Social & Affective Neuroscience Society
Annual Meeting 2009

October 9-11, Marriott Downtown
New York, NY

Organizing Committee

David Amodio, New York University
Jennifer Beer, University of Texas at Austin
William Cunningham, The Ohio State University
Matthew Lieberman, University of California, Los Angeles
Jason Mitchell, Harvard University
Kevin Ochsner, Columbia University

Schedule-at-a-glance

Friday, October 9

3:00-5:00 PM	Registration, 3rd floor foyer
5:00-6:30 PM	Session A: Keynote Address
6:30-8:00 PM	Welcome Reception

Saturday, October 10

8:00-9:00 AM	Continental breakfast, 3rd floor foyer
9:00-10:30 AM	Session B: Emotion & Motivation
10:30-11:00 AM	Coffee break, 3rd floor foyer
11:00-12:30 PM	Session C: Hormones, Brain & Behavior
12:30-2:30 PM	Break for lunch
2:30-4:00 PM	Session D: Attitudes & Social Cognition
4:00-5:30 PM	Session E: Poster Presentations
5:30-6:30 PM	Session F: Keynote Address

Sunday, October 11

8:00-9:00 AM	Continental breakfast, 3rd floor foyer
9:00-10:30 AM	Session G: Development & Theory of Mind
10:30-12:00 PM	Session H: Poster Presentations
12:00-1:30 PM	Break for lunch
1:30-3:15 PM	Session I: Culture & Intergroup Relations

Presentations

Session A: Keynote Address

Friday, October 9, 2009

5:00 PM – 6:30 PM

Joseph E. LeDoux, *New York University*

Session B: Emotion & Motivation

Saturday, October 10, 2009

9:00 AM – 10:30 AM

Eddie Harmon-Jones, *Texas A&M University*

Dean Mobbs, *University College London*

William Cunningham, *The Ohio State University*

Susan Fiske, *Princeton University*

ABSTRACTS

RECENT DEVELOPMENTS IN THE STUDY OF ASYMMETRIC PREFRONTAL CORTICAL ACTIVATION AND MOTIVATION *Eddie Harmon-Jones, Texas A&M University* – Decades of research using multiple methods have suggested that the left and right prefrontal cortices are asymmetrically involved in emotive experience and expression. The left prefrontal cortex is posited to be involved in approach motivational processes, and the right prefrontal cortex is posited to be involved in withdrawal motivational processes. My colleagues and I have conducted a program of research aimed at better understanding the role of the left prefrontal cortex in approach motivational processes. This talk will review our recent research. Among the topics to be covered are: source localization of asymmetric EEG alpha power during anger, the effect of ostracism and jealousy on relative left prefrontal activation, and the effect of emotive body postures on asymmetric prefrontal cortical activation.

FROM THREAT TO FEAR: THE NEURAL ORGANIZATION OF DEFENSIVE FEAR SYSTEMS IN HUMANS *Dean Mobbs, Wellcome Trust Centre for Neuroimaging, University College London, MRC-Cognition and Brain Sciences Unit, Cambridge, UK; Jennifer L Marchant, Wellcome Trust Centre for Neuroimaging, University College London; Demis Hassabis, Wellcome Trust Centre for Neuroimaging, University College London; Ben Seymour, Wellcome Trust Centre for Neuroimaging, University College London; Geoffrey Tan, Wellcome Trust Centre for Neuroimaging, University College London; Marcus Gray, Wellcome Trust Centre for Neuroimaging, University College London; Predrag Petrovic, Wellcome Trust Centre for Neuroimaging, University College London, Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden; Raymond J. Dolan, Wellcome Trust Centre for Neuroimaging, University College London; Christopher D. Frith, Wellcome Trust Centre for Neuroimaging, University College London, Centre for Functional Integrative*

Neuroscience, Aarhus University Hospital, Denmark – Post-encounter and circa-strike defensive contexts represent two adaptive responses to potential and imminent danger. In the context of a predator, the post-encounter reflects the initial detection of the potential threat, whilst the circa-strike is associated with direct predatory attack. We used fMRI to investigate the neural organization of anticipation and avoidance of artificial predators with high or low probability of capturing the subject across analogous post-encounter and circa-strike contexts of threat. Consistent with defense systems models, post-encounter threat elicited activity in forebrain areas including subgenual anterior cingulate cortex (sgACC), hippocampus and amygdala. Conversely, active avoidance during circa-strike threat increased activity in mid-dorsal ACC and midbrain areas. During the circa-strike condition, subjects showed increased coupling between the midbrain and mid-dorsal ACC and decreased coupling with the sgACC, amygdala and hippocampus. Greater activity was observed in the right pregenual ACC for high compared to low probability of capture during circa-strike threat. This region showed decreased coupling with the amygdala, insula and ventromedial prefrontal cortex. Finally, we found that locomotor errors correlated with subjective reports of panic for the high compared to low probability of capture during the circa-strike threat and these panic-related locomotor errors were correlated with midbrain activity. These findings support models suggesting that higher forebrain areas are involved in early threat responses, including the assignment and control of fear, whereas as imminent danger results in fast "hard-wired" defensive reactions mediated by the midbrain.

MOTIVATION AND THE AMYGDALA: GOALS SHAPE ACTIVATION *William Cunningham, The Ohio State University* – Although early research implicated the amygdala in the automatic processing of negative information, more recent research suggests that it plays a more general role in the processing of the motivational relevance of various stimuli. In several studies, we demonstrate that relationships between valence and amygdala activity contextually vary due to chronic and contextual goals. Implications for the social neuroscience of prejudice will be explored.

EXPLORING WARMTH AND COMPETENCE: TOWARD NEURAL SIGNATURES FOR FUNDAMENTAL CATEGORIES OF SOCIAL COGNITION *Susan Fiske, Princeton University* – Social cognition reflects social evolutionary pressures. Social beings need to know, immediately, whether the "other" is friend or foe (that is, intends good or ill) and, next, whether the "other" can enact those intentions (that is, capability). Various labs have confirmed these two universal dimensions of social cognition: warmth and competence. Promoting survival, people accordingly classify others to guide their likely interactions. Others who appear low on both dimensions (e.g., the homeless) present no value, so require no individualizing of their dispositions (Harris & Fiske, 2006) — avoidance-related dehumanization. New data (Cikara, Eberhardt, & Fiske, under review) investigate approach-related dehumanization, when the other possesses instrumental value (controls desired resources). Sexual instrumentality and sexist attitudes influenced appraisals, memory, and neural responses to images of sexualized and clothed men and women. Heterosexual men best recognized images of sexualized female bodies (but not faces), as compared with other targets' bodies; they also more quickly associated sexualized women with first-person action verbs ("handle") and clothed women with third-person action verbs ("handles") than the reverse. As predicted, neuroimaging data demonstrated that passively viewing sexualized female targets activated regions associated with goal-directed behavior: premotor cortex, globus pallidus, thalamus. Memory for sexualized women's bodies correlated with thalamus/pulvinar activation. Hostile sexism correlated negatively with activation of regions associated with mental state attribution—mPFC, posterior cingulate, temporal poles—but only when viewing sexualized women. Sexual instrumentality apparently modulates goal-relevant social cognition processes.

Session C: Hormones, Brain, & Behavior

Saturday, October 10, 2009

11:00 AM – 12:30 PM

Pranjal Mehta, *Columbia University*

Molly Crockett, *University of Cambridge*

Simone Shamay-Tsoory, *University of Haifa*

Karin Roelofs, *Leiden University*

ABSTRACTS

NEURAL MECHANISMS OF THE TESTOSTERONE-AGGRESSION RELATION: THE ROLE OF ORBITOFRONTAL CORTEX *Pranjal Mehta, Columbia University; Jennifer Beer, University of Texas at Austin* - Testosterone plays a role in aggressive behavior, but the mechanisms remain unclear. The present study tested the hypothesis that testosterone influences aggression through the orbitofrontal cortex, a region implicated in self-regulation and impulse control. Thirty-two participants (17 men, 15 women) provided saliva samples for hormone measurement and then were scanned with fMRI while playing the Ultimatum Game, a decision-making paradigm in which people choose between aggression and monetary reward. Testosterone was associated with increased aggression following social provocation (rejecting unfair offers). The effect of testosterone on aggression was explained by reduced activity in the medial orbitofrontal cortex. The findings suggest that testosterone increases the propensity toward aggression because of reduced activation of the neural circuitry of impulse control and self-regulation.

NEUROCHEMICAL MODULATION OF SOCIAL PREFERENCES *Molly Crockett, Department of Experimental Psychology, University of Cambridge; Luke Clark, Department of Experimental Psychology, University of Cambridge; Trevor Robbins, Department of Experimental Psychology, University of Cambridge* - Decades of research have connected the neurotransmitter serotonin to prosocial behavior, but the underlying mechanisms remain unclear. To investigate the psychological and neural processes underlying the link between serotonin and prosocial behavior, we have used a well-studied behavioural economics paradigm, the Ultimatum Game (UG). In this game, one player must decide whether to accept or reject fair or unfair monetary offers from another player. Despite the fact that rejecting an offer means forfeiting payment, humans tend to reject the majority of offers perceived to be unfair. We recently used acute tryptophan depletion (ATD) to temporarily deplete serotonin levels in healthy human volunteers before they played the UG. Compared with a placebo treatment, following ATD participants rejected a higher proportion of unfair offers, while their basic monetary valuation process remained unchanged. These results suggest that serotonin modulates social decision-making in a complex fashion, rather than altering the processing of basic rewards. In the current study, we sought to extend the neurochemical specificity of our finding. In a double-blind, placebo-controlled, crossover design, 30 healthy volunteers received citalopram (an SSRI that boosts serotonin neurotransmission), atomoxetine (an SNRI that boosts noradrenaline transmission), and placebo. Ninety minutes following drug administration, participants played several one-shot UGs. Compared to placebo, atomoxetine did not influence rejection rates, but citalopram reduced rejection rates of economically attractive but moderately unfair offers. These results suggest that the neurochemical modulation of social preferences in the UG is bi-directional and specific to serotonin.

WHEN LESS IS MORE: THE NEURAL BASES OF ENVY AND SCHADENFREUDE *Shamay-Tsoory SG, University of Haifa; Dvash J, University of Haifa; Fischer M, University of Haifa; & Hendler T, Tel Aviv*

University - Humans have an exceptional social tendency to compare themselves to others, "we feel envious when we receive less valuable rewards and may rejoice when our pay-offs are more advantageous. Envy and schadenfreude (gloating over the other's misfortune) are social emotions, widely agreed to be a symptom of the human social tendency to compare one's pay-offs with those of others. To examine the neural bases of envy and schadenfreude participants were scanned while playing a cyber-game of chance involving monetary gains with another player. Our results show that in both envy and schadenfreude conditions the 'mentalzing system' (particularly the medial prefrontal cortex) was involved. Furthermore, the ventral striatum showed increased activation in shcadenfreude as compared to the envy conditions and vice versa. In a second experiment we show that intranasal administration of Oxytocin increases ratings of envy and schadenfreude , indicating that the oxytocinergic system is involved in envy and schadenfreude . Collectively it is suggested that both the mentalizing and the reward systems are involved in social comparison and that the oxytocinergic system may have a modulatory effect on these emotions.

NEURO-ENDOCRINE CONTROL MECHANISMS IN SOCIAL FEAR AND AVOIDANCE *Karin Roelofs, Leiden University Institute for Psychological Research, Clinical, Health and Neuropsychology Unit - Leiden Institute for Brain and Cognition (LIBC), Leiden University, The Netherlands* - Animal as well as human studies have indicated that hyperactivity of the Hypothalamic-Pituitary-Adrenal (HPA)-axis (with its end product cortisol) is associated with social submissiveness and avoidance. In contrast, activity of the Hypothalamus-Pituitary-Gonadal (HPG)-axis and its end product testosterone is associated with social dominance and aggression. We approach this field by studying neuroendocrine aspects of social fear and avoidance in individuals who have an extreme motivation to avoid social interactions: patients with social phobia. In my presentation I'll discuss a series of behavioral, ERP and fMRI studies, investigating the influence of cortisol and testosterone on the cognitive and neural control mechanisms involved in social approach and avoidance behavior. Results indicate that cortisol facilitates social avoidance behavior in socially anxious individuals. In addition, for theoretical as well as clinical purposes, it is particularly interesting to investigate neuroendocrine mechanisms implicated when automatic avoidance tendencies need to be overridden and contra-intuitive social approach actions are to be generated. Results from a recent fMRI study indicate that basal testosterone levels play a modulatory role in the neural control of these contra-intuitive social actions. Together these findings offer strong support for the relevance of the HPA and HPG axes in the regulation of social motivational behavior.

Session D: Attitudes & Social Cognition

Saturday, October 10, 2009

2:30 PM – 4:00 PM

Michael Norton, *Harvard Business School*

Ingrid Olson, *Temple University*

Nicholas Rule, *Tufts University*

Matthew Lieberman, *University of California, Los Angeles*

ABSTRACTS

NEURAL MECHANISMS OF SOCIAL INFLUENCE *Malia F. Mason, Columbia Business School; Rebecca Dyer, Columbia Business School; Michael I. Norton, Harvard Business School* - The present investigation explores the neural mechanisms underlying the impact of social influence on preferences. We socially tagged symbols as valued or not by exposing participants to the preferences of their peers and assessed subsequent brain activity during an incidental processing task in which participants viewed popular, unpopular, and novel symbols. The medial prefrontal cortex (mPFC) differentiated between symbols that were and were not socially tagged, a possible index of normative influence, while aspects of the striatum (the caudate) differentiated between popular and unpopular symbols, a possible index of informational influence. These results suggest that integrating activity in these two brain regions may differentiate objects that have become valued as a result of social influence from those valued for non-social reasons.

CONCEPTUAL KNOWLEDGE ABOUT SOCIAL MEANING IN THE ANTERIOR TEMPORAL LOBES *Ingrid R. Olson, Temple University, University of Pennsylvania; Lars A. Ross, Temple University, University of Pennsylvania* - Two distinct literatures have emerged on the functionality of the anterior temporal lobes: in one field, the ATL's are conceived of as a central "hub" for semantic or conceptual knowledge. In another field, the ATL's are thought to play some undetermined role in social-emotional functions such as theory of mind (ToM). Here we attempted to reconcile these distinct functions by assessing whether the ATL plays a meaningful role in social semantic processing. Social semantic functions refer to knowledge about social concepts and rules. In a first experiment we tested the idea that social semantic representations can account for activations in the ATL to social attribution stimuli, Heider and Simmel (H&S) animations. Left ATL activations to H&S stimuli overlapped with activations to social words. In a second experiment we assessed the putative roles of the ATLs in the processing of narratives and ToM content and found evidence for a role of the ATLs in the processing of ToM over and above narrative. These findings indicate that the ATL is more sensitive so social semantic stimuli then to non-social semantic stimuli and provide evidence in support of the model that the ATL is importantly involved in representing conceptual knowledge about the social world.

AMYGDALA RESPONSE REFLECTS THE ACCURACY OF FIRST IMPRESSIONS *Nicholas O. Rule, Tufts University; Joseph M. Moran, Massachusetts Institute of Technology; Jonathan B. Freeman, Tufts University; John D. E. Gabrieli, Massachusetts Institute of Technology; Susan Whitfield-Gabrieli, Massachusetts Institute of Technology; Nalini Ambady, Tufts University* - The human amygdala responds to first impressions of people as judged from their faces, such as normative judgments about the trustworthiness of strangers. It is unknown, however, whether amygdala responses to first impressions are accurate and can be validated by objective criteria. Here, we examined amygdala responses to faces of Chief Executive Officers (CEOs) where real-world outcomes could be measured objectively by the amounts of profits made by each CEO's company. During fMRI scanning, participants made incidental judgments about the symmetry of each CEO's face. After scanning, participants rated each CEO's face on leadership ability. Parametric analysis showed that greater left amygdala response to the CEOs' faces was associated with greater profits made by the CEOs' companies. Greater left amygdala response was also associated with higher post-scan ratings of the CEOs' leadership ability. Thus, amygdala response reflected both subjective judgments and objective measures of leadership ability based on first impressions.

PERSUASION, ATTITUDE CHANGE, AND MEMES: A SOCIAL COGNITIVE NEUROSCIENCE APPROACH *Matthew Lieberman, University of California, Los Angeles* – The use of communication for the purpose of persuasion has been around as long as communication itself. Yet only in the last half century has there been any science of persuasion and to date, research on persuasion has been virtually non-existent. I will present a series of studies examining the neural correlates of feeling persuaded, of persuasion-induced attitude change and behavior change, and of message propagation from an initial message recipient to other individuals (i.e. buzz, memes, sticky ideas). These studies highlight the fundamentally social and self-related aspects of persuasion and suggest that fMRI can complement traditional measurement techniques to increase the prediction of persuasion effects.

Session E: Poster Presentations

Saturday, October 10, 2009

4:00 PM – 5:30 PM

Abstracts pp. 12-29

Session F: Keynote Address

Saturday, October 10, 2009

5:30 PM – 6:30 PM

David Brooks, *The New York Times*

Session G: Development & Theory of Mind

Sunday, October 11, 2009

9:00 AM – 10:30 AM

Sarah-Jayne Blakemore, *University College London*

Jennifer Pfeifer, *University of Oregon*

Kevin N. Ochsner & Zamil Zaki, *Columbia University*

Eveline Crone, *Leiden University*

ABSTRACTS

DEVELOPMENT OF THE SOCIAL BRAIN *Sarah-Jayne Blakemore, University College London* – The "social brain" describes the network of brain regions involved in understanding others. Behavior related to social cognition changes dramatically during human adolescence. This is paralleled by both structural and functional changes in the social brain during this time. In particular, the medial prefrontal cortex and superior temporal sulcus undergo changes in grey matter and white matter volumes during adolescence. They also show altered activity during the performance of social cognitive tasks between adolescence and adulthood. Recent behavioral evidence suggests that adolescence is also a period in which performance on social cognitive tasks is still developing. In this talk, I bring together two relatively new and rapidly expanding areas of neuroscience: social neuroscience and the development of the brain during adolescence, in an attempt to evaluate how the social brain develops during adolescence.

CHANGES IN THE BRAIN AND CHANGES IN BEHAVIOR: A LONGITUDINAL FMRI STUDY OF SOCIAL COGNITIVE FUNCTIONING DURING THE TRANSITION TO ADOLESCENCE *Jennifer H. Pfeifer, Department of Psychology, University of Oregon; Tasha M. Oswald, Department of Psychology, University of Oregon; Larissa A. Borofsky, Ahmanson-Lovelace Brain Mapping Center, University of California, Los Angeles; Marco Iacoboni, Ahmanson-Lovelace Brain Mapping Center, University of California, Los Angeles; John C. Mazziotta, Ahmanson-Lovelace Brain Mapping Center, University of California, Los Angeles; Mirella Dapretto, Ahmanson-Lovelace Brain Mapping Center, University of California, Los Angeles* - Several brain regions have been identified that may play a critical role in processing the thoughts, feelings, and/or intentions of others, including medial prefrontal cortex (MPFC), temporal-parietal junction (TPJ), and the putative human mirror neuron system (MNS). Further, the functioning of these structures is frequently related to individual differences in things like mentalizing and interpersonal competence. Longitudinal evidence of these brain-behavior relationships has yet to be amassed, but exploring them in such a way may provide a deeper understanding of the neural networks that support social cognitive functioning throughout development. At two timepoints separated by nearly three years, approximately 40 neurotypical children (aged 9.5-10.6 years at the first timepoint) underwent fMRI while observing emotional facial expressions. Self- and parent-reports of attributes including empathy, perspective-taking, resistance to peer influence, and interpersonal competence were obtained outside the scanner. Longitudinal analyses were conducted by constructing functionally-independent ROIs based on anatomy and putative Brodmann's Areas, then extracting parameter estimates from these ROIs. These data provide the first demonstration of longitudinal change in brain activity in relation to developmental change in social cognitive functioning. Findings also highlight regions that may be critical to perspective-taking during adolescence, including those both common to and distinct from ones previously identified in the adult literature.

ACTIVITY OF DISSOCIABLE NEURAL SYSTEMS PREDICTS DECISIONS ABOUT COMPLEX SOCIAL INFORMATION *Jamil Zaki, Kelly Hennigan, Jochen Weber, & Kevin Ochsner, Columbia University* - Social information is complex and multimodal, involving visual and semantic components that often present contradictory cues about people's internal states. However, extant research on social cognition has often used simplified stimuli that do not approximate real-world social information. Previous work has identified two dissociable neural systems responsible for social cognition: the mirror neuron system, which may support perception of the action intentions based on observed movements, and the mentalizing system, which may support explicit attributions about mental states based on semantic information. However, the way these systems interact during processing of realistic social cues is unclear. In this study, we collected whole-brain fMRI data while participants watched silent videos of targets describing emotional experiences, read sentences describing the target's emotional experiences, or saw both videos and sentences concurrently, and rated the emotion they believed targets were experiencing. When both types of information were presented concurrently, videos and sentences were sometimes congruent in valence, and sometimes incongruent. Watching target videos selectively engaged the mirror neuron system, whereas reading semantic information selectively engaged the mentalizing system. Combining both types of information engaged both systems more robustly than either type of information taken alone. Furthermore, when the valence of the video and sentence conflicted, engagement of the mirror neuron system predicted perceivers' use of visual information in making their rating, and engagement of the MPFC predicted their use of semantic information. These results represent a step towards understanding the ways that neural systems interact in processing and make decisions about complex social information.

SOCIAL DECISION-MAKING IN ADOLESCENCE: CHANGES IN BRAIN REGIONS IMPORTANT FOR INTENTION CONSIDERATIONS *Eveline Crone, Berna Guroglu, Wouter van den Bos, Leiden University, The Netherlands* - Changes in social cognition in adolescence have been well documented, but it is not yet known how the maturation of social reasoning is related to changes in brain function over the course of adolescent development. In two studies using functional magnetic resonance imaging, we have found that between ages 12 and 25 adolescent are increasingly capably of understanding intentions of others in social exchanges using economic decision-making games (Trust and Ultimatum Game). Associated with these developmental differences, we have observed changes in activation in regions previously implicated in social understanding, including anterior medial prefrontal

cortex, the insula and the temporal parietal junction. Based on these studies, we hypothesize that the age-related changes in intention consideration result from slow and asynchronous maturation of brain regions which are important for social cognition.

Session H: Poster Presentations

Sunday, October 11, 2009

10:30 AM – 12:00 PM

Abstracts pp. 30-45

Session I: Culture & Intergroup Relations

Sunday, October 11, 2009

1:30 PM – 3:15 PM

Eric Vanman, *University of Queensland*

Belle Derks, *Leiden University*

Shihui Han, *Peking University*

Shinobu Kitayama, *University of Michigan*

ABSTRACTS

A NEURAL SUBSTRATE FOR THE MANAGEMENT OF IMPLICIT AND EXPLICIT RACIAL PREJUDICES IN WHITE AND AFRICAN AMERICAN PARTICIPANTS *Eric J. Vanman, University of Queensland; John P. Ryan, Georgia State University; Michael Philipp, University of Queensland; Tricia Z. King, Georgia State University* - This study examined neural mechanisms that underlie the relationship between implicit and explicit measures of racial prejudice. In the first testing session, 11 White participants and 9 African American participants rated photos of White and Black faces for liking while facial EMG was recorded to measure affective responses. Analyses revealed that White participants showed more EMG bias against outgroup targets (Black faces), but reported more liking for them as well. Black participants also showed more EMG bias against the outgroup (White faces), but reported less liking for those targets. In a separate fMRI testng session, these same participants categorized another set of photographs by race. White participants who had exhibited a greater discrepancy between the implicit and explicit measures of Session 1 showed greater levels of bold activity in dorsal anterior cingulate cortex (ACC), whereas African American participants did not. These data support a cognitive conflict model of prejudice based on contemporary social and personal motivations to manage one's own prejudices.

THE EYE OF THE BEHOLDER: STEREOTYPE THREAT INCREASES ATTENTION TOWARD REJECTION-RELATED CUES *Belle Derks, Leiden University, the Netherlands; Michael Inzlicht, University of*

Toronto; Cheryl Kaiser, University of Washington - Stereotype threat is the anxious expectation of confirming negative stereotypes about ones group. Previous work has suggested that stereotype threat causes individuals to vigilantly scan their environment for cues that signal failure or rejection by others. Using ERP measures, the present study investigated whether women pay more attention to facial expressions signaling rejection when they experience stereotype threat. Female participants (N = 40) performed a task that was either presented as diagnostic of math ability (stereotype threat) or 'attentional flexibility' (control). An attention-shifting paradigm was used in which every math equation was preceded with a dot-probe task in which participants detected dots on faces displaying happy, angry or contemptuous expressions. Although these emotional stimuli were irrelevant to the math task, N2 amplitude revealed that attention to expressions was modulated by stereotype threat. Whereas participants in the control condition did not differentiate between expressions, participants under stereotype threat paid most attention to faces displaying contempt (but not anger). These results indicate that stereotype threat instills a vigilance for rejection-related cues, even when these cues are completely task irrelevant. Moreover, the modulation of attention by context and emotional expression occurred very early in information processing, underlying the relatively automatic nature of this process. The implications of these results for stereotype threat theory are discussed.

DO YOU FEEL MY PAIN? RACIAL GROUP MEMBERSHIP MODULATES EMPATHIC NEURAL RESPONSES *Shihui Han, Xiaojing Xu, Xiangyu Zuo, Xiaoying Wang, Department of Psychology, Peking University; Department of Radiology, Peking University First Hospital* - Empathy plays a pivotal role in human social behaviors and is influenced by social relations. However, the neural mechanism underlying the interaction of empathy and social link remains unknown. To investigate how empathic neural responses to perceived pain in others are modulated by racial in-group/out-group relationship, we scanned Caucasian and Chinese participants using functional magnetic resonance imaging while they watched video clips of Caucasian and Chinese faces receiving painful or non-painful stimulations. We found that that, while painful stimulations applied to racial in-group faces induced increased activations in the anterior cingulate cortex (ACC) and inferior frontal/insula cortex in both Caucasians and Chinese, the empathic neural response in the ACC decreased significantly when participants viewed faces of other races. Our findings uncover neural mechanisms of an empathic bias towards racial in-group members.

CHOICE RESULTS IN ENHANCED SELF-RELEVANCE AND HEDONIC VALUE: AN FMRI STUDY OF POST-DECISIONAL DISSONANCE EFFECT IN CHINA *Shinobu Kitayama, University of Michigan; Shihui Han, Peking University; Sasha Kimel, University of Michigan; Jungan Qin, Peking University* - After having made a choice between two equally attractive items, people typically report a greater preference for the chosen over rejected item. The choice may be hypothesized to change the hedonic values of the items involved, their self-relevance, or both. The present fMRI study tested 12 Chinese young adults, who first ranked 60 popular music CDs into 10 groups of equal size. They then performed a series of choices between two equally ranked CDs. Participants were scanned both before and after the choice while reporting 1) their preference for each of the 60 CDs and 2) their judgment of whether each CD was recent or old. Patterns of brain activation in the preference (relative to recency) judgment were assessed. Consistent with a recent British study (Sharot et al., 2009), we found that even though the choice items were equally ranked they in fact varied in the degree to which they activated a dopaminergic target area (i.e., the nucleus accumbens; NAcc), which in turn predicted subsequent choice. Unlike the Sharot et al. study, however, we showed that after the choice the chosen item was associated with a significant increase of medial prefrontal cortex activation, which in turn was associated with post-choice ranking change. Yet, no increase in activation of the NAcc was associated with chosen items. The results were interpreted in light of both some significant procedural differences between the two studies and recent cross-cultural behavioral evidence concerning choice effect on value and self-relevance.

Poster Session E

E1

RED SOX V. YANKEES: FMRI INVESTIGATION OF PAIN AND PLEASURE RESPONSES TO A RIVAL GROUP'S OUTCOMES *Mina Cikara, Princeton University; Mathew M. Botvinick, Princeton University; Susan T. Fiske, Princeton University* – Because competitive groups' misfortunes imply own-group's relative gain, outgroups' misfortunes can engender pleasure. Pleasure at others' misfortunes, Schadenfreude, may inhibit empathy towards groups in need, at best allowing indifference toward their suffering, and at worst facilitating active harm. In the current fMRI study, 10 Red Sox and 6 Yankees fans watched baseball plays featuring their favored teams and rivals playing one another and a neutral third team, the Orioles. After each play, participants reported pleasure, anger, and pain in response to the play's outcome. Favored team-success, rival-failure, and rival-failure against the neutral team (pure Schadenfreude) all elicited significantly more pleasure than the control condition (Orioles v. Blue Jays). Favored team-failure and rival-success elicited significantly more anger and pain than the control condition. Regions of the ventral striatum putamen, nucleus accumbens were activated by 'pleasurable' baseball plays as compared to the control; putamen activation correlated with subjective ratings of pleasure. Also, activation in anterior cingulate cortex and insula, regions part of a well-established pain network, corresponded to 'painful' baseball plays; insula activation correlated with subjective ratings of pain, but not anger. These results suggest that evolutionarily old brain systems, which also respond selectively to more basic reinforcers and punishments (e.g., juice, pain, respectively), may have adapted to integrate information about rewards as abstract as favored group-identity and positive and negative outcomes in intergroup competition. This is the first study of which we are aware to investigate the neurobiological correlates of group-identity based pleasure and pain.

E2

CULTURE SHAPES A MESOLIMBIC RESPONSE TO SIGNALS OF DOMINANCE AND SUBORDINATION THAT ASSOCIATES WITH BEHAVIOR *Jonathan B. Freeman, Tufts University; Nicholas O. Rule, Tufts University; Reginald B. Adams Jr., The Pennsylvania State University; Nalini Ambady, Tufts University* – It has long been understood that culture shapes individuals' behavior, but how this is accomplished in the human brain has remained largely unknown. The mesolimbic reward system likely plays an important role, yet it is unknown whether mesolimbic activity may be shaped by human culture. To examine this, we made use of a well-established cross-cultural difference in behavior: American culture tends to reinforce dominant behavior whereas Japanese culture tends to reinforce subordinate behavior. In 17 Americans and 17 Japanese, we assessed behavioral tendencies towards dominance/subordination and measured neural responses using fMRI to dominant and subordinate stimuli. In the scanner, participants passively viewed images of dominant and subordinate displays of the body. After the scan, participants completed a questionnaire indexing behavioral tendencies towards dominance/subordination (e.g., "I impose my will on others."). In Americans, dominant stimuli selectively engaged the caudate nucleus, bilaterally, and the medial prefrontal cortex (mPFC), whereas these same regions were selectively engaged by subordinate stimuli in Japanese. Correspondingly, Americans self-reported a tendency towards more dominant behavior, whereas Japanese self-reported a tendency towards more subordinate behavior. Moreover, activity in the right caudate and mPFC correlated with behavioral tendencies towards dominance/subordination, such that stronger responses in the caudate and mPFC to dominant stimuli were associated with more dominant behavior and stronger responses in the caudate and mPFC to subordinate stimuli were associated with more subordinate behavior. The findings provide a first demonstration that culture can flexibly shape functional activity in the mesolimbic reward system, which in turn may guide behavior.

E3

A CROSS-CULTURAL COMPARISON OF SEMANTIC JUDGMENTS *Angela Gutchess, Brandeis University, Trey Hedden, Massachusetts Institute of Technology & Massachusetts General Hospital, Sarah Ketay, Mount Sinai School of Medicine, Arthur Aron, State University of New York at Stony Brook, John D. E. Gabrieli, Massachusetts Institute of Technology* – Recent evidence suggests that culture can operate as a lens, bringing distinct aspects of one's environment into focus and guiding information processing strategies based on cultural priorities, values, and experiences. The current study employed functional MRI to investigate the contribution of domain-general (e.g., executive functions) and domain-specific (e.g., semantic knowledge) processes to differences in semantic judgments across cultures. Previous behavioral experiments identified cross-cultural differences in categorization, with East Asians preferring a strategy based on thematic or functional relationships (e.g., cow-grass) and Americans relying on a strategy based on categorical relationships (e.g., cow-chicken). East Asians and American participants underwent scanning while alternating between categorical or thematic strategies to sort triads of words, as well as matching words on control trials. Across both category and relationship trials, compared to match (control) trials, East Asians activated a frontal-parietal network implicated in controlled executive processes, whereas Americans engaged regions of the temporal lobes and the cingulate, possibly in response to conflict in the semantic content of information. The results suggest that cultures differ in the ways that they resolve conflict between competing semantic judgments.

E4

THE CLOSED CIRCLE OF EMPATHY: OUTGROUPS DO NOT ACTIVATE THE NEURAL NETWORKS ASSOCIATED WITH EMPATHY *Michael Inzlicht, University of Toronto; Jennifer Gutsell, University of Toronto* – Empathy facilitates prosocial behavior and social understanding. Here, however, we suggest that empathy is limited: the neural system underlying empathy is less responsive to outgroups than ingroups. This unresponsiveness might create an emotional barrier between groups leading to prejudice. Using electroencephalographic (EEG) oscillations as an index of empathy and its underlying neural processes, we conducted two separate studies. In Study 1, we measured Alpha Asymmetry over the prefrontal cortices as participants experienced emotions themselves or watched ingroup and outgroup others experience emotions. In Study 2, we measured motor neuron activity, defined as the suppression of the Mu frequency over sensorimotor cortex, as participants engaged in motor activity themselves or watched ingroup and outgroup others engage in motor activity. Results indicated that participants showed similar patterns of activation when they felt sad or engaged in motor activity as when they observed ingroup members feel sad or engage in motor activities. In contrast, participants did not show activation of similar networks for outgroup members, thus suggesting that the basic processes underlying empathy are less sensitive for outgroups. Importantly, the vicarious activation of brain networks was negatively correlated with prejudice, showing that the more prejudiced people were, the less responsive they were to outgroup member's feelings and actions. These findings provide evidence from brain activity for the concept of bounded empathy: Empathy may be restricted to close others and, without active effort, may not extend to outgroups, thus making them likely targets for prejudice and discrimination.

E5

STRATEGIES TO REDUCE IMPLICIT BIAS INVOLVE EARLY ATTENTION TO RACIAL CUES: ROLE OF THE P200 EVENT-RELATED POTENTIAL *Saaid A. Mendoza, New York University; David M. Amodio, New York University* – In previous behavioral research, we showed that a specific if-then plan that links the perception of a person's race with a specific response (i.e., an implementation intention) is effective in reducing the expression of implicit racial bias. In the present study, we examined the neurocognitive mechanism underlying this effect. We hypothesized that implementation intentions tune early perceptual processing of race to trigger a planned, egalitarian response. Participants completed the Shooter Task while event-related potentials (ERPs) were recorded. The Shooter Task is a reaction-time measure that requires one to decide quickly whether to shoot Black or White male targets holding guns or innocuous objects. This task typically elicits a pattern of racial bias, whereby individuals are more likely to mistakenly shoot unarmed Blacks than Whites. Participants were given an implementation intention ("If I see a Black person, then I will be more careful!") or a comparable goal intention for completing the task. The P200 ERP component - which indexes early perceptual attention - was assessed in response to White vs. Black targets in the task. The P200 was larger to Black than White targets, replicating past work. In the simple goal condition, the degree of this P200 race effect predicted greater racial bias in task behavior. However, in the implementation intention condition, the P200 race effect predicted less racial bias. These findings suggest that implementation intentions operate by tuning early attention to racial cues that trigger pre-specified egalitarian responses.

E6

N170 RESPONSES TO FACES PREDICT IMPLICIT INGROUP FAVORITISM: EVIDENCE FROM A MINIMAL GROUP STUDY *Kyle G. Ratner, New York University; David M. Amodio, New York University* – People typically favor members of their own group in evaluations and behavior. This "ingroup favoritism" even occurs for novel and arbitrary group distinctions, and it leads to implicit positive evaluations of ingroup members. To understand the mechanisms underlying this effect, we examined the association between implicit evaluative bias and differences in basic-level face perception of novel ingroup vs. outgroup members. Using the minimal group paradigm, we assigned participants to one of two arbitrarily-defined groups. We then recorded event-related potentials (ERPs) while participants viewed and categorized faces of people identified as members of their novel ingroup vs. outgroup. Next, participants completed a behavioral measure of implicit evaluative bias toward the ingroup vs. outgroup. Our analysis focused on the N170 component of the ERP, which peaks in occipitotemporal scalp regions at approximately 170 ms following face onset and is believed to reflect the earliest stages of face perception. Larger N170 amplitudes to outgroup vs. ingroup faces predicted stronger implicit ingroup favoritism on the behavioral measure of implicit evaluation. These results suggest that mere group membership affects face perception, which may then contribute to the expression of positive ingroup bias in behavior. By linking face perception to implicit evaluative responses, these findings begin to provide new insight into how group categorizations can shape social perceptions and behaviors.

E7

SOCIAL IDENTITY ORGANIZES FACE PERCEPTION: THE FUSIFORM FACE AREA RESPONDS PREFERENTIALLY TO MEMBERS OF AN EXPERIMENTALLY CREATED INGROUP *Jay J Van Bavel, The Ohio State University; Dominic J. Packer, Lehigh University; William A. Cunningham, The Ohio State University* – There has been extensive research on a region of the fusiform gyrus that is critical for recognizing faces, termed the fusiform face area (FFA). However, it remains an open question whether the FFA is sensitive to shifting social

dynamics. One possibility is that facial processing in the FFA may be relatively invariant and other neural systems may be recruited to imbue faces with social meaning. Another possibility is that social context may provide a direct, top-down influence on representations in the FFA. The current fMRI study explored the sensitivity of the FFA to an experimentally created social identity. We assigned participants to one of two arbitrary groups, then had them visually identify ingroup and outgroup faces and complete a FFA localizer during neuroimaging. The FFA was selectively engaged during presentation of experimentally created ingroup (> outgroup) faces, even when the intergroup distinction was random, there were no visual cues to distinguish group membership, and exposure to the faces was equivalent, brief (~15 minutes) and recent. The results suggest that a currently salient group membership, however arbitrary, may recruit the FFA to visually identify fellow group members in the absence of long-term experience with that category. Although these results are consistent with models suggesting that the FFA plays a general role in subordinate processing of stimuli within a category (Palmeri & Gauthier, 2004), our data suggest that long-term experience is not necessary to engage these processes. Instead, top-down influences like social identity can influence FFA activity in a dynamic fashion.

E8

SOCIAL COMPARISONS AND PROPOSER BEHAVIOR IN THE ULTIMATUM GAME *Swati Bhattacharya, Department of Psychology, Rutgers University; Megan Schulze, Department of Psychology, Rutgers University; Mauricio R. Delgado, Department of Psychology, Rutgers University;* – Researchers have noted that dominance-related judgments in social situations can be automatic (Moors & DeHouwer, 2005), but how these social comparisons influence decision making is less clear. In this study, we induced comparison through a novel game in which pairs of subjects were divided into a high status (HS) and low status (LS) groups. The HS subjects were given praise and a raffle ticket for a desirable good (e.g., an ipod) as a status symbol while the LS group received neither. After the manipulation, the LS group rated themselves significantly lower than their partners on a questionnaire typically used to measure status, while the opposite was observed for the HS group. Subjects then played the role of a proposer in a modified version of an ultimatum game simultaneously with each other. They proposed a division of monetary amounts that varied with respect to value (from low to high endowments). To motivate the subjects towards the task, they were told that one of the offers would be randomly chosen. If their chosen offer was accepted by their partner, they would receive an additional raffle ticket, but if their offer was rejected, neither would receive the additional ticket. A significant interaction was observed between value (high and low endowments) and status (LS and HS). Specifically, the HS group proposed lower amounts compared to the LS group, particularly when splitting larger endowments. This study suggests that contextual comparisons can evoke changes in decision making as evidenced by proposer behavior.

E9

YOU HAVE GREAT TASTE: NEURAL CODING OF AGREEMENT WITH OTHERS ON MUSIC USING REWARD PATHWAYS *Daniel Campbell-Meiklejohn, University College London & Aarhus University; Dominik Bach, University College London; Andreas Reopstorff, Aarhus University; Chris Frith, University College London & Aarhus University* – With other people's opinions, we learn about our own preferences and the value of objects. We hypothesized that learning the opinions of others involves the same neural systems as learning about rewarding outcomes. We asked 29 healthy, right-handed participants to submit a list of any 20 desired songs that they did not yet own. On test day, participants were told that two 'expert' music reviewers were asked for their preferences between each of the submitted songs and various other songs, unfamiliar to the participant. With event-related fMRI, participants were asked to make the same choices as the reviewers just before finding out what the reviewers would have preferred. Each reviewer could agree or disagree with the participant. Next, participants received a token for the preferred or non-preferred song. Tokens increased the likelihood of a song being received after the experiment. Agreement and preferred token receipt were orthogonal by design. Reviewer agreement (vs. disagreement) activated known reward pathways in the ventral striatum which were also activated by preferred (vs. non-preferred) song tokens. Overall mean neural effects of agreement and token-reward in overlapping areas were additive. This relationship could potentially vary with susceptibility to reviewer influence. Finally, both unanimous agreement and unanimous disagreement among the reviewers (vs. two different opinions) correlated with increased activity in anterior insula cortex. These findings have fascinating implications with regard to how we use and process the opinions of others.

E10

THE NEURAL, PSYCHOLOGICAL, AND ECONOMIC BASES OF GUILT-AVERSION IN SOCIAL INTERACTION *Luke Chang, Alec Smith, Martin Dufwenberg, & Alan Sanfey, University of Arizona Department of Psychology, Tucson, AZ & University of Arizona Department of Economics, Tucson, AZ* – Previous work has demonstrated that guilt often promotes reparative behavior following a social transgression. However, no study to date has demonstrated that guilt-aversion can motivate cooperative behavior. Using a formal model of guilt developed within the context of Psychological Game Theory, this study integrates theory and methods from the diverse fields of psychology, economics, and neuroscience to triangulate the neural mechanisms that mediate cooperative behavior. We recruited 30 participants to play a modified single-shot Trust Game, in which we also elicited beliefs about their partners' expectations. Seventeen of these participants

underwent fMRI while they decided whether or not to reciprocate their partner's trust. Our model was not only able to successfully predict participant's behavior, but it also revealed that participants demonstrated increased activation in the insula and DACC/SMA when they were behaving in a manner consistent with our model of guilt aversion, and exhibited increased activity in the vmPFC when they returned less money then they believed their partner expected. Insula activity correlated with self-reported counterfactual guilt, providing further support of its role in promoting social cooperation via a guilt-aversion mechanism. This study demonstrates how the strengths of psychology, economics, and neuroscience can be integrated to study high-level social processes. More specifically, we demonstrate that the predictive power of economic models can be dramatically improved by incorporating psychological principles and that the use of formal models can allow more specific inquiry into the neural computations underlying high level cognitive and affective processes.

E11

EVENT-RELATED POTENTIAL EVIDENCE SUGGESTING VOTERS REMEMBER POLITICAL EVENTS THAT NEVER HAPPENED *Jason Coronel, University of Illinois; Brian Gonsalves, University of Illinois; Kara Federmeier, University of Illinois* – Voters with high levels of political knowledge tend to misattribute issue positions that are consistent with a candidate's party affiliation, even when the candidate has never explicitly stated or endorsed such issue positions. There are at least two possible explanations that account for this political puzzle. The first explanation points to an inference-based process. According to this account, knowledgeable voters use prior information about a candidate, such as his or her party affiliation, to make an educated guess as to whether a candidate has explicitly endorsed a particular issue. The second explanation points to a false memory-based process. In this scenario, a voter's schema-based memory of a Democrat and a Republican candidate are sufficiently developed that knowledge of some of a candidate's issue positions can lead to the implicit generation of other, related positions. In order to examine the mechanism underlying the misattribution phenomenon, event-related potentials were used in a study-recognition test paradigm where participants learned about novel political candidates. The N400 and the LPC were used as measures of implicit and explicit memory, respectively, in order to determine whether the issue misattributions were the result of an inference or a false memory-based process. Results show that responses to misattributed issues elicited implicit memory signals similar to that of old correctly remembered issues, indicating the formation of false memories.

E12

EARLY ERP NEGATIVITY DURING CATEGORIZATION AS EVIDENCE FOR PERCEIVER AWARENESS OF MULTIPLE SOCIAL CATEGORIES *Cheryl L. Dickter, The College of William & Mary; Kyle T. Gagnon, The College of William & Mary* – Although much psychophysiological research on social categorization has demonstrated that participants attend to race early during person perception, less research has investigated how perceivers process information about multiple social categories. The current study sought to investigate how race and gender interact during early social categorization. Specifically, by using early components of the ERP as indexes of attention, this research examined how perceivers allocate attention to multiple social categories (i.e., race and gender). During a modified flanker paradigm, Black and White participants completed a series of trials in which they explicitly categorized the race of a target face presented on a computer screen. These target faces were presented among flanker faces that, on each trial, varied in compatibility with the target face by race and gender. Event-related potentials (ERPs) were measured in order to examine early attention to race and gender information. Results indicated that participants were sensitive to both the race and gender of the targets, as seen by the behavioral and ERP data. Black male targets yielded the quickest reaction times and the largest N100 amplitudes than other targets. Additionally, a significant interaction was found between target race and participant race in the N200 component of the ERP, supporting previous research indicating that the social group of the perceiver may play an important role during social categorization. In conclusion, this study indicates that perceivers distinguish between multiple social category information early in processing and that this distinction may have implications for later behavior.

E13

MEDIAL PREFRONTAL CORTEX ACTIVITY WHEN EVALUATING OTHERS DEPENDS ON THEIR FACIAL EXPRESSION AND AGE *Natalie C. Ebner, Yale University; Sebastian Gluth, Max Planck Institute for Human Development and Humboldt University; Matthew R. Johnson, Yale University; Carol L. Raye, Yale University; Marcia K. Johnson, Yale University* – Medial prefrontal cortex (mPFC) activity is associated with self-referential thinking (Johnson et al., 2006; Mitchell, Macrae, & Banaji, 2006). Furthermore, thinking about oneself and similar others is associated with ventral mPFC activity, whereas thinking about dissimilar others is associated with more dorsal mPFC activity (Mitchell et al., 2006). The present functional magnetic resonance imaging (fMRI) study examined whether evaluation of persons with different expressions and of different ages differentially engaged self-referential thinking. Young and older participants saw neutral, angry, and happy young and older individuals' faces, and were asked to judge each person in terms of various personality characteristics. In a post-scan session, participants indicated how similar they felt to each person. Preliminary analyses suggest that evaluation of persons with happy compared to angry expressions engaged a more ventral region of mPFC, whereas evaluation of persons with angry compared to happy expressions engaged a more dorsal region of mPFC in both

young and older participants. In addition, participants reported being more similar to happy than angry persons. A similar dissociative pattern emerged for judgments of young and older persons. This suggests that more self-referential thinking is involved when mentalizing about happy than angry and about young than older persons.

E14

INDIVIDUAL DIFFERENCES IN ANXIETY AND DIRECTION OF GAZE PREDICT THE AMYGDALA RESPONSE TO FACIAL SIGNALS OF THREAT *Michael P. Ewbank, MRC Cognition and Brain Sciences Unit, Cambridge, UK; Elaine Fox, Department of Psychology, University of Essex, UK; Andrew J. Calder, MRC Cognition and Brain Sciences Unit, Cambridge, UK* – Angry and fearful facial expressions represent two qualitatively different forms of threat. Fearful faces have been proposed to signal the presence of an undetermined source of danger within the environment, referred to as 'ambiguous threat', while angry faces represent a more direct form of threat, often used in face-to-face encounters. Behavioral evidence shows that angry facial expressions are perceived as more threatening, and elicit greater anxiety, when their gaze is directed at, rather than away from the observer. By contrast, the influence of gaze on the processing of fearful faces is considerably less consistent, with a number of studies showing no effect of gaze on the perceived intensity of threat. Using fMRI, we addressed the influence of gaze on the neural response to these two expressions, taking account of recent evidence showing that the amygdala response to signals of threat is determined by participants' level of anxiety. We found that the amygdala response to direct, but not averted gaze angry faces increased as a function of anxiety. For fearful expressions, however, we found amygdala correlations with anxiety irrespective of gaze direction. In addition, the effects of anxiety and gaze on emotional intensity ratings of the faces mirrored the effects found in the amygdala. Our results are difficult to reconcile with the proposal that the amygdala is preferentially involved in the processing of ambiguous threat, and accord more with the suggestion that the this region is involved in coding threat signals with personal relevance.

E15

NEURAL CORRELATES OF PERSUASION AND MESSAGE PROPAGATION *Emily Falk, Sylvia Morelli, Locke Welborn, & Matthew Lieberman, University of California, Los Angeles* – Information exchange is at the heart of social interaction and can result in the spread of important attitudes and behaviors. Here, we present an fMRI study that begins to address the previously unexplored neurocognitive mechanisms underlying message propagation following a persuasive communication. Each participant was scanned while acting as the middle link in a modified "telephone" game. Participants were asked to pretend that they were interns at a television studio and were in charge of passing show proposals on to their boss (the producer). Post-scan interviews were video-recorded and played for additional subjects who decided, based on the interviews, whether they would produce the show, and in turn whether they would pass the information on to others. Video interviews were also coded along a number of dimensions related to successful message propagation (e.g. accuracy, enthusiasm). Across several measures of successful message propagation, increased activity in regions associated with social cognition and mentalizing was associated with successful message propagation. Several measures of successful message propagation were also associated with increased activity in regions associated with self-referential processing. These findings build on previous work exploring the neural bases of persuasion, and extend it to include the important follow-up behaviors that ultimately result in the spread of information and attitudes.

E16

INTEREST IN POLITICS MODULATES NEURAL ACTIVITY IN THE AMYGDALA AND VENTRAL STRIATUM *Marta Gozzi, Cognitive Neuroscience Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health; Dipartimento di Psicologia, Universite di Milano Bicocca; Pediatrics & Developmental Neuroscience Branch, National Institute of Mental Health, National Institutes of Health; Giovanna Zamboni, Cognitive Neuroscience Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health; Dipartimento di Neuroscienze, Universite di Modena e Reggio Emilia Frank Krueger, Cognitive Neuroscience Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health; Department of Molecular Neuroscience, Krasnow Institute for Advanced Study, George Mason University Jordan Grafman, Cognitive Neuroscience Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health* – Studies on political participation have found that a person's interest in politics contributes to the likelihood that he or she will be involved in the political process. Here, we looked at whether interest in politics affects patterns of brain activity when individuals think about political matters. Using functional magnetic resonance (fMRI), we scanned 25 individuals (either interested or uninterested in politics based on a self report questionnaire) while they were expressing their agreement or disagreement with political opinions (e.g., "The law should strictly control immigration"). After scanning, participants were asked to rate each political statement presented in the scanner for emotional valence and emotional intensity. Behavioral results showed that those political opinions participants agreed with were perceived as more emotionally intense and more positive by individuals interested in politics relative to individuals uninterested in politics. In addition, individuals interested in politics showed greater activation in the amygdala and ventral striatum relative to individuals uninterested in politics when reading political opinions in accordance with their own views. Our results cannot be attributed to factors such as gender and political orientation. First, the two groups did not differ in demographic (gender, age, education, income) or political characteristics (political

orientation and party affiliation). Second, gender and political orientation were included as nuisance covariates in the fMRI data analysis. The present study shows that having an interest in politics elicits activations in emotion- and reward-related brain areas even when simply agreeing with written political statements.

E17

LONELINESS AND SOCIAL NETWORK SIZE IN PATIENTS WITH HIPPOCAMPAL AMNESIA *Rupa Gupta, University of Iowa; Janelle N. Beadle, University of Iowa; Rachael Rubin, University of Illinois at Urbana-Champaign; Brooke Bachelder, University of Iowa; Neal J. Cohen, University of Illinois at Urbana-Champaign, Daniel Tranel, University of Iowa; Melissa C. Duff, University of Iowa* – Memory impairments after brain damage result in profound changes in numerous domains of everyday life. Case descriptions suggest that memory-impaired patients tend to be socially isolated and have impoverished social networks and relationships (Tate, 2002; O'Connor et al., 1995). Here, we examine self-reports of two aspects of social isolation: "objective" social isolation, as measured by social network size, and "perceived" social isolation, as measured by loneliness (Cacioppo & Patrick, 2008), in 4 patients (1 female) with bilateral hippocampal damage due to anoxia/HSE. These patients have severe declarative memory impairments (WMS-III General Memory Index M=63), which are sufficiently severe to interfere with activities of daily life, including preventing them from independent living or employment since the onset of their amnesia. The amnesic participants have smaller social networks (e.g., the number of people they talk to at least once every two weeks; Cohen et al., 1997) than age-, sex-, and education-matched healthy comparison participants (M=8 vs. 18 people, respectively), however, the amnesic participants' reports are higher than collateral reports from their family members (M=8 vs. 3 people, respectively). Moreover, three of the four amnesic participants do not report having more loneliness than matched comparison participants as assessed by the UCLA-R Loneliness Scale (Russell, 1996); however, differences in level of insight for the severity of their memory impairment may influence reported loneliness. These results suggest that while patients with hippocampal amnesia are more socially isolated than healthy comparisons, their memory impairments may preclude them from fully apprehending the extent of their social isolation.

E18

AGE DIFFERENCES IN SELF-REFERENCING: EVIDENCE FOR DISTINCT ENCODING STRATEGIES *Angela Gutchess, Rebecca Sokal, Jennifer A. Coleman, & Gina Gotthilf, Brandeis University* – Self-referencing is a strategy that supports deep elaborative encoding of information into memory. Recent evidence indicates that this strategy also benefits older adults, who are particularly prone to long-term memory problems with age. Although engagement of medial prefrontal cortex (MPFC) underlies self-referencing of information for younger and older adults, the response of the region during encoding of self-referenced information varies across younger and older adults in unexpected ways. We sought to determine the extent to which interference between conditions (the self, other, and case judgments used in previous studies) and low numbers of forgotten items contributed to previous patterns of age differences in neural activity during the encoding of self-referenced information. During an fMRI session, fifteen young adults and seventeen older adults incidentally encoded 144 adjectives using a self-reference task (i.e., does this adjective describe me?) and received a surprise memory test outside of the scanner. For items later recalled compared to those later forgotten (Dm analysis), young adults tend to engage orbitofrontal gyrus more than older adults, likely reflecting orientation to the emotional aspects of the task. In contrast, older adults engaged the lingual gyrus more than young, reflecting their greater attention to visual aspects of the task. We conclude that based on a free recall measure, age groups differ in the processes that support encoding of information into memory. Further analyses based on a recognition measure will further delineate the contribution of interference to age differences in task performance and neural activity, compared to previous studies.

E19

DIFFERENTIAL NEURAL CONNECTIVITY IN PROCESSING SAME- AND OTHER-RACE FACES *Yi He, Yale University; Marcia K. Johnson, Yale University; Gregory McCarthy, Yale University* – We investigated the influence of race on face processing using functional magnetic resonance imaging (fMRI). Twenty White participants viewed faces from their same-race (White) and two other-races (Asian and Black) while engaged in a gender discrimination task. At the conclusion of this fMRI task, participants were given implicit association tests (IAT) for Black-White and Asian-White. The results from a separate face/scene localizer task were used to individually define six face-sensitive regions, located in bilateral occipital, fusiform, and superior temporal cortices. The left occipital face-sensitive area had greater activation to faces from both other-races when compared to same-race faces, and this difference was largest between Black and White faces. The right superior temporal face-sensitive area had greater activation to White faces than Black faces. Activation in the right fusiform face-sensitive area was correlated with the IAT, with participants who showed positive associations of White greater than Asian exhibiting greater activation to White than Asian faces. A psychophysiological interaction (PPI) analysis was conducted to examine if connectivity between the amygdala and other brain regions was influenced by the race of the faces viewed by the participants. The results of the PPI analysis revealed greater connectivity between the right amygdala and anterior cingulate and inferior temporal regions for White than Black faces, and greater connectivity between right amygdala and inferior frontal, frontal polar and precentral regions for Black than White faces.

E20

SUBLIMINAL PRESENTATION OF OTHER-FACE (BUT NOT SELF-FACE) PRIMES SEMANTIC PROCESSING OF PAINFUL EXPRESSIONS *Esteban Hurtado, Alejandro Lobos, Josefina Escobar, Natalia Trujillo, Agustin Ibanez. Neuroscience Laboratory, University Diego Portales, Santiago, Chile Institute of Cognitive Neurology (INECO), Buenos Aires, Argentina Neuroscience Group, University of Antioquia, Medellan, Colombia P. Catholic University of Chile, Santiago, Chile Department of Psychology, Department of Psychiatry, and Center for Cognitive and Social Neuroscience, The University of Chicago, USA* – Currently research on empathy for the pain accentuates the neural overlap of the first-hand experience of pain and its perception in others. Nevertheless, on a recent study of priming faces with like or dislike semantic information, Yamada & Decety (2009) found evidence that suggested a pain processing as threat value rather than an automatic empathic resonance. In this line, pain processing of other-related information (and not self-related information) could imply danger and not empathy, because of the possible threat represented in others (especially if associated to pain stimuli). In order to test this hypothesis, neutral and painful semantic expressions previously primed with self or other faces were presented. Only the detection of painful expressions was facilitated when other-face priming were used. In addition, painful expressions were processed quickly when they were formulated in third person (and not first person). This result put forward the threat value of pain hypothesis and promotes the future inclusion of self vs. other related-information in pain research.

E21

INFERRING COMMUNICATIVE INTENTION FROM MOTOR INFORMATION: A POINT-LIGHT STUDY *Valeria Manera, Center for Cognitive Science, Department of Psychology, University of Turin; Cristina Becchio, Center for Cognitive Science, Department of Psychology, University of Turin; Ben Schouten, Laboratory of Experimental Psychology, University of Leuven; Karl Verfaillie, Laboratory of Experimental Psychology, University of Leuven; Bruno G. Bara, Center for Cognitive Science, Department of Psychology, University of Turin* – In everyday life interactions, many cues are available for learning about peoples' communicative intentions. Here we used the point-light technique to test whether communicative intention might be inferred from movement information alone. Point-light stimuli represent the movements of a body through a small number of point lights indicating the major joints of a moving person. Despite this drastic degradation of the stimulus, motor information available has proven to be sufficient for recognizing actions, for determining the identity of a figure, as well as his/her gender, age and emotional state (see Vanrie and Verfaillie 2004). In the present study, motion capture techniques and animation software (Dekeyser, Verfaillie, and Vanrie, 2002) were combined to create a database of 20 communicative interactions performed by a male and by a female couple as seen from different visual perspectives. Normative data collected to assess the recognisability of the stimuli suggest that for most action stimuli motor information in point-light-displays was sufficient to clearly recognize the action as communicative as well as to identify the specific communicative gesture performed by the actor. These findings are discussed in light of motor theories of social cognition. Finally, we present preliminary data concerning the possible applications of communicative point-light stimuli in perceptual masking experiments.

E22

NEURAL SENSITIVITY TO PEER REJECTION DURING ADOLESCENCE: LONGITUDINAL LINKS WITH DEPRESSION *Carrie Masten, University of California, Los Angeles; Naomi I. Eisenberger, University of California, Los Angeles; Mirella Dapretto, University of California, Los Angeles* – Extensive developmental research has linked peer rejection during adolescence with a host of psychopathological outcomes, including depression. Moreover, neuroimaging research from our lab has suggested that increased activity in the subgenual region of the anterior cingulate (subACC), which has been previously linked with depression symptomatology (e.g., Keedwell et al., 2008), is related to greater distress resulting from simulated peer rejection among adolescents (Masten et al., in press). In the current study, our goal was to assess the relationship between neural sensitivity to peer rejection and the onset of depression symptomatology during adolescence. During an fMRI scan, 20 adolescents (13 girls, mean age 13.0) were excluded during a ball-tossing game in which they believed they were playing with two other adolescents, who were actually computer-controlled. Both at the time of the scan, and one-year later at age 14, participants' depression symptoms were assessed via parental reports using the Childhood Behavior Checklist. Although there was no association between neural sensitivity to exclusion and depression at age 13, both whole-brain and region of interest regression analyses indicated that subACC activity during exclusion was associated with depression symptoms at age 14, controlling for symptoms at age 13. In other words, adolescents who displayed heightened subACC activity in response to simulated peer exclusion showed a prospective increase in depression symptomatology the following year. As a whole, these findings have implications for understanding the relationship between sensitivity to peer rejection and the increased risk of depression that occurs during adolescence.

E23

THE NEURAL CONSEQUENCES OF PERSPECTIVE-TAKING ON PERCEPTIONS OF FAIRNESS *Sylvia Morelli, University of California, Los Angeles; Austin Grinberg, University of California, Los Angeles; Meghan Meyer, University of California, Los Angeles; Matthew D. Lieberman, University of California, Los Angeles* – Our study explores the neural consequences of perspective-taking, examining whether

perspective-taking biases later perceptions of the fairness of the person's actions. Participants began with a perspective-taking induction in which they viewed a photo of an individual (PT player) and read two first-person passages that described the person's thoughts and emotions during everyday situations. Next, participants watched the PT player play a series of Ultimatum Games against two other unknown players. Each Ultimatum Game showed two players, the sum of money they had to split, and then the offer one player made the other. Participants saw players make offers from 20% to 50% of the total stake, then judged how fair the offer was for each game. Initial results from 18 participants show that neural activation occurs in the dorsal medial prefrontal cortex (DMPFC) during the perspective-taking induction (relative to neutral passages), as well as when participants later view that same person responding to offers in the Ultimatum game (relative to when they see an unknown player). Behavioral responses show that perspective-taking biases participants to perceive offers as fairer when the PT player proposes the offer compared to when a neutral player proposes the same offer. When the PT player receives an offer, the offer is viewed as less fair compared to when a neutral player receives the same offer. These results suggest that perspective-taking may have lasting neural and behavioral consequences, causing people to naturally take someone's perspective in later interactions and creating biases in their perceptions of fairness.

E24

THE POWER OF CHARISMA: PERCEIVED CHARISMA INHIBITS THE ATTENTIONAL AND EXECUTIVE SYSTEMS OF BELIEVERS IN INTERCESSORY PRAYER *Uffe Schjoedt, Aarhus University; Hans Stodkilde-Jorgensen, Aarhus University Hospital; Armin W. Geertz, Aarhus University; Torben E. Lund, Aarhus University Hospital; Andreas Roepstorff, Aarhus University Hospital* – The study presented used functional magnetic resonance imaging (fMRI) to investigate how assumptions about speakers' abilities changed the evoked BOLD response in secular and Christian participants who received intercessory prayer. In a randomized design the study found that assumptions about the speaker's healing abilities had significant effects on the Christian participants only. Most notably, they deactivated the frontal executive network consisting of the medial and the dorsolateral prefrontal cortex bilaterally in response to speakers who they believed had healing abilities. An independent analysis across subjects revealed that this deactivation predicted the participants' subsequent ratings of the speakers' charisma. We argue that this relation may point to an important mechanism of authority which is ubiquitously present in interpersonal interactions, e.g. in leader-follower, doctor-patient, teacher-student, and parent-child relations. The fact that only Christian participants responded according to the speakers' abilities indicates that the power of authority depends on beliefs and expectations which are specific to a group or culture.

E25

USING THE SELF TO UNDERSTAND OTHERS: MPFC SUBSERVES ANCHORING-AND-ADJUSTMENT IN SOCIAL INFERENCE *Diana Tamir, Harvard University; Jason Mitchell, Harvard University* – Neuroimaging research into social cognition has repeatedly implicated the medial prefrontal cortex (mPFC) in solving social inference problems. The mPFC has also been implicated in processing information about the self. This neural overlap has been taken as evidence for simulation theory, which suggests that one way in which people understand the minds of other people is by first accessing their own mental states, and then correcting for dissimilarities between the self and the other. The goal of this study was to find neural evidence for the role of self information and for the corrective process of adjustment away from this self information during social inferences. To do this, we analyzed functional data from sixty-four subjects from four experimental designs, each requiring participants to respond to statements about their own preferences and to make inferences about those same preferences for other individuals. For each statement, an adjustment score was calculated as the absolute difference between responses to that statement for the Self and for the Other targets. This adjustment score was used in a parametric analysis that identified neural regions sensitive to the distance between one's judgment of another person and one's own self-reported preference. Two regions in the mPFC were found to be specifically correlated with adjustment during Other trials. These results suggest that the mPFC contributes not only to the generation of self-reflective information but the use of that information to judge other minds.

E26

UNDERSTANDING OTHERS' ACTIONS AND INTENTIONS BY MIRROR AND MENTALIZING SYSTEMS: A META-ANALYSIS *Frank Van Overwalle, Vrije Universiteit Brussel, Belgium; Kris Baetens, Vrije Universiteit Brussel, Belgium* – This meta-analysis explores the role of the mirror and mentalizing networks in the process of understanding other people's action intentions. On the basis of over 200 fMRI studies, this analysis demonstrates that the mirror network, consisting of the anterior intraparietal sulcus and the premotor cortex, is engaged when one perceives articulated motions of body parts, irrespective of their sensory (visual or auditory) or verbal format. Observations of whole-body motions and gaze engage the posterior superior temporal sulcus and most likely reflect an orientation response in line with the action or attention of the observed actor. In contrast, the mentalizing network, consisting of the temporo-parietal junction, the medial prefrontal cortex and the precuneus, becomes active when there is no input on a moving body, such as when geometrical shapes are seen moving in a human-like fashion or when behaviors implying inferences such as goals, beliefs or moral issues are described in abstract (e.g., verbal) terms. Comparisons with other, non-social tasks (e.g., Posner's cuing task) suggest that the temporo-parietal junction

computes the orientation or direction of the behavior in order to predict its likely end-state (or goal). Neither network subserves the other, they are complementary. The evidence, however, suggests a transition from the mirror to the mentalizing system even in the face of body part motions when perceivers consciously deliberate about the others' intentions and their behavioral executions, such as when perceived body motions are incorrect, implausible or pretended.

E27

DIFFERENTIAL NEURAL RESPONSES TO FACES PHYSICALLY SIMILAR TO THE SELF AS A FUNCTION OF THEIR VALENCE *Sara C. Verosky, Department of Psychology and Princeton Neuroscience Institute, Princeton University; Alexander Todorov, Department of Psychology and Princeton Neuroscience Institute, Princeton University* – Behavioral studies show that people self-enhance across a number of domains, including self-face recognition. We used functional magnetic resonance imaging (fMRI) to investigate whether response to physical similarity to the self would differ depending on whether the self-face was morphed with a positive (trustworthy) or negative (untrustworthy) novel face. Participants were presented with morphs of their faces (20%, 40%, 50%, 60%, and 80% self) and asked to decide whether the morph looked like them or the other face. Although there were no statistically discernible effects of face valence on behavioral responses, there were large differences in brain activation to trustworthy and untrustworthy morphs. As similarity of the untrustworthy morphs to the self decreased, the response in a number of regions, including right inferior frontal gyrus, right posterior superior temporal sulcus/ inferior parietal lobule, and left fusiform gyrus, increased. In contrast, there was little evidence for changes in activation as a function of the similarity to trustworthy faces. In fact, there was a trend in the opposite direction â€“ as the similarity with trustworthy faces increased so did the activation. That is, these regions seemed to differentiate between the self and untrustworthy faces to a much greater extent than between the self and trustworthy faces, despite the fact that the task did not demand evaluation of the faces. The findings suggest that comparing the self to others who are viewed as positive versus negative triggers different psychological processes.

E28

NEURAL ACTIVATION IN THE 'REWARD CIRCUIT' SHOWS A NONLINEAR RESPONSE TO FACIAL ATTRACTIVENESS *Xiaoyun Liang, Brandeis University; Leslie Zebrowitz, Brandeis University; Eyleen Zhang, Brandeis University* – Positive behavioral responses to attractive faces have led neuroscientists to investigate underlying neural mechanisms in a 'reward circuit' that includes brain regions innervated by dopamine pathways. Using male faces ranging from attractive to extremely unattractive, disfigured ones, this study is the first to demonstrate heightened responses to both rewarding and aversive faces in numerous areas of this putative reward circuit. Parametric analyses employing orthogonal linear and nonlinear regressors revealed positive nonlinear effects in anterior cingulate cortex (ACC), amygdala (AMY), lateral orbitofrontal cortex (LOFC), ventral striatum (nucleus accumbens (NAC), caudate, putamen), and ventral tegmental area (VTA), in addition to replicating previously documented linear effects in MOFC and LOFC. The ubiquitous nonlinear responses are consistent both with single cell recordings in animals showing responses to both rewarding and aversive stimuli and some human fMRI investigations of non-face stimuli. They indicate that the reward circuit does not process face valence with any simple dissociation of function across structures. Perceiver gender modulated some responses to our male faces: women showed stronger linear effects, and men showed stronger nonlinear effects, which may have functional implications. Our discovery of nonlinear responses to attractiveness throughout the reward circuit echoes the history of amygdala research: early work indicated a linear response to threatening stimuli, including faces; later work also revealed a nonlinear response with heightened activation to affectively salient stimuli regardless of valence. The challenge remains to determine how such dual coding influences feelings, like pleasure and pain, and guides goal-related behavioral responses, like approach and avoidance.

E29

PUPILLARY RESPONSES TO IMAGES WITH SOCIAL-AFFECTIVE CONTENT IN AUTISM AND WILLIAMS SYNDROME *Marie-Christine Andre, Boston University School of Medicine; Olufemi Olu-Lafe, Boston University; Daniela Plesa-Skwerer, Boston University School of Medicine; Helen Tager-Flusberg, Boston University School of Medicine* – Initially viewed as diametric opposites in their social phenotypes, Autism Spectrum Disorders (ASD) and Williams Syndrome (WS) reveal subtle commonalities in social deficits. Indeed, recent work has found impairments in social cognition and perception on explicit tasks in both populations. We examined implicit processing of emotional information as reflected in psychophysiological responses to social-affective visual content. Pupillary responses were used as a measure of arousal to threat-related images from the International Affective Picture System (IAPS) selected based on their content â€“ social, non-social and angry or fearful faces. Individuals with ASD matched on age with individuals with WS and normal controls (NCs) passively viewed emotionally charged pictures while pupil diameter measures were collected using a TOBII-1750 eye-tracker. The results revealed a significant group-by-content interaction with all three groups exhibiting a different pattern of responsiveness. Most strikingly, the ASD group showed greater pupil dilation to faces than the WS group. Larger pupillary changes were similarly found in the ASD group when viewing faces compared to images with non-social and social content. No difference in content-related responsiveness was found within the WS group. The NCs exhibited greater pupil dilation for non-social than social

content. These pupillometry results are consistent with previous findings of increased autonomic arousal measured by skin conductance responses in people with ASD and electrodermal hypoarousal in WS to viewing emotional faces. The ASD group's hyperarousal to face content parallels previous findings of amygdala hyperactivation to direct gaze in ASD. Possible explanations for these profiles of autonomic responsiveness will be discussed.

E30

INTENTION RECOGNITION IN AUTISM: AN FMRI STUDY *Angela Ciaramidaro, Department of Psychology, Center for Cognitive Science, University of Turin, Italy; Sven Bolte, Department of Child and Adolescent Psychiatry, J. W. Goethe-University, Frankfurt/M., Germany; Sabine Schlitt, Department of Child and Adolescent Psychiatry, J. W. Goethe-University, Frankfurt/M., Germany; Bruno G. Bara, Center for Cognitive Science, University of Turin, Italy; Bernhard Weber, Department of Psychiatry, J. W. Goethe-University, Frankfurt/M., Germany; Fritz Poustka, Department of Child and Adolescent Psychiatry, J. W. Goethe-University, Frankfurt/M., Germany; Henrik Walter, Department of Psychiatry, Division of Medical Psychology, University of Bonn, Germany* – Aim of the study: Theory of Mind (ToM) is the ability to explain and predict the behaviour of conspecifics, based on observation of their intentional actions. This ability seems to be impaired in patients with autism. Studies on brain function show atypical patters of brain activation in individuals with autism when processing ToM task, but no studies have distinguished between different types of intentions involved. Using a paradigm including a control condition (physical causation or Ph-C) and two intention conditions (private intention or PInt and communicative intentions or CInt) we investigated intention recognition in autism. Method: 18 right-handed patients (3 female; age 20.4) and 18 controls subject (3 female; age 19.3) were recruited. The participants' task was to choose the logical ending of a series of comic-strips. fMRI-imaging: 3 Tesla Scanner (Allegra, Siemens, Erlangen, Germany), single-shot EPI-sequence, TE/TR 30/2000 ms, 30 slices. Image processing and data analysis: SPM5. Results: ANOVA between groups comparing contrasts of interest in controls and patients revealed significantly elevated activations only in the control group compared to the patient group and not vice versa. The contrast PInt versus Ph-C reveals differences in the inferior frontal gyrus, and the contrast CInt versus Ph-C indicates significant group differences in the right TPJ. Conclusion: Here we provide evidences that the dysfunction on individuals with autism was dependent on the type of intention represented.

E31

NEURAL CORRELATES OF THE DETECTION OF OWN AND OTHER'S ERRORS IN INDIVIDUALS WITH PSYCHOPATHY *Ellen R.A. de Bruijn, Donders Institute for Brain, Cognition and Behaviour; Inti A. Brazil, Donders Institute for Brain, Cognition and Behaviour, Pompestichting Nijmegen; Berend H. Bulten, Pompestichting Nijmegen; Jan K. Buitelaar, Donders Institute for Brain, Cognition and Behaviour; Robbert J. Verkes, Donders Institute for Brain, Cognition and Behaviour, Pompestichting Nijmegen* – For successful goal-directed behavior it is essential for humans to continuously monitor one's actions and detect errors as fast as possible. EEG studies have identified an error-related ERP component known as the error-related negativity (ERN), originating from posterior medial frontal cortex. Recently, an ERN has also been demonstrated following the observation of other's errors, the so-called observed ERN (oERN). Individuals with psychopathy are characterized by a failure to efficiently adapt their behavior in response to aversive events, suggesting deficits in error-monitoring processes. Crucially however, the core symptoms of psychopathy are most prominent during interactions with other people. The aim of the current study was to disentangle possible deficits in monitoring of own and other's errors in individuals with psychopathy. Behavioral and EEG data were obtained from 18 individuals with psychopathy and 18 healthy controls matched for age and education. All participants performed a speeded choice-reaction task and observed another person perform the same task. The two groups did not differ in ERN amplitudes following own errors, but the individuals with psychopathy did display reduced oERN amplitudes in response to other's errors. In line with previous studies from our lab, individuals with psychopathy do not show disturbances in the automatic processing of own errors. Importantly, however, the current study demonstrates specific deficits in the monitoring of other's actions. The present findings are in line with the prominent disturbed interpersonal behavior characteristic for this severe personality disorder and may thus provide us with important knowledge about the underlying cognitive and neural mechanisms.

E32

NEURAL CORRELATES OF FAIRNESS IN SOCIAL DECISION-MAKING ACROSS CHILDHOOD, ADOLESCENCE AND ADULTHOOD *Berna Guroglu, Leiden University; Wouter van den Bos, Leiden University; Serge Rombouts, Leiden University Medical Center; Eveline Crone, Leiden University* – The concerns for self versus others change across child and adolescent development but the neural mechanisms of these developmental changes are currently unknown. The Ultimatum Game (UG), in which a responder can accept or reject an offer made by a proposer, is a well-established tool to study fairness concerns. In this study we have used an adapted version of the UG that is better suited for examining fairness and intentionality considerations in social exchanges (Falk, Fair, & Fischbacher, 2003). Prior neuroimaging studies based on the UG in adults have demonstrated that the insula is activate when unfair offers are rejected, whereas the lateral prefrontal cortex (lat-PFC) is activated when unfair offers are accepted and the tendency to reject unfair offers is overridden (Sanfey et al., 2003). We tested how these brain areas are sensitive to self-other concerns between ages 9 and 25 (current n = 51). As predicted, neural correlates of

fairness considerations were intention-dependent. Violation of own social norms (i.e., acceptance of unfair offer with fair or hyperfair alternatives or rejection of unfair offer with no alternative) was related to higher ACC and insula activity. Importantly, the modulating role of dorsolateral prefrontal cortex (DLPFC) changed with age; specifically, in young children DLPFC was active when accepting unfair offers, whereas in adults DLPFC was active when rejecting unfair offers. We suggest that these data indicate a shift in implementation of control, possibly related to the development of perspective-taking skills and understanding of intentionality with age (Blakemore et al., 2007).

E33

ATYPICAL NEURAL SELF-REPRESENTATION IN AUTISM *Michael V. Lombardo, University of Cambridge; Bhismadev Chakrabarti, University of Reading; Ed Bullmore, University of Cambridge; Susan Sadek, University of Cambridge; Greg Pasco, University of Cambridge; Sally Wheelwright, University of Cambridge; John Suckling, University of Cambridge; Simon Baron-Cohen, University of Cambridge; MRC AIMS Consortium, University of Cambridge, University of Oxford, Institute of Psychiatry Kings College London* – The autistic 'self' is a paradox. On the one hand, individuals with autism are thought to be totally self-focused, yet are also impaired in self-referential cognition. The organization of neural representations of self and other may be an important component in understanding this paradox and its relation to the social impairments in autism. We examined the neural circuitry involved in self-representations in autism spectrum conditions (ASC). Thirty three adult males with Asperger Syndrome and 33 age-, IQ-, and sex matched neurotypical adults were scanned during fMRI while making reflective mentalizing or physical judgments about themselves or a familiar non-close other (the British Queen). While neurotypical adults recruited ventromedial prefrontal cortex (vMPFC) more for self than other, individuals with ASC recruited vMPFC similarly for self and other. This absent self-other distinction in the vMPFC of individuals with ASC also correlated with individual differences in social impairment on the Autism Diagnostic Interview-Revised (ADI-R). As social impairment increased, Self>Other processing in vMPFC decreased into an atypical pattern of vMPFC recruitment for Other>Self. The typical pattern of increased self-specific functional connectivity between vMPFC, frontal operculum, and somatosensory was also absent in ASC. These results illustrate a system-wide dysfunction of the normative neural circuits engaged during self-representation in ASC. The equivalent vMPFC response to self and other is highly indicative of an extreme egocentric stance in ASC. This egocentric stance may derail typical development of the self and its relation to the social world and may be a key component underlying social impairments in autism.

E34

IMPAIRED AFFECTIVE THEORY OF MIND AMONG CHILDREN WITH FRONTAL LOBE INJURIES *Tal Shany-Ur, Department of Psychology, University of Haifa, and Pediatric Rehabilitation Department, Chaim Sheba Medical Center, Israel; Rachel Tomer, Department of Psychology, University of Haifa, Israel; Amichai Brezner, Pediatric Rehabilitation Department, Chaim Sheba Medical Center, Israel; Jana Landa, Pediatric Rehabilitation Department, Chaim Sheba Medical Center, Israel; Simone Shamay-Tsoory, Department of Psychology, University of Haifa, Israel* – Children with brain lesions, especially those involving the frontal lobes, often exhibit difficulties in social cognition and behavior. These have been attributed in part to deficits in Theory of Mind (ToM) and executive functions (EF). Previous adult lesion studies have differentiated between affective and cognitive ToM, referring to reasoning about mental states involving emotions or not involving them, respectively. The goal of this study was to examine the relationship between early frontal lobe lesions and affective versus cognitive ToM. Children with brain lesions aged 6- 13 years (n=12), and age- and verbal ability-matched healthy controls (n=90), completed comparable versions of cognitive and affective ToM tasks (false belief, false attribution, sarcasm, and deception stories), as well as several EF tasks. We hypothesized that the integration between ToM and affective understanding ("belief about emotion") is related to maturation of frontal lobe regions and circuits more so than cognitive ToM ("belief about belief"). As predicted, children with lesions involving the frontal lobes were impaired in understanding affective but not cognitive ToM stories, when compared to healthy controls. However, children with posterior lesions were not significantly different from controls on any of these measures. Children with frontal lesions additionally performed less well on tasks assessing visual working memory and reversal learning. Conclusions: The study emphasizes that early frontal lobe damage may lead to deficits in affective ToM and EF, processes which contribute to social cognition and behavioral regulation. These deficits may account for the social and behavioral difficulties commonly found among this population.

E35

AMYGDALA MEDIATES EXPECTANCY EFFECTS ON PAIN-PROCESSING REGIONS *Lauren Y. Atlas, Columbia University; Niall Bolger, Columbia University; Martin A. Lindquist, Columbia University; Tor D. Wager, Columbia University* - Numerous affective domains have been shown to be highly influenced by expectancy, yet we know little about the specific mechanisms by which expectations modulate affective experience. Expectations about pain intensity can strongly influence self-reported pain in experimental and clinical settings, but whether and how expectancy-related changes in the brain contribute to the subjective experience of pain is largely unknown. In addition, limbic and striatal regions such as the amygdala and ventral striatum are implicated in hundreds of studies of emotion and affect, but they have an ambiguous relationship with pain. In this study, we provide evidence that pain expectancies influence both core pain-processing regions and interconnected limbic regions, including the

amygdala. We used a novel multi-level mediation analysis in fMRI to identify regions that 1) respond to expectancy, 2) predict trial-to-trial variations in pain reports, and 3) formally mediate the relationship between experimentally manipulated expectancy and reported pain. Several canonical pain-processing regions emerged as mediators, including anterior cingulate cortex, anterior insula, thalamus, and pons. In addition to these pain-processing mediators, we identified mediators not typically associated with pain but with affective value including the left amygdala. In this presentation, we focus on interactions between expectancy effects on left dorsal amygdala and pain-processing mediators. We show that expectancy-related increases in the amgydala predict increases in core pain-processing regions, which in turn predict pain experience. These results directly link amygdala activity to perceived pain, and begin to outline how multiple brain pathways interact to generate the subjective experience of pain.

E36

OXYTOCIN PRODUCES DIVERGENT EFFECTS ON TRUST AND COOPERATION IN HEALTHY ADULTS AND ADULTS WITH BORDERLINE PERSONALITY DISORDER *Jennifer A. Bartz, Mount Sinai School of Medicine; Daphne Simeon, Mount Sinai School of Medicine; Holly K. Hamilton, Mount Sinai School of Medicine; Sarah I. Crystal, Mount Sinai School of Medicine; Victor Vicens, Mount Sinai School of Medicine; Eric Hollander, Mount Sinai School of Medicine* – Oxytocin (OXT) is involved in pro-social behavior in animals and trust in humans. Moreover, negative early care-giving experiences impact the OXT system, both in animals and humans. Borderline personality disorder (BPD) is characterized by interpersonal instability, impulsivity, and trust issues, and is often associated with early trauma. We investigated whether OXT would facilitate trust and cooperation in individuals with BPD and healthy controls. Thirteen healthy and 14 BPD participants were randomly administered 40IU of intranasal OXT or placebo and then played the Assurances Game, a social dilemma game involving salient trust issues, with a partner (confederate). Controls expected their partner to be more cooperative, whereas BPD participants expected their partner to be less cooperative following OXT, $F(1,23)=4.31$, $p<.05$. Controls were more likely to cooperate in response to their partner's hypothetical cooperation following OXT, whereas BPD participants were more likely to defect (an aggressive strategy which punished their partner but cost them monetarily), $F(1,23)=4.82$, $p<.05$. All participants cooperated when interacting with a cooperative partner; however, after experiencing partner defection, controls were equally likely to cooperate or defect, whereas all BPD participants cooperated in the OXT condition, Pearson Chi-Square = 4.2, $p<.05$ (a strategy which signaled trust but again cost them monetarily). OXT produces divergent effects on trust and cooperation in healthy and BPD participants. The oxytocinergic system may be dysregulated in BPD, and exogenous OXT may be activating the attachment system and exacerbating a pre-existing, mixed-motives interpersonal conflict (affiliate/ingratiate but protect self/punish others), and undermining rational behavior.

E37

SEX AND STRESS: NEURAL ACTIVATION CHANGES DURING PSYCHOSOCIAL STRESS *Annie Duchesne, Douglas Mental Health Institute, McGill University, Montreal, Quebec, Canada; Najmeh Kahili Mahani, Douglas Mental Health Institute, McGill University, Montreal, Quebec, Canada; Claudia Buss, Douglas Mental Health Institute, McGill University, Montreal, Quebec, Canada; Katarina Dedovic, Douglas Mental Health Institute, McGill University, Montreal, Quebec, Canada; Jens C Pruessner, Douglas Mental Health Institute, McGill University, Montreal, Quebec, Canada* – Introduction: Within Health research, one of the best-replicated and most consistent findings is the difference in vulnerability between men and women to fall ill from stress-related diseases. Sex differences in stress reactivity are consistently shown in human and animal studies, although little is known about the neural mechanisms mediating these effects. The goal of this project was to assess gender differences of endocrine and neural activation changes during a psychosocial stress paradigm. Methods: We exposed 26 women and 25 men to a functional magnetic resonance imaging stress task (Montreal Imaging Stress Task; MIST) consisting of challenging mental arithmetic with a predetermined failure rate and negative feedback. Salivary cortisol was measured along the procedure. Results: As a whole, men showed a significant cortisol increase in response to the paradigm, while women did not. Looking specifically at responders and non responders, we demonstrated that during stress neural activity of men responders includes deactivation of the orbitofrontal cortex and hippocampus while women responders did not showed hippocampal deactivation. In the non responders only women present a deactivation of the cuneus, precuneus and sensory cortex. Conclusion: Our endocrines and neural activation results support important sexual differences with respect to stress reactivity to a challenging mental arithmetic. Recently, several studies have demonstrated that achievement-type tasks are not the best stressors for women which might explain the observed sex difference. Exploration of the neural activation in varying stressful contexts would represent an interesting approach to better understand the gender differences in stress reactivity.

E38

INTRANASAL ADMINISTRATION OF OXYTOCIN INCREASES ENVY AND SCHADENFREUDE (GLOATING) *Dvash J., University of Haifa; Shamay-Tsoory S. G., University of Haifa; Fischer M., University of Haifa; Harari H., Shalvata Mental Health Center; Perach-Bloom N, University of Haifa; Levkovitz Y., Shalvata Mental Health Center* – Background: Humans have an exceptional social tendency to compare themselves to others -- we feel envious when we receive less valuable rewards and may rejoice when our

pay-offs are more advantageous. Envy and schadenfreude (gloating over the other's misfortune) are social emotions, widely agreed to be a symptom of the human social tendency to compare one's pay-offs with those of others. Given the important social components of envy and schadenfreude, we speculated that oxytocin may have a modulating effect on the intensity of these emotions. Methods: Participants played a game of chance involving monetary gains with another player following the administration of oxytocin and placebo. Results: Oxytocin, compared with placebo, had the remarkable effect of increasing envy ratings during unequal monetary gains conditions involving relative loss (when the participant gained less money than another player). Oxytocin also increased ratings of schadenfreude during relative gain conditions. On the other hand, oxytocin had no effect on emotional ratings following equal monetary gains, nor did it affect general mood ratings. Conclusions: These results suggest that the oxytocinergic system is involved in modulating envy and schadenfreude. Rather than being involved solely in positive prosocial behaviors (as believed so far), this system probably plays a key role in a wider range of social emotion-related behaviors. Since the oxytocinergic system has recently been positioned amongst the most promising targets for various psychiatric treatments, we suggest that it is essential to also inventory potential undesirable effects of such treatments.

E39

THE EFFECT OF INTRANASAL ADMINISTRATION OF OXYTOCIN ON FEAR RECOGNITION *Fischer Meytal, Department of Psychology, University of Haifa; Shamay-Tsoory Simone G., Department of Psychology, University of Haifa; Harari Hagai, Shalvata Mental Health Care Center; Levkovitz Yechiel, Shalvata Mental Health Care Center* – The oxytocinergic system has been associated with prosocial behavior. Recent studies suggest that administration of oxytocin may improve empathy and increase trust. Given its modulatory effect on amygdala activation, we speculated that the administration of oxytocin may have a selective effect on fear recognition. In the present study, a double-blind placebo-controlled crossover design was used in a dynamic facial expression task, in order to assess the effect of oxytocin on fear processing. A single dose of oxytocin or a placebo was administered intranasally to 27 healthy male subjects 45 minutes prior to task performance. Following treatment the participants watched a neutral human face changing its expression into an emotional one (happy, sad, fearful, angry, surprised or disgusted). The results showed that a single intranasal administration of oxytocin, as opposed to the placebo, improved subjects' ability to recognize fear ($F(1,24)=7.16$ $p<0.05$), but not that of sadness, happiness, surprise, disgust or anger. These results are in line with other studies that relate oxytocin the modulation of neural circuitry for social cognition and fear in humans (Kirsch et al. 2005). The results support our initial hypothesis regarding the role of oxytocin in the ability to perceive and use social cues and suggest a specific role for oxytocin in fear recognition, which could be relevant for clinical disorders that manifest deficits in recognizing emotional facial expressions, particularly fear.

E40

WORKER ALLOSTATIC LOAD EFFECTS ON DIURNAL AND REACTIVE STRESS MEASURES *Robert-Paul Juster, Andrea Perna, Alireza Hashemi, Shireen Sindi, Marie-France Marin, & Sonia Lupien, Laboratory of Psychoneuroendocrinology of the Centre for Studies on Human Stress, Fernand-Seguin Research Centre of the Louis-H Lafontaine Hospital* – The allostatic load (AL) model proposes that chronic stress contributes to physiological 'wear and tear' as dysregulated stress hormone levels like cortisol (C) exact deleterious effects on multiple biological systems and increase vulnerabilities to stress-related diseases like depression. We investigated the effect of AL indices on diurnal C fluctuations and stress reactivity measures induced using the Trier Social Stress Test (TSST). Thirty full-time Montreal general workers ages 27 to 65 participated. Blood samples were assayed for C, dehydroepiandrosterone-sulphate, c-reactive protein, fibrinogen, insulin, glycosylated haemoglobin, albumin, creatinine, amylase, triglycerides, total and HDL-cholesterol. Participant's waist-to-hip ratio, systolic and diastolic blood pressures were also recorded. Biomarker levels within high-risk quartiles based upon biomedical normative ranges were aggregated into an AL index subsequently categorized into high and low groupings. Diurnal C for two days measured upon awakening, 30 minutes afterwards, 2:00PM, 4:00PM and before bedtime were collected. Stress reactivity was assessed using 10 repeated measures of salivary C, alpha-amylase, recordings of blood pressure and heart rate throughout the TSST protocol involving public speech and mental arithmetic tasks. The Maslach Burnout Inventory (MBI) was also administered. Repeated measures ANOVAs were employed to assess AL group effects on stress reactivity with MBI scores entered as a covariate. High AL was related to significantly lower diurnal and reactive C levels but higher blood pressure and heart rate throughout the TSST. Consistent with AL expectations, the observed sluggishness of C activations and simultaneous elevations in cardiovascular reactivity resembles burnout profiles characterized by blunted C and elevated catecholamine levels.

E41

REGULATION OF CRAVING USING COGNITIVE STRATEGIES: LESSONS FROM SUBSTANCE ABUSE *Hedy Kober, Columbia University, Department of Psychology; Ethan F. Kross, Universty of Michigan, Ann Arbor, Department of Psychology; Peter Mende-Sidlecki, Columbia University, Department of Psychology; Walter Mischel, Columbia University, Department of Psychology; Carl Hart, Columbia University, Department of Psychology, Division on of Substance Abuse, New York State Psychiatric Institute and Department of Psychiatry, College of Physicians and Surgeons of Columbia University; Kevin N. Ochsner, Columbia University, Department*

of Psychology – A failure to regulate craving has been implicated in substance abuse disorders and in post-treatment relapse. This underscores the urgent need to understand the neural correlates of craving and its regulation in substance abusing populations. This talk will present data from a recent study that used functional magnetic resonance imaging (fMRI) to examine the neural bases of craving for cigarettes and food, as well as the regulation of craving using cognitive strategies in a nicotine-dependent population. Twenty-one cigarette smokers viewed images of cigarettes and of delicious looking, unhealthy foods, and were instructed to think about either the (a) immediate sensory experience (e.g. increase craving), or (b) the long-term negative physical health implications associated with consuming each item (e.g. regulate craving). As expected, subjective ratings indicated that participants experienced significantly less craving for both cigarettes and food when considering the long-term consequences associated with consumption, suggesting that cognitive strategies can be used to effectively regulate craving for both food and cigarettes (consistent with clinical data). On "increase craving" compared to "regulate craving" trials, we observed activation in regions including subgenual cingulate, ventral striatum, and ventral tegmental area. This pattern was stronger for cigarettes compared to food, consistent with participants' reports of greater craving for cigarettes compared to food. Conversely, on "regulate craving" trials we observed activity in "control" regions including the dorsomedial prefrontal cortex and inferior frontal gyrus. This pattern was stronger for food compared to cigarettes, suggesting a possible mechanism for the impaired regulation of cigarette craving (compared to food craving) exhibited by these cigarette smokers in everyday life. Ongoing work on the regulation of craving in methamphetamine-dependent individuals will also be discussed.

E42

NALOXONE MODULATES VISUAL JUDGMENTS OF SIMILARITY BUT NOT DISSIMILARITY *Peter Krummenacher, Collegium Helveticum, Zurich, Switzerland, Department of Neurology, Neuropsychology Unit, University Hospital Zurich, Switzerland; Elvan Kut, Collegium Helveticum, Zurich, Switzerland; Marianne Regard, Department of Neurology, Neuropsychology Unit, University Hospital Zurich, Switzerland; Gerd Folkers, Collegium Helveticum, Zurich, Switzerland; Peter Brugger, Department of Neurology, Neuropsychology Unit, University Hospital Zurich, Switzerland* – Endogenous opioids have been implicated in mediating (placebo) analgesia and in the regulation of social emotions such as attachment. However, little is known about its putative contribution to higher cognitive functions. To investigate links between endogenous opioids and cognition, we used a novel visual similarity/dissimilarity judgment-task with meaningless geometric figures. Eighteen different stimulus pairs were tachistoscopically (150ms) presented and 19 healthy right-handed men had to judge the similarities and the dissimilarities on a bipolar visual analogue scale (VAS) in two separate runs. In a double-blind, between-subject design, participants were administered either 0.2 mg/kg naloxone intravenously (n=10) or placebo (n=9) 5 minutes prior to the judgment-task. The magnitude of the VAS score and the response latencies were measured. In addition, mood ratings were assessed before and after substance administration. VAS score analyses revealed a significant interaction between substance group and run; the magnitude of similarity judgments was lower in the naloxone than in the placebo group. No substance group difference was found in the dissimilarity run. Reaction latencies and mood scores did not differ between the two groups, indicating that the reported effects are unlikely to simply reflect altered motor performance and motivation. We thus infer that naloxone decreased the "analogy criterion" in visual cognitive-affective judgments, but only when framed for similarity but not for dissimilarity. These findings indicate a modulatory effect of naloxone on cognitive judgments. The task introduced here could be used for the implicit study and quantification of subtle affective-cognitive processes beyond the level of merely questionnaire data.

E43

ABNORMAL BRAIN RESPONSES DURING SOCIAL INCLUSION IN DEPRESSIVE ILLNESS *Poornima Kumar, University of Aberdeen & Oxford, Gordon Waiter, Trevor Ahearn, Maarten Milders, Ian Reid, University of Aberdeen, J Douglas Steele, University of Aberdeen & Dundee* – Humans desire to be included within a group and feel frustrated if they are excluded. Learning to predict about social outcomes facilitates humans to adapt socially and live a healthy and longer life. Patients with depressive illness often respond abnormally to social and emotional stimuli and appear impaired in their prediction of social behaviour. The subgenual cingulate, posterior cingulate and orbitofrontal cortices, and insula have been reported to be involved in various social cognitive and emotion tasks in healthy controls. These are the same regions reported to be structurally and functionally abnormal in depressed patients. Hence, we hypothesised that these regions would be abnormal in depressed individuals when undertaking a social inclusion experiment. 15 patients with major depressive disorder and 16 matched healthy controls were engaged in a social inclusion paradigm during fMRI (functional magnetic resonance imaging) scanning. The paradigm required participants to play a "ball passing" video game while in the scanner. During the image acquisition the participants would be periodically excluded from the game. The task was used to investigate the neural circuitry involved during various levels of inclusion in healthy controls and depressed patients. Consistent with our hypothesis, the subgenual cingulate, lateral orbitofrontal cortex, insula and posterior cingulate were found to be deactivated in depressed patients when compared with controls during social inclusion. Abnormal activity in these brain regions in patients during a social inclusion task may be associated with a failure to efficiently

predict social behavior and respond normally during social interactions.

E44

SELECTIVE ATTENTION TO SMOKING CUES IN SMOKERS AND NON-SMOKERS: AN ERP STUDY USING THE VISUAL ODDBALL PARADIGM *Littel, M. Institute of Psychology, Erasmus Universiteit Rotterdam, Rotterdam, The Netherlands; Franken, I.H.A. Institute of Psychology, Erasmus Universiteit Rotterdam, Rotterdam, The Netherlands* – Substance use disorders are characterized by cognitive processing biases, such as automatically detecting and orienting attention towards drug-related stimuli. Up to now it is unclear how, when and what kind of attention (i.e. bottom-up, top-down) interacts with the processing of these stimuli. In addition, it is unclear whether smokers are hypersensitive to emotionally significant cues in general or to smoking-related cues in particular. The present ERP study aimed to enhance insight in drug-related processing biases by manipulating attention for smoking and other motivationally relevant (emotional) cues in smokers and non-smokers using a visual oddball task. Each of the categories served as a target (explicit attention; counting) or a non-target (implicit attention; oddball) category. Compared to non-smokers, smokers' P300 (350-600 ms) was enhanced to smoking pictures under both attentional conditions. P300 amplitude did not differ between groups in response to positive, negative, and neutral cues. It can be concluded from this study that attention manipulation affects the P300 differently in smokers and non-smokers. Smokers display a very specific bias to smoking-related cues, and this bias is present in both explicit and implicit processing. Overall, it can be concluded that attention appears to play an important role in drug-related processing bias.

E45

NEURAL CORRELATES OF EXTERNALLY INDUCED AND INTERNALLY GENERATED SELF-AWARENESS *Yina Ma, Department of Psychology, Peking University, Beijing, P. R. China; Shihui Han Department of Psychology, Peking University, Beijing, P. R. China* – Orientation of consciousness towards the self can either be initiated by perceived stimuli with self-specific information or take place without stimuli with self-specific information. However, it remains unknown whether self-awareness in these two conditions are associated with distinct neural correlates. To investigate this, we presented subjects with pictures of their own face, a face of a gender-matched friend, and an ambiguous face morphed with self- and friend-faces. Neural activity associated with a face identification task was recorded using functional MRI and event-related potentials (ERPs). We found that, relative to friend-face, self-face induced increased activation in the caudal cingulate and decreased amplitudes of an ERP component peaking at about 170 ms over the occipito-temporal electrodes. However, the morphed face generated increased activations in the posterior cingulate/precuneus and the ventral medial prefrontal cortex when it was subjectively identified as the self relative to when identified as a friend. ERPs that differentiated the morphed face identified as the self or friend occurred at 640 ms over the right frontal electrodes. Our fMRI and ERP results provide neuroimaging evidence for the dissociation between externally induced self-awareness and internally generated self-awareness in both neural structures involved and temporal courses of the neural activity. Moreover, the activity in the posterior cingulate/precuneus positively correlated with the percentage of subjective report of the morphed face as the self, suggesting a functional role of this brain area in orienting consciousness to the self.

E46

RECONSOLIDATION OF EMOTIONAL MEMORIES IN HUMANS: THE ROLE OF STRESS HORMONES *Marie-France Marin, Centre for Studies on Human Stress, Mental Health Research Centre Fernand-Seguin, Hospital Louis-H. Lafontaine, Universite de Montreal; Sonia J. Lupien, Centre for Studies on Human Stress, Mental Health Research Centre Fernand-Seguin, Hospital Louis-H. Lafontaine, Universite de Montreal* – Glucocorticoids (GCs) are a major class of stress hormones known to modulate different memory processes. In general, high levels of GCs enhance consolidation whereas both low and high levels impair memory retrieval. It has recently been proposed that when a memory is retrieved, it becomes active once again and subject to modifications before it undergoes a second round of consolidation, called reconsolidation. The role of GCs on memory reconsolidation in humans has not yet been assessed. In Study 1, we therefore investigated whether a stress induced GC elevation might impact the reconsolidation of a reactivated memory trace. Thirty-two participants encoded a movie containing neutral and emotional slides. Two days later, they recalled the movie. Then, half were exposed to a psychosocial stressor whereas the others read magazines (controls). Memory was re-assessed immediately after stress and five days later. The stressed group recalled more emotional material after the stressor and the effect was maintained five days later. In Study 2, we investigated whether low levels of GCs would affect memory retrieval in a temporary or a long-lasting manner, which would suggest a reconsolidation effect. Twenty-two participants encoded the movie. Three days later, they were randomly assigned to a metyrapone (an inhibitor of GC synthesis) or a placebo condition. Memory performance was assessed after drug administration and four days later. At both time points, the metyrapone group recalled less emotional material compared to controls. These experiments suggest that GC levels can modulate the reactivation and the reconsolidation of emotional memories.

E47

BRAIN RESPONSES ASSOCIATED WITH REWARD SENSITIVITY AND ADHERENCE TO A 9-MONTH EXERCISE PROGRAM *Laura E. Martin, University of Kansas Medical Center; Rebecca J. Chambers, University of Kansas*

Medical Center; Christie Befort, University of Kansas Medical Center; Jeffrey J. Honas, University of Kansas; Richard R. Suminiski, Kansas City University of Medicine and Biosciences; Wendell C. Taylor, University of Texas Health Science Center at Houston; Joseph E. Donnelly, University of Kansas; Cary R. Savage, University of Kansas Medical Center – Regular exercise is associated with numerous health benefits; however, the rewarding aspects of exercise are not immediate. Individuals must, therefore, make behavioral choices based on anticipation of future reward. Differences in reward sensitivity may, therefore, be associated with adherence to an exercise program. The current study employed fMRI to examine the neural systems of reward while monetary rewards were predicted and delivered among participants enrolled in a 9-month exercise program. The fMRI task consisted of the presentation of cues that predicted the delivery of a reward or punishment with 75% probability. Participants received feedback on how much money they won or lost on each trial. To date, we have data in 5 adherers (participants who completed the 9 month program) and 5 non-adherers (participants who dropped out). Preliminary results indicate differences between reward and punishment in the middle frontal gyrus of the prefrontal cortex (PFC) at both anticipation and delivery. During anticipation, adherers showed greater activation (reward>punishment) than non-adherers in PFC (x,y,z = 30,23,40). During delivery, non-adherers showed greater activation (reward>punishment) than adherers in PFC (x,y,z = 24,5,43) when expected outcomes were delivered. When unexpected outcomes were delivered, PFC responded more to punishments compared to rewards among non-adherers. These preliminary results indicate that adherence to an exercise program may be influenced by individual differences in how rewards and punishments are processed. More specifically, individuals who show increased PFC activations during reward anticipation may be more successful in long-term exercise programs than individuals who show increased activations only during delivery.

E48

TOP-DOWN AND BOTTOM-UP EMOTIONAL PROCESSING: THE INTERACTION BETWEEN EMOTION GENERATION AND EMOTION REGULATION *Kateri McRae, Stanford University; Supriya Misra, Stanford University; Aditya K. Prasad, Stanford University; Sean C. Pereira Stanford University; & James J. Gross, Stanford University; .* – Current theories driving affective neuroscience indicate that emotions may be generated in at least two different ways: bottom-up and top-down. Bottom-up emotion generation relies on the properties of a stimulus itself through the perception of low-level stimulus features (e.g., emotional faces), while top-down emotion generation relies on the meaning given to a stimulus through high-level cognitive appraisals (e.g., verbal statements). The present study tested the hypothesis that top-down emotions are better regulated than bottom-up emotions when using a top-down emotion regulation strategy. In particular, we focused upon cognitive reappraisal, which has been shown to decrease self-reported negative affect and BOLD signal from the amygdala. Twenty-four women were scanned on a 3-Tesla GE magnet while viewing top-down and bottom-up emotional stimuli under instructions to look and respond naturally, or to use cognitive reappraisal to decrease negative affect. Measures of self-reported negative affect indicated that top-down emotions were more successfully regulated than bottom-up emotions. BOLD signal from the amygdala showed also showed this interaction, but paradoxically, amygdala activation was greater during regulation of bottom-up stimuli than during the instruction to respond naturally. This implies that the method of emotion generation (top-down vs. bottom-up) may impact the subsequent success of top-down regulation strategies like cognitive reappraisal. These results have implications for developing more effective emotion regulation techniques depending on the emotion generation processes.

E49

PERCEIVED SOCIAL STATUS MODULATES THE NEURAL RESPONSE TO VIEWING EMOTIONAL FACIAL EXPRESSIONS AMONG ADOLESCENTS *Keely A. Muscatell, University of California, Los Angeles; Baldwin M. Way, University of California, Los Angeles; Mirella Dapretto, University of California, Los Angeles* – Recent research has demonstrated that subjective perceptions of low social status are related to a number of negative outcomes, including increased risk of mortality, and greater physiological stress reactivity following a socially threatening event. Recent research has begun to explore potential neural mechanisms of these effects. In particular, it was recently demonstrated that young adults perceptions' of their parents' social status was associated with amygdala activity when viewing threatening facial expressions. In the present study, we sought to determine if a similar effect occurred in adolescents. Specifically, we predicted that adolescents' perceptions of their family's social status would modulate the neural response to viewing threatening facial expressions. To test this prediction, 27 adolescents (age 13 years) completed a revised version of the MacArthur Subjective Social Status Scale, in which they were asked to indicate where their family stood on a ladder intended to represent the hierarchy in American society. Participants also underwent an fMRI scan while they observed faces that displayed fear, anger, and sad expressions. Results revealed that adolescents who rated their families as lower in social status exhibited greater neural activity in the dorsal anterior cingulate cortex and anterior insula, regions involved in processing physical and social pain. Thus, as has been found with adult samples, low familial social status is associated with increased neural sensitivity to social threat in adolescents.

E50

DOES IT MAKE A DIFFERENCE IF I LOOK AT YOU OR YOUR PICTURE? *Laura Pönkänen, University of Tampere; Jari Hietanen, University of Tampere* – Virtually all research on

face perception is currently conducted by presenting images of faces on a computer screen. However, it is obvious that looking at a face of a real person vs. an image on a computer screen is experientially not the same. In a series of recent experiments, we have measured brain responses and autonomic responses to facial stimuli differing in their potentiality (human face vs. dummy face) or preparedness (direct gaze vs. averted gaze) for interaction. These stimuli have been presented in two conditions, as pictures on a monitor vs. live through a computer-controlled liquid crystal window. The critical question is, whether the mode of presentation has an effect on the (supposedly) differential brain and autonomic responses to these facial stimuli. Namely, in the picture condition, the potentiality or preparedness for interaction cannot be realized. This is possible only in the live condition. The results have shown, for example, that visual event-related potentials discriminated between a real human face and a dummy face in the live condition, but not when they were presented as pictures. Measurements of the frontal EEG asymmetry and skin conductance responses have indicated that seeing another person's direct and averted gaze differently activated the motivational approach avoidance systems. Again, these results were observed only when the faces were presented live. We suggest that facing a real person vs. a picture of a face activates social-cognitive processes differently, and this, in turn, may have an impact on sensory and affective-motivational responses to facial stimuli.

E51

A NEURAL TEST OF A TWO-DIMENSIONAL MODEL OF FACE EVALUATION *Christopher Said, Princeton University; Nikolaas Oosterhof, Bangor University; Andrew Engell, Yale University; Alexander Todorov, Princeton University* – People make rapid and reliable trait inferences from faces. These inferences are often not independent of each other, thus rendering many functional imaging findings difficult to interpret. Specifically, during the perception of faces, variance in brain response that is attributed to one trait inference might be better explained by a different, correlated inference. One way to avoid some of the problems associated with correlated trait inferences is to use orthogonal dimensions from which other traits can be created by linear combination. Using a variant of reverse correlation, we created a CGI (computer-generated imagery) model of social face space consisting of a valence/trustworthiness dimension and an orthogonalized power/dominance dimension. In fMRI studies, we found significant linear responses to both dimensions in inferior temporal cortex: Reponses were larger as dominance increased and trustworthiness decreased. Quadratic responses to trustworthiness were found in the inferior temporal cortex, the basal ganglia, and the dorsal amygdala: Responses were largest at the extremes of both trustworthiness and dominance, and weakest in the middle range. These regions also showed an interaction between trustworthiness and dominance, with stronger linear responses to trustworthiness for dominant faces compared to submissive faces. These findings were robust to task, appearing in subjects asked to perform a one-back recognition task, as well as in subjects asked to make a binary approach/avoid decision. We also compare these results to those obtained when subjects viewed a non-social dimension matched for change in identity and distance in physical face space.

E52

CORTISOL LEVELS IN RESPONSE TO STRESSFUL VERSUS NON-STRESSFUL TESTING ENVIRONMENTS *Shireen Sindi, McGill University; Catherine Lord, McMaster University; Bruce Pike, McGill University; Jens Pruessner, McGill University; Sonia Lupien, University of Montreal* – Elevated cortisol levels can impair cognitive performance, but do testing environments themselves function as stressors? The goal of this study was to assess whether the cortisol stress response (CSR) differs as a function of testing environments manipulated to induce higher or lower distress. Twenty eight adults ages 18 to 35 were each tested in three different conditions: 1) Montreal Neurological Institute (MNI) tested on university grounds in the afternoon by a young graduate student; 2) Douglas Hospital (DH) tested far from the university in the morning by an older adult; 3) Douglas Hospital re-visit (DH-R) for exposure to a psychosocial stress task. Salivary cortisol was repeatedly measured in all conditions. Area under the curve with respect to ground (AUCg) was calculated for the CSR in each session. One-way repeated measures ANOVA were performed with three levels for the different contexts followed by paired samples t-test for significant effects. Results revealed that DH AUCg was significantly higher than the MNI AUCg. DH-R AUCg was also significantly higher than MNI AUCg. That young adults experienced higher CSRs in both stressful conditions (morning testing) versus the non-stressful condition (afternoon testing) stresses the importance of context.

E53

WHY AND HOW DO PEOPLE DO WHAT THEY DO? AN FMRI STUDY OF MENTALIZING AND MECHANIZING KNOWN ACTIONS *Robert P. Spunt, University of California, Los Angeles; Emily Falk, University of California, Los Angeles; Matthew D. Lieberman, University of California, Los Angeles* – The present study takes an action identification theoretical approach (Vallacher & Wegner, 1987) to characterizing the neural bases of retrieving knowledge about everyday actions. Action identification theory assumes that action knowledge is organized hierarchically, with higher levels referring to the unobservable outcomes and mental states that explain why an action is performed, and lower levels referring to the specific motor actions and tools that describe how the action is performed (Kozak, Marsh, & Wegner, 2006). We used fMRI to investigate the neural bases of mentalizing and mechanizing known actions. Participants were presented with schematic descriptions of 20 actions (e.g., "brush their teeth") and were asked to silently indicate why and how

people perform these actions. Compared to identifying how, identifying why selectively produced activity in areas known to be involved in mental state inference, including both dorsal and ventral aspects of medial prefrontal cortex, posterior cingulate cortex, right temporoparietal junction, and left temporal pole. Consistent with an embodied cognition account of mechanizing actions, the reverse contrast revealed increased activity in dorsal and ventral aspects of left premotor cortex, posterior parietal cortex, and areas of occipitotemporal cortex. These results confirm that independent neural systems are required to mentalize and mechanize known actions.

E54

DO POLITICS GET YOUR HORMONES GOING? VOTERS' TESTOSTERONE AND CORTISOL RESPONSES TO THE OUTCOME OF THE 2008 UNITED STATES PRESIDENTIAL ELECTION *Steven J Stanton, Duke University; Jacinta C Beehner, University of Michigan - Ann Arbor; Ekjyot K Saini, University of Michigan - Ann Arbor; Cynthia M Kuhn, Duke University; Kevin S LaBar, Duke University* – Dominance contests are a critical component of determining the leadership of social hierarchies across a wide range of species. In modern human societies, this dominance contest often takes the form of a democratic election. Across mammalian species, specific testosterone and cortisol responses are uniquely linked to winning and losing dominance competitions. However, it is unknown whether these patterns of hormone response to winning and losing extend beyond interpersonal competitions to the societal context of political elections. The present study investigated voters' testosterone and cortisol responses to the outcome of the 2008 United States Presidential election. 183 participants at two research sites (Michigan and North Carolina) provided saliva samples at several time points before and after the announcement of the winner on Election Night. Radioimmunoassay was used to measure cortisol and testosterone levels in participants' saliva. Relative to earlier in the evening, male Barack Obama voters had stable post-outcome testosterone levels, whereas testosterone dropped in male John McCain and Robert Barr voters. There was no effect of candidate choice on testosterone change in female voters. For voters of both sexes in North Carolina, McCain and Barr voters had post-outcome cortisol increases while Obama voters had stable post-election cortisol levels. Cortisol levels after the outcome of the election were positively correlated with a measure of political conservatism in North Carolina voters. Our data suggest that voters physiologically respond to the outcome of political elections depending on if their candidate wins or loses as if they had participated in an interpersonal dominance contest.

E55

BASAL TESTOSTERONE MODULATES PREFRONTAL-AMYGDALA EFFECTIVE CONNECTIVITY DURING SOCIAL EMOTIONAL BEHAVIOR *Inge Volman, Donders Institute for Brain, Cognition and Behaviour, Centre for Cognitive Neuroimaging, Radboud University Nijmegen, the Netherlands, Leiden University Institute for Psychological Research, Clinical Psychology Unit, the Netherlands; Ivan Toni, Donders Institute for Brain, Cognition and Behaviour, Centre for Cognitive Neuroimaging, Radboud University Nijmegen, the Netherlands, Donders Institute for Brain, Cognition and Behaviour, Centre for Cognition, Radboud University Nijmegen, the Netherlands; Lennart Verhagen, Donders Institute for Brain, Cognition and Behaviour, Centre for Cognitive Neuroimaging, Radboud University Nijmegen, the Netherlands, Helmholtz Institute, Experimental Psychology, University Utrecht, Utrecht, the Netherlands; Karin Roelofs, Leiden University Institute for Psychological Research, Clinical Psychology Unit, the Netherlands, Leiden Institute for Brain and Cognition (LIBC), the Netherlands* – Testosterone plays an important role in the regulation of social emotional behavior (Archer, 2006), but the neural circuits supporting this hormonal influence remain unclear. Previous work has shown that the left ventro-lateral prefrontal cortex (vlPFC) plays an important role in this regulation, as operationalized by approach and avoidance (AA) responses to happy and angry faces (Roelofs et al., 2009). Here, we build on that work, using fMRI to assess how inter-individual differences in basal testosterone alter the cerebral circuitry involved in regulating such social emotional behavior. BOLD-sensitive fMR images (1.5 Tesla, multi-echo GRAPPA sequence, TR = 2.14ms, 34 slices, 3.3 x 3.3 x 3.0 mm voxel size) were acquired while twenty healthy male participants approached or avoided photographs of happy and angry faces by pulling or pushing a joystick towards or away from their bodies, respectively. The subjects responded to the emotional value of the faces. Basal testosterone levels were measured at the beginning of the experiment. During the task, affect-incongruent trials (i.e. approach angry faces; avoid happy faces) evoked longer response times and stronger left vlPFC activity than affect-congruent trials. Crucially, the circuitry supporting the affect-congruency effect was strongly modulated by basal testosterone levels. High testosterone resulted in reduced affect-congruency effects in the vlPFC, combined with increased coupling with the amygdala during the affect-incongruent trials. Participants with low basal testosterone showed the opposite pattern. These results illustrate how testosterone can modulate the balance between changes in local activity and inter-regional connectivity in cerebral circuits controlling social emotional behavior.

Poster Session H

H1

PARSING SMILES: THE DISTINCT NEURAL CORRELATES EVOKED BY EMBARRASSMENT AND DUCHENNE SMILES *Antonenko, Olga, University of California, Berkeley; Simon-Thomas, Emiliana, University of California, Berkeley; Keltner, Dacher, University of California, Berkeley* – Using functional magnetic resonance imaging (fMRI), the current study examined neural responses to viewing two different kinds of smiles: the classic Duchenne smile which involves activation of the orbicularis oculi muscles surrounding the eyes, and the more modest, submissive embarrassment smile, which involves classic appeasement behaviors like neck displays and gaze aversion. FMRI data were acquired from 12 healthy volunteers as they viewed blocked sequences of Duchenne and embarrassment smiles. While both smile conditions activated the left fusiform facial area (FFA) and visual centers, embarrassment smiles also engaged the posterior temporal cortex (PTC), posterior cingulate cortex (PCC), and medial prefrontal cortex (mPFC). In contrast, Duchenne smiles selectively engaged the right amygdala. Unlike the Duchenne smile, embarrassment smiles recruited areas associated with empathy, self-focused and social inferences. Activation of the PTC suggests that construing embarrassment smiles involves taking the smiler's thoughts and feelings into consideration, i.e. employing theory of mind (Saxe & Powell, 2006). PCC and mPFC activation suggests empathic and emotional inference processes (Decety & Jackson, 2004; Singer, 2006), lending credence to proposed social appeasement functions of embarrassment expressions (Keltner & Buswell, 1997). In summary, while Duchenne smiles simply prompt face perception and emotional salience signals, smiles that signal embarrassment, a more complex, status-related self-conscious emotion, require social appraisal, empathic and emotional inference processes.

H2

AMYGDALA VOLUME IN THE HEALTHY POPULATION AND REACTION TO EMOTIONAL FACES *Sarah Jane Banks, Montreal Neurological Institute and McGill University; Danielle Douglas, Concordia University; Marilyn Jones-Gotman, Montreal Neurological Institute and McGill University* – In various neurological and psychiatric disorders, deficits in emotion recognition are associated with abnormalities in amygdala volume. There is also considerable natural variation in amygdala volume in the healthy population. This study assessed the relationship between amygdala volume and emotion recognition ability, as well as skin conductance responses to emotional stimuli. Nine healthy participants with no history of neurologic or psychological disorders were recruited. Two tests were used involving faces expressing 5 basic emotions (happiness, sadness, fear, anger and disgust) or neutral expressions. The first test was designed to assess participants' implicit reaction to emotional faces: they were asked to choose which of two decades the individual in the photograph was closest to in age. The second was a test of explicit emotion recognition: participants were asked to pick between two emotion labels for each face. Throughout both tasks, bimanual recordings of skin conductance were made. Participants also underwent structural scans in a 3 Tesla magnet. Amygdalae were then manually segmented and volumes were measured. Results indicated that, despite a wide range of amygdala volumes in our sample, there was no relationship between amygdala volume and accuracy of emotion recognition. Similarly, amygdala volume did not predict the extent of skin response to different emotional expressions. The confirmation that normal variation in amygdala volume is not associated with reaction to, or ability to identify, emotional expressions is especially important for functional imaging studies, where structural differences are rarely taken into account when measuring changes in activation in the amygdalae.

H3

TO ERR IS NO BIG DEAL (WHEN YOU'RE DRUNK): ALCOHOL, NEGATIVE AFFECT REDUCTION, AND THE MEANING OF THE ERROR-RELATED NEGATIVITY (ERN) *D. Bartholow, University of Missouri, Columbia, MO; Erika A. Henry, University of Missouri, Columbia, MO; Sarah A. Lust, University of Missouri, Columbia, MO; J. Scott Saults, University of Missouri, Columbia, MO* – The current research tested two competing hypotheses concerning effects of alcohol on ERN amplitude, related to understanding cognitive and affective/motivational influences on this component. In a recent paper, Ridderinkhof et al. (2002, Science) reported that alcohol consumption decreased ERN amplitude and eliminated typical post-error adjustment in response time. Based on these findings, they concluded, "alcohol…compromises performance by attenuating the brain's capacity to detect action slips [errors]." While plausible, this conclusion ignores several key facts: (1) the neural generator of the ERN, the anterior cingulate cortex, is highly sensitive to distress; (2) error commission is aversive; and (3) alcohol is well known to reduce distress/anxiety. Here, participants were randomly assigned to consume alcohol, a placebo, or a control beverage prior to completing one of two cognitive control tasks (different experiments), both of which included "accuracy judgment" responses following each trial, while ERPs were recorded. Alcohol reduced ERN amplitude and impaired post-error adjustment behavior, but did not impair error detection. Rather, effects of alcohol on both the ERN and post-error adjustment were related to reductions in negative affect (indicated by self-report state affect measures) following alcohol relative to placebo consumption. Also, ERN amplitude was larger for placebo than for control subjects, suggesting potential motivational influences on placebo group performance. These findings have two main implications: (1) alcohol impairs error processing due to affective/motivational factors, not compromised error detection; and (2) theories of ERN

functionality must consider the key role played by affective and motivational factors.

H4

IS ECSTASY AN 'EMPATHOGEN'? MDMA INCREASES SOCIAL FEELINGS WHILE BLUNTING IDENTIFICATION OF NEGATIVE EMOTIONS IN OTHERS *Gillinder Bedi, Human Behavioral Pharmacology Laboratory, University of Chicago, Division on Substance Abuse, New York State Psychiatric Institute, and Department of Psychiatry, College of Physicians and Surgeons of Columbia University; Harriet de Wit, Human Behavioral Pharmacology Laboratory, University of Chicago* – The psychoactive drug MDMA (Â±3,4-methylenedioxy-methamphetamine, 'ecstasy') is believed to produce unusual effects, including increased empathy, sociability, and interpersonal closeness. These so-called 'empathogenic' effects appear to motivate recreational ecstasy use; they also underpin the rationale for use of MDMA as an adjunct to psychotherapy. Mechanisms and defining characteristics of these effects are poorly understood. In this study, we investigated effects of controlled MDMA administration on empathogenic feelings and emotional identification skills in humans. Over four sessions, healthy ecstasy-using volunteers (N=21) received MDMA (0.75mg/kg; 1.5mg/kg), methamphetamine (20mg; METH), and placebo (PBO) under double-blind, randomized conditions. Participants provided self-reports of empathogenic affective states. During peak drug effects, they underwent standardized tests of identification of emotions in others based on facial expressions and vocal cues. Both MDMA (1.5mg/kg) and METH increased self-reported sociability and playfulness, whereas only MDMA (1.5mg/kg) enhanced loving feelings and friendliness. MDMA (1.5mg/kg) decreased accuracy of recognizing fearful and sad facial expressions relative to PBO. MDMA (1.5mg/kg) also marginally reduced identification of vocal sadness compared to PBO and METH. Although MDMA increases empathogen-like subjective effects, it may reduce accurate identification of negative emotional signals in others. These socio-emotional cognitive effects appear consistent with enhanced sociability, but not with increased empathy, after MDMA. These findings, suggesting that MDMA directly alters socio-emotional cognition, have important implications for recreational and therapeutic MDMA use. Future investigations employing an integrative neuroscience approach could provide valuable insights into the role of socio-emotional processes in acute and longer-term effects of other psychoactive drugs. Supported by NIDA DA02812.

H5

RESTING RSA PREDICTS GREATER ENGAGEMENT OF SOCIAL COGNITIVE AREAS IN BOLD RESPONSE TO EMOTIONALLY HETEROGENEOUS SLIDES. *Elizabeth Castle, UC Berkeley; Emiliana Simon-Thomas, UC Berkeley; June Gruber, Yale University; Alex Kogan, Hong Kong University; Dacher Keltner, UC Berkeley* – The myelinated branch of the vagus nerve slows heart rate during expiration in a process theorized to foster calm behavioral states and spur social engagement (Porges, 2007). One measure of this effect is resting respiratory sinus arrhythmia (rRSA). Studies have shown associations between rRSA and increased emotion regulation (Fabes & Eisenberg, 1997), and heightened experience of pro-social states like compassion (Oveis et al., 2009). This study investigated the relationship between rRSA and neural correlates of emotional and social cognitive processes. To achieve this aim, subjects (n=10; 6 female) viewed blocks of slides designed to elicit several social and nonsocial states (pleasure, pride, compassion, and neutral) during fMRI scanning, and provided rRSA during a separate, non-fMRI resting condition. Regression analyses between individual rRSA values and neural responses to slides were performed. With respect to the pleasure slides, rRSA predicted bilateral TPJ which has been implicated in theory of mind, mirroring and perspective taking (Saxe & Powell, 2006), as well as nucleus accumbens, a classic reward response that indicates hedonic pleasure (Knutson & Cooper, 2005). In response to both the pride and neutral slides, rRSA predicted activation in the left temporal parietal junction (TPJ), and in the medial prefrontal cortex (mPFC), an area involved in inferring one's own, and others' mental states (Mitchell, Banaji, & Macrae, 2005). In the compassion condition, rRSA predicted activation both in the mPFC, and in the superior parietal cortex, which has been implicated in evaluating social distance (Yamakawa, Kanai, Matsumura, & Naito, 2009). These patterns of activation suggest that greater tonic influence of the myelinated vagus on heart rate, as indexed by rRSA, relates to more socially attuned responding.

H6

SADNESS PERCEPTION IN FACIAL AND NON FACE-LIKE STIMULI *Mariam Chammat, CNRS-UPMC USR 3246, CRICM, CHU Pitie-Salpetriere, Paris, France; Aurelie Foucher, CNRS-UPMC USR 3246, CRICM, CHU Pitie-Salpetriere, Paris, France; Jacqueline Nadel, CNRS-UPMC USR 3246, CRICM, CHU Pitie-Salpetriere, Paris, France; Stephanie Dubal, CNRS-UPMC USR 3246, CRICM, CHU Pitie-Salpetriere, Paris, France* – Human faces are the main emotion displayers. Knowing that emotional compared to neutral stimuli elicit enlarged ERP components at the perceptual level, one may wonder whether this has lead to an emotional facilitation bias toward human faces. To contribute to this question, we measured the P1 and N170 components of the ERPs elicited by human compared to robotic emotional stimuli. Electroencephalograms (EEGs) were acquired from 62 Electrodes from 15 healthy subjects during the presentation of sad and neutral pictures of human versus robotic heads. Inverted pictures were used as a control condition. Sad expressions were detected faster than neutral ones regardless of the media. This emotional facilitation coincided with an increase in P1 amplitude in response to emotional images compared to neutral images, supporting an early perceptual amplification for sadness information. P1 and N170 latencies were delayed and N170 amplitude was increased in response to human compared to robotic

stimuli. Inversion produced higher P1 amplitude and inverted human images only, led to delayed P1 and N170 latencies and increased N170 amplitude. As already found in a first experiment with robotic and human displays of joy, our results show that facilitation is not biased to human faces but rather extends to non-human displays, underscoring our capacity to read emotion beyond faces. Interesting inversion effects arise from our study posing further questions as to the relations between images and the semantics attributed to them. Keywords: ERP, P1, N170, Inversion, face and non face-like stimuli

H7

THE NEURAL SYSTEMS THAT RESPOND TO EMOTIONAL STIMULI WITH PHYLOGENETIC AND ONTOGENETIC SIGNIFICANCE *Joaquin de Rojas, Boston College; Elizabeth Kensinger, Boston College* – Neural and behavioral responses to emotional stimuli often are discussed within an evolutionary framework. Although some of the information that elicits an emotional response is likely to have had evolutionary significance (e.g., snakes, spiders), many other stimuli would not have been evolutionarily relevant (e.g., guns, grenades). The present study re-analyzed data from two fMRI studies (Kensinger et al., 2007; Kensinger & Schacter, 2008) to examine whether the neural systems that respond to emotional stimuli differ depending upon whether those stimuli were of phylogenetic or ontogenetic significance. The results revealed that when stimuli were ontogenetic, activity was increased in regions of the anterior cingulate and orbitofrontal cortices. By contrast, when stimuli were phylogenetic, activity was increased in a region spanning the lingual and fusiform gyri. These results suggest that there can be differences in how emotional stimuli are processed, and those differences can depend upon the stimuli's evolutionary significance.

H8

COGNITIVE EMOTION REGULATION IN MEDITATION PRACTITIONERS: AN EEG STUDY *Liselotte Gootjes, Erasmus Affective Neuroscience Lab, Institute for Psychology, Erasmus University Rotterdam; Ingmar H.A. Franken, Erasmus Affective Neuroscience Lab, Institute for Psychology, Erasmus University Rotterdam; Jan W. Van Strien, Erasmus Affective Neuroscience Lab, Institute for Psychology, Erasmus University Rotterdam* – The ability to successfully handle our emotions contributes greatly to mental and physical health and well-being. Cognitive reappraisal is one aspect of emotion regulation and involves the reinterpretation of an aversive event in such a way that it generates less negative emotions. Recently, there is a growing interest in the possible effects of meditation as an attentional and emotional regulatory strategy. Findings of beneficial effects of meditation and related practices like yoga and yogic breathing on attention and emotion, raises the question whether these techniques facilitate successful emotion regulation. In the present study, we examined the neurophysiological correlates of cognitive reappraisal of aversive pictures (IAPS) in meditation practitioners and controls. Interestingly, although participants in both groups reported reduced emotional experience to aversive visual stimuli after reappraisal, only the yogic meditation group showed neurophysiological signs of reduced negative emotions after reappraisal of the pictures. The magnitude of the late LPP, an affective-related ERP components over the parietal areas, was reduced after reappraisal of aversive pictures in the yogic meditation group, but not in the control group. This might be an indication of increased ability to regulate emotions in the meditation group compared to the controls.

H9

GENETIC CONTRIBUTIONS TO EXTINCTION RETENTION IN HUMANS *Catherine A. Hartley, Department of Psychology, New York University; Rabia Salman, Department of Psychology, New York University; Ashley Richman, Department of Psychology, New York University; BJ Casey, Sackler Institute for Developmental Psychobiology, Weill Medical College of Cornell University; Charles Glatt, Sackler Institute for Developmental Psychobiology, Weill Medical College of Cornell University; Elizabeth A. Phelps, Department of Psychology, Center For Neural Science, New York University* – The ability to adjust our emotional responses to changing circumstances is critical for our psychological well-being. Extinction is one way of modifying previously learned emotional associations. During fear conditioning, a neutral stimulus acquires emotional salience through pairing with an aversive reinforcer. During extinction, fear expression decreases as the conditioned stimulus is presented without reinforcement. The acquisition and retention of extinction learning over time is thought to confer resilience against anxiety-related clinical disorders. However, factors that give rise to individual differences in extinction retention are not well understood. Evidence from animal models suggests that the serotonin transporter gene may influence extinction retention. A recent study reported that mice lacking the serotonin transporter (5-HTT) gene exhibit impaired extinction retention (Wellman et al., 2007). Previous research has found that human carriers of the low-expressing short allele variant of the 5-HTT gene have reduced volume in and functional connectivity between the amygdala and vmPFC, regions believed to support extinction retention (Pezawas et al., 2005). In our study, we investigated whether carriers of the 5-HTT short allele exhibit reduced ability to retain extinction learning. We utilized a two-day aversive conditioning paradigm, probabilistically pairing visual stimuli with electric shock. Day one consisted of the acquisition and the initial extinction phase. Day two consisted of the extinction retention test phase, allowing us to determine whether participants retained extinction learning from the first day. Preliminary results revealed that participants carrying the short allele variant of the 5-HTT gene showed reduced extinction retention, suggesting that genetic variation may contribute to individual differences in the ability to successfully extinguish conditioned fear responses.

H10

HUMANIZING EXTREME OUTGROUPS: THE EFFICACY OF CBT TREATMENT FOR SOCIAL DISGUST *Claire Hoogendoorn, New York University, Psychology Department; Lasana Harris, New York University, Psychology Department; Ashley Shurick, New York University, Psychology Department; Amy Krain, New York University, Psychology Department, New York University, Center for Neural Science, New York University Medical School, Child and Adolescent Psychology; Elizabeth Phelps, New York University, Psychology Department, New York University, Center for Neural Science* – People and other causes including food, decay, and objects elicit disgust. However, it is unique because unlike other social emotions (e.g. pride, envy and pity), it is not restricted to people as the attitude-object. People feel social disgust toward traditionally dehumanized groups (Fiske, Cuddy, Glick, & Fiske, 2002) and show insula and amygdala activity (Harris & Fiske, 2006). Cognitive behavioral therapy (CBT) lowers disgust responses and decreases insula activity in phobia research involving fear and disgust inducing stimuli (Hunter & Anthony, 2009; Schienle, Shafer, Stark & Vaitl, 2009). Electromyography (EMG) data was collected from the levator labii of 14 participants while they viewed images eliciting social disgust or neutral emotions. The experimental group received CBT treatment (the control group did not) aimed at reducing their disgust response to the social disgust groups. Participants returned one week after noting initial thoughts and emotions (the control condition did the same but did not practice CBT technique) and again underwent EMG data collection. Results indicate a significant difference between individuals who received and applied CBT compared to the control. CBT may be more effective in reducing disgust for individuals with high trait disgust sensitivity compared to individuals with lower trait disgust sensitivity. We intend to explore neural differences between these two groups to discover pathways that regulate disgust.

H11

REDUCED COGNITIVE CONTROL SUPPORTS POSITIVITY BIASES IN SOCIAL EVALUATION *Brent L. Hughes, Department of Psychology, University of Texas at Austin; Jennifer S. Beer, Department of Psychology, University of Texas at Austin* – Evaluations of self and close others are characterized by bias; evaluations to be unrealistically positive compared to objective criteria. Previous neural investigations have mostly operationalized self-evaluation bias by comparing judgments of positive characteristics to judgments of negative characteristics. This research has concluded that biased evaluations are supported by ventral anterior cingulate cortex. However, valence and degree of bias need to be treated as independent factors because people bias their evaluations of both positive and negative information. When positivity motivations are activated, bias is reflected in people's tendency to overclaim positive attributes and to underclaim negative attributes. Additionally, no neural research has examined evaluation bias for other people. The current research examined the neural systems that differentiate valence and bias across social targets that vary in their elicitation of positivity motivation (self, close other, non-close other). Ventral anterior cingulate cortex differentiated the valence of traits and this effect was modulated by intimacy with the social target. However, ventral anterior cingulate did not predict bias. Instead, bias was characterized by reduced recruitment of regions associated with cognitive control (e.g., orbitofrontal cortex, dorsal anterior cingulate cortex) when compared to accuracy. These neural findings suggest a new neural model of social evaluation bias. Furthermore, researchers have debated whether cognitive control characterizes bias or accuracy in social evaluation. These findings suggest that accuracy is characterized by greater cognitive control over information processing whereas bias likely reflects the use of heuristics. Furthermore, the heuristic approach to social evaluations is likely increased by positivity motivation.

H12

SOCIAL WARMTH: AN FMRI INVESTIGATION OF FEELINGS OF SOCIAL CONNECTION *Tristen K. Inagaki, University of California, Los Angeles; Naomi I. Eisenberger, University of California, Los Angeles* – While social ties are important for well-being, the underlying mechanisms that make these connections beneficial are less understood. One aspect of close relationships that makes them particularly pleasing is the warm and tender feelings that stem from feeling connected, calm, and safe with another person, a feeling state we call "social warmth." These warm feelings are thought to result from an opioid-mediated consummatory state, in which the goal of social connection has been achieved and the individual is in a state of satisfaction or physiological quiescence (Depue & Morrone-Strupinksy, 2005). To date, the neural basis of this consummatory side of relationships has remained largely unexplored. In this study, romantically attached female participants viewed social warmth pictures (pictures of mothers caressing their babies) in an fMRI scanner as well as control images (pictures of mothers and babies eating, walking). After the scan, participants rated the extent to which the pictures made them feel social warmth ("loving," "connected"). Neuroimaging results revealed that greater feelings of social warmth were associated with increased activity in several regions of the anterior cingulate cortex, fitting with this region's role in opioid-related processes. Additionally, deactivations found in regions associated with regulatory and self-processing (lateral and medial prefrontal cortex) suggest a relief state induced by viewing the social warmth pictures. Taken together, these results suggest a mechanism by which social warmth is pleasing.

H13

SOCIAL MIRRORING: THE ROLE OF MIRROR NEURONS IN DECODING EMOTIONS FROM ACTIONS *Rajesh K. Kana Ph.D., University of Alabama Birmingham; Christopher C. Klein, M.A., University of Alabama; Brittany G.Travers, M.A., University of Alabama* –

Understanding the actions and emotions of others is critical in navigating the social world. The human brain seems to be endowed with structures (such as mirror neurons) that are active both during the first-and third-person experience of actions and emotions. The primary goal of this fMRI study is to examine the role of mirror neurons in action recognition in general, and decoding emotions from actions in particular. Fifteen healthy right-handed adults (mean age = 20.6 years; data collection ongoing) from the University of Alabama-Birmingham community participated in the fMRI study. Participants were presented with still images of stick figure characters depicting actions in a randomized blocked design format. In the physical condition, participants identified the physical action depicted by the stick figure (e.g. cartwheeling). In the emotion condition, participants identified the emotion or mood depicted by the stick figure (e.g. sad). fMRI data acquired on a Siemens 3.0T Allegra scanner at UAB was analyzed using SPM2. We found increased activation for emotion recognition when compared to physical action recognition in the bilateral inferior frontal gyri (a pivotal component of the mirror neuron system). In addition, several areas activated more in emotional condition: right superior temporal gyrus, left fusiform gyrus, and orbitofrontal cortex. Functional connectivity analysis revealed increased connectivity in the physical condition, mainly between the ventral temporal and parietal areas. The findings of this study indicate the specific role of mirror neurons in emotional aspects of action understanding, which has direct implications for core social functions like empathy.

H14

RESPONSE INHIBITION AND ERROR MONITORING DEFICITS ASSOCIATED WITH MARIJUANA USE *Jesse T. Kaye, University of Colorado – Boulder; Tiffany A. Ito, University of Colorado - Boulder* – Cognitive theories of drug addiction highlight trait deficits in executive functions, such as response inhibition, as a predisposition to problematic drug use; difficulties with response inhibition may impair ones ability to override pre-potent drug use behaviors that have become habitual and automatized, in favor of more adaptive goal-directed behaviors (i.e., abstinence; Tiffany, 1990). The current study investigated the relationship between marijuana use and executive function by recording ERPs during a go/no-go task. On correct trials, we examined the N2 component, which is thought to reflect response conflict associated with the need for inhibition. For trials on which participants made a behavioral response, we analyzed the ERN and P_e. Consistent with previous go/no-go studies, N2s were larger on correct no-go than go trials, likely reflecting greater conflict and need for control when inhibiting the prepotent go response. ERNs and P_es were larger following false alarms than hits, reflecting conflict detection and reactions to errors. Of greater interest, marijuana users displayed decreased no-go N2 effects, suggesting poorer response inhibition associated with heavy marijuana use. Additionally, more frequent marijuana use was associated with a smaller P_e after errors of commission, suggesting diminished evaluative reactivity following erroneous performance. Taken together, the results indicate that marijuana use is related to decrements in neural processes of both response inhibition and error monitoring.

H15

AGING AND EMOTION REGULATION: AN ERP STUDY *Sandra J. E. Langeslag, Erasmus University Rotterdam; Jan W. Van Strien, Erasmus University Rotterdam* – It has been suggested that emotion regulation improves across the life-span. Event-related potential (ERP) studies with younger adults have revealed that the amplitude of the Late Positive Potential (LPP), which is typically larger for emotional than neutral pictures, is reduced when participants are instructed to decrease feelings elicited by emotional pictures. In this study, we investigate age differences in emotion regulation by studying the LPP amplitude. We hypothesized that emotion regulation effects would be larger in older than younger adults. Younger (18-26 yrs) and older (60-77 yrs) participants completed an emotion regulation task while their EEG was recorded. First, participants were instructed to simply view neutral, unpleasant, and pleasant pictures. Then, they viewed either unpleasant or pleasant pictures and were instructed to either increase or decrease the elicited feelings. Between 700-1000 ms, the LPP was more positive for emotional than neutral pictures in the view condition, and for unpleasant compared to pleasant pictures in all instruction conditions. An instruction effect was present between 150-1000 ms, with the ERP being more positive in the increase than in the view and decrease conditions. The ERP in the view and decrease conditions in general did not differ. Thus, we show that, when presenting relatively low arousing pictures, LPP amplitude enhancement when increasing feelings can be observed. Most relevant, however, is that we did not observe any age differences in valence or instruction effects on the ERP. Thus, our data do not support the notion that emotion regulation changes with aging.

H16

AGE-RELATED DIFFERENCES IN THE NEURAL MECHANISMS OF SUCCESSFUL AND UNSUCCESSFUL EMOTION REGULATION *Christina M. Leclerc, Boston College; Elizabeth A. Kensinger, Boston College* – The ability to regulate emotion has many important implications in daily life. Recent research has begun to outline the neural mechanisms of the cognitive regulation of emotional stimuli in younger adults, however, less is known about the neural mechanisms of these processes in the older adult population. The current work used functional magnetic resonance imaging (fMRI) to investigate the neural systems associated with successful and unsuccessful attempts to cognitively reappraise emotional images. Participants were asked to up or down regulate their emotional reactions to positive and negative photographs, with ratings of self-reported arousal given both before and after reappraisal. Successful trials were defined as those

where compared to the pre-appraisal ratings, the post-appraisal ratings were higher when participants were asked to increase their emotional reaction, lower for trials when they were instructed to decrease their emotional reaction, and unchanged for trials when they were asked to simply view the images. Functional MRI results indicated differing patterns of neural activation as the two age groups successfully and unsuccessfully regulated their emotions. Older adults exhibited a clear pattern of increased prefrontal cortex activation for trials in which they successfully regulated their emotional reaction to the image, whereas younger adults did not show such a pattern. These results suggest that, in the context of a deliberative emotional reappraisal task, older adults recruit additional prefrontal cortex activation than younger adults in order to successfully complete the task.

H17

REGULATION WITHOUT INTENTION?: NEURAL CORRELATES OF INCIDENTAL REGULATION OF RESPONSES TO ATTRACTIVE OTHERS *Meghan L. Meyer, University of California, Los Angeles; Elliot T. Berkman, University of California, Los Angeles; Johan C. Karremans, Radboud University Nijmegen; Matthew D. Lieberman, University of California, Los Angeles* – Investigations into the neural systems involved in emotion regulation have predominantly examined deliberative and intentional strategies such as reappraisal. Behavioral research has identified other forms of emotion regulation that take place without intention and outside of awareness, but the neural mechanisms involved in these forms of regulation have remained unexamined. How might the brain systems involved in deliberative/intentional versus incidental/unintentional emotion regulation be similar or different? The present study addresses this question by examining one kind of unintentional regulation. Previous behavioral research has shown that romantically attached participants tend to derogate the attractiveness of opposite-sex others in a free response period but not when under cognitive load. Importantly, participants have no instruction to deliberately regulate their responses in this way and funneled debriefing suggests that they are unaware of doing so. We had romantically attached participants indicate whether they would consider each of a series of attractive and unattractive opposite-sex others as a hypothetical dating partner while undergoing fMRI scanning. This task was completed both without (and with) time pressure to allow participants to regulate their responses (or not). Behavioral results confirm the finding that attached participants consider attractive opposite-sex others as dating partners more frequently under time pressure than not. On trials when they successfully derogated attractive others (compared to when they did not), participants recruited several brain regions implicated in deliberative emotion regulation such as the ventral and dorsal lateral prefrontal cortices, and others that have been observed in other incidental processes such as the rostral ACC.

H18

NEURAL CORRELATES OF GUILT *Rajendra A. Morey, Duke Univeristy; Srishti Seth, Duke University; Gregory McCarthy, Yale Univeristy; Elizabeth S. Selgrade, Durham VA Medical Center; Jessica D. Nasser, Durham VA Medical Center; Kevin LaBar, Duke University* – Guilt plays an important factor in governing social behavior and promoting compliance with social norms. The experience of guilt depends on the self's role in the event causing guilt and the perceived negative consequences to others. We compared neural activation evoked by reading of neutral scenarios and guilt scenarios in which the participant's actions result in negative consequences to himself (GuiltSelf) or negative consequences to others (GuiltOther). Sixteen male subjects participated in this fMRI study, and provided subjective ratings of guilt feelings after reading each scenario. The GuiltOther condition led to greater subjective guilt than the GuiltSelf condition. The contrast for GuiltOther > GuiltSelf revealed differential activation of dorsomedial PFC, right posterior superior temporal sulcus (STS), precuneus, caudate, and left inferior PFC. The contribution of guilt, independent of perspective taking, was assessed by regressing guilt ratings with trials combined from GuiltOther, GuiltSelf, and Neutral conditions. This analysis revealed differential activation in the right posterior STS, precuneus, dorsomedial PFC, and caudate. These two analysis approaches, associated with guilt feelings and perspective-taking related to negative consequences, pointed to common regions of differential activity including the right posterior STS, dorsomedial PFC, caudate, precuneus, and left inferior prefrontal cortex. Our findings shed light on the network of regions involved in guilt and the perceived the role of self on negative consequences for self and others. This work will inform future clinical research studies in posttraumatic stress disorder and depression where guilt can be a prominent symptom.

H19

NEURAL SUBSTRATES OF AMBIGUITY RESOLUTION: INDIVIDUAL DIFFERENCES IN RESPONSE TO SURPRISED FACIAL EXPRESSIONS *Maital Neta, Dartmouth College; M. Justin Kim, Dartmouth College; Catherine J. Norris, Dartmouth College; Paul J. Whalen, Dartmouth College* – In previous research, we found that activity in the corrugator supercilii muscle region in response to surprised facial expressions reflected individual differences in positivity-negativity bias, rather than valence ratings on a given trial. Moreover, neuroimaging studies have shown that negative versus positive interpretations of surprised faces are correlated with distinct inverse reactivity patterns between the amygdala and a region of the ventral anterior cingulate cortex. This lends support to the notion that surprised faces are a useful tool for examining individual differences in positivity-negativity bias. Here, we sought to dissociate neural activity to a facial expression of ambiguous valence (i.e., surprise) when contrasted with expressions of clear valence at both ends of the valence continuum (e.g., happy, angry). We found greater activity in

dorsal anterior cingulate cortex as well as frontal operculum to surprise when compared to angry and happy faces, consistent with previous data showing that these regions play a role in conflict monitoring and ambiguity resolution, respectively. When we compared subjects who interpreted surprise positively vs. negatively, we observed activation in a region of ventrolateral prefrontal cortex in response to surprise vs. angry and happy faces. Responses in this region, previously implicated in regulatory processes, were functionally coupled with parahippocampal cortex and posterior cingulate in the presence of ambiguity (i.e., surprised faces).

H20

NEURAL CORRELATES OF REFLECTION ON GOALS: DISTINGUISHING DOMAIN-SPECIFIC FROM DOMAIN-GENERAL PROCESSES *Dominic Packer, Lehigh University; William Cunningham, The Ohio State University* – Effective self-regulation requires the ability to consider alternate goal states in order to adapt to shifting circumstances. Previous research on goal reflection has identified goal-type dissociations in brain regions broadly associated with self-projection. Importantly, however, there is a need to distinguish activation differences due to recruitment of distinct processes from activations that reflect common processes with varying levels of recruitment. The fact that different types of goals tend to covary naturally with time allowed us to vary the difficulty of goal reflection across content domains. Participants in an fMRI study thought about promotion or prevention goals at three time points. Goals that varied in terms of content, time-frame, valence, and abstractness but were difficult to construct (relative to other goals) activated an area of dorsal medial PFC, suggesting that this region may support general-purpose projective processes. In contrast, goals that were easy to construct activated a region of dorsolateral PFC involved in domaingeneral memory retrieval. Importantly, we also observed domain-specific effects of goal type and temporal distance; promotion goals were associated with heightened activity in medial PFC, short-term goals activated precuneus and anterior cingulate cortex, and longer-term goals activated frontal areas, including ventrolateral PFC and orbitofrontal cortex.

H21

THE ROLE OF THE HIPPOCAMPAL FORMATION IN SIMULATION -AN FMRI STUDY *Perry, D., Department of Psychology, University of Haifa; Hendler, T., Psychology Department and Faculty of Medicine, Tel-Aviv University; Shamay-Tsoory, S. G., Department of Psychology, University of Haifa* – It has been argued that the hippocampal formation is part of the simulation matrix. This matrix enables an analogical mapping between the observer and the protagonist's emotions, in order to draw inferences about others. The mapping process relies on self- referential thinking and autobiographical memory. In order to assess the role of the hippocampal formation in simulation processes we examined the behavioral and neuronal components that underlie the contribution of self-referential thinking to emotional judgment using fMRI. It was suggested that emotional judgments would involve a greater extent of simulation processes as the similarity between the observer and the protagonist grows. Prior to the scan, similarity between self and others was evaluated implicitly by the subjects via questionnaire. Afterward, subjects underwent fMRI scan while making emotional judgments for self, similar and dissimilar others. Results show a significant activation of the hippocampal formation during emotional judgments for self, especially for negative events. More interestingly, an interaction was found in the hippocampal formation for emotional judgments for others; the hippocampus was significantly more active during mentalization about negative events happening to similar as compared to dissimilar others. These results suggest that the hippocampal formation plays a vital role in emotional judgments of self and others. Specifically, it is part of the simulation matrix which mediates this process by means of self referential thinking and remembering. It is speculated that the perceived similarity between self and other and the emotional valence of the event mediate the participation of the hippocampus in mentalizing processes.

H22

INTEGRATION OF ANXIETY AND MEMORY IN ANTERIOR AND POSTERIOR HIPPOCAMPUS *Ajay B. Satpute, Columbia University; Bruce D. Naliboff, University of California, Los Angeles; Jeanette A. Mumford, University of California, Los Angeles; Russell A. Poldrack, University of California, Los Angeles* – Several recent reviews on the neurobiological bases of anxiety have implicated the hippocampus as a critical structure. Studies conducted primarily in rodents have suggested that the ventral (anterior in humans) hippocampus may be particularly implicated in anxiety, whereas the dorsal (posterior in humans) hippocampus is more specific to mnemonic functions. In addition, the anterior but not posterior hippocampus projects to the ventromedial prefrontal cortex, which is commonly involved in emotion regulation. In humans, fMRI studies have frequently implicated both anterior and posterior hippocampus in memory processes. Here we examine the relationship of anterior and posterior hippocampus while in a context of learning, and while under hi or low state anxiety. Participants engaged in a classification-learning task while under threat or no threat conditions. Anterior hippocampus was specifically related to self-reported anxiety and functionally related to VMPFC activity but only during conditions of threat. Posterior hippocampus was not. Intriguingly however, posterior hippocampus was related to trait anxiety. In combination with the existing literature on the role of memory in the hippocampus, the results suggest a processing differentiation between anterior and posterior hippocampus, as well as an integration of processes underlying the mnemonic and anxiety-related functions of the hippocampus.

H23

EMOTIONAL CONTENT DOES NOT MODULATE ACTIVITY IN THE SCENE PROCESSING REGIONS OF THE VENTRAL VISUAL STREAM *Damian A. Stanley, New York University; Ashley A. Shurick, New York University; Sonya Dougal, New York University; Elizabeth A. Phelps, New York University* – Previous fMRI studies have demonstrated that early visual cortex and face-processing regions in the ventral visual stream show greater activity for emotional than neutral faces (see Stanley et al., 2009 for review). Conversely, recent studies have found increased memory-related activation in scene-processing regions of the parahippocampal cortex for neutral versus emotional scenes (Dolcos et al., 2004; Sharot et al., 2004). To systematically investigate how emotion modulates activity in scene processing regions of the ventral visual cortex we developed and normed a set of emotional images with neutral counterparts that were matched for scene content. FMRI data was acquired using a blocked design while subjects (N=36) viewed neutral and emotional faces and scenes. In a separate run, subjects viewed faces, scenes, objects, and their phase-scrambled counterparts (e.g., Epstein & Kanwisher, 1998) allowing us to independently localize the parahippocampal place area (PPA) and fusiform face area (FFA). An ROI analysis revealed no difference in activity for neutral versus emotional scenes in the PPA, presumably because we equated the scene content of our picture set whereas previous studies did not. Activation in the left FFA was greater for emotional versus neutral scenes with a trend for emotional versus neutral faces. The amygdala response was greater for emotional than neutral scenes with no difference in activation for emotional versus neutral faces. These results suggest that emotion differentially modulates activity in the ventral visual stream, and these structures may be sensitive to domain specific aspects of the emotional content of the scenes.

H24

REMEMBERING NEGATIVE EVENTS INDUCE LEFTWARD DEVIATION IN A LINE BISECTION TASK *Corinne Tamagni, Department of Neurology, Unit of Neuropsychology, University Hospital Zurich, Switzerland; Simona Croce, University of Zurich, Switzerland; Veronique Wettstein, University of Zurich, Switzerland; Peter Brugger, Department of Neurology, Unit of Neuropsychology, University Hospital Zurich, Switzerland* – Previous studies suggest a relation between emotion and spatial attention. More specifically, personality traits like optimism or positive mood were found to be associated with a rightward orientation preference (Drake, 1992; Gasper, 2002). In this study, we investigated whether inducing positive or negative emotions while bisecting lines may have opposite effects on the direction of error. Participants (40 healthy right-handed adults) were required to mark the midpoint of each of 24 horizontal lines (line lengths 26 cm) with a sharp pencil held in the dominant right hand. While executing this task, each adult participant was asked to try to remember a positive or a negative autobiographical event. The number of leftward vs rightward deviation were recorded and an average deviation from the midline over all lines was obtained from each participant. ANOVA of the number of leftward vs rightward displacements with induced emotion (positive or negative) as the repeated measure revealed significantly more leftward displacement under negative emotion. Our results confirm previous findings of a leftward bias (so-called "pseudoneglect") in normal participants when bisecting horizontal lines (Jewell, 2000). Considering the number of leftward vs rightward deviations, participants showed significant more leftward shift remembering negative autobiographical events. The phenomenon of "pseudoneglect" is significantly enhanced by negative emotion.

H25

MOOD INDUCTION EFFECTS ON COGNITIVE RESOURCES IN BEHAVIORAL INHIBITION *Nicholas T. Van Dam, University at Albany, SUNY; Cheryl Seifert, University at Albany, SUNY; Mitch Earleywine, University at Albany, SUNY* – The role of mood in executive function is controversial, with positive and negative mood producing facilitative, impairing, or no effects in different cognitive paradigms. One important dimension of executive function is behavioral inhibition. Despite being a key construct of executive function, there is a paucity of research examining mood's impact on behavioral inhibition. In the current study, participants completed a stop signal task before and after a randomly assigned mood induction (a narrated powerpoint containing 12 Velten statements accompanied by mood-congruent music). Based on preliminary findings (n = 50 across 3 groups), only participants in the negative (sad) mood induction reported a significant change in mood. Prior to the mood induction, participants low in self-rated happiness required marginally more immediate inhibition signals to successfully inhibit responses than those high in self-rated happiness. Relative to the negative mood induction and neutral control, positive mood induction significantly decreased the cognitive processing time necessary to inhibit responses. These findings suggest emotional facilitation of available cognitive resources in behavioral inhibition, and have implications in terms of understanding interactions between emotional states, cognitive function and the capacity to inhibit unwanted behaviors.

H26

THE LIMITED RESOURCES OF MOTIVATIONAL PROCESSING *Lotte F. Van Dillen, Utrecht University; Belle Derks, Leiden University; Dirk Heslenfeld, VU University; Sander L. Koole, VU University* – Attention plays a crucial role in motivational processes. Most researchers agree that the more people direct their attention to motivationally salient cues, the more the stimulus input determines people's experiences and responses in that situation. The central question of this presentation is whether attention to motivationally salient cues is fixed, or whether contextual factors may alter attentional processing of motivational

salience. On the one hand, research proposes that motivationally salient cues are automatically derived from the environment. On the other hand recent studies suggest that cognitive load attenuates attention to information when this information bears no relevance for current task performance. fMRI, EEG, and behavioral findings will be presented that demonstrate how the selective processing of motivationally salient cues, such as emotional scenes, desirable food items, and attractive opposite-sex partners, may be contingent on the availability of cognitive resources. Results show that, in line with an automatic vigilance account, people selectively attend to motivationally salient cues, but only when concurrent task load is low. When cognitive load of a focal task is high, people no longer display such an attention bias. In addition, self-reported differences in attentional control, deprivation, and susceptibility to temptation seem to moderate participants' attention bias to motivationally salient cues, but only when ample cognitive resources are available. Together, these findings suggest that people automatically direct their attention to motivationally salient cues in their environment, but that this attention bias may be contingent on cognitive capacity.

H27

POSITIVE AFFECT AND EXECUTIVE CONTROL *Henk van Steenbergen, Leiden Institute for Brain and Cognition, Leiden University Institute for Psychological Research, The Netherlands; Guido P.H. Band, Leiden Institute for Brain and Cognition, Leiden University Institute for Psychological Research, The Netherlands; Bernhard Hommel, Leiden Institute for Brain and Cognition, Leiden University Institute for Psychological Research, The Netherlands* – Positive affect is known to influence performance in several cognitive tasks. We address the question how short- and long-term positive emotions influence performance in attention and cognitive control paradigms. We will discuss a series of experiments which provide strong indications that positive affect influences adaptive control in systematic ways. These findings are consistent with theories proposing that positive affect induces a more lenient and flexible processing style. Moreover, our data suggests that affect modulates activity in brain areas underlying conflict detection and adaptation. We propose that the mesolimbic dopamine system mediates this modulation.

H28

FACIAL FEAR ATTENUATES THE ERP OLD/NEW EFFECT *Jan W. Van Strien, EAN lab Rotterdam; Liselotte Gootjes, EAN lab Rotterdam; Sandra J.E. Langeslag, EAN lab Rotterdam; Ingmar H.A. Franken, EAN lab Rotterdam* – The ERP old/new effect typically comprises an earlier N400-related component and a late positive component (LPC), reflecting familiarity and recollection, respectively. Here we examined the influence of fearful vs. neutral facial expressions on these components. Twenty participants (mean age = 20.8 years) viewed 30 fearful and 30 neutral faces, with each face representing a different person. In a continuous recognition paradigm, each face was presented twice in a random fashion, and participants had to make 'old' vs. 'new' decisions. The behavioral data demonstrated an emotion-induced recognition bias reflecting the tendency to classify fearful faces as 'old' and neutral faces as 'new', irrespective of their true old or new status. For the N400 component we found that the second presentation of faces resulted in a more positive going waveform compared to the first presentation, as did the presentation of fearful faces compared to neutral faces. No N400 interaction of old/new and emotion was found. For the LPC however, this interaction was significant, with much larger old/new effects for neutral compared to fearful faces at central and parietal sites. The attenuation of the LPC old/new effect for fearful faces appeared to be a consequence of the much more positive LPC waveform for 'new' fearful than for 'new' neutral faces. The ERP results indicate that fearful facial expressions modulate recollection rather than familiarity.

H29

EXPENDING COGNITIVE EFFORT LEADS TO EMOTIONAL DYREGULATION *Dylan D. Wagner, Dartmouth College; Todd F. Heatherton, Dartmouth College* – Failure to appropriately regulate one's emotions is a hallmark of many clinical psychiatric disorders. Evidence from brain imaging research has focused on an amygdala prefrontal pathway involved in successful emotion regulation and is often impaired in mood disorders such as PTSD and depression. Findings from research on self-regulation have repeatedly demonstrated that engaging in effortful emotion regulation tasks impairs attempts at self-regulation in cognitive and social domains. In the present study, we tested whether engaging in effortful self-regulation in the cognitive domain would disrupt the prefrontal amygdala circuit, leading to dysregulation of amygdala response to negatively valenced stimuli. Participants viewed two blocks of valenced images during functional magnetic resonance imaging (fMRI). Task blocks were separated by a depletion task which required participants to engage in effortful attention control. Prior to the depletion task activity in the amygdala when viewing negatively valenced images was inversely correlated with a region of ventral PFC associated with emotion regulation. Cognitive depletion disrupted the prefrontal amygdala circuit leading to a positive response in both amygdala and PFC following depletion. These findings suggest that prefrontal regulation of amygdala response draws from a limited resource which can be depleted by acts of self-regulation.

H30

HOW EMOTIONAL AROUSAL LEADS TO SELECTIVE MEMORY IN AGING: FMRI EVIDENCE *Jill D. Waring, Department of Psychology, Boston College; Elizabeth A. Kensinger, Department of Psychology, Boston College, Athinoula A. Martinos Center for Biomedical Imaging* – Attention is often attracted by emotional stimuli, improving memory for those

details at the cost of memory for peripheral information. This effect is called an emotion-induced memory trade-off. In an event-related fMRI study, we showed young and older adults scenes containing highly arousing, less arousing, and neutral items placed upon neutral backgrounds. Analysis of the subsequently remembered items and backgrounds from scenes showed that both young and older adults demonstrate a trade-off for highly arousing and less arousing emotional scenes. Closer examination of the neural activity corresponding with the trade-off revealed a less coherent network of activation present in older adults than young adults. Whereas in young adults the trade-off for highly arousing scenes corresponded with a broad network of affective processing regions, as well as fronto-temporal areas associated with focused attention upon visual details, older adults instead showed activation in a more limited set of limbic and temporal lobe areas. Although these whole-brain analyses suggest that there are many age group differences in activation patterns associated with the trade-off effect, region-of-interest analyses revealed that several regions have similar activation patterns in young and older adults, including portions of the amygdala and temporal pole. These results indicate that although older adults have a generally less coherent network of brain regions associated with the trade-off effect than young adults, many of the same key regions implicated in the trade-off effect in young adults continue to be active in older adults.

H31

THE NEURAL TEMPORAL DYNAMICS OF THE INTENSITY OF EMOTIONAL EXPERIENCE *Christian E. Waugh, Stanford University; J. Paul Hamilton, Stanford University; Ian H. Gotlib, Stanford University* – In contrast to 'core' emotional processing, which is fast and involves the reflexive assessment of the valence and salience of emotional events, 'elaborative' emotional processing is slow and involves the reflective deliberation of the self-relevance and importance of an emotional event. We hypothesized that more intense emotional experiences would invoke the slow 'elaborative' assessment of the self-relevance of emotional events and, consequently, would be characterized by greater width of activation in brain regions along the cortical midline associated with self-relevant processing. Participants rated the intensity of their emotional responses to emotional and neutral pictures. We used inverse logit modeling to estimate separately the height, time-to-peak and width of the BOLD responses to the stimuli. Supporting our hypothesis, we found greater negative emotional intensity to be associated with greater width of activation in the rostral medial prefrontal cortex (rMPFC) and the posterior cingulate cortex. Importantly, the rMPFC did not also show differences in activation height, suggesting that its role is primarily to deliberate on, but not to generate, emotional experiences. These are the first data exploring the temporal dynamics of emotional processing; they suggest that assessing the intensity of an emotional event may be a slow elaborative process that is better captured by the duration than by the peak of neural activity.

H32

EMOTION REGULATION AND COGNITIVE CONTROL PRESERVE LEARNING UNDER STEREOTYPE THREAT *Ronald C. Whiteman, The City College of New York, CUNY; Catherine Good, Baruch College, CUNY; Carol Dweck, Stanford University; Jennifer A. Mangels, Baruch College, CUNY* – Research on stereotype threat (ST) reveals that women's math performance may suffer when tasks are presented as diagnostic and gender is made salient because worry about fulfilling the stereotype absorbs working memory resources. Less is known, however, about how these affective responses influence learning processes that could support remediation of performance errors. Here, we took advantage of the neuromonitoring afforded by ERPs to assess females' affective appraisal of negative performance feedback on a challenging math test and their engagement with tutorial opportunities that could support error correction on a later surprise retest. We divided our subjects into better and poorer learners based on a post-hoc median split of error correction to determine if different processes supported effective learning under ST and non-threat (NT) conditions. Overall, better learners exhibited reduced affective processing of negative feedback, as indexed by the Late Positive Potential (LPP), a waveform associated with attention to arousing stimuli. However, the LPP of better learners under ST was reduced further compared to better learners under NT, suggesting additional down-regulation of the affective response. During preparation to receive the math tutor, better learners exhibited posterior slow wave activity indicative of a reorienting of attention toward the learning opportunity. Under ST, this was coupled with greater anterior activity suggesting engagement was more effortful compared to NT. Taken together, these data suggest that when exposed to ST, down-regulating negative emotional responses to errors and up-regulating cognitive processing of learning opportunities may be even more critical for rebound from failure than under NT.

H33

HOW DO WE PERCEIVE THE PAIN OF IN-GROUP AND OUT-GROUP MEMBERS? IMPLICIT VS. EXPLICIT PROCESSING *Reem Yahya, Department of Social Psychology, University of Haifa, Israel; Ramzi Suleiman, Department of Social Psychology, University of Haifa, Israel; Simone S. Tsoory, Department of Social Psychology, University of Haifa, Israel; Jean Decety, Department of Neuropsychology, University of Haifa, Israel; Daniella Pery, Department of Social Psychology, University of Haifa, Israel* – Neuroimaging studies indicate that the perception of pain in others can be modulated by motivational factors and social relationships. Within the context of social categorisation, however, such modulation in perceived pain are still poorly understood, and explored. In the present preliminary study we examined how unconscious and conscious ethnic social

categorization of others affects the pain empathy. To meet this aim, we assessed perceived pain when Jewish and Arab participants viewed a series of pictures showing right hands and right feet in painful and non-painful situations. The pictures were associated with explicitly or subliminally primed typical names depicting ingroup, outgroup or control group. Results show incongruity between the implicit and explicit levels of processing, which indicates that pain perception is differently influenced when social factors are processed consciously as opposed to unconsciously. Pain ratings in the explicit priming provide support for the ingroup empathy hypothesis in which greater pain ratings were apparent when viewing ingroup pictures. In contrast, implicit priming data showed an interesting pattern in Jewish subjects where pictures of pain were rated higher for the outgroup members. This suggests that an inherent threat value of pain may have taken place in the processing of the pain from a potential threatening other, which leads to an unconscious automatic increase in anxiety, and hence higher ratings of pain. These findings are consistent with the notion that pain processing relies on two dissociable dimensions: the inherent threat value and an empathic prosocial concern. Finally, overall ratings of pain were significantly greater in the eyes of Arab subjects beyond ethnic differences and priming conditions. This study may shed light on cultural differences in the perception and processing of pain.

H34

EFFECTS OF DIFFERENT REGULATION STRATEGIES FOR PICTURE-INDUCED NEGATIVE EMOTION ON EYE-MOVEMENT PATTERN AND PSYCHOPHSIOLOGICAL RESPONSES *Nai-Shing Yen, Department of Psychology, National Chengchi University; Chun-Yu Chen, Department of Psychology, National Chengchi University; Cheng-Ching Han, Department of Psychology, National Chengchi University; Chang-Hao Kao, Department of Psychology, National Chengchi University; Kuan-Hua Chen, Department of Psychology, National Chengchi University* – The aim of current study is to investigate the effects of different strategies of emotion regulation on eye-movement pattern and psychophysiological responses. Subject's emotion was elicited by presenting negative pictures from IAPS. Four emotion regulation strategies were manipulated by presenting different instructions (distraction, distance, reinterpretation, and viewing). In "distraction", "distance," and "reinterpretation" condition, subjects were instructed to reduce the negative emotion by being absent-minded toward the presenting pictures, pretending themselves as scholars who were viewing the pictures for research purpose, or reinterpreting the negative pictures, respectively. Eye-movement pattern, EKG, SCR and self-rated valence and arousal of the emotion after regulation were collected. On self-rated valence, the effects of emotion regulation were shown in all three emotion regulation strategies. That is, subjects reported more negative emotion in viewing condition than those in the emotion regulation conditions. On self-reported arousal level, the effect of emotion regulation only showed in "reinterpretation" condition. The same effect showed on EKG data. The heart-rate significantly decreased in "reinterpretation" condition during 2.5 to 3.5 sec post stimuli while comparing with that in the viewing condition. For eye movement pattern, subjects spent more time on the emotion areas in "distance" and "reinterpretation" condition, but less in "distraction" condition, comparing with the "viewing" condition. In summary, the EKG data support the emotion regulation effect on self-rating arousal level. On the other hand, eye-movement data showed different pattern across the emotion regulation strategies.

H35

SO CLOSE AND SO MUCH INVESTED: GOAL PROXIMITY AND SUNK EFFORT ESCALATE FRUSTRATION *Rongjun Yu, MRC-Cognition and Brain Sciences Unit, Cambridge, UK; Dean Mobbs, MRC-Cognition and Brain Sciences Unit, Cambridge, UK; Ben Seymour, Wellcome Trust Centre for Neuroimaging, University College London, UK; James Rowe, MRC-Cognition and Brain Sciences Unit, Cambridge, UK; Andrew J Calder, MRC-Cognition and Brain Sciences Unit, Cambridge, UK* – Frustration aggression theory states that frustration, elicited by the unfulfilled appetitive motivation to attain a reward or goal, is an antecedent to aggression. It has been hypothesized that the amount of frustration is a function of the strength of the desire to obtain the goal. Previous studies suggest that motivation increases with increasing proximity to the goal, the 'goal gradience effect,' and with the amount of prior expenditure in resources or effort, known as the 'sunk cost effect'. Given the hypothesized link between motivation and frustration, we theorized that the closer one is to a goal, and the larger the effort expended on the goal, the stronger the motivation to reach it, and subsequently the stronger the frustration after goal blockage. We designed a functional magnetic resonance imaging (fMRI) experiment to assess how reward proximity and expended effort affect the motivation to obtain the reward and the frustration when the reward is blocked. As hypothesized, the self reported motivation to obtain the reward and the frustration after reward blockage were enhanced with increasing reward proximity and effort. Our preliminary fMRI results show that increasing motivation was associated with the activation in ventral striatum and caudate. As the reward blockage occurred closer to the final goal, brain activity in amygdala increased while activity in vmPFC decreased. Failure to inhibit the aversive emotion induced by unmet desire may underlie the frustration-evoked aggression.

H36

PRIOR SOCIAL INTERACTIONS MODULATE TRUST DECISIONS AND REWARD LEARNING IN THE STRIATUM *D.S. Fareri, Psychology Department, Rutgers University; M.A. Niznikiewicz, Psychology Department, Rutgers University; M.R. Delgado, Psychology Department, Rutgers University* – Previous research suggests that social expectations formed from explicit instruction (reading a bio)

influence neural mechanisms of reward learning. It is unknown, however, if expectations acquired by experience will also affect reward mechanisms. The goal of this experiment is to investigate how experience shapes social expectations and influences the neural circuitry of reward-related learning. Participants played computerized ball tossing games with three fictional characters, whose personalities were manipulated to be 'good' (always throwing to participant, and not a control character), 'bad' (never throwing to participant, but solely to the control), or 'neutral' (throwing equally to participant and the control). In a subsequent economic trust game, participants could keep or share (e.g., exhibiting trust) a given amount of money with each character; sharing afforded potential reciprocation (reward) or defection (punishment) of trust by the character. Unbeknownst to participants, all characters reinforce at the same rate (50%). Initial results indicate participants were biased by their acquired social expectations, exhibiting higher sharing rates with the good compared to the bad character, and were slow to update their decisions based on immediate positive or negative feedback. Preliminary neuroimaging analysis suggests greater sensitivity to positive and negative outcomes in the striatum during trust exchanges with the neutral character (no biases existed) in contrast to when social expectations were present (e.g., good character). Further analysis will probe how expectations acquired via social interactions modulate both decision and outcome phases of the trust game.

H37

FUNCTIONAL CONNECTIVITY DURING THE REWARD PROCESSING: THETA COHERENCE IN A GAMBLING TASK *Chella Kamarajan, SUNY Downstate Medical Center; David Chorlian, SUNY Downstate Medical Center; Madhavi Rangaswamy, SUNY Downstate Medical Center; Ashwini K. Pandey, SUNY Downstate Medical Center; Roopesh B. Nagaraj, SUNY Downstate Medical Center; Ramotse Saunders, SUNY Downstate Medical Center; Niklas Manz, SUNY Downstate Medical Center; Bernice Porjesz, SUNY Downstate Medical Center* – The outcome related negativity (ORN), an event-related potential (ERP) component around 200-250 ms, has been suggested to be an electrophysiological brain signature for the processing of loss and gain. This component has been suggested to involve theta band oscillations as a primary feature. The aim of the current study is to examine the nature of functional connectivity across brain regions during the processing of monetary loss and gain. The sample consisted of 38 healthy individuals with the age range of 18-35 years. A 64-channel EEG was recorded continuously while the subjects were performing a gambling task that prompted the subject to select one of two amounts, 10 and 50. Four possible outcomes (+50, +10, -50, -10) were analyzed using a Wavelet coherence method for the theta band from electrodes within the frontal, central, temporal and parietal regions. Coherence values were plotted and compared across all four outcomes. The preliminary results tend to confirm the view that loss- and gain-related processing may be mediated by separate and distinct cortical circuits.

H38

REGULATORY FOCUS MODULATES REWARD-RELATED NEURAL ACTIVITY IN ANTERIOR ORBITOFRONTAL CORTEX *Samantha M. Mowrer, The Ohio State University; Andrew A. Jahn, The Ohio State University; William A. Cunningham, The Ohio State University* – Reward and motivation are inherently intertwined. Although motivation is often reward-based, specific motivational states can also impact valuation and reward seeking. Thus, motivation may serve as an organizing principle, dynamically shaping the perception, interpretation, and experience of rewards in the service of goal-directed activity. Using fMRI, the current study examined how regulatory focus, a motivational principle strongly coupled with reward, impacted neural reward processing. Participants were randomly assigned to promotion or prevention focus and then completed a reaction time task in which they could experience successful and unsuccessful outcomes of stimuli representing potential gains and losses. Results showed regulatory focus modulated activation in a region of anterior but not posterior orbitofrontal cortex (OFC). Whereas posterior OFC responded to potentially rewarding stimuli, anterior OFC was sensitive to rewarding outcomes and regulatory focus. Specifically, promotion focus enhanced responsivity to successful outcomes in this region. Results are consistent with hypotheses suggesting posterior OFC generates computations of stimulus value, while more anterior regions integrate contextual and motivational information to provide a more nuanced valuation signal. The observed data may be due to promotion focus generally enhancing neural sensitivity to rewards or due to regulatory fit. That is, the current task may have induced regulatory fit for promotion but not prevention, thus resulting in increased reward responsivity of OFC only for promotion focus. Overall, these effects suggest motivation impacts reward processing in important ways, potentially directing subsequent processing in a top-down manner and giving rise to distinct behavioral outputs and subjective experiences.

H39

TRACKING THE MECHANISMS OF AVOIDANCE AND APPROACH LEARNING IN THE HUMAN BRAIN *M. A. Niznikiewicz, Psychology Department, Rutgers University; M. R. Delgado, Psychology Department, Rutgers University* – The human striatum has been previously implicated in the processing of positive reinforcement, but less is known about its role in processing negative reinforcement. In this experiment, participants learn specific approach or avoid responses, mediated by positive and negative reinforcers respectively, to investigate how both reinforcers are processed in the human striatum. The experimental task was divided into two discrete blocks, where participants could either earn monetary rewards (Approach Block) or

avoid monetary punishments (Avoid Block) based on successful learning. Specifically, a conditioned cue predicted the chance to win or avoid losing money contingent on a correct button press (Pre-learning trials), which upon learning led to the delivery of rewards or termination of punishments (post-learning trials). Thus, this design varied type of reinforcement between blocks (positive vs. negative reinforcers) and time of learning (pre and post learning). Skin conductance responses (SCRs) and subjective ratings confirm a learning effect (i.e., greater SCRs pre vs. post learning) and valence of reinforcement (greater rating for stimuli that predicted positive vs. negative outcomes). Preliminary neuroimaging results indicate the striatum is involved in actively learning through reinforcement, regardless of its valence, with greater responses during pre compared to post trials. However, greater BOLD signals were observed during Avoid compared to Approach blocks, highlighting the potential influence of negative reinforcers on motivated behavior and reinforcement learning circuitry in humans.

H40

LOW SELF-ESTEEM BIASES NEURAL RESPONSES TO EVALUATIVE SOCIAL FEEDBACK *Leah H. Somerville, Weill Cornell Medical College, Dartmouth College; Todd F. Heatherton, Dartmouth College; William M. Kelley, Dartmouth College* – Self-esteem is a facet of personality that influences our perception of social standing and modulates the salience of social acceptance and rejection cues. In this experiment, we sought to test whether self-esteem may act as a mediator of neural responsivity to positive and negative evaluative social feedback. Participants (n=42) engaged in a social evaluation task whereby they received ostensible social feedback from peers during fMRI scanning. Self-esteem modulated behavioral responses to the task such that high self-esteem individuals significantly overestimated the percent of positive feedback they received. Brain imaging analyses demonstrated that individuals with low self-esteem showed enhanced differential activity in the ventral anterior cingulate/medial prefrontal cortex to positive relative to negative social feedback. Follow-up voxelwise analyses revealed that individuals with lower self-esteem also recruited a greater spatial extent of activation within the medial prefrontal cortex while coding the valence of social feedback. These findings suggest an enhancement in neural representation of affective properties of social feedback in low self-esteem individuals, consistent with the tendency for low self-esteem individuals to engage in enhanced monitoring of environmental signals of social inclusion and exclusion.

H41

INDIVIDUAL DIFFERENCES IN SENSITIVITY TO REWARD ARE ASSOCIATED WITH ELECTROPHYSIOLOGICAL RESPONSES TO MONETARY GAINS AND LOSSES *Ivo van den Berg, Erasmus University Rotterdam, Institute of Psychology; Ingmar Franken, Erasmus University Rotterdam, Institute of Psychology; Peter Muris, Erasmus University Rotterdam, Institute of Psychology* – Reward, such as monetary gain, and punishment, such as monetary loss, are capable of modifying the electrophysiological signals of the brain. Further, it is known that there are individual differences in the sensitivity for reward and punishment. This study set out to test the relationship between self-reported sensitivity to reward and sensitivity to punishment and electrophysiological brain responses to monetary gains and losses. Subjects filled out the modified BIS/BAS scales for measuring responsiveness to reward (RR) and responsiveness to punishment (RP), and performed a gambling task. The results showed that there was a significant positive correlation between scores on the RR scale and levels of brain activity in the early (200-300 ms) interval in response to large reward trials, but also in response to large punishment trials. There was no significant correlation however, between scores on the RP scale and the ERP components on punishment trials. Thus individuals scoring high on RR seem to be generally more sensitive initially to outcomes (either positive or negative) during a task where they might receive a reward. Keywords: modified BIS/BAS scales, responsiveness to reward and punishment, monetary gambling task, ERP

H42

THE NEURAL SUBSTRATE OF THE SUBJECTIVE EXPERIENCE OF ANXIETY *Barry H. Cohen, New York University* – More than eighty years ago, Cannon (1927) posited that the most defining aspects of the subjective experience of the various emotions arise directly from neural activity in the thalamus that projects to, and produces activation in, the neocortex. In more recent times, the neural origins of the most basic emotions have been identified principally with subcortical structures other than the thalamus. However, there is one form of emotional experience for which parts of the thalamus seem uniquely suited to generate, and that is the subjective experience of anxiety. Specifically, the organization of the midline and intralaminar nuclei of the thalamus and their projections to areas in the prefrontal cortex conform well to the neural substrate that could be expected to underlie the subjective aspects of anxiety. In this poster, I describe key elements of the phenomenology of anxiety, distinguishing this feeling state from related experiences, such as fear. Then, I summarize the current state of knowledge concerning the functional neuroanatomy and neurophysiology of the midline thalamic nuclei with special attention paid to the mediodorsal nucleus of the thalamus and its projection to the orbitofrontal cortex. I argue that the highest levels of the Ascending Reticular Activating System contain exactly the structure and functional capacities that are needed to account for both normal and pathological levels of subjective anxiety, as well as for the physiological, behavioral, and cognitive consequences often associated with episodes of anxiety.

H43

AN FMRI STUDY ON ATTENTIONAL BIAS IN INDIVIDUALS AT RISK FOR DEVELOPING DEPRESSION *Katarina Dedovic, Department of Neurology and Neurosurgery, Douglas Mental Health University Institute, Montreal, QC, Canada; Annie Duchesne, Department of Neurology and Neurosurgery, Douglas Mental Health University Institute, Montreal, QC, Canada; Sonja Damika Lue, Department of Psychiatry, Douglas Mental Health University Institute, Montreal, QC, Canada; Julie Andrews, Department of Neurology and Neurosurgery, Douglas Mental Health University Institute, Montreal, QC, Canada; Simona Efanov, Department of Neurology and Neurosurgery, Douglas Mental Health University Institute, Montreal, QC, Canada; Veronika Engert, Department of Psychiatry, Douglas Mental Health University Institute, Montreal, QC, Canada; Thomas Beaudry, Department of Neurology and Neurosurgery, Douglas Mental Health University Institute, Montreal, QC, Canada; Ashley Ortega, Department of Psychology, McGill University, Montreal, QC, Canada; Jens C. Pruessner, Department of Neurology and Neurosurgery, Douglas Mental Health University Institute, Montreal, QC, Canada* – Depressed individuals display a maladaptive attentional bias. Depressed individuals exhibit hypoactivity in the prefrontal cortex (PFC). These phenomena may be linked to vulnerability for developing depression. However, no studies have investigated neural correlates of attentional bias in a population at high risk for developing depression, but which has not yet reached clinical levels. Sixty four (33M:34F) healthy university students were recruited. Based on the scores on Beck Depression Inventory (BDI), the subjects were assigned to either a control group (BDI<10) or a subclinically depressed group (9<BDI<19). The participants underwent three functional runs during which they completed the classical dot-probe task adapted for neuroimaging environment employing happy, sad and neutral faces. Analysis (groupXgenderXbias) revealed a biasXgroup interaction (F=4.04, p=.051), with the subclinical group bias for happy faces being greater compared to controls (F=4.23,p=.046). Contrasting happy-neutral within the subclinical group revealed unique clusters in bilateral putamen and dorsal ACC. Within controls, we observed increased activation in the left inferior frontal gyrus(IFG), and decreased activity in subgenual ACC and DMPFC. Within controls, sad-neutral contrast revealed activation in the right IFG, and DLPFC. Direct comparison between the two groups did not reveal any significant differences. All contrasts were thresholded for clusters t>Â±3.27, p=0.05 corrected. Bias toward happy faces in subclinical individuals may represent a cognitive strategy to elude clinical depression. This cognitive approach may be subserved by the activity in the basal ganglia and dACC. The involvement of IFG in empathy may be crucial for understanding the bias pattern observed in the control group.

H44

EMOTIONAL PROCESSING MODULATION BY SHORT-TERM ANTIDEPRESSANTS IN SUBJECTS WITH HIGH NEUROTICISM *Martina Di Simplicio, Neuroscience Department, Psychiatry Section, University of Siena, Siena, Italy and University Department of Psychiatry, Warneford Hospital, Oxford, UK; Catherine Harmer, University Department of Psychiatry, Warneford Hospital, Oxford, UK* – Recent studies have identified neural circuits underlying the biases in emotional processing in high neuroticism. To further investigate this, we have looked at the effects of antidepressant administration on neural responses to facial expressions and self-referential words. Methods: Forty never-depressed highly neurotic subjects were randomized to 20 mg/day citalopram versus placebo for 7 days, in a double-blind, between-groups design. On the last day functional MRI data were acquired with an event-related design, while subjects performed a gender discrimination task on fearful and happy facial expressions and a categorization task with self-referential positive and negative words. Results: First, citalopram increased the activation to fearful versus happy faces of high intensity in cortical and limbic areas including PFC and amygdala. Citalopram also increased the response to happy versus fearful faces of medium intensity in posterior cortical areas including precuneus and fusiform gyrus. Moreover, on a region of interest analysis over a parietal area previously correlated to neuroticism scores, subjects on citalopram presented decreased activation during categorization of self-referential negative words compared to placebo (all contrasts p<.050). Conclusions: Emotional processing in high neurotic subjects can be modulated by antidepressant administration. However, the neural responses to negative and positive stimuli after antidepressant manipulation appear to be different in a sample with vulnerable personality compared to previous studies on healthy volunteers. Further analysis are needed to verify whether these results represent in fact neural abnormalities that contribute to the development of psychopathology and that can be reverted by treatment.

H45

THE DAT1 GENOTYPE IN EXECUTIVE DYSFUNCTION IN ALEXITHYMIA *Nancy S. Koven, Bates College; Leah H. Carr, Bates College* – Alexithymia is marked by difficulty identifying and describing emotions. Although not a unique clinical syndrome per se, alexithymia has been implicated in numerous medical and psychiatric conditions. Previous neuropsychological studies indicate frontal lobe impairment in alexithymia, which suggests corresponding weaknesses in executive functioning. However, little is known about the genetic contributions to the cognitive components of emotion disregulation in this population. Given that the mesocortical pathway is responsible for innervating the frontal lobe via dopaminergic neurons, the present study sought to examine the relationship between dopamine-related gene expression, executive functioning, and levels of alexithymia traits. In this study, an unselected sample of community participants completed a self-report survey of alexithymia (Trait Meta Mood Scale), a broadband measure of executive functioning (BRIEF-A), and standard

venipuncture in order to assess the 40 base-pair variable number of tandem repeat (VNTR) polymorphism of the dopamine transporter gene (DAT1). Analysis of variance indicated that participants with the 9/10 genotype (n=47) demonstrated weaker skills in cognitive flexibility and error recognition and reported diminished clarity of emotion relative to participants with the 9/9 genotype (n=66). Results suggest a significant role of DAT expression within the mesocortical dopaminergic pathway in aspects of cognitive and emotional functioning.

H46

PERCEPTUAL ENHANCEMENT OF AFFECTIVE PICTURE PROCESSING IN ANHEDONIA *Gwladys Rey, CNRS USR 3246, CHU Pitie Salpitriere, Paris, France; Laurent Lamalle, INSERM IFR1, Unite IRM 3T, CHU Michallon, Grenoble, France; Alexandre Krainik, INSERM U836, Grenoble Institut des Neuroscience, CHU Michallon, Grenoble, France; Kenneth Knoblauch, INSERM U846, Stem cell and brain research institute, Bron, France; Roland Jouvent; CNRS USR 3246, CHU Pitie Salpitriere, Paris, France; Philippe Fossati, CNRS USR 3246, CHU Pitie Salpitriere, Paris, France; Stephanie Dubal, CNRS USR 3246, CHU Pitie Salpitriere, Paris, France* – Affective stimuli enhanced activation in several regions of the visual cortex. This perceptive amplification for emotional information is related to the facilitated detection of the emotional information. We used functional magnetic resonance imaging (fMRI) to explore the effect of anhedonia i.e. the loss of the capacity to experience pleasure, on the processing of emotional information. Moreover, we manipulated the visual contrast of the stimuli to explore the effect of this stimulus characteristic on the processing of emotional pictures. Ten control subjects and 10 non-clinical anhedonic subjects were presented with positive and neutral pictures at 20% and 100% of contrast in a 3T Bruker scanner. The event-related design included two randomized sequences of 120 stimuli and 30 null events presented for 1.5 sec and followed by a fixation point of 2 sec. Subjects judged the pleasant character of the pictures on a 4-point rating scale. Anhedonics rated positive pictures less pleasant than controls. Anhedonic subjects displayed a more widespread pattern of visual cortical activation than controls, especially for positives pictures. Anhedonics also showed greater activity in an attentional network involving frontal lateral and dorsal cingulate anterior cortices, and lower activity in cortical midline regions including the cortex prefrontal medial, posterior cingulate, precuneus, and the pregenual anterior cingulate cortex. The enhanced perceptual amplification for emotional information in anhedonia may be linked to an increase of attentional processing. In addition, reduced activity of the default network suggests that anhedonia is associated with deficits in emotional appraisal and self-referencial processing.

H47

ASSOCIATION BETWEEN SCHIZOTYPY AND REDUCTION OF THE AUDITORY P200 EVENT-RELATED POTENTIAL (ERP) COMPONENT *Celeste Silveira, Fernando R. Santos, Joana B. Vieira, Pedro R. Almeida, Fernando Barbosa, João Marques-Teixeira, University of Porto.* – Schizotypal personalities are characterized by a pervasive pattern of social and interpersonal deficits with reduced capacity for close relationships, eccentricities of behavior and depressed mood, among other core or associated features (DSM-IV-Tr). The P200 component elicited in auditory oddball has been studied in patients with schizophrenia, but such reports are scarce and their results are conflicting. Schizotypy may be particularly useful in exploring biological correlates of an underlying schizophrenic predisposition, given that these subjects share traits with patients with schizophrenia, although in a less severe form, and are usually free from sources of interference in ERP measures (e.g., medication, hospitalization). Twenty-nine subjects (age M=45.64; SD=14.64; 17 male) were assessed with the reduced version of the O-LIFE schizotypy scales and performed an auditory oddball task while ERPs were recorded at 19 sites. Potentials were averaged for frequent stimuli and P200 peak amplitude and peak latency measures were obtained. Subjects were divided in two groups according to their overall schizotypy score (median cut, with the unassigned case being randomly included in the high-schizotypy group). Analysis of midline electrodes revealed significant rank differences for P200 peak amplitude at Cz. The low-schizotypy group (Mdn=3.30) showed reduced P200 amplitude when compared with the high-schizotypy group (Mdn=4.83), U=60.0, p=.05, r=-0.36. No other significant differences were found. The present findings are in-line with previous reports regarding reduced P200 amplitude to frequent stimuli in schizophrenia, suggesting that the study of schizotypy is important, not only in itself, but also to further the understanding of the electrophysiology of schizophrenia.

H48

COGNITIVE STYLE PATTERNS IN INDIVIDUALS AT HIGH FAMILIAL RISK FOR DEPRESSION *Jamie L. Skipper, Mount Sinai School of Medicine; William R. Taboas, Mount Sinai School of Medicine; Dennis S. Charney, Mount Sinai School of Medicine; Adriana Feder, Mount Sinai School of Medicine* – BACKGROUND: The hopelessness theory of depression posits that an internal, stable, and global attributional style for negative life events represents a pre-morbid cognitive style that contributes to the onset of major depressive disorder (MDD). METHODS: Male and female volunteers with no personal history of any Axis I disorders, aged 18 to 35 years, were stratified into two groups based on their family history of MDD. High-risk (HR) volunteers (n =16) had at least one first-degree relative with early-onset, recurrent MDD. Low-risk (LR) volunteers (n = 16) had a negative family history of any Axis I disorders in first-degree relatives. Participants were administered a modified version of the Cognitive Style Questionnaire (CSQ). Mean scores for each attributional style dimension were compared in HR and LR groups using t-tests. Correlation coefficients were calculated to determine the relationships between

these dimensions within each risk group. RESULTS: There were no significant between-group differences in mean internality, globality, and stability scores for positive or negative life situations. For negative life situations, however, while there were significant moderate correlations between the globality and stability dimensions within both risk groups, only the HR group showed significant moderate positive correlations between the internality and globality dimensions ($r = 0.59$, $p = 0.02$), and between the internality and stability dimensions ($r = 0.54$, $p = 0.04$). CONCLUSIONS: This particular combination of attributional tendencies observed only in the HR group supports the hopelessness theory of depression and may represent a trait marker of risk for depression.

H49

PERCEIVED SOCIAL SUPPORT AND RISK FOR MAJOR DEPRESSION *William R. Taboas, Mount Sinai School of Medicine; Jamie Skipper, Mount Sinai School of Medicine; Dennis S. Charney, Mount Sinai School of Medicine; Adriana Feder, Mount Sinai School of Medicine* – BACKGROUND: The relationship between major depressive disorder (MDD) and lower perceived social support has been well established, yet little is known about perceived support in healthy, never-depressed individuals at high familial risk for major depression. METHODS: Male and female volunteers with no personal history of any Axis I disorders, aged 18 to 35 years, were stratified into two groups based on their family history of MDD. High-risk (HR) volunteers (n =16) had at least one first-degree relative with early-onset, recurrent MDD. Low-risk (LR) volunteers (n = 18) had a negative family history of any Axis I disorders in first-degree relatives. Participants were administered three subscales of the Interpersonal Support Evaluation List (ISEL), measuring tangible support, appraisal, and belonging, and the Social Network Index (SNI), measuring participation in social relationships. Mean scores for each scale and subscale in the HR and LR groups were compared using t- tests. RESULTS: Mean total ISEL (HR =31.3, LR = 33.8, $p = 0.04$) and mean belonging support subscale (HR = 10.32, LR = 11.33, $p = 0.045$) scores were significantly lower in the HR group than in the LR group. There were no significant between-group differences in mean tangible and appraisal support subscales, or in mean SNI scores. CONCLUSIONS: These findings suggest that lower perceived social support (in particular about the presence of others with whom to identify and socialize) but not lower actual participation in social relationships might be a risk factor for the development of MDD.

Index of Posters

Alphabetical by Corresponding Author: