responses provided psychophysiological measures of observational learning. We conclude that describing a demonstrator's ability as low corrupts observational avoidance learning, especially when the actual ability is low. This is argued to be caused by a decrease in attention which affects learning from a poor performing demonstrator more since the choices of such a demonstrator are more unpredictable and require more attention.

C - 34
LOST ILLUSIONS: MODULATION OF REWARD LEARNING BY SOCIAL CONTEXT IN SUICIDAL BEHAVIOR

Polina Vanyukov - University of Pittsburgh, Department of Psychiatry; Katalin Szanto - University of Pittsburgh, Department of Psychiatry; Mauricio Delgado - Rutgers University, Department of Psychology; Alexandre, Y Dombrovski - University of Pittsburgh, Department of Psychiatry

The predisposition to suicidal behavior is complex and may include enduring traits that also manifest in interpersonal dysfunction and decision-making deficits. Phenomenology of suicide suggests that processes construing social decision-making may be altered in suicide attempters; however, the mechanisms of this disturbance remain largely unknown. One hypothesis is that suicide attempters poorly integrate social context into decision-making. To test this hypothesis, we used a repeated trust game and manipulated the share rate (50%, 25%, 88%) of the trustees (good, bad, neutral, computer) to examine how healthy controls, depressed non-suicidal, and suicide attempters optimize their decision-making to varying reward schedules. Trustee type, recent reinforcement history, and reward schedule predicted probability of sharing with a trustee, p(share), and sensitivity to the reward schedule [slope of p(share)]. Effect of trustees' reputations wore off with multiple interactions. Interestingly, individuals were most sensitive to a reward schedule (88% and 25%) when interacting with the "bad" trustee. Preliminary results indicate that, although p(share) was initially affected by trustees' reputations in all groups, reward schedule sensitivity of suicide attempters with history of most serious and premeditated attempts (HL) was the least affected by trustees' reputations. These results are interesting in light of earlier findings, indicating that, unlike other groups, these individuals were also the least affected by the stake size in the Ultimatum Game. We speculate that HL attempters may be unable to integrate rich contextual cues into their reward-driven decision-making. Finally, we also present neuroimaging data probing cortico-striatal networks involved in reward processing in this task.

C - 35
ALEXITHYMIA AND REDUCED ANTICIPATION OF NEGATIVE EMOTIONAL EVENTS

Francesca Starita - University of Bologna, Bologna, Italy; Elisabetta Ladavas - University of Bologna, Bologna, Italy; Giuseppe Di Pellegrino - University of Bologna, Bologna, Italy

Alexithymia is characterized by difficulties in emotion processing, especially in relation to negative emotions. Nevertheless, its causal mechanisms remain elusive. Reduced anticipation of emotional events may be one of them. In fact, it enables the individual to prepare to respond effectively to the coming events facilitating rapid regulation of emotional experience. To test this hypothesis, changes in skin conductance response (SCR) were recorded during classical fear conditioning in participants with high (HA), medium (MA) and low (LA) levels of alexithymia while learning to anticipate a negative emotional event (i.e. a mild electrical stimulation). Critically, despite all groups showing higher SCR in anticipation of the stimulation as compared to a neutral stimulus, SCR in anticipation of the stimulation was lower and extinguished earlier in HA compared to MA and LA. These differences between groups appeared to be attributable neither to differences in the intensity of stimulation received, nor to SCR to the stimulation itself. Groups showed comparable SCR to a neutral stimulus as well. Confirming the hypothesis, HA exhibited reduced anticipation of a negative emotional event. Disruption of this mechanism may then compromise effective emotion recognition, emotional response and response regulation, possibly representing a causal mechanism underlying the difficulties in emotion processing characteristic of alexithymia.

C - 36
INFLUENCE OF PERSPECTIVE-TAKING ON NEUROENDOCRINE ATTUNEMENT DURING A DYADIC NEGOTIATION TASK

Benjamin W Nelson - University of Oregon; Smrithi Prasad - University of Oregon; Pranjal Mehta - University of Oregon

Psychobiological attunement, the temporal coregulation of physiology in relationships (Butler & Randall, 2012), is thought to have implications for relational functioning. A current goal of this research is to identify individual characteristics that influence such physiological synchrony during interactions, because research is mixed on whether synchronous processes are associated with positive (Hibel et al., 2015) or negative (LeMoult et al., 2015) individual and relational characteristics.

The current study investigated how perspective-taking (PT) during a negotiation task influenced cortisol attunement. 44 dyads (65.9% female) engaged in a dyadic negotiation in which they were assigned the role of a job candidate or a recruiter. Each dyad negotiated over five hiring issues- salary, benefits, vacation, medical plan and location. Further, recruiters were also randomly assigned to a PT condition or a control condition. Saliva samples were collected and assayed for salivary cortisol both pre- and post-negotiation task. We hypothesized that higher reported PT would result in increased cortisol attunement.

Hierarchical linear modeling was used to examine the covariation of each partners' cortisol levels across the session (Raudenbush & Bryk, 2002). Results indicated that recruiters in the PT condition had significantly increased cortisol attunement (p = .039), while the recruit, those not in the PT condition, did not display increased cortisol attunement to their partner (p = .336). The ability to take a partners' perspective has been shown to have positive relational influences, therefore these results would support previous research that demonstrate the beneficial effects of cortisol attunement during relational interactions.

C - 37
EMOTION-INDUCED INTERFERENCE: EVIDENCE FROM PREVIOUSLY EMOTIONALLY NEUTRAL STIMULI
Huan Wang - Simon Fraser University, Burnaby, Canada; Killian Kleffner - Simon Fraser University, Burnaby, Canada; Patrick, L. Carolan - Simon Fraser University, Burnaby, Canada; Mario Liotti - Simon Fraser University, Burnaby, Canada

Emotional stimuli are known to facilitate or impede the processing of the following stimuli based on their emotionality. We examined if stimuli with acquired emotions could impede the processing of emotional words, or if these stimuli could facilitate the processing of words of the same valence in a novel paradigm. Thirty-five undergraduates performed a value learning task in which they used feedback to categorize emotionally neutral images as indicators of reward, punishment or neutral-control (Condition). Subsequently, individuals performed the second task in which they identified the valence of either positive or negative words (Valence) that were preceded by images from the learning task. We found an interaction between Valance and Condition for response time (RT: $F_{(2, 68)} = 6.50$, $p < .01$). The interaction was explained by that RT was slower in both reward and punishment compared to the control condition for positive words ($t_{(34)} = 4.52$, $p < .01$; $t_{(34)} = 2.58$, $p < .05$, respectively), and that RT was longer for negative compared to positive words in the control condition ($F_{(1, 34)} = 21.23$, $p < .01$). No main effect of Condition was found for negative words ($F_{(2, 68)} = 2.17$, $p > .05$). This suggests that, rather than facilitation, stimuli with acquired emotions impair the processing of the following emotional stimuli. However, the characteristics of the second emotional stimuli also matter and stimuli such as negative words may allow individuals to recover from this interference.

C - 38
NEURAL RESPONSES TO CIGARETTE AND MONETARY GAINS AND LOSSES IN DEPRIVED SMOKERS
Andrea H Lewis - Rutgers University; Heena Manglani - The Ohio State University; Mauricio R Delgado - Rutgers University

Research examining addicted populations posits that drug deprivation leads to decreased sensitivity to non-drug rewards (e.g. Goldstein et al., 2007; Martin-Soelch et al., 2003; Rose et al., 2012). For instance, deprived smokers show enhanced neural responses to the anticipation of cigarette rewards compared to monetary rewards (Sweitzer et al., 2014). In the current study, we examined the neural responses to the receipt of both smoking and monetary-related gains and losses in a population of smokers following smoking deprivation. Participants were deprived of smoking for 12 hours and engaged in a card-guessing paradigm (Delgado et al., 2000) that afforded the opportunity to earn both money and cigarette puffs that would be delivered at the end of the experiment. Notably, a willingness to pay (WTP) measure taken prior to the task was used to equate the cigarette and monetary outcomes in terms of value. Preliminary neuroimaging analyses highlight striatal activity during outcome processing that is sensitive to valence (gain vs loss) during receipt of monetary, but not cigarette outcomes. However, this result is driven by individual differences in reported levels of cigarette craving at the onset of the task, particularly participants

experiencing low craving. Furthermore, a region of anterior cingulate cortex (ACC) exhibits differential activation to cigarette as compared to monetary outcomes, regardless of outcome valence. This difference is attenuated in lighter, as compared to heavier, smokers. Taken together, these findings highlight differential responses in corticostriatal circuitry to both drug (cigarette) and non-drug (monetary) gains and losses in a deprived smoking population.

C - 39
MORE THAN MEETS THE EYE? THE P100 COMPONENT IN RESPONSE TO INTACT AND SCRAMBLED EMOTIONAL FACES

Holly Earls - University of Colorado Boulder; Tim Curran - University of Colorado Boulder

Event-related potential (ERP) studies have found differences in visual processing of faces relative to non-face objects in the very early stages of processing, as indexed by the P100 component. The P100 component in response to faces has also been shown to be modulated by emotional expression, but this might be due to low-level visual differences between expressions. Similarly, such low level differences have been shown to be sufficient to explain previous reports that the P100 differs between faces and non-face objects like cars (Rossion and Carahel, 2011). The aim of the current investigation was to examine whether differences in P100 amplitude based on emotional expression of faces are due to low-level visual cues rather than the phenomenological experience of facial affect. Participants were presented with intact and scrambled neutral, happy, fearful, and angry faces. The scrambled faces allow for the preservation of global low-level properties such as color and luminance while degrading shape. Results show P100 amplitude is modulated by emotion for intact but not scrambled faces, suggesting that differences in low-level visual cues cannot account for differential early visual processing of emotional faces.

C - 40
NEURAL RESPONSE TO PERSONALIZED VS. GENERALIZED SECURITY PRIMING

Andy Miller - University of Kansas, Lawrence USA; Sabrina Gregersen - University of Kansas, Lawrence USA; Erik Benau - University of Kansas, Lawrence USA; Austin Svancara - University of Kansas, Lawrence USA; Ruth Ann Atchley - University of Kansas, Lawrence USA; Omri Gillath - University of Kansas, Lawrence USA

Attachment security has been repeatedly shown to associate with beneficial emotional, cognitive, and behavioral outcomes (Schimel et al., 2001). Furthermore, exposing people to security-related cues or primes can enhance one's level of attachment security (Gillath, Selcuk, & Shaver, 2008). However, not everyone reacts to all security primes in the same way. People's attachment history (their attachment style) may moderate their reactions. This could be due to the tendency of people who are insecure in their attachment to associate some security-related primes with negative constructs, preventing them from reaping the benefits other people gain from security primes. We tested whether the type of the security prime might affect this interaction. Security primes can be generalized (e.g., "love" and "hug"), or personalized (e.g., names of security providing attachment figures). We tested our predictions using the Late Positive Potential (LPP) Event Related Component, which is known to reflect emotional salience and selective attention (Herbert et al., 2006). As expected, both secure and insecure participants exhibited more robust LPP signals when exposed to personalized primes (M = 4.75, SE = 0.63) compared to generalized primes (M = 3.10, SE = 0.59). Furthermore, whereas attachment style did not moderate the effects of personalized primes, avoidant attachment predicted lower LPP amplitudes at early time intervals for the generalized primes (400-500ms after stimulus onset). Previous studies found similar LPP patterns in response to negative stimuli, suggesting that avoidant individuals process the attachment words as negative stimuli.

C - 41
SLEEP LOSS NEGATIVELY AFFECTS EMPLOYABILITY AND PERCEIVED LEADERSHIP SKILLS

John Axelsson - Karolinska Institutet; Tina Sundelin - Stockholm University

Objective: Previous research shows that sleep-deprived people are perceived as less attractive and more tired than their well-rested selves. Attractive people are more often ascribed qualities such as social competence, potency, and intellectual competence. These qualities are especially desirable for leaders, but also for employees. The objective of this study was to find out whether sleep loss and perceived tiredness might affect employability and perceived leadership skills, as well as perceived intelligence and trustworthiness.

Method: 24 people were photographed on two separate occasions, at least one week apart. In one photograph they had slept no more than 4h/night for two consecutive nights and in the other they had spent at least 8h/night in bed for two consecutive nights. The photographs were rated by 61 observers on leadership ability, employability, trustworthiness, and intelligence. The observers also rated participants' attractiveness and tiredness.

Results: When participants were sleep deprived, they were rated as less good leaders (p<0.001), less employable (p=0.001), and less trustworthy (p=0.01) compared to when they had slept. Sleep-deprived participants were also rated as less attractive (p=0.006) and more tired (p=0.011). There was no significant difference in ratings of intelligence (p=0.105). Looking more tired was strongly related to being perceived as a poorer leader, less employable, less trustworthy, and less intelligent (p's<0.001)

Conclusions: The study confirmed previous findings of sleep deprivation affecting attractiveness and perceived tiredness, and showed that sleep-deprived people are judged as being worse leaders, as well as being less employable and less trustworthy.

C - 42
EMPATHIC NEURAL RESPONSES IN DRUG-ADDICTED MOTHERS: AN EVENT-RELATED POTENTIAL INVESTIGATION.

Arianna Schiano Lomoriello - Department of Social and Developmental Psychology, University of Padova, Padova (Italy); Giulia Piallini - Department of Social and Developmental Psychology, University of Padova, Padova (Italy); Federica Meconi - Department of Social and Developmental Psychology, University of Padova, Padova (Italy); Francesca De Palo - Department of Social and Developmental Psychology, University of Padova, Padova (Italy); Alessandra Simonelli - Department of Social and Developmental Psychology, University of Padova, Padova (Italy); Paola Sessa - Department of Social and Developmental Psychology, University of Padova, Padova (Italy)

Mother-infant relationship is decisive for offspring's development. Several studies showed that neural circuits associated with parental behavior overlap with those involved in addiction, therefore substance abuse might subtract neural resources for parenting. Surprisingly, no previous study has explored neural empathic responses towards both adults' and children' pain in drug-addicted mothers. Empathy is a more general construct than parenting and deficits in neural empathic responses might explain failures of addicted mothers caring. Furthermore, substantial evidence suggests that drug-addiction reduces mentalizing abilities. The neurocognitive model of empathy is appropriate to test this idea since it includes mentalizing as one of its subcomponents. Event-related potentials (ERPs) have been recorded from drug-addicted mothers (i.e., clinical) and control groups to track neural activity in a pain decision task. Stimuli were color pictures showing painful (harmful objects applied to the hand) and neutral (harmful objects near the hand) situations of either an adult or a toddler. Neural empathic responses towards adults in pain were comparable in the two groups (ERPs diverged between the two stimulations in 200-400 ms time-range) but clinical group showed a delay of such reaction of approximately 70 ms. Furthermore, in the clinical group, neural empathic responses towards children in pain diverged between painful and neutral stimulation in the P3 component time-range. We interpreted this pattern as indicating that mothers of the control group, but not clinical mothers, implicitly judged the neutral situations as potentially painful for children suggesting a lack of mentalizing abilities in the clinical group when compared with controls.

C - 43
CULTURAL DIFFERENCES IN NEURAL CORRELATES OF INTERGROUP EMPATHY

Lynda C Lin - University of Illinois at Urbana-Champaign; Yang Qu - University of Illinois at Urbana-Champaign; Eva H Telzer - University of Illinois at Urbana-Champaign

Empathy, or the ability to understand and share other people's feelings, can help us understand and form connections with others. In an intergroup context, studies have found that more empathy between groups can lead to more positive intergroup attitudes, interactions and prosocial behaviors. Previous studies have suggested that people show different empathic neural responses when seeing members of a racial ingroup and outgroup in pain. However, the neural mechanisms by which people empathize with members of their ingroup and outgroup in more everyday situations are poorly understood. Building upon past research on intergroup empathy and pain, the goal of this study was to examine the neural mechanisms underlying intergroup empathy in positive (happy) and negative (sad) contexts among members of two different cultures. 15 American and 14 Chinese first-year undergraduate students completed a task in the fMRI scanner where they saw pictures of people engaged in positive and negative social contexts. Half of the people in the pictures matched the participant's ethnicity (ingroup) and half did not (outgroup). We found that compared to American participants, Chinese subjects showed greater neural activity in areas related to social (TPJ) and face (fusiform) processing when viewing members of their ingroup compared to members of their outgroup. This suggests that Chinese participants tend to process faces and emotions more deeply for the ingroup than outgroup, which might be explained by the heightened emphasis on maintaining group cohesion (e.g., focusing on the feelings and facial expressions of the ingroup) in collectivistic cultures.

C - 44

FLEXIBLE NEURAL RESPONSES TO CHANGES IN SOCIAL CONTEXT DURING EMOTION INTERPRETATION

Willa Voorhies - McGill University; Caitlin Stoddart - McGill University; GanZhen Liang - McGill University; Daina Crafa - McGill University; Mathieu Brodeur - McGill University

The ability to adapt to changing social contexts and integrate new information is essential to performing complex tasks such as interpreting emotions. Neural flexibility, which refers to an individual's ability to reinterpret information based on changes in the surrounding scene or context, may underlie this ability. Social context may alter emotion interpretations and temporarily alter neural processes, particularly in frontal brain regions. This study used an ERP design to evaluate the neural mechanisms associated with the integration of new information, by comparing appraisals of ambiguous social stimuli to those that become unambiguous after the addition of new contextual information. Twenty-seven healthy participants performed a computerized task in which they were asked first, to judge facial emotion without contextual information and then subsequently to judge the same faces presented in either a neutral or helpful context. Changes in ERP responses reveal that frontal activity is modulated by the addition of helpful contexts. Our findings additionally demonstrate a modulatory role of context in emotion interpretation outcomes. The changes in neural activity, combined with behavioral responses, show reliable markers of flexibility to changing social contexts, and provide novel evidence for the seminal role of neural flexibility in the interpretation of facial emotion.

C - 45

CAN WE EMPATHIZE WITH OBJECTIFED WOMEN? HOW THE PERCEPTION OF OTHERS SHAPE OUR FEELING TOWARD THEM.

Carlotta Cogoni - SISSA; Andrea Carnaghi - University of Trieste; Giorgia Silani - University of Vienna

People are likely to rely on their own emotional state to infer other's emotions, consequently this could lead on to biased judjments (EEB). The aims of the present research are to shed lights on empathic feelings and EEB toward human and objects, but also to investigate whether those processes can be moderated by the objectification of humans. Indeed, when women are objectified (i.e., represented by their physical appearance over mental states), they are represented as less human, and processed in an analytic mode like objects. In this study, male and female participants took part into the touch paradigm; it is based on the simultaneous visuo-tactile stimulation of the participant and a confederate and it allows for assessing the affective component of empathy and the EEB, as a measure of self-other distinction. Depending on the experimental condition, the confederate could be a mannequin (object condition) or a female individual which could be either dressed in an objectified fashion (objectified condition) or in a non-objectified manner (personalized condition). Results showed that the EEB seems to be an hardwired process. On the contrary, higher empathy toward human than non-human has been found. Interestingly empathy did not differ between objectified women and mannequins, while it is higher when interacting with a personalized woman than with mannequins. In conclusion the process of objectifying women leads to a cognitive shift from human to object-like processing, assimilating women to inanimate entities and dampening the empathic responses, but not the EEB, typically recruited when processing human beings.

C - 46

THEORY OF MIND IN CHILDREN WITH ATTENTIONAL DEFICIT HYPERACTIVITY DISORDER: A STUDY OF FALSE BELIEFS, PRAGMATIC LANGUAGE AND EMOTIONAL ATTRIBUTION IN COLOMBIA

Wilmar Pineda - Universidad Simón Bolívar-Colombia; Johana Escudero - Universidad Simón Bolívar-Colombia

The poster presents the results of a research that inquired the features of the Theory of mind in children with Attention Deficit Hyperactivity Disorder. False beliefs, pragmatic use of language and emotional attribution to the look, were evaluated using the unexpected change task (Wimmer y Perner, 1983), Happé's strange stories (Happé, 1994) and Eye Test child version (Baron-Cohen, et al, 2001) respectively. In the study participated 36 children separated in two groups, 18 to the case group (children with ADHD, 88% male and 11% female, average age of 10,21 years and average CI of 103,4) and 18 to the control group (healthy children, 88% male, 11% female, average age of 10,57 years and average CI of 107,9), we controled socio economic status. The results showed that cases group had statistically significant difference from the control group. Case group presented an inferior yield in the false beliefs task and pragmatic use of language but not on the emotional attribution to the look. We concluded that children with ADHD have most difficulty to cognitive aspect (Cold theory of mind) than emotional aspect (Hot theory of mind) of theory of mind. We suggest considering the cognitive inhibitory control and language like mediators of the theory of mind in children with ADHD.

C - 47

DOES CHARISMA SYNCHRONIZE FOLLOWERS' BRAINS? A MEG STUDY

Yair Berson - New York University & Bar-Ilan University; Yuval Harpaz - Bar-Ilan University; Abraham Goldstein - Bar-Ilan University

When exposed to charismatic leaders individuals often tend to become cognitively, emotionally, and behaviorally synchronized with the leader. While attention to contagious effects of charismatics goes back to 19th century crowd psychology, little is known about the neurological foundations of synchronization caused by social interactions, in particular charismatic leadership. Whereas imaging research demonstrated that brains "tick together", indicated by higher inter-subject correlations (ISC) in response to captivating visual stimuli, the extent to which social interactions cause such effects remains unknown. In addition, though earlier neuroimaging research has been able to classify leaders' charisma, the effects of such leaders on followers' brains are unclear. We hypothesized that ISC will be higher during exposure to a charismatic leader than during exposure to a non-charismatic message. In line with charismatic leadership theory, we anticipated these effects to prevail in both verbal (language) and non-verbal areas (visual, sensory). To test our hypothesis, we videotaped a professional actor, presented as a candidate to student union leadership, reading a charismatic vs. non-charismatic message (with similar length and content). Forty subjects were exposed to these two conditions and two baseline conditions while being recorded by MEG. We found that ISC were higher for subjects in the charismatic condition in all frequency bands but particularly in the beta range. Differences were observed mainly in peri-sylvian areas in both hemispheres, in visual regions, and pre- and post-central areas. We will discuss implications for understanding the neurological basis of contagion due to charismatic leadership.

C - 48

THE NEUROSCIENCE OF PREJUDICE

Pascal Molenberghs - School of Psychological Sciences and Monash Institute of Cognitive and Clinical Neurosciences, Monash University, Australia

How we interact with outgroup members is context dependent. In normal situations we usually act friendly towards them but in extreme situations (e.g., war) we sometimes have to harm them to save our own life. From an evolutionary point of view, our brain had to develop to adapt to these different types of situations. To shed insight into this, three fMRI experiments were conducted. The first fMRI experiment showed that in groups that have no strong animosity towards each other, ingroup bias is more about ingroup love than outgroup hate. Brain regions involved in rewarding others (medial orbitofrontal cortex and striatum) were more active when rewarding ingroup members. However, brain regions involved in punishing others, such as the lateral orbitofrontal cortex (lOFC), were equally active when harming ingroup and outgroup members (Molenberghs et al., 2014a). The second fMRI experiment showed that the lOFC region is highly sensitive when outgroup members attack people from our own group (Molenberghs et al., 2014b). Finally, the third fMRI experiment showed that in warlike situations the group membership of the victim (i.e., innocent civilian vs. soldier) is very important. Harming innocent civilians led to the usual increase in lOFC activation but when the participant felt the violence was justified (i.e., killing an opposing soldier) no increase was observed in this region (Molenberghs et al., 2015). Combined, the results show that our emotional brain is highly adaptive to respond to outgroup members in different situations.

C - 49

AN EXPLORATION OF THE RELATIONSHIP BETWEEN TEMPER OUTBURSTS AND ADHD

Randi H Bennett - Fordham University; Sheina Godovich, A - Fordham University; Samantha Adelsberg - Fordham University; Amy K Roy - Fordham University

Emphasis on classifying psychopathology based on behavioral dimensions has increased attention on temper outbursts (TO). TO occur across diagnoses, with greater likelihood among those with ADHD (Roy et al., 2013). Neurally, studies posit disrupted subcortical connectivity in relation to TO in children with ADHD (e.g. Posner et al., 2014). Information about TO is typically collected through subjective parent-report (Gualtieri & Johnson, 2005). Here, we sought to explore 1) interactions between ADHD symptoms and TO using an objective behavioral measure, and 2) associated neural underpinnings. Participants included 33 children with TO, 15 children with ADHD without TO, and 28 controls. All participants completed the "Impossibly Perfect Circle/ Star" task (LabTAB; Goldsmith & Rothbart, 1996). Preliminary analyses didn't show differences in persistence/frustration between groups. To examine the effect of ADHD (67% of TO group), follow-up analyses were conducted to compare all subjects with ADHD to those without. This yielded a minute by group interaction for frustration and persistence ($p < 0.05$; $p < 0.04$). Post-hoc

t-tests revealed children with ADHD experienced significantly increased frustration/decreased persistence. To explore this neurally, intrinsic functional connectivity was assessed using a bilateral amygdala seed-based ROI analysis on resting-state fMRI data from 30 of these subjects. We found that frustration and persistence showed significant correlations with right amgydalar-precentral gyrus connectivity ($p<0.01$) in ADHD. Data collection/analyses are ongoing. However, based on early findings, children with ADHD exhibit increased frustration and decreased ability to persist, regardless of outward TO. Further, preliminary imaging analyses suggest that amygdala-precentral gyrus connectivity underlie this frustration intolerance.

C - 50
FEAR LEARNING, EXTINCTION RETENTION AND FEAR RENEWAL IN OCD AND SOCIAL ANXIETY

Abby, J Fyer - Columbia University/NYSPI; Helen, B. Simpson - Columbia University/NYSPI; Franklin Schneier - Columbia University/NYSPI; Tse-Hwei Choo - Columbia University/NYSPI; Stephanie Tacopina - Columbia University/NYSPI; Marcia Kimeldorf - Columbia University/NYSPI; Melanie Wall - Columbia University/NYSPI; B. Timothy Walsh - Columbia University/NYSPI

Background: One current approach to understanding the pathophysiology of anxiety disorders is to experimentally probe neural circuits involved in associative fear and extinction learning. Here we assess these processes in healthy control (HC) volunteers and two disorders that, while clinically different, also share significant symptoms of fear and anxiety: obsessive compulsive disorder (OCD); and social anxiety disorder (SAD).

Methods: An established associative fear learning paradigm (UCS=shock, visual CS) was used to assess associative fear learning, extinction, extinction retention and fear renewal in medication free adults with principal diagnosis of OCD (N = 41) or SAD (N= 41) and matched HC (N = 64). Acquisition took place in one context, extinction and extinction recall in another, and renewal in the original context (ABBA design). Data were analyzed using a mixed method model incorporating diagnosis, block and stimuli and adjusting for race and gender.

Results: Fear learning,extinction and extinction recall did not differ significantly between groups. Significantly ($p<.05$) greater fear renewal as compared to HC was seen in OCD and SAD.

Conclusions: Our findings differ from previous studies that found decreased extinction recall in OCD. The observation of increased fear renewal in OCD and SAD requires replication and further research but suggests that a subset of individuals with anxiety symptoms may be particularly sensitive to context.

Poster Session D

Saturday April 30, 10:30 - 11:30AM

D - 1 **SANS Poster Award winner**
A CAUTIONARY NOTE ON TESTING FOR INTERACTIONS IN WHOLE-BRAIN ANALYSES OF VARIANCE
Robert Chavez - Ohio State University; Dylan Wagner - Ohio State University
Whole-brain analysis of variance (ANOVA) is a common analytic approach in social and affective neuroscience. Researchers are often interested in exploring whether brain activity reflects to the interaction of two factors. Disordinal interactions (AKA crossover interactions) — where there is a reversal of the effect of one independent variable at a certain level of a second independent variable — are common in the literature. It is well established in power-analyses of factorial ANOVAs that certain patterns of interactions require less power than others to detect. This fact, combined with the perils of mass univariate testing suggests that testing for interactions in whole-brain ANOVAs, may be biased towards the detection of disordinal interactions. Here we report on a series of simulations of whole-brain fMRI data using realistic, multi-source noise parameters at multiple sample sizes and SNR values and analyzed using standard procedures. Results of these simulations indicate that spurious disordinal interactions are routinely found at common thresholds and cluster sizes at the group level in pure noise data. Moreover, simulations based on implanting a true ordinal interactions can nevertheless appear like crossover effects at realistic levels of SNR when performing mass univariate testing at the whole-brain level, potentially leading to erroneous conclusions when interpreted as is. Simulations of varying sample sizes and SNR levels show that this bias is driven primarily by SNR and larger sample sizes do little to ameliorate this issue. Recommendations for researchers to minimize the impact of these issues are provided.

D - 2 **SANS Poster Award winner**
THE SELF IS MORE THAN VALUATION: A NEW FMRI TASK ALLOWS DISSOCIATION OF SELF AND VALUE IN VMPFC
Christin Scholz - Annenberg School for Communication, University of Pennsylvania; Nicole Cooper - Annenberg School for Communication, University of Pennsylvania; Emily B. Falk - Annenberg School for Communication, University of Pennsylvania
Humans usually overestimate the value of entities that are self-relevant (e.g. through ownership or similarity) and identify disproportionately often with those that seem highly valuable. This natural confound between self and valuation raises the question whether the two are inherently indistinguishable, or related, but separate concepts. Neuroimaging might address this question by identifying physiological structures underlying self- and value-related computations. Functional overlap would be consistent with some degree of shared processing. A dissociation implies partially independent functioning. Although prior work found overlap between self- and value-related regions in VMPFC, those studies that were focused on valuation have failed to control for the stimuli's self-relevance and vice versa. Overlapping activations might thus be explained by conceptual confounds rather than true indistinguishability. In five behavioral studies (N = 413) we developed a new experimental procedure to address this shortcoming and applied it in a subsequent fMRI study (N = 60). fMRI participants first rated the self-relatedness and value of personality traits one week before scanning, and were then re-exposed to these traits inside the fMRI scanner, performing a task unrelated to self and value.
Using pre-scan ratings as parametric modulators, we identified non-overlapping clusters modulated by self (anterior) and value (subgenual) in VMPFC, suggesting some degree of dissociability. Next, we controlled for self-relevance when analyzing valuation and vice versa by removing shared variance from each predictor. After orthogonalization, the self cluster remained significant whereas the valuation cluster was marginally significant, suggesting that self-related thought contains components that are independent from value-related processing.

D - 3
NEUROCOMPUTATIONAL MECHANISMS UNDERLYING SUBJECTIVE REWARD DEVALUATION BY COGNITIVE AND PHYSICAL EFFORT
Matthew A.J. Apps - University of Oxford, Oxford, UK; Trevor T-J Chong, - Macquarie University, Sydney, Australia; Annie Sillence - University of Oxford, Oxford, UK; Kathrin Giehl, - University of Oxford, Oxford, UK; Laura L. Grima, - University of Oxford, Oxford, UK; Masud Husain - University of Oxford, Oxford, UK

Subjective evaluations of the costs and benefits of exerting a quantum of effort to obtain rewards, are central to motivated behavior. Yet, little is known about the neural substrates or mechanisms that underpin people's sensitivity to different types of effort. Here, we examined the neuro-computational mechanisms that underlie the processing of the subjective value (SV) of rewards associated with effort in the cognitive and physical domains. Subjects were first trained on a cognitively effortful task (CET) and a physically effortful task (PET). These tasks parametrically manipulated six levels of either cognitive or physical effort, with the demands in the other domain held constant. During scanning, subjects made choices between a fixed, low effort low reward option (effort level 1, 1 credit), and a variable, higher effort, higher reward option (effort levels 2-6, 2-10 credits). They made these choices separately for offered effort/reward combinations of the PET and CET. Using computational modelling, we show that rewards are subjectively valued distinctly when associated with cognitive or physical effort. Despite these distinct computational mechanisms, activity in a common network of regions, including the dorsomedial and dorsolateral prefrontal cortex, intraparietal sulcus and anterior insula covaried with the SV of rewards associated with both types of effort. In contrast, we identified a domain-specific role of the amygdala for processing the SV of rewards associated only with cognitive effort. These results are the first to reveal the neurocomputational mechanisms underlying subjective cost-benefit valuation across domains, and provide an insight into the multidimensional nature of motivation.

D - 4
BEHAVIORAL AND NEURAL ASYMMETRIES IN MORAL UPDATING.

Jordan, E Theriault - Boston College; Liane Young - Boston College

Moral judgment is a dynamic process that has typically been studied in stasis. In daily life, moral judgments are not one-shot; and while they can be made quickly and intuitively, they can also be updated as new information—either exculpatory, or incriminatory—comes to light. In the present work, we connect recent neuroimaging research in impression updating with questions drawn from moral psychology, probing both asymmetries in moral updating and its relationship to activity in the Theory of Mind (ToM) network. A series of stories described an agent's decision in the context of a moral dilemma. Scenarios were designed to first elicit positive or negative moral judgments, and then to reverse them, using novel exculpatory or incriminatory information. Each story used interchangeable segments that, when reordered, changed the direction of updating. Behaviorally, we observed two asymmetries: (a) incriminatory information was attributed to individuals, whereas exculpatory information was attributed to situations; and (b) exculpatory information induced greater updating. Neurally, asymmetries emerged in an item-wise analysis of story features. During exculpatory updating, but not during incriminatory updating, activity in RTPJ—a key node for ToM—tracked the deviance of an agent's behavior from established social norms. This work advances our understanding of moral judgment in a way that is not possible from its study in one-shot dilemmas. Furthermore, our neural results may offer insight that is of interest to researchers calling for the "deconstruction and reconstruction" of ToM, providing greater specificity with regard to the function of RTPJ.

D - 5
WHO WEARS THE RUBY RED SLIPPERS? MULTIVOXEL PATTERNS DECODE INDIVIDUALS FROM THEIR BELONGINGS

Ashley Unger - Temple University; Jessica Collins - Massachusettes General Hospital; Jessica Koski - University of Texas Austin; Ingrid Olson - Temple University

For social animals, the canonical form of social knowledge is information about other people. Detailed knowledge of particular individuals can be accessed by exposure to a range of cues. These range from proximal cues -such as a name- to distal cues – such as an object that belongs to someone. Here we asked whether the functionally localized face-processing network contains multivoxel patterns that represent this type of abstract person information. This would be indicated by the accurate classification of an individual's facial identity when a classifier is trained using that person's name, objects associated with that individual, or a picture of their home. Participants learned detailed biographical information about 4 previously unfamiliar males prior to scanning. In the scanner, participants were shown novel versions of the learned names, houses, occupations, and faces. The task was to answer a binary question about the person linked to the pictures, e.g. "Is the person who lives in this house single"? Results showed that multivoxel patterns along the extended face network could decode the faces of particular individuals after training on their names, objects associated with their particular occupation (such as a stethoscope), or pictures of their homes. These findings indicate that portions of the extended face network code for highly abstract, conceptual information about individuals. This coding scheme may permit the rapid, and automatic access of biographical information based on a single bit of person-specific information – such as a pair of ruby red slippers.

D - 6

DOES UNILATERAL INSULAR DAMAGE DISTURB PERSONALITY? A STUDY WITH EPILEPTIC PATIENTS

Benjamin Hebert-Seropian - University of Montreal ; Olivier Boucher - University of Montreal; Carole Sénéchal - University of Ottawa; Alain Bouthillier - University of Montreal; Franco Lepore - University of Montreal; Dang K. Nguyen - University of Montreal

It has been convincingly established that the insula is involved in the emergence of interoceptive awareness and in the processing of emotional information. It was proposed that these two seemingly separate functions may work conjointly as part of a large neural circuit tasked with the extraction of emotional information from bodily. It was hypothesized that, if the insula does indeed modulate feelings and the cognitive processes which derive from them, insular damage would result in alterations of emotional experience, social behavior, and personality. To that effect, this study examined behavioral changes in a group of 18 patients who underwent unilateral insulectomy surgery as part of their epilepsy treatment. These patients were compared to a lesion-control group consisting of 20 epileptic patients who underwent temporal lobe surgery. Participants were assessed using the Iowa Scales of Personality Change (ISPC), filled out at least 6 months post-operatively by someone close to the patient. Insular patients were rated as more irritable and emotionally labile post-operatively, a difference which is not observed in the lesion-control group. Among both groups, ratings of anxiety were significantly increased post-surgery, but while the temporal patients' anxiety scores decreased over time, they remained stable for insular patients, suggesting that the resection of the insular cortex may have a more enduring anxiogenic effect. There was no effect of insular resection on social behavior, executive/decision-making, or on motivation-emotionality ratings. To our knowledge, this study is the first to assess changes in personality in a relatively large sample of patients with insular lesions.

D - 7

FMRI STUDY OF SCRIPT-DRIVEN IMAGERY OF SOCIAL REJECTION AND SOCIAL INCLUSION MEMORIES IN DEPRESSION

Julia Gillard - MRC Cognition and Brain Sciences Unit, University of Cambridge, Cambridge, United Kingdom; Jason Stretton - MRC Cognition and Brain Sciences Unit, University of Cambridge, Cambridge, United Kingdom; Tim Dalgleish - MRC Cognition and Brain Sciences Unit, University of Cambridge, Cambridge, United Kingdom

Major life events involving social rejection are found to be proximal risk factors for depression and persistent low mood. Social rejection has been argued to activate a distinct social pain network by co-opting the physical pain matrix. This study uses script-driven imagery of emotionally salient autobiographical experiences to elucidate the neural correlates of social rejection and inclusion within depressed and healthy control participants.

In the scanner, 18 participants with Major Depressive Disorder and 21 healthy controls listened to and imagined 18 autobiographical memories of social rejection, inclusion and neutral memories acquired in a prior interview. Participants rated their current mood following each memory.

Affective ratings found significant changes in mood, but no main effect for group. One sample t-test in depressed participants revealed activations in right amygdala, subgenual prefrontal cortex (PFC), bilateral insula and ventral striatum (VS) for rejection versus neutral memories. During inclusion compared to neutral, we additionally found subgenual PFC, with the exception of VS.

In healthy participants the bilateral post central gyrus and posterior dorsal anterior cingulate cortex (dACC) were active during social rejection memories.

Inclusion compared to neutral revealed bilateral post central gyrus activity. There were no differences between social rejection compared to inclusion in either group. Two-sample t-tests revealed depressed participants showed increased activation in the dACC and bilateral insula during social inclusion compared to neutral memories, relative to controls.

Overall, our results suggest that social rejection and social inclusion may share a common neural substrate, which may be heightened in the presence of MDD.

D - 8

WHEN SELF-PERCEPTION IS ITS OWN REWARD: NARCISSISTIC SELF-VALUATION IN PERSON PERCEPTION AND SOCIAL COGNITION

Noam Zerubavel - Columbia University, New York, USA; Kevin Ochsner - Columbia University, New York, USA

What compelled Narcissus to fixate on his reflection instead of others? Could the underlying neural mechanisms also explain narcissists' excessively self-centered cognitions? We hypothesized that narcissistic self-absorption—both in person perception and social cognition processes—relates to disproportionate reward value elicited by focusing on oneself relative to others. Specifically, we tested the hypothesis that individual differences in trait narcissism (NPI-

16) would correlate with activity in core valuation regions—ventromedial prefrontal cortex (vmPFC) and ventral striatum (VS)—evoked by images of oneself (relative to group members) and making trait judgments about oneself (relative to group members). To test this hypothesis, we recruited groups of well-acquainted participants to complete several tasks in the fMRI scanner: (1) viewing their own and group members' faces while performing a simple cover task; (2) making trait judgments about themselves and group members; and (3) an independent functional localizer (Monetary Incentive Delay task) to identify vmPFC and VS regions of interest (ROIs) active during anticipation and receipt of monetary rewards. We found that individual differences in trait narcissism were predicted by heightened neural activation in both vmPFC and VS ROIs while (1) viewing images of oneself (relative to group members) as well as (2) making trait judgments about oneself (relative to group members). In addition, these neural indices of narcissistic self-perception predicted participants' behavioral self-enhancement effects (in the trait judgment task) better than did the NPI-16. More broadly, the naturalistic paradigm we advance can be used to elucidate the psychological and brain bases of various personality disorders.

D - 9
THE ROLE OF PARENTAL BUFFERING IN THE RELATIONSHIP BETWEEN EARLY DIURNAL CORTISOL AND ADOLESCENT MENTAL HEALTH-RELATED PROBLEMS

Jessica Flannery - University of Oregon; Leslie Roos - University of Oregon; Heidemarie Laurent - University of Oregon; Philip Fisher - University of Oregon

The social environment in early life plays a critical role in the programming of the hypothalamic-pituitary-adrenal axis (HPAA), which is essential for maintaining homeostatic balance in the face of stressors. Specifically, in early life, the social environment is largely comprised of the primary caregiver who under normal circumstances serves as an external regulator of the HPAA. However, both the quality of early social support and early functioning of the HPAA have been largely linked with greater risk for mental health problems, such internalizing and externalizing behaviors. For example, children who have experienced early and/or chronic neglect typically show blunted diurnal cortisol patterning across childhood and increased anxiety in adolescence; however not all children experience this trajectory. Few studies have examined the longitudinal relationship between these systems to characterize the potential moderating mechanisms of these relationships.

The present study followed children in foster care longitudinally from early (ages 3-5) to late childhood (ages 10-12) to prospectively measure the buffering effect of parental care on paths from child HPAA activation to mental health related problems (i.e. internalizing and externalizing or emotion regulation difficulties). We used a latent growth curve model to examine the dynamic interactions between diurnal cortisol (2 days per month for 3 months, over 2 years) and parenting across early childhood to predict later adolescent mental health related problems. Preliminary results indicate severity of neglect predicts cortisol stability across the 2 years. Follow up analyses will examine the link between cortisol stability and emerging mental health problems in adolescence.

D - 10
DEVELOPMENTAL DIFFERENCES IN THE PERCEPTION OF NON-VERBAL CUES: AN FMRI STUDY

Ashley, R Smith - National Institute of Mental Health; Johanna, M Jarcho - Stony Brook University; Brent Rappaport - National Institute of Mental Health; Daniel, S Pine - National Institute of Mental Health; Eric, E Nelson - National Institute of Mental Health

There is a multitude of psychological research focused on understanding how individuals make immediate judgments about others based on non-verbal cues, a phenomenon known as "thin slices." Studies show that even when observing non-verbal interactions for a few seconds individuals are able to reliably and accurately rate others' emotions and behaviors. While this behavior seems stable in adults very little is known about this phenomenon during adolescence, a critical period for social development. During adolescence brain regions responsible for processing social information undergo major reorganization and it is unclear how this continued development affects adolescents' perception of non-verbal social cues. In the current study adolescents and adults viewed 5-second silent videos of people discussing various topics while undergoing fMRI. Following each video participants were asked to rate either how much they think they would like the individual in the video or how much they would be liked by the individual. Preliminary results show that adults report higher likelihood of liking, and being liked, by the individuals in the video than adolescents. fMRI results show an age by rating interaction in the superior temporal gyrus (STG), a region known for its involvement in social cognition. Interestingly, adults show higher STG activation during both ratings conditions, with the highest activation when rating whether or not they will like the individual in the video. These findings suggest that key regions involved in processing social information are continuing to develop during adolescence and may affect their immediate judgments of others.

D - 11
USING BRAIN CONNECTIVITY PATTERNS TO UNDERSTAND INDIVIDUAL DIFFERENCES IN REGULATORY RESPONSES TO SOCIAL EVALUATIVE FEEDBACK

Michael H. Parrish - UCLA, Los Angeles, California; Janine M. Dutcher - UCLA, Los Angeles, California; Keely A. Muscatell - University of California, Berkeley, California; Tristen K. Inagaki - University of Pittsburgh, Pittsburgh, PA; Michael R. Irwin - UCLA, Los Angeles, California; Naomi I. Eisenberger - UCLA, Los Angeles, California

Although socially evaluative feedback is known to alter affect and state self-esteem, important individual differences may alter these responses to social evaluation. Specifically, high self-esteem is associated with enhanced responses to positive social feedback, while depression is associated with blunted responses to positive social feedback and amplified responses to negative social feedback. An important factor that may explain these individual differences in response to feedback is the presence of implicit regulatory strategies. Individuals with more resilient psychological profiles (high self-esteem, low depression) may amplify reward-related responses to positive evaluations and attenuate threat-related responses to negative evaluations. To examine this, we explored how self-reported self-esteem and depression correlated with patterns of functional connectivity during positive and negative feedback, which may provide important information about specific automatic regulatory strategies that are activated in response to evaluation. We focused on connectivity between vlPFC (implicated in affective regulation) and: 1) sgACC during positive feedback (as this region may process social acceptance) and 2) amygdala during negative feedback (as this region is involved in threat processing). Results demonstrated that, in response to positive feedback, those with higher self-esteem and lower depression showed greater positive vlPFC-sgACC, connectivity, suggesting potential amplification of responses to positive social feedback. Moreover, in response to negative feedback, individuals with lower depression exhibited greater negative vlPFC-amygdala connectivity, suggesting potential attenuation of responses to negative feedback. These results highlight two distinct neural circuits, which may underlie individual differences in responsivity to social evaluation.

D - 12
FEAR-SPECIFIC ENHANCEMENT OF TACTILE PERCEPTION IS DISRUPTED AFTER AMYGDALA LESIONS

Caterina Bertini - University of Bologna - Department of Psychology, Bologna, Italy; Cristina Scarpazza - University of Bologna - Department of Psychology, Bologna, Italy; Claudia Passamonti - Ospedali Riuniti - Department of Neuropsychiatry, Ancona, Italy; Nelia Zamponi - Ospedali Riuniti - Department of Neuropsychiatry, Ancona, Italy; Elisabetta Làdavas - University of Bologna - Department of Psychology, Bologna, Italy

Tactile perception on one's own face is enhanced when viewing touch on a fearful face compared with viewing touch on other expressions, a phenomenon known as the emotional modulation of Visual Remapping of Touch (eVRT; Cardini et al., 2012). This effect seems to be due to a preliminary activation of the somatosensory system in response to threat. To test the contribution of the amygdala to the preferential activation of the somatosensory cortices in response to fear, a group of patients with unilateral lesions to the amygdala following temporal lobectomy, a control group of patients with lesions to the extratemporal regions and a group of healthy participants were tested in an eVRT paradigm in which they were required to distinguish between unilateral or bilateral tactile stimulation on their own cheeks, while viewing fearful, happy or neutral faces being touched or just approached by fingers. While control patients and healthy participants showed the typical enhanced VRT for fearful faces compared to other faces, in patients with lesions to the amygdala the VRT for fearful faces was disrupted, suggesting that the preferential activation of the somatosensory cortices in response to threat relies on the activity of the amygdala.

D - 13
NEURAL SUBSTRATES OF GENERALIZED SOCIAL CATEGORIZATION

Tatiana Lau - Harvard University, Cambridge, USA; Mina Cikara - Harvard University, Cambridge, USA

Social categorization is integral to survival; understanding this initial process has implications for the mechanisms underlying how we perceive others. What are the neural signatures of the processes of categorizing "us" and "them" irrespective of the particular groups in question (i.e., generalized social categorization)? Previous experiments suggest that the self is useful in the categorization of others; regions involved in self-referential processes such as the medial prefrontal cortex (MPFC) are active when processing in-group concepts. However, different in-groups reflect different facets of the self. Here, we used repetition suppression—the phenomenon of reduced neuronal activity in stimulus-sensitive areas when presented with repeated stimuli relative to different stimuli—to examine generalized social categorization. Self-identifying Democrats (n=22) were assigned to a novel team for the purposes

of a competition and underwent fMRI while engaged in categorizing political and novel group members. Trials either were different (e.g., political out-group followed by political in-group), same (e.g., minimal in-group followed by political in-group), or identical (e.g., political in-group followed by political in-group). We identified a network of regions exhibiting greater levels of activation in different trials compared to same and identical trials: bilateral middle temporal gyrus, bilateral superior parietal lobule, and bilateral dorsolateral prefrontal cortex, as well as the right orbitofrontal cortex. Unlike previous studies highlighting the role of the MPFC and self-referential thought in categorizing others, our results suggest that generalized social categorization engages areas associated with cognitive control directed towards salient, task-relevant stimuli.

D - 14
THE EFFECTS OF ACUTE STRESS ON THE CALIBRATION OF PERSISTENCE

Karolina M. Lempert - New York University, New York, NY; Joseph T. McGuire - Boston University, Boston, MA; Danielle B. Hazeltine - New York University, New York, NY; Joseph W. Kable - University of Pennsylvania, Philadelphia, PA; Elizabeth A. Phelps - New York University, New York, NY

People often fail to wait for delayed rewards, even after expressing a preference for them. While this failure to persist is sometimes maladaptive, there are environments in which limiting persistence is advantageous. Persistence should be calibrated to the statistics of delay times in a given environment. Previous work has shown that individuals can calibrate how long to persist for delayed rewards after experience with an environment, and optimal calibration depends on a signal in the ventromedial prefrontal cortex, which tracks the subjective value of waiting over time. Since acute stress can impair prefrontal cortex function, here we tested whether stress would impact the calibration of persistence, in a between-subjects design (four groups; n = 30 each). Half the participants performed a task in which persistence was optimal (high persistence, HP), either after an acute physiological stressor or no stress. The other half performed a task in which it was optimal to quit waiting for a reward soon after each trial began (limited-persistence, LP), either under stress or no stress. There was no main effect of stress on persistence, nor was there a stress x environment interaction. Thus, calibration of persistence is preserved under stress. However, among the stressed participants, both the cortisol response to stress (β = 0.38; p = 0.01) and baseline cortisol (β = 0.39; p = 0.01) independently predicted better calibration under stress (less waiting in LP, more waiting in HP). This suggests that increased systemic cortisol output after stress predicts more optimal behavior in this task.

D - 15
A SYSTEMATIC CHARACTERIZATION OF PREFERENCES FOR GENEROSITY

Carolina, M Di Tella - New York University; Paul, W Glimcher - New York University; Wei Ji Ma - New York University
Decisions that affect other people's outcomes are a fundamental aspect of social behavior. In non-strategic contexts, such decision-making processes are formalized as models of "other-regarding preferences", which measure how much a person is willing to sacrifice to help or hurt others. Many models of other-regarding preferences have been proposed, but there has not been convincing evidence in favor of any particular one. In this project, we aim to empirically identify the best model from amongst leading other-regarding preferences models using a modified dictator game task in which the recipient is either a friend of the subject or a stranger. Previous to running the experiment, we developed a novel trial-design method that allowed us maximally distinguish hypothesized models and parameters. We find that amongst a number of standard economic models, the Charness-Rabin model is by far the best descriptor for our sample. Particularly, the full version of this model provides a better fit than simpler nested versions of it (e.g., Fehr-Schmidt model, simple linear function) that are often used in economic or neuroscientific studies, respectively. We also find that other-regarding preferences towards friends versus strangers vary in degree more than in nature within subjects, meaning that those who are generous towards friends are also generous towards strangers, although less, and those who are competitive towards strangers are typically competitive towards friends as well. Finally, we show that looking at population averages is misleading and argue in favor of looking at individual level data to make conclusions about social preferences.

D - 16
IS YOUR BOSS AN ALARM BELL OR A USEFUL TOOL? HOW SOCIAL RANK SHAPES LOW LEVEL VISUAL ATTENTION.

Matthias S. Gobel - Sage Center for the Study of the Mind, University of California, Santa Barbara; Thomas Bullock - Psychological and Brain Sciences, University of California, Santa Barbara; Daniel C. Richardson - Experimental Psychology, University College London; Heejung S. Kim - Psychological and Brain Sciences, University of California, Santa Barbara; Barry Giesbrecht - Psychological and Brain Sciences, University of California, Santa Barbara

From the boardroom to the playground, social hierarchies coordinate human interactions. Recent behavioral evidence suggests that knowledge about where a person of higher or lower rank is looking modulates another person's information processing, suggesting that visual attention might play a key role in coordinating interactions within hierarchies. Here we examined the neural bases of these effects and tested two competing hypotheses about its nature: The alarm hypothesis holds that higher rank increases saliency and automatically captures onlookers' attention. The tool hypothesis holds that higher rank guides onlookers' attention only when it is relevant to the task. These hypotheses were tested using a visual task in which participants (n=60) saw a cue (a dot) and then had to detect a subsequent target (a square) presented at the same location or somewhere else. Participants were told that the cue was the gaze location of a confederate who was described to be either of higher or of lower rank. Behavioral cue-target spatial compatibility effects were greater when the cue was assigned to a higher ranking partner, but only when participants believed they were engaged in the same task. Electroencephalography measurements revealed that alpha-band oscillatory activity (8-13Hz) was modulated by the confederate's social rank and task relevance around 150-550ms after target onset over regions associated with the fronto-parietal attention network. These results are inconsistent with the alarm hypothesis, but are in support of the notion that higher rank's gaze can be a useful tool, when relevant to the task at hand.

D - 17
OLFACTORY LEARNING AND THE FUNDAMENTAL ATTRIBUTION ERROR

Philipp Homan - Friedman Brain Institute, Departments of Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Benjamin Ely - Friedman Brain Institute, Departments of Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; May Yuan - Friedman Brain Institute, Departments of Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY; Tobias Brosch - Department of Psychology, University of Geneva, Switzerland; Daniela Schiller - Friedman Brain Institute, Departments of Psychiatry and Neuroscience, Icahn School of Medicine at Mount Sinai, New York, NY

Background: Humans tend to overestimate personality dispositions when explaining behavior. This well-known fundamental attribution error (FAE) has been conceptualized in a dual process model consisting of an automatic and a controlled part. Here we tested whether the manipulation of prior cues through aversive olfactory conditioning would lead to a bias towards dispositional judgments and thus a higher rate of committing the FAE. We also tested whether this bias was driven by increased neural activity of olfactory learning substrates and decreased activity of cognitive control substrates during the inference stage.
Methods: Seventeen healthy subjects underwent an aversive olfactory conditioning paradigm during fMRI. Subjects were shown two faces, one of them paired with an aversive smell in 33% of the trials. In a subsequent fMRI task the same faces were repeatedly shown again, accompanied by written information about a specific behavior under a specific context. Subjects had to judge whether the behavior was driven by personality or by situational causes.
Results: Olfactory conditioning induced feelings of anger, disgust, and anxiety towards the conditioned face. Subjects were more likely to attribute behavior to the personality when exposed to a conditioned compared to an unconditioned face. This effect was accompanied by lower activity in the ventromedial dorsolateral prefrontal cortex (vmPFC) during the inference stage.
Conclusions: Aversive olfactory memories can result in a higher tendency to explain human behavior by personality traits and a lower willingness to consider contextual information. Our findings suggest that this effect is mediated by the vmPFC.

D - 18
PARENTAL DEPRIVATION PREMATURELY ENDS A SENSITIVE PERIOD FOR AMYGDALA BUFFERING BY PARENTS: LONG-TERM ANXIETY ASSOCIATIONS.

Bridget Callaghan - Columbia University; Dylan Gee - Cornell University; Laurel Gabard-Durnam - Columbia University; Eva Tezler - University of Illinois; Kathryn Humphreys - Tulane University; Bonnie Goff - University of California Los Angeles; Mor Shapiro - University of California Los Angeles; Jessica Flannery - University of Oregon; Daniel Lumien - University of California Los Angeles; Nim Tottenham - Columbia University

The quality of the child-caregiver relationship is one of the most significant contributing factors to emotional functioning across the lifespan. The amygdala is considered to be at the core of emotional functioning and studies in animals and humans have shown that amygdala reactivity can be buffered by parental presence/parental stimuli during a sensitive period in childhood. However, studies in rodents have shown that early adversity exposure reduces the potency of the mother as a buffer of amygdala activity during that sensitive period. Whether parental buffering of amygdala reactivity occurs in human children exposed to parental deprivation early in life is an open and important

question. To address this issue we compared previously institutionalized (PI) children/adolescents to a comparison group of children/adolescents that were not exposed to parental deprivation. To assess amygdala reactivity to parental stimuli participants viewed faces of their parent or a stranger while undergoing functional neuroimaging. As demonstrated in past work, comparison children but not adolescents exhibited lower amygdala responses to pictures of a parent, relative to a stranger (parental buffering in children). Interestingly, however, PI children and adolescents exhibited no differential activity to the two picture categories (similar to comparison adolescents; i.e., no parental buffering of amygdala reactivity). Importantly, a lack of parental buffering in childhood was predictive of higher levels of generalized anxiety 2-4 years after the scan. These data suggest that parents may not be effective buffers of amygdala reactivity in PI children and that this may have long-term consequences for anxiety symptoms.

D - 19
EYE FOR AN EYE: RECIPROCAL PUNISHMENT IN DYADIC INTERACTION

Tanaz Molapour - Karolinska Institutet, Department of Clinical Neuroscience; Björn Lindström - Department of Economics, University of Zurich; Jan Haaker - Department of Clinical Neuroscience, Karolinska Institutet; Martin Bellander - Aging Research Center, Karolinska Institutet; Andreas Olsson - Department of Clinical Neuroscience, Karolinska Institutet

Retaliatory interactions are central to many destructive social behaviors, such as blood feuds, school-yard-fights, and flaming wars in online forums. What are the processes behind these retaliatory interactions in real life and online? To address this question, we analyzed online behavior of anonymous commenters in dyadic interactions in an Internet forum. Modelled after the Internet forum, we then created a simple experimental model examining punishment in dyadic interactions. In three separate experiments, we allowed for punishments and counter-punishments with direct physical costs (mild electrical shocks) to the participants to examine whether (1) punishment is self-reinforced, and (2) people engage in counter-punishments with or without provocation. Further, we applied a computational model to quantify participants' decisions to administer shocks based on how many shocks they received from the co-player. In line with the Internet data, the experiments revealed that participants punished co-players, despite the cost of receiving punishment back. These findings describe a form of self-punitive behavior previously documented in animals. Participants' tendencies to administer shocks were exacerbated when the co-player initiated punishment, indicating that a small initial offense motivated punishing behavior over time. The best predictor for administration of shocks was the number of shocks participants received on a previous trial. The computational model corroborated both our Internet and experimental data. We hope that our results will improve the understanding of the processes underlying common destructive social phenomena where people punish others even at a cost to themselves.

D - 20
DON'T TOUCH ME! AUTISTIC TRAITS MODULATE ELECTROPHYSIOLOGICAL RESPONSES TO SOCIAL TOUCH

Leehe Peled-Avron - Department of Psychology, University of Haifa, Haifa, Israel; Simone G. Shamay-Tsoory - Department of Psychology, University of Haifa, Haifa, Israel

An inherent feature of social interactions is the use of interpersonal touch for social communication. It is increasingly acknowledged that individuals with autism spectrum disorders (ASD) show impaired reaction to interpersonal touch. Yet, the neural underpinnings of this difficulty are still largely unknown. Therefore, the current study sought to examine the behavioral mechanisms, time course and neural correlates underlying interpersonal touch perception in individuals with high and low autistic traits, using both a behavioural and an ERP experiment. Fifty four participants were divided into high and low autistic traits' groups according to their performance in the autism quotient (AQ) survey. We recorded their electroencephalography activity during the observation of human touch, object touch and control non-touch portrayed in photos. Human touch photos elicited higher P1 and LPP compared to objects' touch or non-touch conditions. However, only elevated LPPs were evident in high relative to low AQ scores during observation of human touch compared to the other conditions. In addition, AQ scores were positively correlated with social touch aversion and anxiety. Given that elevated LPP's may represent an anxiety bias, our results may indicate that individuals with high autistic traits experience anxiety during interpersonal touch. These findings may account for the touch aversion observed in ASD and may underlie these individuals' social difficulties.

D - 21
COGNITIVE EXTINCTION: WHERE REAPPRAISAL AND EXTINCTION INTERSECT

Birthe Macdonald - University of Reading, Reading, United Kingdom; Shannon Hoare - University of Reading, Reading, United Kingdom; Tom Johnstone - University of Reading, Reading, United Kingdom

Researchers have proposed that cognitive reappraisal, which involves ventrolateral prefrontal cortex (vlPFC), also engages neural regions important for the extinction of conditioned fear, such as ventromedial prefrontal cortex (vmPFC). This study used a novel cognitive extinction task to test directly whether reappraisal of negative stimuli involves fear extinction circuitry.

Participants (N=20) underwent fear conditioning using letters as conditioned (CS) and mild electric shocks as unconditioned stimuli (US), before completing a cognitively mediated extinction task . During the cognitive extinction phase, the same letters (CS+ and CS-) were embedded in words belonging to two categories, one of which was safe (not associated with a risk of electric shock) and one dangerous. We hypothesised that participants would reappraise the CS+ when it was presented within the safe category, with increased activation in vmPFC and vlPFC, as well as decreased activation in areas involved in shock perception, such as the insula.

Dangerous CS+ trials were associated with greater skin conductance responses and greater activation in the insula than safe CS+, and CS- trials. We also found increased activation in left vlPFC during safe compared to dangerous CS+ trials. We did not find activation in vmPFC in this contrast. These results suggest that cognitive extinction involves vlPFC in the reappraisal of the CS+, which is effective in reducing shock-related insula activation without significant vmPFC activation. Further analyses will examine if cognitive extinction is related to altered functional connectivity between vlPFC, vmPFC and insula.

D - 22

THE IMPACT OF SOCIAL CONTEXT ON A NEUROCOGNITIVE MEASURE OF EMOTION REGULATION IN CHILDREN

Sarah Babkirk - The Graduate Center, CUNY; Hunter College, CUNY; Olga Gulyayeva - Hunter College, CUNY; Jean Quintero - The Graduate Center, CUNY; Hunter College, CUNY; Samantha Birk - Hunter College, CUNY; Tracy, A. Dennis-Tiwary - Hunter College, CUNY; The Graduate Center, CUNY

Emotion regulation (ER) is a key predictor of positive adjustment across the lifespan. The late positive potential (LPP) is a neurocognitive signature of ER: LPP amplitudes are reduced when adults intentionally decrease emotional responses. Yet, the utility of the LPP in developmental research remains unclear, partly because developmentally-appropriate and ecologically-valid assessments are absent. The present study systematically varied the social context of ER during EEG assessment by including conditions in which parents were present or helped children manage their emotional reactions by scaffolding ER. Twenty-four 5- to 8-year-olds (11 female; Mage = 6.89, SD = 1.01) completed a Directed Reappraisal Task (DRT). EEG was recorded during three conditions: negative (unpleasant pictures with negative stories), reappraisal (unpleasant pictures with reappraisal stories), and neutral (neutral pictures with neutral stories). In the Parent-Scaffolding Group (n = 9), parents read scaffolding scripts before each story. In the Parent-Present Group (n = 6), children completed the DRT with the parent present but not interacting. In the Child-Alone Group (n = 9), children completed the DRT alone. The Condition x Group interaction, $F(4, 42) = 3.36$, $p < .05$, $\eta p2 = .24$, showed that only children in the Parent-Present group showed the predicted reappraisal effect, with reduced LPP amplitudes in the reappraisal (M = 24.86, SD = 8.71) versus negative (M = 37.15, SD = 15.46) condition, $t(5) = 3.01$, $p < .05$. Findings suggest that children's reappraisal capacity is bolstered by the mere presence of their parent. This highlights the need for ecologically-valid developmental methods.

D - 23

WILLINGNESS TO VACCINATE DECREASES WHEN CONSIDERING BENEFITS TO SOCIALLY DISTANT INDIVIDUALS

Alex, J Francisco - University of Missouri - Kansas City; Jared, M Bruce - University of Missouri - Kansas City; Seung-Lark Lim - University of Missouri - Kansas City; David, P Jarmolowicz - University of Kansas; Derek, D Reed - University of Kansas; Krishna, M Amin - University of Missouri - Kansas City; Cash Sterling - University of Kansas Medical Center; T Ryan Smith - University of Kansas Medical Center; Amanda Bruce - University of Kansas Medical Center

There has been a recent resurgence of vaccine preventable illness in the United States. Decisions to vaccinate (or not) involve risk to the general public, as well as perceived risk of side effects to the person being vaccinated. Participants defined members of their social network, and subsequent hypothetical vaccine decisions were made when considering the probability of preventing disease in five of these members, each increasing in social distance. Results indicated that participants were most willing to subject their child to possible vaccine side effects when considering the likelihood of preventing disease in their child, but were least willing to risk side effects in their child to prevent disease in an acquaintance or stranger; $F(4,164) = 27.34$, $p < .0001$. Participants exhibited a pattern of decline in willingness to risk side effects with each increase in level of social distance; $r(42) = -.369$, $p < .0001$. This

mentality may underlie "vaccine hesitant" parents, who are concerned with the well-being of their children but unmoved by petitions to vaccinate their children to protect the general public. Separate analyses suggested individuals with larger social networks are less willing to risk side effects in their children for the benefit of socially distant individuals, $r(42) = -.319$, $p = .01$; this suggests social network size may play a role in diffusion of responsibility when considering benefits of vaccines to the general public. Persons with larger social networks may experience a type of bystander effect that shifts vaccine status responsibility to others.

D - 24

CHOKING UNDER PRESSURE: A NEUROPSYCHOPHYSIOLOGICAL INVESTIGATION AT 7T

Lauren A J Kirby - Department of Psychology, Auburn University; Matthew Miller - School of Kinesiology, Auburn University; Keith Lohse - School of Kinesiology, Auburn University; Kirk Grand - School of Kinesiology, Auburn University; Jerry E Murphy - School of Kinesiology, Auburn University; Ken Graap - Biopac Systems, Inc.; Alan Macy - Biopac Systems, Inc.; Jennifer L Robinson - Department of Psychology, Auburn University

We examined the effects of social pressure on performance during a simple hand-grip task. The current study is the first of its kind to combine six measures of peripheral nervous system activity (e.g., psychophysiological measurements) with central nervous system (functional magnetic resonance imaging [fMRI]) functioning. After practice trials, participants underwent test trials to achieve 30% of their maximum grip force without feedback under two testing conditions: social pressure and no-pressure. Social pressure was induced via social and monetary incentives. Participants performed the motor task in a 7T Siemens MAGNETOM scanner while BIOPAC MR-compatible modules, leads, and electrodes collected electrocardiograph (ECG), respiration, electrodermal activity (EDA), electromyogram (EMG on extensor and flexor muscles), and grip force from a hand dynamometer. Participants made more errors in attempting to reach their target force (30% of max) during the pressure condition, compared to the no pressure condition. Thus, we found behavioral support for "choking under pressure". Additionally, submillimeter fMRI revealed that the pressure condition (in comparison to the no-pressure condition) elicited greater activation during the motor task compared to the rest period immediately following it, and greater activation in fronto-parietal areas, suggesting participants may have been thinking more about their performance and monitoring errors. We also found consistent neural correlates for ECG and EMG, but not for other psychophysiological measures. This may be due to lack of power, or variable neural correlates for these signals. Taken together, these data suggest a neural mechanism for the "choking under pressure" phenomenon supported by behavioral and psychophysiological measures.

D - 25

EMPATHY...ONLY WHEN HUMAN: MINIMAL HUMANITY CUES INDUCE NEURAL -EMPATHIC REACTIONS TOWARDS NON-HUMAN ENTITIES

Federica Meconi - University of Padova; Jeroen Vaes - University of Trento; Mateusz Olechowski - University of Warsaw; Paola Sessa - University of Padova

This study tested whether minimal attribution of humanness is necessary for the occurrence of empathic neural reactions towards non-human entities that are "painfully" stimulated. In previous studies, vegetables have been often used as a control condition to explore empathy towards humans' pain, in the context of the present study they were given a minimal humanity cue (i.e., a human name) or not (i.e., an adjective). Human associations with these different types of vegetables were measured with an Implicit Association Task allowing us to split the sample in those who significantly humanized the vegetables with a name and those who did not. We then manipulated pictures of vegetables representing them either pricked by a needle (painful condition) or touched by a Q-tip (touch condition) while recording electroencephalographic activity from a sample of 18 healthy students. Results indicated that the more participants humanized the vegetables with a name, the more they showed an increased neural reaction when vegetables with a name were painfully rather than neutrally stimulated compared to vegetables without a name. These reactions occurred both in an early (P2: 130-180 ms) and a later (P3: 360-540ms) time-window. Moreover, the P3 reaction to pain significantly correlated with participants' explicit empathic tendencies suggesting that the positive shifts in the P3 amplitude are compatible with an empathic response. Overall, these findings suggest that empathy can be triggered by non-human entities as long as a minimal humanity cue is attributed to them.

D - 26

EXPERIENCE SAMPLING OF EMOTIONAL STATES INDUCED DURING PAVLOVIAN FEAR CONDITIONING

Daniel Stjepanovic - Duke University, Durham, USA; Kevin S. LaBar - Duke University, Durham, USA

Pavlovian fear conditioning provides a powerful translational tool for the study of memory and emotion processes. Despite the wide use of this paradigm, the nature of the affective experiences that are elicited during Pavlovian fear conditioning remain poorly understood. Animal models implicate fearful reactions during Pavlovian conditioning, and human neuroimaging work has demonstrated an overlap of the neural structures that enable fear learning with those activated during fear induction. Yet, it remains unclear the extent to which fear-conditioning procedures elicit the subjective experience of fear or other emotions. The present study used experience sampling to directly assess what emotional states are elicited during differential fear conditioning in healthy human adults. Participants self-reported their emotional states intermittently while undergoing fear conditioning. We found that participants were significantly more likely to endorse negative emotional states, such as 'fear' and 'anger', and less likely to endorse positive states such as feeling 'content' immediately following the presentation of an aversively-reinforced CS+ stimulus. A second experiment extended these findings using differential reversal conditioning, a paradigm in which the associative binding between the CS+ and the aversive US is reversed with an explicitly unreinforced CS– after successful learning. Consistent with the results of the first experiment, we again found greater endorsement of a number of negative states, which tracked the change in CS-US binding. The present results indicate that Pavlovian fear conditioning indeed elicits a fearful emotional state in participants, though fear is intermixed with endorsement of some other negative emotional states.

D - 27
READING MORE THAN ONE MENTAL STATE

Ceylan Ozdem - Vrije Universiteit Brussels; Marcel Brass - ; Laurens Van der Cruyssen - ; Arjen Schippers - ; Frank Van Overwalle - Vrije Universiteit Brussel

Neuroimaging research has demonstrated that the temporo-parietal junction (TPJ) and medial prefrontal cortex (mPFC) are activated during high-level thinking about the beliefs of other people, such as false beliefs that do not conform to reality. Recent approaches (Cabezza et al., 2012) see activation of the TPJ during false belief reasoning as caused by reorientation of attention from reality to internal memory. However, it is still unclear how reorientation is accomplished: by reducing attention to the self (what you observed) or by increasing attention to the other target's mind (what you remember the other knows)? To resolve this question, we asked participants to judge the false and true beliefs of one or two persons, instead of only one person as in past research. The results suggest comparing responses when maintaining two false beliefs as opposed to one false belief, results in longer response times. Moreover, the results revealed stronger activation in the ventral mPFC during the belief formation and question phase, and in the left TPJ during the question phase only. This suggests that increasing one's attention to distinct targets' mind is accomplished by increased recruitment of several brain areas responsible for false belief understanding.

D - 28
RESTING-STATE FUNCTIONAL CONNECTIVITY IN HUMAN REACTIVE AGGRESSION

Gabriela Gan - Icahn School of Medicine at Mount Sinai; Federico d'Oleire Uquillas - Icahn School of Medicine at Mount Sinai; Anna Zilverstand - Icahn School of Medicine at Mount Sinai; Muhammad A. Parvaz - Icahn School of Medicine at Mount Sinai; Rebecca N. Preston-Campbell - Icahn School of Medicine at Mount Sinai; Dardo Tomasi - National Institute on Alcohol Abuse and Alcoholism; Scott J. Moeller - Icahn School of Medicine at Mount Sinai; Thomas Maloney - Icahn School of Medicine at Mount Sinai; Rita Z. Goldstein - Icahn School of Medicine at Mount Sinai; Nelly Alia-Klein - Icahn School of Medicine at Mount Sinai

Intermittent-explosive disorder (IED) is characterized by reactive aggression, low self-control, and elevated stress reactivity. Previously, we reported that aggressive individuals exhibit altered resting glucose metabolism in the default-mode network (DMN), measured with FDG-PET. Here, we investigated the effects of reactive aggression on DMN resting-state functional connectivity (rsFC) using seed-based fMRI and graph theory analyses.
Twenty-four male participants (n=12, reactive aggressive [RA, including 4/8 subclinical/full IED]; n=12, matched low aggressive controls) underwent resting-state fMRI, and completed the Multidimensional Personality Questionnaire. We investigated group differences in seed-based rsFC of the precuneus, a central DMN node, and in whole-brain connectivity to assess clustering coefficient, a measure of local connectivity between neighboring nodes. Connectivity-personality trait correlations were also explored.
Relative to controls, RA individuals reported elevated stress reactivity (p<.001) and low self-control (p<.05). For the precuneus seed, controls but not RA individuals exhibited conventional negative connectivity with 'task-positive' regions, which are active during cognitive tasks (pcluster- corrected<.05, -68 voxels). Graph theory analyses revealed decreased clustering coefficient in sensorimotor network nodes (pre-motor, mid-cingulate, paracentral

lobule, precuneus) for RA individuals vs. controls (pFDR-corrected <.05). Aberrant rsFC for both measures was correlated with increased stress reactivity across participants (p<.01), a result reflected by group differences. Our findings suggest that heightened stress reactivity and low self-control in RA individuals, vulnerability factors for over-reaction to salient events (e.g., provocation), may be linked to impaired inhibition of task-positive regions at rest, and to disrupted local connectivity in the sensorimotor network, a crucial system for the control and monitoring of motoric responses.

D - 29
"IT'S THE LITTLE THINGS IN LIFE": EVIDENCE FOR SPONTANEOUS EMOTION REGULATION TO MILDLY EMOTIONAL PICTURES IN OLDER FEMALES

Michelle R Johnson - Swarthmore College; Catherine J. Norris - Swarthmore College

Older adults tend to experience fewer negative emotions while putting greater focus on positive emotions (Mather & Carstensen, 2005). This pattern is called the positivity effect and likely results from increased emotion regulation that promotes emotional well-being later in life. The current study looked at age differences in a similarly beneficial pattern called the positivity offset, in which mildly pleasant stimuli have a stronger effect on emotional responses than mildly unpleasant stimuli (Norris, Larsen, Crawford & Cacioppo, 2011). Functional magnetic resonance images (fMRI) were collected while older and younger females viewed and subsequently rated mildly pleasant and unpleasant pictures. Although all participants exhibited a positivity offset, such that mildly pleasant pictures were rated more strongly than equally extreme and arousing mildly unpleasant pictures, older females demonstrated a larger positivity offset than younger females. Older females also showed decreased activation of the amygdala and increased activation of the dlPFC, a region associated with emotion regulation, while viewing mildly emotional stimuli. In addition, older participants had longer response times to mildly unpleasant pictures and these RTs correlated with decreased negativity ratings, suggesting that older adults were taking more time to reappraise their feelings toward mildly unpleasant stimuli. The combination of longer response times, decreased ratings of mildly unpleasant pictures, increased activation of the dlPFC, and decreased activation of the amygdala suggests older females were spontaneously regulating their emotions to decrease negative affect to mildly emotional stimuli and consequently increase their positivity offset. This tendency may prove significant for healthy aging.

D - 30
AFFECTIVE FLEXIBILITY: A REGISTERED REPLICATION

Daniel S Lumian - University of Denver; Kateri McRae - University of Denver

The amygdala has been implicated in detecting and responding to threatening and salient stimuli. Additionally, it has been well-established that bidirectional neural pathways between the prefrontal cortex (PFC) and the amygdala allow the PFC to react and then regulate activation in the amygdala. However, there is evidence that cognitive goals, or top-down frames implemented, can also alter amygdala responsivity. This study is a registered replication of Cunningham, Van Bavel & Johnsen (2008) demonstrating this flexible mapping of evaluative goal-state to amygdala activation. 39 participants underwent a functional magnetic resonance imaging scan while viewing famous names. Participants were asked to rate each of the 96 names from popular culture under three rating conditions: overall, positive and negative. During the overall condition, participants were asked to consider and rate both positive and negative associations they had of the individual. During the positive condition, participants were asked to only think of positive associations and ignore any negative information. Conversely, in the negative condition, they were asked to focus on the qualities and ignore positive information. Positive, negative and emotionality ratings were collected for each name outside the scanner. The interaction between rating and condition was the a priori effect of interest for the replication. Parametric modulation analyses using post-scan ratings revealed an interaction of rating and condition, F(1, 22)=6.44, p=.02. Greater right amygdala activation was observed as positive ratings increased, but only during the positive rating condition. The previously reported affective flexibility effect was replicated in a well-powered sample and using current stimuli.

D - 31
THE RELATION BETWEEN SELF-DISTANCING AND THE NEURAL BASIS OF EMOTION DYNAMICS.

Maxime Résibois - University of Leuven, Belgium; Philippe Verduyn - Maastricht University, Netherlands; Pauline Delaveau - University of Paris VI, France; Jean-Yves Rotgé - University of Paris VI, France; Peter Kuppens - University of Leuven, Belgium; Iven Van Mechelen - University of Leuven, Belgium; Philippe Fossati - University of Paris VI, France

Emotions unfold over time. Consequently, a full understanding of emotion characteristics can only be reached when their dynamic nature is taken into account. A particularly salient dynamic characteristic of emotions is their intensity. During an emotional episode, intensity varies over time, resulting in an emotion intensity profile. It has been shown that intensity profiles can take many different shapes differing mainly in explosiveness (i.e., whether the profile has a steep vs. a gentle start) and accumulation (i.e., whether intensity increases over time vs. goes back to baseline). However, the psychological and neural mechanisms underlying variability in these dynamic features remain largely unknown. We conducted two fMRI studies to fill this gap. Participants received negative social feedback and were asked to think about it, either without any further specification (Study 1), or from an immersed vs. a distanced perspective (Study 2). In both studies, participants were further asked to draw emotion intensity profiles reflecting changes in their emotional experience over time. In Study 1, emotion explosiveness and accumulation were found to have a different neural signature with explosiveness being related to cortical midline regions involved in self-referential processing, and accumulation to regions belonging to the salience and social pain networks (e.g., Insula). In Study 2, taking a distanced perspective was found to decrease both emotion explosiveness and accumulation. The neural mechanisms mediating the effect of self-distancing will be discussed.

D - 32
STABILITY AND RELIABILITY OF A PHYSIOLOGICAL MEASURE OF NEGATIVE AFFECT

Nathaniel W Elkins-Brown - University of Toronto, Toronto, Canada; Blair Saunders - University of Toronto, Toronto, Canada; Michael Inzlicht - University of Toronto, Toronto, Canada
Historically, electromyographic activity over the corrugator supercilii (cEMG) has been used as measure of negative emotion and of exerted effort. Recently, researchers have found evidence for early increased cEMG during errors in cognitive control tasks, and that these increases are correlated with behavioral and neurophysiological measures of error monitoring. Given the potential for cEMG to be a more objective, continuous, and unobtrusive measure of negative emotion than self-report, we sought to assess its stability and reliability during errors of commission. In the present study, we reanalyzed error-related cEMG data from two studies—one using an inhibitory control task (n = 54) and the other using a classic Eriksen flanker task (n = 51)—and compared them to established measures of neural monitoring, the ERN and Pe. Calculations of Cronbach's alpha, signal-to-noise ratios, and correlations with grand average signal revealed that error-related cEMG was sufficiently stable and reliable in as few as 6 trials, and acquired excellent stability and reliability in as few as 14. Surprisingly, these results are highly comparable to both the ERN and Pe, despite the greater overall inter- and intra-variability of facial EMG compared to EEG. These findings suggest that cEMG is a stable and reliable measure when event-locked to errors, and may prove useful to researchers seeking an objective and fast measure of negative emotions during response tasks.

D - 33
SPATIOTEMPORAL CHARACTERISTICS OF SOCIAL AND NON-SOCIAL DECISION MAKING.

Konstantina Kyriakopoulou - Department of Psychology, University of Bolton, UK; Rebecca Harris - Department of Psychology, University of Bolton, UK; Richard Jagger - Department of Psychology, University of Bolton, UK
Social decision-making is the most complex cognitive function performed by the human brain (Seo & Lee, 2012). Traditionally it was thought that social and non-social decision making rely on distinct neural representation, however, recent studies have identified a unified mechanism for motivational control of behaviour that may incorporate both social and non-social factors (Ruff & Fehr, 2014).
The present study developed a novel high-density EEG fronto-central circuitry to investigate the neural networks of social and non-social decision-making by recording neural activity in real time as participants complete tasks. This is the first EEG/ERP study to examine fronto-central circuitry comparing responses to social and non-social stimuli concurrently in a task that encodes preference choice without reward signal analysis.
Participants (n=25, 84% females) completed two preference choice tasks, which varied in the sociality dimension (social versus non-social) and in the valence dimension (positive versus negative). On each trial, participants were instructed to make preference choices between pair of pictures (either faces or landscapes) to compare temporal characteristics and regional coding between social and non-social choices.
Behavioural results revealed slower reaction time for social decisions compared to non-social ones. Preliminary electrophysiological analysis identified major discriminating components including the face-selective N170 and a significant late positive component for the social stimuli in comparison to the non-social stimuli.
These findings provide behavioural, neuroimaging and electrophysiological evidence about the longstanding question of the relationship between social and non-social decision-making and represent an important step toward a neural explanation for complex human social behaviours.

D - 34

EFFECTS OF DEPRESSIVE SYMPTOMS, MOOD AND ANHEDONIA ON BEHAVIORAL, ELECTRO-CORTICAL AND CARDIAC CONCOMITANTS OF FEEDBACK PROCESSING IN HEALTHY UNDERGRADUATE STUDENTS

Frederik M. van der Veen - Institute of Psychology, Erasmus University Rotterdam, the Netherlands; Fatima Hussain - Institute of Psychology, Erasmus University Rotterdam, the Netherlands; Ingmar H. Franken - Institute of Psychology, Erasmus University Rotterdam, the Netherlands

Healthy undergraduate psychology students (N=110) performed a recently developed version of the time estimation paradigm. They had to estimate a 2.5-second interval and could receive three types of feedback. Positive feedback (20%) was given when the estimation was close to target, negative feedback (20%) was given when the estimation was far from target and intermediate feedback (60%) was given when estimation was neither far from target nor close to target. The size of behavioral adjustments after a feedback signal was largest for negative, followed by intermediate and positive feedback. As expected, it was found that the feedback related negativity (FRN) was equally large for positive and negative feedback and smaller for intermediate feedback. Cardiac slowing was largest for positive feedback, followed by intermediate feedback and smallest for negative feedback. A self-report measure of depressive symptoms was positively related to the size of behavioral adjustments after negative feedback, but was not related to cardiac and electro-cortical responses. A self-report measure of depressed mood was not related to any of the measures of feedback processing. A self-report measure of anhedonia was negatively related to the size of adjustments after negative and intermediate feedback, but not to any other measures. The opposite relation between the size of behavioral adjustments and depressive symptoms and anhedonia, contributes to the explanation of earlier mixed findings with respect to depression and feedback processing. Finally, these findings stress the importance of distinguishing between depressed mood and anhedonia in depression research.

D - 35

A COMMON CODE FOR EMOTION IN MUSIC AND MOVEMENT

Beau Sievers - Dartmouth College; Thalia Wheatley - Dartmouth College

The kinetic power of music is the foundation of human behaviors as diverse as dance, romance, lullabies, and the military march. Despite its significance, the music-movement relationship is poorly understood. We present a series of behavioral and neuroimaging studies that show a common code for emotion in music and movement. Our method uses a computer program that generates matching examples of music and movement from a single set of features: rate, jitter (regularity of rate), direction, step size, and dissonance/visual spikiness. We applied our method in a behavioral study of emotion perception showing that emotion perception is determined by the same dynamic code as emotion expression, and that this code can be extended to mixed, hybrid emotions such as happy-sad and angry-happy. We also present a functional magnetic resonance imaging study showing both shared and dissociable neural mechanisms for processing emotion in music and movement.

D - 36

ADAPTIVE ADOLESCENT FLEXIBILITY: DECISION-MAKING IN A RISKY CONTEXT

Ethan M McCormick - University of Illinois - Urbana Champaign, Champaign, United States; Eva H Telzer - University of Illinois - Urbana Champaign, Champaign, United States

Research on adolescences has largely focused on how the particular biological and neural changes that teens experience put them at risk for negative outcomes linked to increases in sensation-seeking and risky behavior. However, there is a growing interest in the adaptive function of adolescence, with work highlighting the dual nature of adolescence as a period of potential risk and opportunity (Crone & Dahl, 2012; Casey, 2015). One suggestion is that adolescents have more flexible neural and behavioral responses than children or adults, allowing them to adapt to their changing biological and social roles. Building on this work, we examined how behavioral and neural sensitivity to risk and reward vary as a function of age using the Balloon Analog Risk Task (BART). The BART requires participants to take risks to obtain a reward, making it a useful paradigm for examining age-related approaches to risky decision-making. Seventy-seven Children and adolescents (ages 8-17) completed a 24-balloon BART during an fMRI session. Results indicate that adolescent show greater flexibility in their behavior both across the whole task and on a trial-by-trial basis in response to in-task feedback. Furthermore, older participants showed increased neural responses to reward in the orbitofrontal cortex and ventral striatum as well as increased sensitivity to risk in the bilateral SFG, left IFG, and mid-cingulate. Age-related changes in activity in these regions help account for the relationship between age and flexible behavior. These results support the idea that adolescents' sensitivity to risk and reward supports adaptive behavioral approaches for reward acquisition.

D - 37

INTACT REWARD RESPONSIVENESS IN MOTHERS UNDERGOING LONG-TERM OPIOID MAINTENANCE TREATMENT

Marie Eikemo - University of Oslo, Oslo, Norway; Mads, L Pedersen - University of Oslo, Oslo, Norway; Monica Sarfi - University of Oslo, Oslo, Norway; Philipp Lobmaier - University of Oslo, Oslo, Norway; Nikolaj Kunøe - University of Oslo, Oslo, Norway; Lars Tanum - University of Oslo, Oslo, Norway; Siri Leknes - University of Oslo, Oslo, Norway

Reduced responsiveness to non-drug cues (anhedonia) is common across a range of drug use disorders. In opioid dependent individuals, anhedonia often persist in opioid maintenance treatment (OMT) with methadone or buprenorphine. It remains unclear whether the reduced reward responsiveness is caused by the opioid medication per se or by associated lifestyle factors (unemployment, recurring relapse to drug use etc.). To disentangle this question, we measured reward responsiveness in 23 mothers in long-term OMT who have maintained the stable lifestyle required to retain custody of their children for > 7 years. Twenty-seven healthy comparison mothers were also tested. Reward responsiveness was measured using a decision making task with skewed rewards. Data were analyzed with a drift-diffusion model (DDM) of decision making which enabled simultaneous assessment of participants' (1) reward bias, (2) effort exerted, (3) response caution and (4) non-decision time. A self-report measure of hedonic capacity was also collected. Both groups of women showed a clear bias toward the high-reward probability option, comparable to that seen in healthy controls (n>200) in previous studies using this task. Further, no group differences were seen in the other decision parameters. In line with the modeling results, self-reported hedonic capacity (state or trait) did not significantly differ between the groups. In summary, mothers in stable long-term OMT display normal reward responsiveness. Therefore, the anhedonia reported by previous studies of opioid maintenance treatment are more likely to result from non-opioid factors such as an unstable lifestyle or male gender

D - 38

IT HURTS ME TOO: AN FMRI STUDY ON THE EFFECTS OF EXPERIMENTAL SLEEP RESTRICTION ON EMPATHY FOR PAIN IN YOUNGER AND OLDER ADULTS

Sandra Tamm - Karolinska Institute, Stockholm, Sweden; Gustav Nilsonne - Stockholm University, Stockholm, Sweden; Johann Schwarz - Stockholm University, Stockholm, Sweden; Claus Lamm - University of Vienna, Vienna, Austria; Göran Kecklund - Stockholm University, Stockholm, Sweden; Predrag Petrovic - Karolinska Institute, Stockholm, Sweden; Torbjörn Åkerstedt - Karolinska Institute, Stockholm, Sweden; Mats Lekander - Stockholm University, Stockholm, Sweden

Emotional processes rely on adequate sleep and change with aging. Whether this is likewise true for social emotions, such as empathy, is not known. This study aims to investigate how neural and behavioural responses to pain in others are affected by sleep restriction and age, and whether age modulates the role of sleep in emotional functioning. In an randomised cross-over experimental design, 47 healthy young (age: 20-30) and 39 older (age: 65-75) volunteers underwent fMRI twice, after either normal sleep or sleep restricted to 3 hours. During the fMRI task, participants viewed pictures of hands being pricked by needles (pain) or touched by Q-tips (control), and reported their vicarious unpleasantness. Older participants generally experienced more unpleasantness in response to pictures of pain compared to younger participants (p < 0.001) and this was accompanied by higher activity in bilateral angular gyrus. Sleep condition and age interacted significantly (p < 0.01), so that sleep restriction caused decreased unpleasantness in young and increased unpleasantness in old to pain stimuli, cancelling out a general effect of sleep on empathy for pain across age groups. In clusters in bilateral insula, old participants showed more activity and young less activity in response to pain after sleep restriction. Older participants generally responded more to pain in others compared to young. With sleep restriction, empathic responses in young and older changed in opposite directions. Given that empathy is crucial in effective interaction with others, our findings imply possible age-related differences in prosocial behaviour, potentially amplified with short sleep.

D - 39

HAPPY VOCALIZATIONS INCREASE ATTENTION: COMBINING P300 AND ALPHA OSCILLATIONS

P. Pinheiro Ana - Neuropsychophysiology Lab, School of Psychology, University of Minho; Barros Carla - Neuropsychophysiology Lab, School of Psychology, University of Minho; Dias Marcelo - Neuropsychophysiology Lab, School of Psychology, University of Minho; A. Kotz Sonja - Max Planck Institute for Human Cognitive and Brain Sciences; Maastricht University

During social interactions sensitivity towards sudden and unexpected changes in vocal expressions is essential. However, few studies have examined how emotion modulates the allocation of attention in voice processing. We

investigated neutral, happy and angry vocalizations (Montréal Affective Voices battery) in a modified oddball task and looked at how stimulus salience affects attention in vocal emotional processing.

Stimuli were presented as standard or target stimuli in different blocks. Participants silently counted the targets in each block. At the end of the EEG session, they rated the valence, arousal and dominance of the vocalizations. A combined ERP and EEG time-frequency analysis was used, with the focus on P300, as well as theta and alpha oscillations.

Task-relevant happy vocalizations were associated with an increase in P300 amplitude at centro-parietal electrodes, while task-irrelevant angry vocalizations elicited reduced alpha evoked power and phase synchronization at fronto-central electrodes. These findings suggest that positive salience can preferentially attract endogenous attention in voice processing.

D - 40
SPATIAL NAVIGATION UNDER THREAT

F. Caroline Davis - US Army Natick Soldier Research, Development & Engineering Center; Tad, T. Brunye - US Army Natick Soldier Research, Development & Engineering Center; Jan, M. Wiener - Psychology Research Centre, Bournemouth University; Lindsay Houck - Tufts Center for Applied Brain & Cognitive Sciences; Caroline, R. Mahoney - US Army Natick Soldier Research, Development & Engineering Center; Holly, A. Taylor - Tufts University

Individuals such as firefighters, law enforcement officials or military personnel are required to operate under highly stressful conditions, sometimes using information learned in a safe setting to perform a task under stress. Many tasks, such as navigating through an environment, can be accomplished using a variety of strategies, but the optimal strategy for performing such a task can vary depending on an individual's emotional state. Previous studies using behavioral and pharmacological manipulations to initiate a physiological stress response suggest that individuals tend to use rigid, egocentric (striatum-dependent) over more flexible, allocentric (hippocampus- dependent) spatial learning and memory strategies following stress exposure. Here, we sought to extend this work to determine whether stress induced by unpredictable threat biases spatial navigation strategy selection. Participants were guided through a virtual reality environment and then tested on their route knowledge as they approached the target from an unfamiliar direction. In the threat condition, participants were warned that they could receive an electric shock at any time, which would be unpredictable and unrelated to task performance. Participants reported feeling more anxious and displayed heightened physiological responses in threat compared to safe conditions. Consistent with previous research, we also observed a shift in navigation strategy preference such that individuals used the rigid, egocentric strategy more often under threat, despite the fact that accurate performance could only be achieved using an allocentric navigation strategy. These findings highlight the importance of considering the context in which information will be used when developing training strategies for individuals operating under stress.

D - 41
NEURAL CORRELATES OF INDIVIDUAL VARIATION IN COOPERATIVE BEHAVIOR

Joshua A Davila - Emory University, Atlanta, GA; Xu Chen - Department of Anthropology, Department of Psychiatry and Behavioral Sciences, Emory University, Atlanta, GA; James Rilling - Department of Anthropology, Department of Psychiatry and Behavioral Sciences, Center for Behavioral Neuroscience, Yerkes National Primate Research Center, Center for Translational Social Neuroscience, Emory University, Atlanta, GA

Reciprocal altruism is a core behavioral principal of human social life, but little is known about the neural bases of individual variation in cooperative behavior in this context. The iterated Prisoner's Dilemma Game has been used to model this type of cooperation. In this fMRI study, we imaged 153 healthy normal men and 151 healthy normal women as they played an iterated Prisoner's Dilemma game with both same-sex human and computer partners. We searched the whole brain for significant correlations between the BOLD response to reciprocated cooperation (CC) and the probability of cooperating after a CC outcome (pC/CC), separately for men and women. In both men and women, significant negative correlations were found in the caudate nucleus, prefrontal cortex and intraparietal sulcus. Women additionally showed negative correlations in the anterior insula and putamen (cluster-corrected $p<0.05$, voxelwise $p<0.005$). We also examined correlations between the BOLD response to unreciprocated cooperation (CD) and the probability of cooperating after a CD outcome (pC/CD). Women showed a negative correlation in the thalamus, while men showed positive correlations in the medial and dorsolateral prefrontal cortex (cluster-corrected $p<0.05$, voxelwise $p<0.005$). Our findings suggest that men may be using cognitive control (medial and dorsolateral prefrontal cortex) to override pre-potent tendencies to retaliate for unreciprocated cooperation. On the other hand, women who experience greater anxiety reduction (attenuated anterior insula

activation) in response to reciprocated cooperation may be more likely to persist with cooperation. These results provide insights into the neural bases of individual variation in cooperative behavior.

D - 42
NEURAL & COGNITIVE MECHANISMS CONSEQUENCES OF BEING MIMICKED BY ANOTHER

Hamilton Antonia - Institute of Cognitive Neuroscience, UCL; Hale Jo - Institute of Cognitive Neuroscience, UCL; Farmer Harry - Institute of Cognitive Neuroscience, UCL

Mimicry occurs when people unconsciously copy each other's posture, gesture, facial expressions or vocal features. It has been described as a 'social glue' with numerous prosocial effects. However, the precise mechanisms by which people recognise if someone else is mimicking them are not known. Here I present three novel studies examining this question. First, we used virtual reality to create avatars who mimic a participant's head motion during a picture description task. We test if the precise time delay (1-3 seconds) between participant and avatar action alters participant's ratings of trust and rapport. There were no effects of delay, indicating mimicry recognition mechanisms are broadly tuned. Second, we used the same virtual reality system to test if mimicry from an outgroup avatar has the same effect as mimicry from an ingroup avatar, using European and East-Asian participants matched with European or East-Asian avatars. Results are in progress.

Finally, we developed a novel mimetic desire task in which participants express a preference for abstract art, and then two virtual people express similar or different preferences during fMRI scanning. Participants show higher liking for people who share their art preferences. Viewing choices made by the dissimilar other lead to higher activation of the orbitofrontal cortex and medial prefrontal cortex, compared to viewing choices made by the similar other. This may reflect the different reward value of interacting with similar and dissimilar others. Altogether, these studies provide novel insights into the neural mechanisms which recognise and process mimicry from others.

D - 43
AUTISM SPECTRUM DISORDER TRAITS, NOT ALEXITHYMIA TRAITS, EXPLAIN REDUCED ATTENTION TO EXCLUSION

Alicia Vallorani - Western Illinois University; Sandra L. McFadden - Western Illinois University; Naoyuki Sunami - University of Delaware; Sarah E. Nielsen - Western Illinois University; Mitchell A. Kittelson - Western Illinois University; Anton Lebed - Western Illinois University; Lindsey K. Robinson - Western Illinois University; Rose T. Speidel - Western Illinois University

Autism Spectrum Disorder (ASD) is characterized by impaired social interactions, communications and restricted interests (American Psychiatric Association, 2013). Alexithymia is a sub-clinical disorder described as an inability for individuals to process and label emotions (Samur et al., 2013). Recent research suggests that the social-emotional deficits generally attributed to ASD, including emotion recognition (Cook, Brewer, Shah, & Bird, 2013), empathy (Bird et al., 2010) and eye-fixation (Bird, Press, & Richardson, 2011), are attributable to comorbid Alexithymia. Other research, however, suggests that Alexithymia may be related to reduced recognition of social-emotional stimuli, whereas ASD may be related to reduced attention to social emotional stimuli (Vallorani et al., 2015). The current study was designed to assess differences in attention to social exclusion in individuals with traits of ASD and Alexithymia.

A sample of 29 undergraduate students completed measures of both ASD and Alexithymia and then participated in two games of Cyberball while event related potential were recorded. During the first game, participants were included and during the second game they were excluded. Data analysis revealed a significant relationship between Alexithymia and ASD (r = .59). Additional analyses revealed that individuals with ASD related social motivation deficits showed significantly attenuated P3 waves when excluded, suggesting that individuals with social motivation deficits showed reduced attention to being excluded by others. Alexithymia traits were not related to attention to social exclusion. The findings suggest that ASD traits may explain deficits in attention to relevant social-emotional stimuli regardless of Alexithymia traits.

Poster Session E

Saturday April 30, 4:10 - 5:10PM

E - 1 *SANS Poster Award winner*
SLIPPERY SLOPE OF RACIAL BIAS UNDER ECONOMIC STRESS: NEURAL ADAPTATION SUPPORTS INCREASED ANTI-BLACK ALLOCATION OVER TIME WHEN RESOURCES ARE SCARCE *Amy R. Krosch - Harvard University, Cambridge, USA; Mina Cikara - Harvard University, Cambridge, USA*
Economic scarcity promotes discriminatory resource allocation, despite strong social norms and personal motivations to act in an egalitarian fashion. We hypothesized that patterns of discriminatory resource allocation under scarcity might start weak and strengthen over time, as decision makers overcome an initial aversion to discriminate or the value of discriminating increases over time. White participants (N = 33) allocated resources to Black and White male recipients during neuroimaging, in resource scarce and neutral contexts. When resources were scarce, allocation to White recipients increased and allocation to Black recipients decreased over time, compared to a neutral resource context. Furthermore, imaging results suggest adaptation of neural activity in the orbitofrontal cortex to allocation over time to Black recipients, such that large initial allocations elicited the same activity as small allocations later on. We also found evidence of neural adaptation in the bilateral anterior insula and putamen to allocation over time to White recipients, such that small initial allocations elicited the same activity as large allocations later on. Together, our finding suggests that scarcity escalates racial bias over time, and this escalation might be driven by dissociable neural adaptation to decreasing Black allocation and increasing White allocation, potentially uncovering new and potent mechanisms through which economic stress exacerbates racial inequality.

E - 2 *SANS Poster Award winner*
ATTENTION IN (JOINT) ACTION
Sonia Betti - Dipartimento di Psicologia Generale, Università di Padova; Umberto Castiello - Dipartimento di Psicologia Generale, Università di Padova; Luisa Sartori - Dipartimento di Psicologia Generale, Università di Padova
Observing actions performed by others can activate the corresponding motor representations in the primary motor cortex (M1), the so-called direct matching. However, it has been proved that in interactive social contexts this imitative tendency could turn into readiness to perform a dissimilar complementary action. To date, whether or not the observation-execution transformation is automatic (i.e. occurs without attention) is debated. In the present study we aim to bring an increase in the literature by assessing the role of spatial attention during observation of social and non social actions. The stimuli used were action sequences eliciting (or not) complementary responses (i.e. incongruent to the observed action) and spatial attention was manipulated by means of a red dot cue. First, eye-tracking procedures were used to measure the spontaneous allocation of overt spatial attention during action observation. Second, we combined transcranial magnetic stimulation (TMS) over M1 and electromyography recordings to assess the excitability of corticospinal projections to hand muscles while participants were observing the action stimuli. Results show that the allocation of spatial attention towards an observed body part is crucial for direct matching to occur. Conversely, the allocation of spatial attention plays no role when the observed action evokes an interactive complementary motor response. Overall, the present research provides one of the first evidence that social motor preparation is impervious to spatial attentional allocation.

E - 3
GUILT IN THE EYES: EYE MOVEMENT AND PHYSIOLOGICAL PROFILES OF GUILT-INDUCED SOCIAL AVOIDANCE
Hongbo Yu - Peking University; Yunyan Duan - Peking University; Xiaolin Zhou - Peking Univeristy
Guilt is an unpleasant social emotion, which has positive interpersonal consequences. Previous research has focused on the behavioral consequences of guilt (e.g., reparation). Less is known about the phenomenology and psychophysiology of guilt, which is core to the experiential part of guilt. Here we addressed this issue by combining an interpersonal interactive paradigm with eye-tracking (Experiment 1) and physiological measure (Experiment 2). The participants interacted with a partner in a dot-estimation task. In the guilt condition, the participants' performance was below a predefined criterion, which made the partner received a sustained pain stimulation. In the non-guilt condition, it was the partner's own performance that led him/herself to receive the pain stimulation. The participants were asked to watch the video in which the partner was enduring the stimulation. In Experiment 1, where the participants could freely move their fixation on the video, we found reduced fixation on the partner's eye

region and a systematical downward shift of the fixation in the guilt relative to the non-guilt condition, indicating a submissive, avoiding gesture. In Experiment 2, we asked the participants to fixate on the eye (cohort 1) or nose region (cohort 2) of the partner while recorded their skin conductance level (SCL). The SCL was significantly larger in the guilt than in the non-guilt condition, but only when the fixation was on the partner's eye, suggesting heightened affective arousal. Our study advances the understanding of the interpersonal nature of guilt and provides new possibilities for quantifying social interactions in humans.

E - 4
SPONTANEOUS EYEBLINK RATE PREDICTS RECRUITMENT OF MODEL-BASED OVER MODEL-FREE DECISION-MAKING

Tracey C. Shi - Weill Cornell Medicine, New York, USA; Lindsay E. Hunter - Weill Cornell Medicine, New York, USA; Johannes H. Decker - Weill Cornell Medicine, New York, USA; Catherine A. Hartley - Weill Cornell Medicine, New York, USA

Individuals use a variety of strategies to evaluate and select actions. One such strategy, formalized by "model-based" reinforcement learning algorithms, builds a mental model representing state-action-outcome contingencies and recruits this model to inform decisions. By contrast, a "model-free" strategy simply increments the probability of choosing previously rewarded actions. Over-dependence on model-free learning at the expense of model-based learning is thought to increase vulnerability to disorders of compulsivity by facilitating habit formation. However, determinants of individual variability in the recruitment of each strategy are only beginning to be characterized. Previous PET imaging and pharmacological studies have linked central dopamine levels to model-based decision-making. Based on a well-documented association between central dopamine and spontaneous eyeblink rate, we hypothesized that higher eyeblink rate would predict more model-based behavior. We measured spontaneous resting eyeblink rate in healthy adult volunteers who then completed a two-stage sequential reinforcement learning task designed to dissociate the two strategies. We fit a hybrid reinforcement learning model to quantify the degree to which an individual's choices resembled a model-based rather than a model-free strategy. Our data show a significant positive correlation between eyeblink rate and model-based choice. These findings provide further evidence that dopamine modulates the balance between model-based and model-free learning, and additionally suggest that resting eyeblink rate may be a valid metric for examining the relationship between central dopaminergic function and decision making.

E - 5
THE NEUROBIOLOGY OF GROUP-BASED COOPERATION

Julian A. Wills - New York University; Augustus Baker - New York University; Oriel FeldmanHall - New York University; Leor M. Hackel - New York University; Jay J. New York University - New York University

Cooperation is an essential feature of adaptive group living. Studies examining the neurocognitive basis of this behavior, however, are sparse and controversial. Despite traditional assumptions that prosocial behavior hinges on deliberative self-restraint, more recent findings suggest that cooperative decisions primarily result from more automatic, intuitive processes. Given prior research tying the dorsolateral prefrontal cortex (DLPFC) to effortful deliberation and ventromedial prefrontal cortex (VMPFC) to intuitive decision-making, we conducted two experiments to assess the relative contribution of these regions to group-based cooperation. In Study 1, we compared behavior in a Public Goods Game (PGG) between neurologically healthy controls and frontal lesion patients with damage to each region. Compared to VMPFC and control subjects, we found that DLPFC damage predicted fewer contributions to the public good. We next conducted a high-powered fMRI experiment (Study 2) to further probe this relationship. Consistent with our results in Study 1, we observed increased activity in parietal-frontal control networks (including DLPFC) during cooperative trials. However, we found that this effect was driven by predominantly selfish subjects; cooperative subjects, in contrast, showed increased VMPFC activity when contributing to the public good. Furthermore, greater VMPFC activation on cooperative trials was associated with more generous donations in a subsequent Dictator Game. These findings suggest that individual differences in prosocial preferences critically moderate the extent to which these regions mediate cooperation. More broadly, these findings help integrate competing models of prosocial decision-making: whether intuition or deliberation dominates most likely hinges on key dispositional and contextual factors.

E - 6
SOCIOECONOMIC STATUS: MACRO LEVEL ENVIRONMENTAL FACTORS MODERATE NEURAL PROCESSES INVOLVED IN EXECUTIVE FUNCTIONING AND SOCIAL COGNITION

Christopher N. Cascio - University of Pennsylvania, Philadelphia, US; Emily B. Falk - University of Pennsylvania, Philadelphia, US

Health and educational disparities have long been associated with socioeconomic status (SES). Recent research suggests that these disparities may arise because of factors associated with SES on brain development. Initial behavioral and neuroimaging studies suggest that disparities across SES are relevant to neural processes underlying executive functions, which develop differently depending on high and low SES environments. However, much remains unknown about the relationship between SES and brain-based measures of executive functions and social cognition. Therefore, we conducted a series of studies to advance understanding of the relationship between SES and the brain. First (n=71), we extend recent neuroimaging evidence on executive functioning by showing that participants' SES moderated response inhibition activity during a go/no-go task. Next (n=62), we extend our understanding of SES and brain function during social cognition by demonstrating SES differences in the underlying neural mechanisms associated with social influence, including positive valuation/reward processing, conflict monitoring, and mentalizing. Finally (n=78), we extended this work to contexts beyond the scanning environment by showing that macro level environmental factors (high vs. low SES) and situational social context factors (risky vs. safe peer influence) moderated the relationship between neural regions involved in conflict monitoring during social exclusion and risk-taking in the presence of a peer one week later during a driving simulator session. Overall, these studies advance our understanding of how macro level environmental factors, such as SES, moderate neural processes involved in executive functioning and social cognition, and interact with social context factors to influence important real-world relevant behaviors.

E - 7

FACIAL EXPRESSIONS ENGAGE BRAIN NETWORKS ASSOCIATED WITH AFFECTIVE EXPERIENCE AND THEORY OF MIND: A COMBINED FMRI AND ELECTROMYOGRAPHY (EMG) STUDY

Craig Williams - Stanford University, Stanford, USA; Yuan Chang Leong - Stanford University, Stanford, USA; Jamil Zaki - Stanford University, Stanford, USA

Emotional facial expressions are ubiquitous but complex. Expressions are traditionally thought to reflect affective experience, but individuals sometimes increase their emotional displays in social settings to deliberately signal their internal states to others. We investigated the neural correlates of these two sources of facial expression.
Ten pairs of close friends (N = 20) individually viewed positive and neutral images while being recorded using simultaneous fMRI and electromyography (EMG) of zygomaticus major, a muscle associated with smiling. During half of trials, participants believed their facial reactions to images were visible to friends via video feed (Camera ON) and were instructed to clearly convey their feelings via facial display. At other times, participants believed they were not visible (Camera OFF) and were instructed to react naturally.
When participants viewed positive versus neutral images, increased zygomaticus EMG activity tracked greater engagement of brain regions associated with movement (primary and supplementary motor cortex) and emotion processing (orbitofrontal and anterior cingulate cortex, amygdala, insula, and ventral striatum). Interestingly, when participants viewed positive images with the camera ON versus OFF, these same facial movements tracked greater activity in regions associated with theory of mind (superior temporal sulcus, temporal pole, and precuneus).
In summary, we find that facial expressions of emotion track brain networks related to affective experience and theory of mind, according to individuals' communicative goals. These data support a dual-source model under which facial displays reflect both spontaneous experience and deliberate social signaling, depending on context.

E - 8

REDUCED AMYGDALA RESPONSE TO FEARFUL EXPRESSIONS IN YOUTH WITH CALLOUS-UNEMOTIONAL TRAITS RELATED TO FASTER HABITUATION

Meffert Harma - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; Tyler Patrick - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; Botkin Mary - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; Erway Anna - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; Kolli Venkata - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; White Stuart - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; Pope Kayla - Center for Neurobehavioral Research, Boys Town National Research Hospital, Boys Town, NE; Blair James - Section on Affective Cognitive Neuroscience, NIMH, NIH, Bethesda, MD

Youth with Disruptive Behavior Disorders (Conduct Disorder and Oppositional Defiant Disorder) who additionally present with elevated callous-unemotional (CU) traits such as a lack of empathy and remorse/ guilt show reduced

sensitivity to other peoples' fear. This is accompanied by reduced amygdala responsivity. However, the amygdala has been shown to habituate to repeated stimulation by facial expressions, and therefore, the reduced average responsivity to fearful facial expressions might alternatively be related to stronger habituation to these stimuli in DBD youth with elevated CU traits. In the current study, 77 youth with or without a DBD performed a gender discrimination task on photographs of actors displaying fearful expressions of increasing intensity. The task was split into two sessions. Results suggest that bilateral amygdala habituates faster to fearful facial expressions as a function of level of CU traits. In addition, connectivity between the amygdala and the right inferior frontal gyrus / insula, posterior cingulate cortex and several regions in the visual cortex was significantly more inversely related to the participant's level of CU traits during session 2, compared to session 1. In sum, the current data suggest that reduced average responsivity to fearful facial stimuli in DBD youth with elevated CU traits might result from differential habituation to fearful faces. Future studies need to be conducted to verify this possibility.

E - 9
EPIGENETIC VARIABILITY OF THE OXYTOCINERGIC SYSTEM IS ASSOCIATED WITH SALIENCE OF SOCIAL INFORMATION

Meghan H. Puglia - University of Virginia; Jessica J. Connelly - University of Virginia; James P. Morris - University of Virginia

Because of the challenges inherent in studying complex human behaviors, uncovering the neurobiological factors that underlie variability in the social behavioral phenotype will likely require the combined use of endophenotypic measures, such as BOLD response, and behavioral tasks with sufficient sensitivity to detect differences in healthy adult social functioning. We hypothesize that these differences in social behavior are driven in part by endogenous variability within the oxytocinergic system, which may impact the salience of social information.

To test this hypothesis, we designed an fMRI 1-back selective social attention task (adapted from Herrington et al., JADD 2014) in which participants are simultaneously presented with double-exposure images of faces and houses, and told to attend to aspects of either the face or the house. A contrast testing for effect of attentional target (Faces>Houses) on BOLD response across all participants (n=45) reveals that attention to social information activates amygdala, insula, posterior cingulate, and temporal and prefrontal cortices.

We then conducted an exploratory, whole-brain analysis testing the relationship between epigenetic variability of OXTR, the molecule that allows the body to respond to oxytocin, and Houses>Faces BOLD response. This analysis revealed that males (n=19) show a significant negative relationship between DNA methylation of OXTR (mOXTR) and fusiform BOLD response. This decreased activity within fusiform during the attend-houses condition may indicate that individuals high in mOXTR, who have a decreased ability to utilize endogenous oxytocin, show less "breakthrough" of task-irrelevant social stimuli, and find social information less salient.

E - 10
YOU DON'T MISS A BEAT: INTEROCEPTION HEIGHTENS PERCEPTION OF EMBODIED INSULTS

Erik Benau - University of Kansas, Lawrence, KS; Svancara Austin - University of Kansas, Lawrence, KS; Parrish Brittany - University of Kansas, Lawrence, KS; Atchley Ruth Ann - University of Kansas, Lawrence, KS

Individuals with high levels of interoception (the perception of bodily states) are more sensitive to emotional pictures, though it is not known if this effect translates to verbal stimuli, and/or stimuli pertaining to the body. To test this, 32 undergraduates completed a cardiac perception task as a measure of interoception. Fifteen participants were identified as "good" cardiac perceivers and the rest were defined as "poor" perceivers. While EEG was recorded, participants viewed a series of insults, compliments, and neutral stimuli. Half of the stimuli were "embodied" (i.e. contained some element of the body), such as "ugly," while half were non-embodied, such as "stupid." Both lists were matched for frequency, intensity, and orthography. The Late Positive Potential (LPP), which is largely associated with emotional assessment of stimuli, was the dependent variable in a 2(embodiment) X 3(stimulus type) X 2(cardiac awareness group) ANOVA. There were no significant main effects, but there was a significant three-way interaction (p = .020) such that good cardiac perceivers had significantly larger LPPs to embodied insults than non-embodied insults. They also had a larger LPP for embodied insults than did poor perceivers. For poor perceivers, embodied compliments generated a larger LPP than embodied insults, which was not the case for good perceivers. We conclude that having high levels of interoception is not only linked to increased sensitivity to one's bodily states, but to stimuli referencing the body itself.

E - 11
PREDICTING TRAIT ANXIETY FROM AMYGDALA CONNECTION USING PROBABILISTIC TRACTOGRAPHY

Steven G. Greening - Department of Psychology, Louisiana State University, Baton Rouge, Louisiana, USA; Derek G.V. Mitchell - Department of Psychiatry, Schulich School of Medicine and Dentistry, University of Western Ontario, London, Ontario, Canada

The present study demonstrated that the pattern of an amygdala-centric network contributes to individual differences in trait anxiety. Individual differences in trait anxiety were predicted using maximum likelihood estimates of amygdala structural connectivity to multiple brain targets derived from diffusion-tensor imaging (DTI) and probabilistic tractography on 72 participants. The prediction was performed using a stratified six-fold cross validation procedure using a regularized least square regression model. The analysis revealed a reliable network of regions predicting individual differences in trait anxiety. Higher trait anxiety was associated with stronger connections between the amygdala and dorsal anterior cingulate cortex, which is an area implicated in the generation of emotional reactions; and inferior temporal gyrus and paracentral lobule, which areas associated with perceptual and sensory processing. In contrast, higher trait anxiety was associated with weaker connections between amygdala and regions implicated in extinction learning such as medial orbitofrontal cortex, and regions associated with memory encoding and environmental context recognition, including posterior cingulate cortex and parahippocampal gyrus. Thus, trait anxiety is not only associated with reduced amygdala connectivity with prefrontal areas associated with emotion modulation, but also enhanced connectivity with sensory areas. This work provides novel anatomical insight into potential mechanisms behind information processing biases observed in disorders of emotion.

E - 12
THE NOISY, SOCIAL BRAIN: MACROSCALE SYSTEM DYNAMICS PREDICT AUTISM SPECTRUM PHENOTYPES AND EPIGENETIC VARIABILITY IN THE OXYTOCIN RECEPTOR GENE

Tyler Santander - University of Virginia, Charlottesville, USA; Meghan, P. Puglia - University of Virginia, Charlottesville, USA; Jessica, J. Connelly - University of Virginia, Charlottesville, USA; James, P. Morris - University of Virginia, Charlottesville, USA

The human brain is a complex, hierarchical system whose micro- and macroscale components interact to produce myriad mental states. In this study, we sought to investigate dynamical functional connectivity across cortical networks related to social perception, in addition to biochemical markers—namely, DNA methylation on the oxytocin receptor gene (OXTR)—thought to mediate social behavior. Toward that end, young adults underwent resting-state fMRI and provided blood samples for epigenotyping. They additionally completed the Autism-Spectrum Quotient (AQ) as an estimate of the broad autism phenotype (BAP). For each individual, low-frequency BOLD timeseries were extracted from functionally-defined ROIs in the anterior salience network (aSN) and dorsal default mode network (dDMN). We then computed functional connectivity within each network (independently) across sliding windows of time, building a timeseries of edge weights for each pair of regions in the network. Finally, we estimated the stability of pairwise connections over time by computing the standard deviation of each edge timeseries. Results show that dynamical connectivity within the aSN and dDMN predicts both BAP scores and percent methylation on OXTR, such that more stable connections generally predict higher BAP and methylation levels. These findings are perhaps in contrast with "noisy brain" hypotheses of autism spectrum phenotypes; however, they do support a role for oxytocin in the expression of autistic behaviors. Most importantly, they demonstrate that macroscale system dynamics are more than just noise—they offer a useful endophenotype for linking microscale factors (i.e. epigenotypes) to behavioral outcomes.

E - 13
SINGLE DOSE TESTOSTERONE ADMINISTRATION IMPAIRS COGNITIVE REFLECTION IN MEN

Gidi Nave - Wharton Business School; Amos Nadler - Ivey Business School; Colin Camerer – Caltech

Testosterone (T) regulates instinctive behaviors, including fighting and mating, in non-human animals. Human correlational studies have linked T with aggression and poor impulse control, but there is no evidence that T is causing these behaviors, and corresponding mechanisms are poorly understood. We discovered a possible mechanism for T's behavioral effects in humans, limited cognitive reflection. In the largest T administration study to date, 243 men received either T or placebo, then took the cognitive reflection test (CRT). CRT estimates the tendency to override incorrect intuitive responses with deliberate, correct answers. Administered-T reduces subjects' CRT scores. This effect is robust to controlling for age, mood, math skills, treatment expectancy, and 14 other hormones measured using mass-spectrometry. The effects were mediated by interactions with salivary cortisol and estradiol, providing novel causal evidence of dual-hormone interaction. Our finding suggests one mechanism underlying T's diverse behavioral effects in humans and provides novel testable predictions.

E - 14

DISSOCIABLE EFFECTS OF AMYGDALA AND VENTRAL STRIATUM LESIONS ON REINFORCEMENT LEARNING

Vincent, D Costa - Laboratory of Neuropsychology, National Institute of Mental Health, National Institutes of Health; Olga Dal Monte - Laboratory of Neuropsychology, National Institute of Mental Health, National Institutes of Health; Elisabeth, A Murray - Laboratory of Neuropsychology, National Institute of Mental Health, National Institutes of Health; Bruno, B Averbeck - Laboratory of Neuropsychology, National Institute of Mental Health, National Institutes of Health

Traditional views of the amygdala emphasize its role in learning the motivational significance of stimuli to coordinate emotional responses. The contribution of the amygdala to reinforcement learning (RL) within the context of choice behavior is less clear, especially relative to other brain regions regarded as important for RL (e.g. ventral striatum). Here, we tested the contribution of the amygdala and ventral striatum (VS) to RL in deterministic and stochastic environments. We compared the choices on a two-armed bandit task of rhesus macaques with bilateral excitotoxic lesions of the amygdala (n=4) or VS (n=3) to a group of intact controls (n=4). The animals learned to choose between two cues rewarded according to one of four reward schedules (100/0% - 60/40%). We fit temporal-difference RL models to the monkeys' choices, allowing us to quantify learning rates and how consistently the monkeys chose the higher-value option. Although both operated groups were impaired in learning, we found that the groups differed in how they learned from rewarded versus unrewarded trials. Compared to controls, monkeys with amygdala lesions showed overall reduced sensitivity to positive feedback and increased sensitivity to reward omission. By contrast, monkeys with VS lesions showed only reduced sensitivity to reward receipt. Both operated groups chose the higher-value option less consistently than controls, and the amygdala group was less accurate than the striatal group. These results raise important questions about which neural circuits are critical for RL and suggest the amygdala plays a more important role in this process than the VS.

E - 15

NEURAL RESPONSES TO EMOTIONAL SOUNDS: AN FMRI STUDY OF ACTIVITY IN THE BRAIN AND CERVICAL SPINAL CORD

Stephen D. Smith - University of Winnipeg, Winnipeg, Canada; Tiffany A. Kolesar - University of Winnipeg, Winnipeg, Canada; Jennifer Kornelsen - University of Manitoba, Winnipeg, Canada

BACKGROUND: Emotional stimuli modulate activity in motoric regions of the brain, thereby preparing the body to respond to potential dangers in the environment. Recently, we demonstrated that this emo-motoric response extends to the cervical and thoracic spinal cord. Most existing studies of this system have utilized visual stimuli; from an evolutionary perspective, however, motoric responses to emotional auditory stimuli are equally important. In the current research, we performed fMRI of both the brain and the cervical spinal cord in order to identify central nervous system responses to emotional sounds. METHODS: Seventeen healthy participants completed two runs of brain fMRI and two runs of spinal cord fMRI. One run involved the perception of three 60-second blocks of negative sounds whereas the other involved the perception of blocks of neutral/non-arousing sounds. The sound blocks were interleaved by 40-second periods of rest. The sound files used in each block were taken from the International Affective Digitized Sounds (IADS) database. RESULTS: A contrast of negative > neutral conditions found activity in the right superior temporal gyrus, bilateral insula, and left putamen (a motoric region). In the cervical spinal cord, activity was observed bilaterally in the ventral (motoric) region of segment C2, and in the right dorsal (sensory) region of segments C4 and C5. Thus, both sensory and motoric regions were activated in the brain and spinal cord. CONCLUSIONS: The current results provide support for an emo-motoric model of emotion and also highlight the methodological potential of measuring activity in the entire central nervous system.

E - 16

COST-BENEFIT ANALYSES IN REINFORCEMENT LEARNING   *Wouter Kool - Harvard University, Department of Psychology and Center for Brain Science; Samuel, J Gershman - Harvard University, Department of Psychology and Center for Brain Science; Fiery Cushman - Harvard University, Department of Psychology*

Many accounts of decision making and reinforcement learning posit the existence of two distinct systems that control choice: a habitual or automatic system that is computationally cheap, and a more controlled system that requires the exertion of cognitive control. It has frequently been assumed that both systems factor into a cost-benefit analysis that weighs the computational cost of planning against its associated rewards. Recently, Daw et al. (2011) developed a two-stage decision making task that quantifies the relative contribution of the habitual ("model-free") and controlled ("model-based") systems. This task has grown to become the golden standard for describing the tradeoff

between accuracy and the cost of planning. Remarkably, our computational simulations of this task reveal that it does not embody such a tradeoff, i.e., that increased planning is not associated with more reward. Our analyses reveal that this is, among other reasons, driven by the fact that outcome observations from the rewarded stimuli do not carry enough information about their value, and that the sets of rewarding stimuli that are most often employed are marked by relatively low distinguishability. These and other features reduce the reward associated with planning to such a degree that pure model-based and model-free agents obtain equivalent reward. Based on these observations, we have developed a version of the two-step task that formally and empirically obtains a relationship between model-based choice and reward. This paradigm and our computational analyses may prove important in subsequent empirical investigations of how humans balance accuracy and efficiency.

E - 17
THE NEUROPHYSIOLOGICAL MECHANISMS OF OXYTOCIN DURING FALSE BELIEF TASKS IN PATIENTS WITH SCHIZOPHRENIA: AN FRMI STUDY

Lize De Coster - University of California, San Francisco; Daniel, H. Mathalon - University of California, San Francisco; Sophia Vinogradov - University of California, San Francisco; Josh, D. Woolley - University of California, San Francisco
The social cognitive deficits of schizophrenia, including difficulties in the ability to make high-level inferences about one's own and other person's mental states (Theory of Mind, ToM; Premarck & Woodruff, 1978) independently predict worse clinical, functional, and occupational outcomes above positive symptoms and non-social cognitive deficits. Impaired ToM in schizophrenia has been well documented, indicating that areas such as the right temporo-parietal junction (rTPJ) and medial prefrontal cortex (mPFC) underlie these deficits (Lee et al., 2014). In a recent study, Woolley et al. have shown that the administration of oxytocin (OT) selectively improves high-level social cognition such as ToM in patients with schizophrenia. These and other findings indicate that OT may be a useful treatment for the social deficits of schizophrenia (Bos et al. 2012). In the current functional magnetic resonance imaging (fMRI) study, we aimed to explore the neurophysiological mechanisms of OT's prosocial effects in schizophrenia patients. More specifically, the current study investigated whether OT increases activity in brain areas related to ToM deficits in this patient group. To this end, we administered 40 IU of OT to a group of schizophrenia patients and an age-matched control group performing a false belief task in a randomized, double-blind, placebo-controlled cross-over study. Results indicate that OT increases activation in the rTPJ during false belief tasks for both patients with schizophrenia and healthy controls. Since performance on ToM tasks has been linked to real-world social functioning in schizophrenia, these findings suggest that OT may have real-world positive effects in this patient group.

E - 18
APPETITIVE CONDITIONED RESPONSES INDUCED BY SOCIAL RELIEF.

Marta Andreatta - Department of Psychology, University of Würzburg, Germany; Andrea Lewis - Rutgers University-Newark; Megan Speer - Rutgers University-Newark; Paul Pauli - Department of Psychology, University of Würzburg, Germany; Mauricio Delgado - Rutgers University-Newark
Pain termination elicits a rewarding response called relief. The experience of pain relief is associated with activity in the striatum – a region typically linked to reward processing. One interesting question is whether relief-like responses would also extend to the social domain and follow aversive social, rather than physical, signals. Sixteen participants underwent a conditioning protocol in which a desperate female scream (aversive unconditioned stimulus, US) was signaled by a female neutral face (fearCS+) and followed by another neutral face (reliefCS+). Control trials had similar structure but involved a novel face not paired with the US (fearCS-) that was followed by another face (reliefCS-). After conditioning, the fearCS+ was subjectively rated as more negative, arousing and less relieving than the other stimuli. The fearCS- and reliefCS+ were similarly rated. Notably, a direct comparison of reliefCS+ and fearCS+ resulted in increased activity in the striatum. This activity was positively correlated with the relief ratings, in support of the idea that a stimulus associated with relief can yield positive feelings. Interestingly, preliminary connectivity analysis revealed that that greater activity to the striatum in response to the reliefCS+, along with greater amygdala activation in response to the fearCS+, was associated with changes in insula activation. Taken together, these results suggest that individual can acquire appetitive responses (in the form of relief) after termination of aversive social signals, and that this effect may be mediated by increases in striatum signal and its connectivity with regions involved in aversive conditioning such as the amygdala and insula.

E - 19
OXYTOCIN AND CHARISMATIC INFLUENCE IN GROUPS

Yair Berson - New York University & Bar-Ilan University; Ilanit Gordon - Bar-Ilan University
The extraordinary effects of charismatic leaders are often explained by their influence on followers' emotions and behaviors. Accumulating evidence from survey-research indicates that group members mimic leaders perceived by them as charismatic. Yet, the neuro-biological basis of these processes remains largely unknown. Oxytocin (OT), a nine-amino acid neuropeptide, has received a great deal of attention for its involvement in social functioning, beyond parent-infant bond. We examined the impact of intranasal OT administration on members' mimicry of a leader, perceived by them as charismatic. 87 men participated in this double-blind controlled experiment in 29 groups. Each group consisted of 3 group members and a confederate, trained to act in a charismatic fashion while leading a group task, commonly used in leadership research (desert survival). Groups were randomly assigned to receive either 24 international units (IUs) of OT or placebo. All behaviors were videotaped and micro-analyzed. We will present data showing that OT increased both positive affect and positive engagement in group members, but most pronouncedly when the leader was perceived as charismatic. Additionally, OT positively influenced group members' tendency to mimic self-regulation acts performed by the leader. Finally, using hierarchical liner modeling, we found that OT enhanced the effects of group members' perception of charisma on members' positive active affect. These results are the first to demonstrate a biological basis for the association between charismatic leadership, emotions and behavior in dynamic real group interactions. OT may be a component in the neural circuitry underlying leadership effects in humans.

E - 20
BORDERLINE PERSONALITY DISORDER PATIENTS SHOW LONGITUDINAL AMYGDALA AND ANTERIOR INSULA SENSITIZATION TO EMOTIONAL STIMULI FOLLOWING INITIAL HABITUATION

Bryan T. Denny - Icahn School of Medicine at Mount Sinai; Jin Fan - Icahn School of Medicine at Mount Sinai; Queens College, City University of New York; Antonia S. New - Icahn School of Medicine at Mount Sinai; James J Peters VA Medical Center; Marianne Goodman - Icahn School of Medicine at Mount Sinai; James J Peters VA Medical Center; Mercedes Perez-Rodriguez - Icahn School of Medicine at Mount Sinai; Larry J. Siever - Icahn School of Medicine at Mount Sinai; James J Peters VA Medical Center; Harold W. Koenigsberg - Icahn School of Medicine at Mount Sinai; James J Peters VA Medical Center
Borderline personality disorder (BPD) is the prototypical disorder of emotion regulation, yet there remains limited understanding of its neurocognitive correlates. Impairment in habituation or anomalous sensitization of the salience network during repeated exposure to emotional events could contribute to emotion dysregulation in BPD. The present study examined the effect of repeated exposure to emotional images, both within-session and across two sessions separated by about three days, upon nodes of the salience network in BPD patients, avoidant personality disorder patients (AvPD), and healthy controls (HC). 26 BPD, 25 AvPD, and 24 HC participants viewed 5 presentations of the same set of 10 negative and 10 neutral images in each of two sessions spaced approximately three days apart as fMRI data were acquired. Activation in anatomically-defined salience network regions-of-interest (amygdala; anterior insula; and dorsal anterior cingulate cortex, dACC) was compared across groups for each presentation on each of the two study days. Right amygdala activity showed a main effect of within-session habituation across groups ($F(4,1368)=12.45$, $p<0.001$). However, only BPD patients showed increased right amygdala activation to the images re-encountered on Day 2 (Group X Session interaction, $F(2,1368)=23.38$, $p<0.001$). A similar pattern was observed in right anterior insula, but not in left amygdala, left anterior insula, or dACC. BPD patients are distinguished from AvPDs and HCs by right amygdala and right anterior insula sensitization upon delayed re-exposure to negative images for which responses had previously shown habituation. These results suggest dissociable processes of acute habituation and delayed sensitization in BPD patients.

E - 21
NEURAL EFFECTS OF STRESS ON TRIAL-BY-TRIAL SMOKING DECISIONS

Seung-Lark Lim - University of Missouri - Kansas City, Kansas City, US; David Scott - University of Missouri - Kansas City, Kansas City, US; Kyung Mook Choi - University of Missouri - Kansas City, Kansas City, US; Laura Martin - University of Kansas Medical Center, Kansas City, US; Catley Delwyn - University of Missouri - Kansas City, Kansas City, US
Even after quitting or deciding to quit, the cravings for tobacco continue, particularly when exposed to acute stress. During stressful situations, self-control can fail, often resulting in a relapse. By developing a novel MRI-compatible nicotine delivery system, we investigated neural effects of cognitive and emotional stressors on trial-by-trial "real" smoking decisions. While in the fMRI scanner, nineteen cigarette smokers (>10 cigarettes/day; mean 29.2 years; 13 males) who abstained from smoking overnight made 200 real smoking choices (strong no, no, yes, strong yes)

regarding whether or not to take a puff of an electronic cigarette (10 cents for each) in three different dual-task conditions (working memory, emotional distress, and non-stress control conditions). Stressful cognitive overload was induced by a concurrent working memory task, and emotional distress was induced by manipulating a chance of aversive electric shock. As hypothesized, behavior data showed that cognitive and emotional stressors increased the probability of smoking decisions (= to take a puff of an electronic cigarette) compared to control condition (t = 3.00, p < .05; t = 1.97, p = .06). In MRI results, at the time of smoking decisions, ventral striatum showed increased brain activity in the cognitive stress condition compared to the control condition (p < .05, SVC). Also, in both stress conditions, orbitofrontal cortex activity showed stronger positive correlations with motivational smoking decision values indexed by a parametric regressor (p < .05, SVC). Our findings suggest that stress experiences may affect smoking decisions by altering brain reward system activities.

E - 22
COSTLY PUNISHMENT TO UNFAIRNESS IN HIGH-LETHALITY SUICIDE ATTEMPTERS

Katalin Szanto - University of Pittsburgh; Luke Clark - University of British Columbia; Michael Hallquist - University of Pittsburgh; Polina Vanyukov - University of Pittsburgh; Molly Crockett - Department of Experimental Psychology Oxford; Alexandre Dombrovski - University of Pittsburgh

Suicide can be conceptualized as an extreme reaction to stressors that employs a distorted cost-benefit analysis. Medically serious (high-lethality HL) suicide attempts that carry a significant risk of death are: a) more prevalent in old age, b) have been associated with reduced gray matter volume in limbic regions, c) are often motivated by social conflicts.

We measured with the Ultimatum Game older suicide attempters' propensity to deliver costly punishment in 26 HL suicide attempters, 20 low-lethality suicide attempters, 35 non-suicidal depressed older adults, and those with no psychiatric history (22). Using GEE and a multilevel modeling approach that took advantage of complete trial-by-trial data, we tested the hypothesis that people who choose serious suicidal acts over alternative solutions will be insensitive to the monetary cost of rejecting unfair offers, paralleling their tendency of diminished concern about the consequences of their social choices.

HL attempters were not affected by reward magnitude; this tendency selectively distinguished them from non-psychiatric controls, depressed non-suicidal patients, and low-lethality attempters, whose decisions were sensitive to reward magnitude. Two-thirds of the difference between the HL attempters and non-psychiatric controls was explained by differences in fairness judgments: the comparison group judged offer fairness as a joint function of inequality and magnitude, whereas the HL attempters judged offer fairness on the basis of inequality. We also present data on emphatic abilities and reaction to unfairness.

Modifying HL attempters' relative insensitivity to the cost of retaliation and their emotional interference in cooperation and trust may be a possible therapeutic target.

E - 23
EVENT-RELATED POTENTIALS REVEAL DISTINCT SPATIOTEMPORAL DYNAMICS OF STEREOTYPE PROCESSING BETWEEN CONSERVATIVES AND LIBERALS

Adam K Baker - Simon Fraser University; Mario Liotti - Simon Fraser University; Geneveive Fuji-Johnson - Simon Fraser University

Recent research has begun to utilize event-related potentials (ERPs) to investigate social phenomena, such as stereotyping. Here, we continue this work by using event-related brain potentials (ERPs) and behavioral assays of gender stereotyping, together with questionnaires about political orientation, to examine the cognitive mechanisms of gender stereotype processing between groups of people (e.g. liberals and conservatives). Our investigation revealed subjects (n=30) produced greater conflict related neural activity, as revealed by the N400 ERP, in response to gender stereotype word-pair incongruities (Female + Mechanic), compared to congruities (Male + Beer). To highlight automatic and controlled processing between groups, a short (150ms) and long (700ms) stimulus-onset asynchrony (SOA) was utilized. Our results revealed a significant 3 way interaction between Congruency x SOA x Group interaction F(1, 28) = 4.55, p < .05, η2 = .04. Post-Hoc contrasts indicated that in the 150ms SOA condition, the N400 amplitude for incongruent word pairs was significantly larger compared to congruent word pairs in both groups t(14) = 5.42, p.05, but did for the conservative. These results indicate that for liberals, N400 amplitude between gender stereotype incongruities and congruities was greatly attenuated. Taken together, our results highlight important neurocognitive mechanisms of stereotyping processing; bolstering the utility of ERPs to investigate differential processing of social groups and examine inter-group bias (e.g. partisan bias).

E - 24

SLEEP-DEPRIVATION MEDIATES FRONTO-LIMBIC CIRCUITRY IMPLICATED IN RISK-TAKING BEHAVIOR AMONG ADOLESCENTS: AN FMRI STUDY AT 7T

Julio A. Yanes - Auburn University, Auburn, USA; Lauren A. J. Kirby - Auburn University, Auburn, USA; Jerry E. Murphy - Auburn University, Auburn, USA; Stephen A. Earth - Auburn University, Auburn, USA; Kelly M. Tu - Auburn University, Auburn, USA; Mona El-Sheikh - Auburn University, Auburn, USA; Jennifer L. Robinson - Auburn University, Auburn, USA

Token characteristics of adolescence include unstable sleep patterns and emergent risk-taking; however, the relationship between these aspects throughout adolescence- a key developmental period for fronto-limbic circuitry- is poorly understood. Between 20% and 40% of children experience sleep disturbance (e.g., insufficient, low quality, etc.). These deficits are associated with peer-aggression, anxiety, stress, and feelings of loneliness, which then has reciprocal effects on subsequent sleep. Here, we used a novel within-subjects experimental design that leveraged sub-millimeter high-field functional magnetic resonance imaging to probe risk-taking among adolescents under "normal" and "acute deprivation" sleep conditions. Adolescent subjects completed a Balloon Analog Risk Taking (BART) paradigm in the scanning environment on two occasions: the morning following a normal night's sleep (M = 6.7 hours), and following sleep deprivation (M = 3.5 hours). Actimetry sensors were used to quantitatively assess sleep in both conditions. Compared to normal sleep, adolescents showed significant hyperactivation within the amygdala, insula, and caudate nucleus during unsuccessful trials following sleep deprivation. Moreover, normal sleep was associated with increased anterior cingulate cortex (ACC) activity during successful trials. These results were further interrogated using independent components analysis of resting-state data, which demonstrated significant disruptions in the default mode network (including the ACC) and limbic networks (inclusive of the amygdala and hippocampus). Taken together, these findings suggest that sleep deprivation is associated with increased limbic hyperactivity, both at rest and during task engagement, which may subsequently disengage prefrontal cognitive control centers, providing preliminary evidence for potential mechanisms for increased risk-taking behaviors.

E - 25

CONTEXT-SPECIFIC INHIBITORY CONTROL TRAINING: TARGETING A KEY NEUROCOGNITIVE SKILL TO REDUCE RISK-TAKING IN ADOLESCENTS

Kathryn G. Beauchamp - University of Oregon; Kelsey A. Shaffer - University of Oregon; Ursula Tooley - University of Oregon; Philip A. Fisher - University of Oregon; Elliot T. Berkman - University of Oregon

People take more risks during adolescence, particularly in the presence of peers. This propensity to engage in risky behavior is especially pronounced in adolescents with a history of adverse childhood experiences (ACEs). More detailed knowledge about specific neurocognitive skills that protect against risk-taking, particularly in a peer context among people with ACEs, is a promising way to reduce risk-taking where and when it is most likely. Inhibitory control (IC), a key neurocognitive skill, relates to reduced risk-taking behavior and is diminished by experiences of early adversity. In the current work, we attempted to increase IC within a peer context in a group of 15 to 17 year old adolescents (N = 22) recruited from a high school in a low-SES school district. Participants were randomly assigned to receive a context-specific IC training where adolescent faces were paired with stopping in a modified stop-signal task or an active control training where adolescent faces were not paired with stopping. fMRI data were obtained pre- and post-training on all participants. Data collection is complete for 17 participants and will conclude for 5 more in mid-December. Preliminary results suggest that a greater number of ACEs is associated with decreased behavioral performance on the stop-signal task and atypical patterns of IC-related brain activation. Results are informative about the potential for cue-specific IC training to impact both behavioral and neural markers in an at-risk adolescent population.

E - 26

MESSAGE SENSATION VALUE, ARGUMENT STRENGTH, AND AUDIENCE DRUG-USE RISK MODULATE FUNCTIONAL CONNECTIVITY IN THE PERSUASION NETWORK

Rene Weber - University of California Santa Barbara; Richard Huskey - University of California Santa Barbara; James Michael Mangus - University of California Santa Barbara

A growing body of research investigates the neural basis of attitude and behavior change (Falk et al., 2009). The majority of work on the so-called "persuasion network" relies on standard brain-mapping paradigms while only a handful of investigations have assessed functional connectivity. For instance, Ramsay and colleagues (2013) observe functional connectivity between affective and executive structures during strong (but not weak) argument strength

(AS) public service announcements (PSAs) while Seelig and colleagues (2014) found inconclusive evidence that message sensation value (MSV) modulates occipital-temporal connectivity. However, persuasion is a multi-determined construct that results from an interaction between message features and audience characteristics (Weber, et al., 2013), and should lead to specific connectivity patterns among a-priori defined structures within the persuasion network. The present study exposes 28 subjects to anti-drug PSAs in a 2x2x2 mixed-factorial design where MSV, AS, and subject drug-use risk were systematically varied. Psychophysiological interaction analyses (Friston, et al., 1997) tested functional connectivity with seed regions selected from existing literature. Results reveal occipital-temporal (e.g., MTG) and affective (e.g., amygdala) functional connectivity under high MSV among high-risk subjects. While no significant clusters emerged when seeding from Ramsay's LIFG, their socioemotional persuasion hypothesis received support when seeding from Falk's MPFC (Falk et al., 2012) which projected into affective structures (e.g., putamen, insula) for high MSV and high AS PSAs among high-risk subjects. We propose that persuasion neuroscience research must continue to investigate network-level effects while accounting for theoretically relevant (and multidimensional) interactions between message features and target audiences.

E - 27
CAUSATION IN MORAL JUDGMENT: BOTH UNIQUE AND OVERLAPPING NEURAL REPRESENTATIONS
Justin W Martin - Harvard University; Fiery Cushman - Harvard University
For moral judgment, causation is crucial: It means the difference between life in jail for murder, or 10 years for attempted murder. Of course, a person's intentions also matter, and past research demonstrates the centrality of both factors. Yet, while the neural bases of theory of mind (TOM) are well known, little is understood about the neural underpinnings of representing a person's causal role during moral judgment. Here, we probe this process using a predictive coding framework. While undergoing fMRI, participants (N=20) read vignettes in which two agents caused harm to a victim. We contrast cases in which causation occurred as expected and was therefore easy to process (e.g. the agents caused harm in an expected way) with cases in which the two agents' causal roles were unexpected and therefore required greater causal processing. Unexpected causation lead to activity in left dorsolateral prefrontal cortex, which was selective for processing causation and not sensitive to events that involve other (non-causal) manipulations of expectation or events that necessitate greater TOM processing. Intriguingly, we also demonstrate sensitivity to causation in the TOM network, including bilateral temporoparietal junction and precuneus. One possibility is that this overlap in activation represents a processing similarity between attributing causation and mental states to agents: In both cases, an unobservable state is applied to that agent. Ongoing work explores this possibility. Minimally, we demonstrate selective sensitivity to an agent's causal role in harm in left prefrontal cortex, elucidating a critical node in the network of regions subserving moral judgment.

E - 28
DO VALENCE-RELATED VISUAL RESPONSES PRECEDE HIGH-LEVEL AFFECTIVE PROCESSING DURING OBJECT PERCEPTION?
Kevin A. M. Tan - Department of Psychology and Center for the Neural Basis of Cognition, Carnegie Mellon University, Pittsburgh, United States; Michael J. Tarr - Department of Psychology and Center for the Neural Basis of Cognition, Carnegie Mellon University, Pittsburgh, United States
What drives you to use a particular mug or pen? These choices may be driven by "microvalence"—subtle affective responses elicited during object perception (Lebrecht et al., 2012). Microvalences lie on a continuum with strong negative and positive valence. As such, nominally neutral objects near the continuum center may carry microvalence, a hypothesis supported by fMRI work indicating that valence and valence strength are encoded in both lateral prefrontal cortex (PFC) and lateral occipital complex (LOC); canonical affect and object processing regions, respectively (Lebrecht, 2012). Here, we use EEG to address whether recruitment of LOC precedes the PFC responses more typically associated with affective processing. EEGs were recorded across two tasks using object stimuli carrying positive or negative valence at either micro or strong strength. Observers rated objects for pleasantness on a 1–4 scale and—using different objects shown intact and phase-scrambled—performed a one-back identity task. EEG data was decomposed into independent components, which were projected into a standardized brain model through equivalent dipole fitting. ERP analyses using a two-factor permutation test (Valence x Scrambled) suggest that Valence (80–120ms) precedes object-specific processing (120ms+) in lateral occipital regions, where a second test (Valence x Strength) reveals that Valence (85–120ms) is encoded prior to Strength (100ms+). Afterwards, both Valence and Strength are discriminable in prefrontal (450–600ms) and parietal (450ms+) regions. In sum, valence precedes strength- and object-specific processing during P1 in occipital cortex. Valence processing also occurs at P3b

and slow-wave latencies in a prefrontal–parietal circuit, perhaps integrating over perceptual, affective, and semantic information.

E - 29
A COMPUTER-BASED "AVATAR" TASK OF BEHAVIORAL INHIBITION: RELATIONSHIPS TO HARM AVOIDANCE AND ADAPTIVE AND NON-ADAPTIVE COPING STYLES

M. Todd Allen - University of Northern Colorado, Greeley, CO USA; Catherine E. Myers - VA New Jersey Health Care System, East Orange, NJ USA ; Rutgers-New Jersey Medical School, Newark, NJ USA

In previous work, we showed that a computer based task in which the participant guides an on- screen "avatar" through a series of onscreen events could accurately predict participants' behavioral inhibition (BI), a personality trait linked with risk for anxiety disorders. Here, we sought to replicate this finding as well as compare performance on the avatar task to another measure of anxiety vulnerability, the harm avoidance scale of the TPQ, as well as a measure of coping style (i.e., Brief COPE).   It was hypothesized that scores on the avatar task would positively correlate with harm avoidance and differentiate between adaptive and non-adaptive coping styles. Seventy undergraduates completed the avatar task and the paper and pencil inventories. Scores on the avatar task were strongly correlated with BI assessed via the AMBI questionnaire ($r = 0.69$, $p < .001$), which replicates prior findings. There was also a strong positive relationship between the avatar task and harm avoidance scores ($r = 0.60$, $p < 0.001$). A significant positive relationship was observed between the avatar score and the behavioral disengagement, venting, and self-blame scales (r's > 0.25). There were also significant negative relationships between the avatar score and the active coping, positive reframing, and humor scales (r's > -0.25). No other coping styles were significantly related to the avatar score. The usefulness of this computer task as an alternative to inventories in anxiety vulnerability will be discussed.

E - 30
IS HEALTH ANXIETY RELATED TO DISEASE AVOIDANCE?

Mats Lekander - Stockholm University and Karolinska Institutet, Sweden; Erik Hedman - Karolinska Institutet; Bianka Karshikoff - Stockholm University and Karolinska Institutet, Sweden; John Axelsson - Karolinska Institutet

Health anxiety is characterized by a persistent and debilitating worry of somatic illness, as well as of avoidance behaviors. Still, there is little empirical knowledge on the cognitive and affective response mechanisms that lead to avoidant behavior in afflicted individuals. We hypothesized that a higher degree of health anxiety would relate to an altered interpretation of other peoples' health status and that this would be driven by disgust and a fear for becoming sick. We recruited 225 participants with a varying degree of health anxiety (of which 132 were patients suffering from severe health anxiety). The participants rated facial photographs of other individuals with a varying degree of appeared sickness. A higher degree of health anxiety was related to perceiving other people as less healthy, being more contagious, and less attractive to socialize with (p's $<.05$), particularly if people looked more sick. More health anxiety was also related to higher picture evoked anxiety, disgust and worry about one's own health (p's $<.05$). These findings suggest that patients with health anxiety display a cognitive bias to overrate risk for contagion and risk for own health when exposed to other people, phenomena possibly driving socially disabling tendencies to avoidance behavior.

E - 31
SUCCESSFUL SELF-REGULATION OF DRUG-CUE REACTIVITY IN COCAINE ADDICTED INDIVIDUALS.

Parvaz Muhammad - Icahn School of Medicine at Mount Sinai, New York, NY; Malaker Pias - Icahn School of Medicine at Mount Sinai, New York, NY; Alia-Klein Nelly - Icahn School of Medicine at Mount Sinai, New York, NY; Goldstein Rita - Icahn School of Medicine at Mount Sinai, New York, NY

Exposure to conditioned drug-related cues often elicits intense drug craving, one of a well-known pre-requisites for drug seeking behaviors. Thus, efficient self-regulation during exposure to drug-cues may likely prevent subsequent relapse into drug seeking behaviors. To test this hypothesis, 21 individuals with cocaine use disorder (iCUD) and 21 healthy controls (HC) were shown drug and neutral cues, while EEG data was recorded, and were instructed to either continue looking ('LOOK') or to decrease their emotional reactivity to the cues ('DECREASE') via cognitive reappraisal using either the 'distancing' (e.g., "imagine it is part of a television show") and/or the 'reinterpretation' ("imagine it is a pile of icing sugar") strategies. Following each trial, drug and neutral cues were presented side-by-side while eye gaze duration (GD) was recorded along with subjective ratings of 'Liking' and 'Wanting' cocaine. Late positive potentials (LPP), GD, and subjective ratings in response to drug cues relative to neutral cues were calculated to quantify motivated attention, attention-bias and subjective drug-seeking, respectively. As compared to HC, in

response to 'DECREASE' relative to 'LOOK' trials, iCUD had reduced LPP amplitudes along with diminished GD to drug-related cues as associated with reduced 'Wanting' of cocaine. These findings indicate that iCUD were able to use cognitive reappraisal to successfully down-regulate drug-related arousal and attention bias, as associated with reduced drug-wanting (craving). Thus, cognitive reappraisal appears to be successful beyond reducing arousal and spontaneous attention to drug cues, and the effects carry over towards reducing craving; relevance to reducing relapse remains to be tested.

E - 32
ANXIETY-VULNERABLE, BUT NOT NON-VULNERABLE, INDIVIDUALS GENERALIZE PREVIOUSLY ACQUIRED IMPLICIT KNOWLEDGE DURING A SOCIAL EXCHANGE GAME

Catherine E. Myers - VA New Jersey Health Care System, East Orange, NJ, and Department of Pharmacology, Physiology & Neuroscience, Rutgers-New Jersey Medical School, Newark, NJ; M. Todd Allen - School of Psychological Sciences, University of Northern Colorado, Greeley, CO; Mauricio Delgado - Department of Psychology, Rutgers University-Newark, Newark, NJ

Recent studies have shown that anxiety-vulnerable individuals exhibit enhanced associative and avoidance learning. Here we investigated how anxiety-vulnerable individuals form associations in a feedback based task, and generalize this knowledge during a social exchange game involving trust decisions. Sixty participants first received training in an acquired equivalence task, in which faces were implicitly equivalent in the sense of being mapped to similar outcomes. Anxiety-vulnerable and non-vulnerable individuals expressed similar levels of transfer to novel face outcome pairings. Participants then read biographies for a subset of the faces, describing fictitious life events depicting them as morally praiseworthy, neutral, or suspect. Participants then completed a trust game with the previously-experienced faces representing partners. In this social exchange task, participants can choose to keep monetary rewards or share with partners in expectation of future reciprocity. Participants tended to share rewards more often with the "good" than the "bad" partner, suggesting an influence of priors based on the biographies. Critically, anxiety-vulnerable, but not non-vulnerable, participants tended to share rewards more often with the partner who had previously been equivalent to the "good" partner, and less with the partner who had previously been equivalent to the "bad" partner, even though no explicit information had been provided about these individuals. These results suggest that anxiety-vulnerable, but not non-vulnerable, individuals tend to generalize previously acquired implicit knowledge during social interactions. Implications for neural substrates underlying multiple memory systems (e.g., basal ganglia, hippocampus) will be discussed for these tasks.

E - 33
FINDING POSITIVE MEANING IN NEGATIVE EXPERIENCES ENGAGES VENTRAL STRIATAL AND VENTROMEDIAL PREFRONTAL REWARD REGIONS

Bruce P. Dore - Columbia; Chelsea Boccagno - Columbia; Alexa Hubbard - NYU; Kan Long - Columbia Teacher's College; Jochen Weber - Columbia; Yaakov Stern - Columbia college of physicians and surgeons; Kevin Ochsner – Columbia

People have a profound ability to generate positive emotions in the face of adversity, a factor promoting resilience and recovery from stressful life events. Although neuroimaging research has identified systems that facilitate minimizing negative emotion, how the brain is able to transform the valence of an emotional response from negative to positive is unclear. Here we show that successful minimizing reappraisal decreased activity in the amygdala, but successful positive reappraisal increased activity in regions involved in computing reward value, including the ventral striatum and ventromedial prefrontal cortex (vmPFC). Moreover, positive reappraisal enhanced positive connectivity between vmPFC and amygdala, and individual differences in positive connectivity between vmPFC and amygdala, ventral striatum, dorsomedial prefrontal cortex (dmPFC), and dorsolateral prefrontal cortex (dlPFC) regions predicted greater positive reappraisal success. These data broaden models of emotion regulation as quantitative dampening of negative emotion, and identify activity in a network of brain valuation, arousal, and control regions as a neural basis for the ability to create positive meaning from negative experiences.

E - 34
DEAF OR BLIND FOR EMOTION? IMPACT OF COMMUNICATION MODALITY MUTING ON EMOTIONAL RESPONSES IN PSYCHOPATHIC PERSONALITY

Hedwig Eisenbarth - University of Southampton; Regenbogen Christina - Karolinska Institutet

Social interactions are composed of several communication modalities, such as prosody, facial expression or verbal content. Partly muting those modalities can reduce the emotional reaction of the observer. As highly psychopathic

individuals have difficulties in categorizing emotional facial expressions and show reduced emotional arousal, muting different modalities in every-day communication should have less impact on emotional reactivity in highly psychopathic individuals. We presented short video clips (Regenbogen et al., 2012) to 37 undergraduate students (24f,13m), showing actors talking about disgusting, fear-provoking, happy and sad situations, with either neutral prosody, neutral facial expression or neutral verbal content, or with all modalities expressing emotion, but in foreign language. Ratings of emotional intensity and own emotional responses were obtained, as well as psychopathic traits (TriPM, Patrick et al., 2014) and skin conductance responses (SCR). Across participants, videos with unknown language and muted prosody reduced intensity ratings for disgust and sad videos significantly. Similarly, ratings for participants' own emotional reactions were reduced by muted prosody and unknown language in disgust and happy videos, but increased in sad videos. The Boldness aspect of psychopathy was associated with overall lower emotional intensity ratings, whereas Disinhibition and Meanness were related to less variation in response to disgust provoking videos. SCR varied based on modality muting and emotion category. Meanness and Disinhibition aspects of psychopathy were significantly related to higher overall SCR, and high Meanness scores to higher SCR variation depending on type of modality muting. Implications of this dissociation between physiological and subjective responses will be discussed.

E - 35
REWARD MODULATES ATTENTIONAL SELECTION: A FMRI STUDY

Alexia Bourgeois - Laboratory for Behavioral Neurology and Imaging of Cognition - University of Geneva, Switzerland; Virginie Sterpenich - Laboratory for Behavioral Neurology and Imaging of Cognition - University of Geneva, Switzerland; Remi Neveu - Laboratory for Behavioral Neurology and Imaging of Cognition - University of Geneva, Switzerland; Patrik Vuilleumier - Laboratory for Behavioral Neurology and Imaging of Cognition - University of Geneva, Switzerland

In order to behave adaptively, attention can be directed in space either voluntarily (i.e., endogenously) according to strategic goals, or involuntarily (i.e., exogenously) through reflexive capture by salient or novel events. In addition, a growing body of evidence suggests that stimuli with particular emotional or motivational values can also strongly influence attentional orienting. These effects resemble both endogenous and exogenous mechanisms as they are based on internal states generated by affective appraisals and memory, but operate reflexively in a stimulus-driven manner. However, the exact attentional mechanisms and neural substrates of value-based attentional priority remain poorly known. Functional MRI data of 21 participants were analyzed to study how reward learning interferes with the voluntary deployment of attention, on one hand, and with stimulus-driven attention capture, on the other hand, in conditions where attention selection must resolve between competing choices. Behaviourally, our results demonstrated that reward history seems to be a powerful determinant of attentional selection that can mitigate the spatial orienting effects induced by both endogenous and exogenous cues. fMRI results showed that stimuli associated with high reward evoke stronger activation in the right visual cortex, specially when attention was exogenously triggered. Thus, rewards may create low-level bias selective plasticity in the earliest sensory processing levels within the visual cortex.

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AFFECTIVE AND NEURAL CORRELATES OF CONTROL AVERSION

Sarah Rudorf - Social Psychology and Social Neuroscience and Center for Cognition, Learning and Memory, Institute of Psychology, University of Bern, Switzerland; Thomas Baumgartner - Social Psychology and Social Neuroscience and Center for Cognition, Learning and Memory, Institute of Psychology, University of Bern, Switzerland; Daria Knoch - Social Psychology and Social Neuroscience and Center for Cognition, Learning and Memory, Institute of Psychology, University of Bern, Switzerland

When social control restricts their freedom of choice most humans will feel the urge to counteract and thereby reestablish their valued free choice, whereas some humans will not. Although it is clear that the urge to resist social control may lead to suboptimal decision making, it remains unknown how social control is integrated into the decision making process.

We address this question by combining a social decision making task with functional magnetic resonance imaging in a sample of healthy adults. While being scanned subjects allocated money to themselves and varying, anonymous interaction partners. Critically, their interaction partners either let them choose freely or restricted the number of choice options. After each decision, subjects rated their happiness, anger and dominance on non-verbal pictorial assessment scales.

Two thirds of all subjects demonstrated control-averse behavior: they allocated significantly less money to their interaction partners during restricted as opposed to free choices. They were also significantly less happy, angrier and felt less dominant during restricted choices. Interestingly, a subsample of subjects showed the same affective response, but showed no control-averse behavior. So we grouped subjects into control averters and control neutrals according to their behavior and tested whether the two groups encoded the choice situations (restricted vs free) differently. We found a significant interaction effect in the temporal parietal junction (TPJ): attenuated responses to restricted and free choices were observed in control averters compared to control neutrals. Further analyses will explore the role that the TPJ plays in the implementation of control-averse behavior.

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NEURAL SENSITIVITY TO VICARIOUS REWARD CORRELATES WITH PROSOCIALITY AND WELL-BEING

Sylvia A. Morelli - University of Illinois at Chicago; Brian K. Knutson - Stanford University; Jamil Zaki - Stanford University

Why do some individuals consistently engage in prosocial behaviors (such as charitable giving) more than others? One intriguing possibility is that individuals vary in the extent to which they experience vicarious reward when observing others receive positive outcomes, and vicarious reward drives people's proclivity to help others. To test this idea, we assessed individuals' neural sensitivity to both personal and vicarious reward, and explored how sensitivity to each type of reward related to those individuals' prosociality and well-being. Forty-six participants underwent functional magnetic resonance imaging scanning while winning money themselves (personal reward) and observing a close friend win money (vicarious reward). Interestingly, reward-related neural activity during personal and vicarious reward did not significantly relate to each other, such that some individuals were relatively sensitive to personal reward, whereas others were relatively sensitive to vicarious reward. Further, only ventral striatum activity during vicarious reward correlated with individual differences in prosociality. Ventral striatum activity during both personal and vicarious reward positively correlated with subjective well-being (e.g., greater life satisfaction and less loneliness). Together, these findings suggest that individuals exhibit unique "profiles" of neural sensitivity to personal and vicarious reward, and that vicarious reward sensitivity uniquely predicts individuals' prosocial tendencies.

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A FUNCTIONAL MRI INVESTIGATION OF AUTONOMOUS SENSORY MERIDIAN RESPONSES (ASMR)

Beverley Fredborg - University of Winnipeg, Winnipeg, Canada; Jennifer Kornelsen - University of Manitoba, Winnipeg, Canada; Stephen D. Smith - University of Winnipeg, Winnipeg, Canada

BACKGROUND: Autonomous Sensory Meridian Response (ASMR) is a perceptual condition in which specific visual and auditory stimuli consistently trigger tingling sensations on the scalp and neck, sometimes spreading to the back and limbs. These triggering stimuli are typically social, almost intimate, in nature (e.g., hearing whispering, or watching someone brush her hair), and often elicit a calm and positive emotional state. Surprisingly, despite its prevalence in the general population, no published study has examined the neural underpinnings of ASMR. METHODS: Thirteen individuals with ASMR completed six 300-second fMRI runs while passively viewing videos. Three of the videos were shown (through pre-testing) to elicit ASMR tingles and three videos did not (i.e., control videos). Participants indicated the intensity of their ASMR tingles following the scan. The two fMRI runs with the highest intensity ASMR response as well as two control videos were used for analyses. RESULTS: When contrasted to baseline activity, the ASMR videos elicited activity in the right inferior parietal lobe, left cingulate, and left insula. A comparison of the activity in the ASMR vs. Control fMRI runs showed that ASMR videos elicited greater activity in the paracentral lobule, a somatosensory region, and the lingual gyrus. CONCLUSIONS: The paracentral lobule is related to motoric (SMA) and somatosensory functioning; both processes would be involved in tingling sensations. The lingual gyrus has been linked to the processing of emotional faces (a stimulus used in the current study). Together, these results provide an intriguing first step in our understanding of ASMR experiences.

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THE EMOTIONAL HOMUNCULUS: EVIDENCE FOR SOMATOTOPIC EMPATHY

Alejandra Sel - Department of Experimental Psychology, University of Oxford; Beatriz Calvo-Merino - Department of Psychology, City University London; Bettina Forster - Department of Psychology, City University London; Manos Tsakiris - Department of Psychology, Royal Holloway University of London

Recent research has shown independent contribution of somatosensory cortex (SCx) to facial emotion processing (Pitcher et al., 2008; Sel et al., 2014). In addition, research showed that emotions are felt in different body parts and

represented by different patterns of brain responses (Nummenmaa et al., 2014; Saarimaki et al., 2015). We tested whether the empathetic response triggered by observing others emotional face expressions leads to distinct activations of SCx. Participants performed a visual facial emotion discrimination task. On half of the trials SCx activity was probed by task irrelevant touch to different body parts. By subtracting neural activity elicited on visual-only facial emotion expression trials from tactually probed trials we isolated pure SCx emotion responses. Furthermore, by comparing responses to different tactile probe locations (finger versus toe) and different facial emotion expression trials (sad versus anger) we show dissociation in the somatotopic response to different facial emotion expressions. Moreover, participants were asked to indicate where in the body the person expressing the facial emotion felt the emotion. This empathetic inference predicted our participants' cortical activation within SCx when judging facial emotion expressions, at least for anger. Taken together, our result is the first evidence for distinct somatotopic activation patterns of perceiving others' felt emotions.

Nummenmaa et al. 2014. PNAS 111: 646-51.
Pitcher et al. 2008. J Neurosci 28: 8929-33.
Saarimaki et al. 2015. Cereb Cortex: 1-11.
Sel et al. 2014. J Neurosci 34: 3263–7.

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THE ROLE OF THE NEUROPEPTIDE OXYTOCIN IN COGNITIVE AND SOCIOEMOTIONAL AGING

Natalie Ebner - University of Florida

The oxytocin (OT) system is involved in various aspects of social cognition and prosocial behavior. Specifically, OT has been examined in the context of social memory, emotion recognition, cooperation, trust, and bonding, and-though evidence is somewhat mixed-OT appears to benefit aspects of socioemotional functioning. However, most of the extant data on aging and OT is from animal research and human OT research has focused largely on young male adults. As such, though we know that various cognitive and socioemotional capacities change with age, we know little about whether age-related changes in the OT system may underlie age-related differences in cognition and socioemotional functioning. Also, effects of gender are still largely unaddressed in this field. Based on our Age-Related Genetic, Neurobiological, Sociobehavioral Model of Oxytocin (AGeNeS-OT model), we examined age-related changes in the OT system and effects of these alterations on cognition and socioemotional functioning, considering hormonal, neural, behavioral, and genetic data in young and older women and men. Our results suggests a role of peripheral levels of OT on speed of information processing. In addition, findings from an intranasal intervention study propose an age-by-gender modulatory effect of OT on resting-state functional connectivity between amygdala and medial prefrontal cortex as well as on meta-mood. The broader translational potential of this line of research in depression, social stress, and anxiety-all of which have high relevance in aging-will be briefly discussed.

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STRUCTURAL CORRELATES OF EMPATHY IN CHILDREN AND ADOLESCENTS

Eve Rosenfeld - SUNY Buffalo; Natalie Kleeman - Harvard University; Emily Norkett - Boston Children's Hospital/Harvard Medical School; Sarah Hope Lincoln - Boston Children's Hospital/Harvard Medical School

This study investigates the neural structure supporting the social cognitive processes of empathy and perspective taking. Participants were typically developing (TD) children and adolescents ages 8 through 13 years. Using structural magnetic resonance imaging (MRI) data, we assessed differences in grey matter volume (GVM) as they relate to differences in self-reported empathy and perspective taking. Grey matter deficits in social cognition regions of the brain may relate to the social cognition deficits present in several neurodevelopmental disorders, including autism spectrum disorder, Williams syndrome, and psychotic disorders; understanding neural underpinnings of social cognition in typically developing children is necessary for the identification of abnormal development. Additionally, taking an individual differences approach to the understanding of neurodevelopment and social cognition helps us better understand how individual factors contribute to the variance in social cognitive processing in the general population. Participants completed a structural MRI scan and a self-report measure, the Interpersonal Reactivity Index (IRI), which assess empathic concern and empathy. Results suggest that GMV in regions of the insula, somatosensory cortex, and temporoparietal junction (TPJ) are significantly and positively correlated with levels of self-reported empathy and perspective taking in TD children and adolescents. These findings provide support for the theory of mind network in this population.

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THE N170 IS ASSOCIATED WITH AUTISTIC TRAITS IN HEALTHY ADULTS

Jenna M. Van Dyck - University of Virginia, Charlottesville, USA; Meghan H. Puglia - University of Virginia, Charlottesville, USA; Jessica J. Connelly - University of Virginia, Charlottesville, USA; James P. Morris - University of Virginia, Charlottesville, USA

Processing of faces occurs automatically and results in a strong negative component 170 ms after stimulus presentation (N170). However, both the strength and timing of N170 varies across individuals and may be indicative of social disorders. For example, face-processing deficits have long been considered characteristic of autism spectrum disorders (ASD), and individuals with ASD often show a diminished N170. However, it is increasingly understood that the social difficulties associated with ASD are not limited to those that fall within diagnostic categories. Rather, these traits are continuously distributed in the general population and can be reliably assessed with a self-report measure called the Autism-Spectrum Quotient (AQ).

We hypothesized that healthy individuals high in autistic traits would show a diminished response to face stimuli, revealing a continuum of social perceptual biases that may impact overt social behavior. To test this hypothesis, 26 participants underwent electroencephalography (EEG) while completing a selective attention task in which they are instructed to attend to either a face or a house in a face-house overlaid image. Participants also completed the AQ. We computed a difference wave to examine the differential response in N170 when attending to Faces versus Houses. We find a significant negative linear relationship between AQ score and amplitude of the Face-House difference wave over P8, such that individuals with more autistic traits show decreased response to faces versus houses. These results may indicate that healthy individuals with more autistic traits show decreased perceptual bias for social objects.

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FOOD ADDICTION IS ASSOCIATED WITH IMPAIRED PERFORMANCE MONITORING

Ingmar H.A. Franken - Erasmus University Rotterdam; Ilse Nijs - Erasmus University Rotterdam; Freddy van der Veen - Erasmus University Rotterdam

Currently, there is an ongoing debate whether it is possible to be addicted to food. There are several indications pointing in this direction, but research is scarce. Up to date it is not exactly known whether this "food addiction" shares common neurocognitive deficits observed in the more classical types of addictions. One commonly observed finding in addicted patients is that there is an impaired cognitive control. One of the essential components of cognitive control is performance monitoring. In the present study it is studied whether persons with "food addiction" have impaired error monitoring. For this purpose the performance monitoring of persons meeting the criteria for "food addiction" (n=34) according to the Yale Food Addiction Scale (YFAS) were compared with a control group (n=34) while performing an Eriksen Flanker Task and EEG measurement. Both electrophysiological (ERN and Pe component) and behavioral measures were compared between the two groups. The present study indicates that the "food addiction" persons have reduced ERN and Pe waves. In addition, the "food addiction" group demonstrates a higher number of errors on the flanker task. In general, the results provide indications that persons with a "food addiction" display impaired performance monitoring. These findings provide an indication that food addiction, just as other addictions, is characterized by impaired cognitive control.

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REPRESENTATIONS OF PERSONS IN THE MPFC: SELF RELEVANCE OR PERSON KNOWLEDGE?

Elien Heleven - Vrije Universiteit Brussel; Frank Van Overwalle - Vrije Universiteit Brussel

Neuroimaging studies on trait inference demonstrated that the ventral medial prefrontal cortex (mPFC) houses neural representations or codes for traits and persons that possess these traits (Heleven and Van Overwalle, 2015). A proper method to localize these codes is fMRI repetition suppression, a rapid suppression of fMRI responses upon repeated presentation of the same stimulus. Prior work showed repetition suppression in the mPFC when traits or persons were repeated. This finding led us to conclude that there were trait and person codes in the mPFC. An alternative explanation however, is that repetition does not reflect the person or trait itself but rather self-relevance or the degree of knowledge about the person or trait. In the current study we try to explore these alternative hypotheses by manipulating the repetition not only of persons, but also of the knowledge about persons and their self-relevance to the participant. If knowledge and self-relevance are both part of a person code, we expect a summative repetition suppression effect. In this case repetition suppression will be largest in a condition with repetition of knowledge and self-relevance compared to conditions with only repetition of one of them or no repetition at all. However, if both characteristics of the person are represented separately, we hypothesize the repetition suppression effects for knowledge and self-relevance will be found on different locations, both probably in

the mPFC. Moreover, there will be no summative repetition suppression effect. The results will be presented at the conference.

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NEURAL AND GENETIC CORRELATES OF SOCIAL FUNCTIONING IN A SAMPLE OF COLLEGE STUDENTS WITH SUBCLINICAL SCHIZOTYPY

Elaina Montague - University of Nebraska-Lincoln; William D. Spaulding - University of Nebraska-Lincoln
Schizotypy is a continuum of personality characteristics that includes differences in visual and auditory perception, motor functioning, verbal speech, social interaction, affect expression, and cognitive appraisal. It is now understood that these differences reflect a continuum of individual differences, ranging from normal to clinical variations in personality and behavior. Mild, subclinical levels of schizotypy occur in college students, making them a useful population to study, without complications brought by more disabling mental illness. The present study sought to clarify the neural, genetic, and behavioral correlates of social functioning within a sample of students with subclinical schizotypy (N=19) using an fMRI paradigm known to evoke amygdala reactivity to ambiguous facial stimuli. We hypothesized participants with higher levels of schizotypy will demonstrate greater initial amygdala hyperresponsivity (reactivity), as well as greater amygdala hyporesponsivity (deactivaton) across task duration in comparison to participants with lower levels of schizotypy (controls). In addition, participants with higher levels of schizotypy will demonstrate weaker amygdala-prefrontal cortical connectivity at rest than controls, which will be associated negativity bias in face valence ratings, worse emotion identification, worse face matching task performance, and overall lower levels of social functioning. Lastly, polygenetic risk loci (e.g., 5-HTLPR; rs25531; COMT; rs4680) will be associated with differences in time course, pattern and correlates of amygdala activity between groups, as well as behavioral or self-report measures of social functioning. Potential implications for the assessment and treatment serious and disabling mental illness will also be discussed.

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KNOWING WHAT OTHERS WILL DO NEXT: INVESTIGATING THE EFFECTS OF PREDICTABILITY ON THE NEURAL CORRELATES OF GAZE-BASED SOCIAL INTERACTION.

Marie-Luise Brandi - Max Planck Institute of Psychiatry - Research Group Social Neuroscience, Munich, Germany; Leonhard Schilbach - Max Planck Institute of Psychiatry - Research Group Social Neuroscience, Munich, Germany
Gaze behaviour is a vital component of daily social life. Novel eye-tracking methodologies and gaze-contingent virtual character have made it possible to address social gaze during real-time social interactions. Due to the compatibility of these methods with neuroimaging techniques, the study of such gaze-based social interactions does not only provide information about the neural basis of social perception, but also of social interactions. Joint attention (JA) is a core process of social interactions, but the neuronal correlates are still not fully understood. In JA two individuals coordinate their (visual) attention to form a referential triangle. In the current fMRI study healthy participants were instructed to interact with a virtual character, who they believed was controlled by another person, and to induce JA on an object with this person. Depending on condition it was systematically varied whether the agent followed the gaze of the participant, or not on a trial-by-trial basis. Additionally, we evaluated whether differences in the prior knowledge about how the person would behave (predictable vs unpredictable) would influence the neural activation patterns during gaze-based social interaction. The analysis showed that brain areas previously reported to be related to JA (ventral striatum and prefrontal cortex) are involved in real-time social interactions and are influenced by prior knowledge about the outcome of the interaction. All in all, this study therefore provides valuable insights into core processes of social interactions which could be expanded in future studies to investigate the neural mechanisms of social impairments in patient populations.

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THE DECODING OF EMOTIONAL FACIAL EXPRESSIONS ACROSS VARIOUS SPATIAL FREQUENCY BANDS : AN ERP STUDY.

Yann Harel - Centre de Recherche en Neuropsychologie et Cognition, University of Montréal; Fabien D'Hondt - Centre de Recherche en Neuropsychologie et Cognition, Centre de Recherche de l'Hôpital Sainte-Justine; Charline Lavigne - University of Montréal; Franco Lepore - Centre de Recherche en Neuropsychologie et Cognition, University of Montréal
The decoding of emotional facial expressions is a crucial task for the human visual system for it is at the basis of non-verbal communication and thus social interactions. Spatial frequency content of visual stimuli is believed to interfere with face perception. Moreover, low-spatial frequencies conveyed by magnocellular pathways are thought to

modulate spatial attention to emotional cues. This study examined effects of low, medium and high spatial frequency bands on the first steps of visual processing. Event-related potentials were recorded on 23 university students during an emotional oddball task. In this task, the neutral face of one model acted as the frequent stimulus, and the neutral, angry and happy faces of another model as rare stimuli. The task was repeated 3 times using filtered images limited to spatial frequencies ranging between 0.35 and 1.5 cycles per degree (cpd ; low condition), 1.5 and 5.4cpd (medium) and 5.4 and 8cpd (high). Analysis of variance were conducted on peak amplitudes and latencies of the P100, N170 and P3b components as well as response times and accuracy. Response times were shorter for faces containing medium spatial frequencies. Low spatial frequency faces evoked an enhanced P100 but the faces' emotion had no effect on this component. Happy and angry faces evoked an enlarged N170 component in low and high spatial frequency bands. The P3b was enhanced for emotional faces, independent of the spatial filtering. The results' relationships with various levels of anxiety assessed by questionnaires at the time of the experiment will be explored.

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BILATERAL ANTERIOR PREFRONTAL CORTEX INVOLVEMENT IN INTROSPECTION AND EMOTION PROCESSING FROM FACIAL EXPRESSIONS: INSIGHTS FROM THETA-BURST STIMULATION AND EMG/SCR

Luis Carlo Bulnes - Vrije Universtiteit Brussel, Brussel, Belgium.; Chotiga Pattamadilok - Université Aix-Marseille, Aix-en Provence, France; Axel Cleeremans - Université Libre de Bruxelles, Brussels, Belgium; Marie Vandekerckhove - Vrije Universtiteit Brussel, Brussel, Belgium.

Perceptual and affective experiences of emotion are the product of an integration of bodily signals in the brain, and are intrinsically related to introspection, the capacity to reflect upon our own internal states. This process has been associated with activity in the anterior prefrontal cortex (aPFC). However, it is not yet clear whether the aPFC plays a causal role in the processing of subjective experience of emotion, the integration of bodily signals, and embodiment. To investigate this issue, we applied continuous Theta Burst stimulation over bilateral aPFC, combined with facial electromyography and skin conductance recording, in a paradigm of detection of emotional facial expressions. Before and after aPFC disruption, we presented video morphs of gradual changes of facial expressions (ON: Neutral to Happy/Angry or Identity; and OFF: Happy/Angry or Identity to Neutral). On each trial, subjects were invited to (1) Detect the moment of a facial expression change, (2) identify the direction of the change (accuracy) and to (3) rate their level of confidence (Introspective task). During the task, facial electromyography and skin conductance were recorded. This experimental setup allowed us to track the moment when subjects become aware of changes in facial expression and to observe the neurophysiological correlates of embodiment associated to facial expression detection. A comparison of the performance and the neurophysiological measures obtained before and after aPFC disruption would allow us to understand the contribution of this area to emotional detection and the associated introspective awareness.

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TOWARD A CUMULATIVE SCIENCE OF FUNCTIONAL INTEGRATION: A META-ANALYSIS OF PSYCHOPHYSIOLOGICAL INTERACTIONS

David V. Smith - Rutgers University, Newark, NJ, USA; Mouad Gseir - Rutgers University, Newark, NJ, USA; Megan E. Speer - Rutgers University, Newark, NJ, USA; Mauricio R. Delgado - Rutgers University, Newark, NJ, USA

Much of the work in social, cognitive, and affective neuroscience is shifting from a focus on single brain regions to a focus on the connectivity between multiple brain regions. These inter-regional connectivity patterns shape a wide range of behaviors and are studied with models of functional integration. Although the field has amassed a sizable literature on functional integration, it remains unclear whether functional integration is tied to common and distinct patterns of connectivity, thus limiting its utility in explaining how the brain shapes behavior. To address this issue, we performed coordinate-based meta-analyses on 284 experiments examining functional integration with psychophysiological interaction (PPI) analysis. Crucially, we grouped studies according to their chosen seed region and psychological context, allowing us to quantitatively assess the selectivity of these variables within a large corpus of studies. While our results support the reliability of PPI as a tool for studying functional integration, we also found evidence for distinct and common patterns of connectivity. For example, the dorsolateral prefrontal cortex reliably influenced the posterior cingulate cortex during cognitive control but influenced the amygdala in other contexts. Our results point to the robustness of PPI while highlighting common and distinct patterns of functional integration, potentially advancing models of brain connectivity.