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TITLE: The Neurological Basis and Potential Modification of  
Emotional Intelligence through Affective/Behavioral Training

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| 13. SUPPLEMENTARY NOTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                          |                                  |                                                           |                                            |
| 14. ABSTRACT<br>Enter a brief (approximately 200 words) unclassified summary of the most significant finding during the research period.<br>Emotional intelligence (EI) is the ability to accurately perceive, understand, and use emotional information toward adaptive functioning. The goal of the present study is to use functional magnetic resonance imaging to define the neural circuitry underlying EI in order to establish a foundation for the development of programs to train or enhance this capacity in military personnel. During the first year of this study, all necessary administrative and logistical procedures have been completed, recruitment has been initiated, and 13 (22% of expected sample) participants have completed fMRI and EI testing. Preliminary data analyses support our initial hypothesis that higher EI is associated with greater neural efficiency of affective processing regions (i.e., less activation in the amygdala, insula, medial prefrontal cortex), and greater acuity of responses within these regions to biologically/socially relevant stimuli (e.g., facial trustworthiness; facial displays of anger) presented subliminally. Furthermore, the responsiveness of these regions to subliminal stimulation correlates positively with accuracy on conscious affect discrimination/decision tasks. These preliminary findings suggest that EI is a measurable capacity with an identifiable pattern of neural circuitry. Once mapped, this neurocircuitry will provide the basis for designing studies to develop and enhance EI capacities among military personnel. |                  |                          |                                  |                                                           |                                            |
| 15. SUBJECT TERMS<br>Emotional Intelligence (EI), functional Magnetic Resonance Imaging (fMRI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                          |                                  |                                                           |                                            |
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## INTRODUCTION:

Over the past century, great strides have been made in methods to protect and sustain Soldiers, particularly within the realms of physical training, body armor, and medical stabilization technologies. Comparatively little progress has been made, however, with regard to methods protect Soldiers from the mental and emotional strains of combat. Soldiers without the requisite coping and emotional control skills may be less likely to succeed in combat, may be prone to errors in judgment, and may have less resilience against the traumatic stresses they encounter. Just as a Soldier with inadequate training, poor physical conditioning, and insufficient body armor is at great risk of battlefield injury, so too a Soldier with poorly developed emotional capacities and fragile coping abilities is at increased risk for psychological wounds including depression, post-traumatic stress disorder, and even suicide. Renewed efforts to promote and develop emotional and mental resilience among warriors have led to the recent implementation of psychologically based initiatives such as the U.S. Army's Battlemind and Comprehensive Soldier Fitness programs. While these programs represent an important move to protect the mental health of Soldiers, they have been limited by the dearth of knowledge regarding the underlying neurobiology that contributes to the emotional capacities that allow a Soldier to cope effectively and remain resilient in the face of extreme and difficult challenges. The ability to use emotions and emotional information to function adaptively across a variety of situations is known as Emotional Intelligence (EI) (1). Just as standard cognitive intelligence provides the foundation for successful learning, problem solving, and adaptation to a variety of occupational, educational, and intellectual settings, it is likely that EI capacities provide the foundation for successful coping and resilience across a variety of emotionally challenging situations (2, 3), including those encountered during military operations. In order to effectively identify these capacities and promote their enhancement among Soldiers through targeted training programs, it will be necessary to understand the brain-behavior links that serve as the foundation of EI. At present, there is almost no information regarding the underlying brain systems involved in EI (4). To provide a foundation for training and developing EI capacities among Soldiers, the present study aims to use functional neuroimaging to map the neurocircuitry associated with normal variations in this capacity. During the funding period, 60 normal healthy participants ranging in age from 18 to 45 will complete a comprehensive neurocognitive assessment battery that includes two widely accepted measures of EI, assessment of standard cognitive intelligence (IQ), measures of coping, personality and resilience, as well as a host of emotional perception, decision-making, and problem solving tasks. These participants will also undergo structural and functional magnetic resonance imaging (3 Tesla) while engaged in several affective probe tasks designed to engage specific aspects of the neurocircuitry hypothesized to contribute to EI. Major goals of the study include: 1) identification of the neurocircuitry that is parametrically related to variability in EI scores, 2) evaluation of how EI brain systems differ from those of standard cognitive intelligence, 3) determination of whether the two commercially available tests of EI are measuring similar or different hypothetical constructs, and 4) determination of which test of EI is most predictive of brain activation within the hypothesized neurocircuitry and actual performance on emotional tasks.

## **BODY:**

### **Accomplishments According to Statement of Work (SOW)**

The study is progressing as planned. Consistent with the Statement of Work for YEAR 1 the following tasks have been accomplished:

**SOW 1. The study protocol will be submitted to the McLean Hospital IRB for approval to use human subjects in research.**

#### **Accomplishments:**

- **Quarter #1:** The research protocol was written and submitted to the McLean Hospital IRB. This proposal was approved by the local IRB on December 7, 2009. The protocol was then submitted to the USAMRMC for Human Use approval on December 9, 2009.
- **Quarter #2:** After submission to the USAMRMC, further revision was required. Changes were submitted to both the USAMRMC and McLean IRB. The Partner's/McLean Hospital IRB and the USAMRMC approved the study protocol for the use of human subjects as of March 25, 2010.
- **Quarter #3:** The list of study tasks were finalized and approved by the McLean IRB on May 5, 2010.

**SOW 2. The PI will purchase or acquire the EI assessment instruments (i.e., Bar-On EQi; MSCEIT-2; SREIT; NEO-PI-R; PAI; EHT; PEAT; PEDT; IGT; WASI). These instruments will be used to assess the emotional intelligence, cognitive intelligence, and affective decision-making capacities of participants. These data will be used as correlates with neuroimaging findings.**

#### **Accomplishments:**

- **Quarter #1:** Initial purchases of testing materials were initiated and the WASI intelligence test was ordered.
- **Quarter #2:** Study materials were procured or developed, including:
  - a. **Commercially Available Tests:** The following commercially available tests were purchased and received: Wechsler Abbreviated Scale of Intelligence (WASI), Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; computerized administrations, score sheets, test booklets, scoring reports), Bar-On Emotional Quotient Inventory (EQi; computerized administrations, score sheets, test booklets, scoring reports; NEO-PI-R Personality Test and Software System; PAI Personality Test and Software System; PAI Professional Manual).
  - b. **Self-Report/Paper-and-Pencil Tests/Scales:** The following instruments were obtained or developed: including the Self-Report

Emotional Intelligence Test (SREIS), the Positive and Negative Affect Schedule (PANAS), Barratt Impulsivity Scale-11 (BIS-11), Connor-Davidson Resilience Scale (CD-RISC), Invincibility Belief Index (IBI), Evaluation of Risks Scale (EVAR), Design Organization Test (DOT), Anxiety Sensitivity Index (ASI), Morningness-Eveningness Questionnaire (MEQ), Courtauld Emotional Control Scale (CECS), Army Global Assessment Tool (GAT).

- c. **Standard Operating Procedures (SOPs):** Additionally, comprehensive and detailed SOPs outlining administration procedures for all study-related tasks and administration procedures were developed, printed, and mounted into study binders for use during data collection.

**3. The PI will acquire, develop, or program the computerized stimulation paradigms for use during functional neuroimaging (i.e., MJT; BMAT; EFAT). These paradigms will be used to probe for Blood Oxygen Level Dependent (BOLD) activation during affective processing.**

**Accomplishments:**

- **Quarter #1:** Initial programming began on the computerized functional MRI stimulation paradigms using e-prime software.
- **Quarter #2:** Programming of all computerized functional MRI stimulation paradigms and assessment tasks using e-prime software was completed. Computer stimulation paradigms were also given several “dry run” tests in the scanner environment to ensure that they could be presented and seen by subjects in the scanner. MRI scanning time-slots were reserved on the calendar for the remainder of the year.
- **Quarter #3:** The MRI Scan protocol was programmed into the 3T MRI scanner. Two development pilot studies were conducted successfully to ensure that all tasks were operational and that data can be successfully collected during the study.

**4. The PI will hire and train one research assistant (RA) to administer all tasks and carry out study specific procedures.**

**Accomplishments:**

- **Quarter #1:** Advertisements for the research assistant (RA) position were created, approved by the hospital and posted. Over 80 applications were reviewed. After interviews, two candidates were selected and both were hired at 50% effort on the current study as of 01 OCT 2009. Both RA's underwent hospital orientation and safety training as required by hospital policies. Extensive training on laboratory procedures, CPR training, ethics and HIPAA training, materials purchasing, regulatory requirements, subject screening, psychiatric

interviewing, database creation, MRI data acquisition, data processing, and data analysis was accomplished.

- **Quarter #2:** The two research assistants were trained on administration and scoring of the WASI by a trained and licensed neuropsychologist and licensed speech-language pathologist. The research assistants also initiated intensive training on administration and scoring of all other assessments and computerized tasks used in the study.
- **Quarter #3:** RAs completed training on the administration of all study tasks.

**5. Recruitment advertisements will be placed in local newspapers and flyers will be placed at local colleges and universities.**

**Accomplishments:**

- **Quarter #3:** Advertisements were posted and subject recruitment began.
- **Quarter #4:** Advertisements continued to be posted as needed to ensure adequate recruitment.

**6. Upon human subjects approval, data collection is expected to commence during the 3<sup>rd</sup> Quarter of Year 1.**

**Accomplishments:**

- **Quarter #3:** Data collection began during the 3<sup>rd</sup> Quarter. The first subject was screened and run at the beginning of the 3<sup>rd</sup> quarter on 28 April 2010. By the end of the 3<sup>rd</sup> quarter, 6 subjects had been enrolled and completed the study (i.e., data collection was 10% complete).

**7. Databases will be constructed and data will be entered as subjects are completed.**

**Accomplishments:**

- **Quarter #4:** EI and IQ data have been scored for all participants run to date. Excel databases for several of the assessments have been constructed, and subject data for the current subjects have been entered into these databases. Raw fMRI data for all subjects run to date has been archived on CD and copied to our computer systems. Furthermore, fMRI data for all subjects run to date have been pre-processed in SPM5, including spatial preprocessing steps of realigning functional data to remove subject motion artifacts, unwarping and coregistration to their matched anatomical MRI scans, normalization to the anatomical template of the Montreal Neurological Institute (MNI), spatial smoothing using an isotropic Gaussian filter of 6 mm full width at half maximum [FWHM]. Furthermore, first level general linear models for each task and condition of interest have been created in SPM5 and applied to the data for all subjects acquired to date.

## 8. Approximately 15-20 (25-33%) subjects will be run by year-end.

### Accomplishments:

- **Year #1:** 15 subjects have been enrolled in the study. Complete functional MRI scans have been acquired on 13 subjects (1 subject was deemed ineligible after enrollment; 1 subject was enrolled but could not be run due to scanner malfunction).

### Preliminary Research Findings

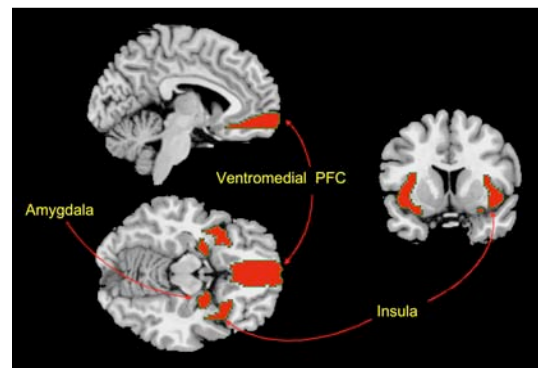
In addition to the accomplishments relating to the SOW, we have also conducted a number of preliminary analyses ahead of schedule. These preliminary analyses have resulted in 8 scientific abstracts being written and submitted for presentation at the 39<sup>th</sup> Annual Meeting of the International Neuropsychological Society in Boston, MA, February 2-5, 2011. The submitted abstracts are attached as an Appendix. Below is a summary of these preliminary findings:

#### **Preliminary Analysis 1:** Emotional Intelligence Correlates with Non-Conscious Insular Responses to Facial Trustworthiness

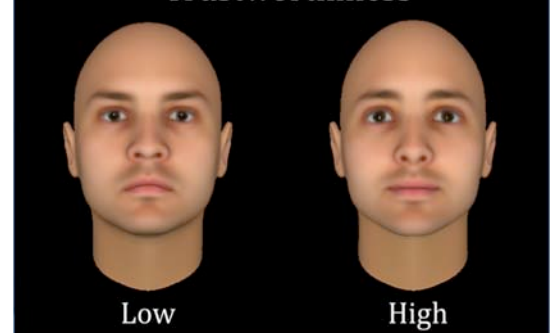
Emotional intelligence (EI) is the ability to accurately perceive, understand, and use emotional information to guide decision-making. The neural basis of EI is not well delineated but it has been proposed to involve the Damasio somatic marker circuitry (medial prefrontal cortex [MPFC], insula, and amygdala). We hypothesized that activation within this circuitry during subliminal presentations of facial cues of trustworthiness would be correlated with EI.

Twelve healthy adults (6 male; 6 female) ranging from 19 to 45 years of age completed the Bar-On Emotional Quotient Inventory (EQi) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). During fMRI, participants viewed masked presentations of faces previously rated high (H) or low (L) in trustworthiness. These faces were presented during fMRI in a blocked paradigm. Conscious awareness of the trustworthiness of each face was effectively prevented via a procedure known as backward stimulus masking. This technique involves rapid presentation of the target (H or L) face (20 msec) followed by a neutral expression mask (80 msec). Contrast images comparing H vs L conditions were constructed in SPM5 and

Emotional Intelligence Somatic Marker Circuitry



Trustworthiness



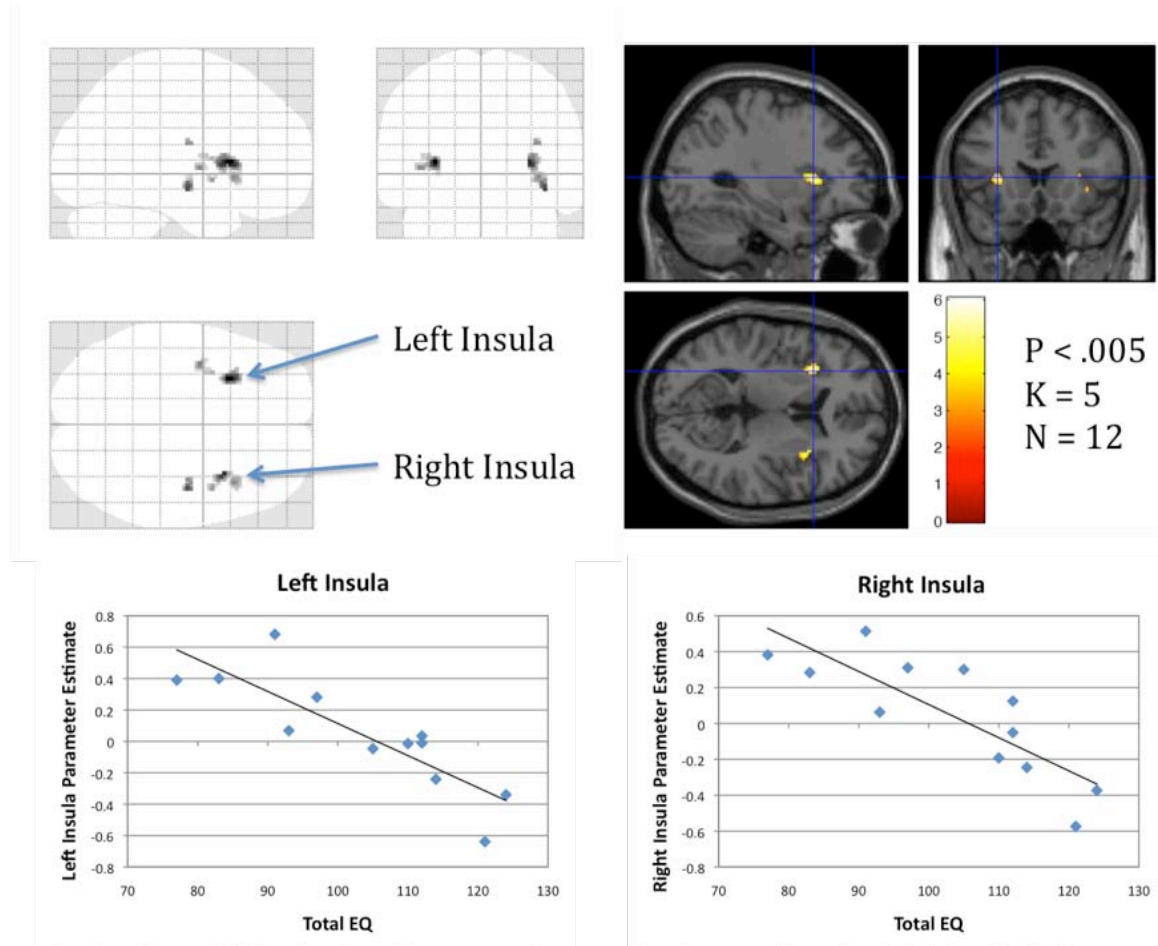
Example faces used in the Masked Trustworthiness Task



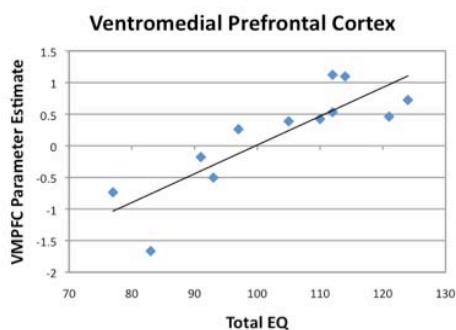
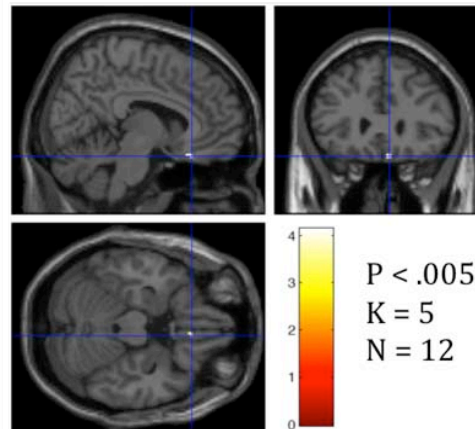
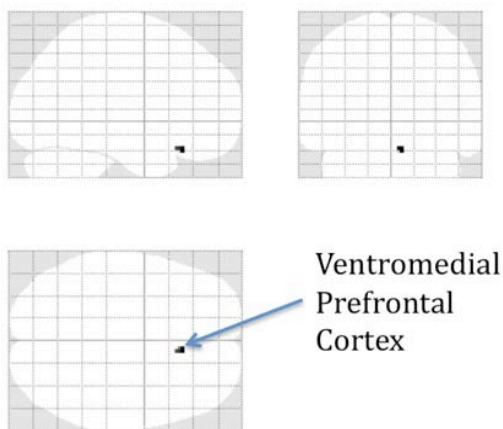
entered into second level regression analyses with EQi and MSCEIT as predictor variables. Three bilateral search territories comprising the somatic marker circuitry were interrogated ( $p < .005$ ,  $k \geq 5$ ), including MPFC, insula, and amygdala.

Higher EQi scores were associated with reduced activation of the anterior insula and increased ventromedial prefrontal cortex responses to greater trustworthiness in faces. EQi was unrelated to amygdala responses. Higher MSCEIT was similarly associated with reduced left middle insula and dorsal anterior cingulate gyrus responses to high facial trustworthiness. Amygdala responses were unrelated to MSCEIT.

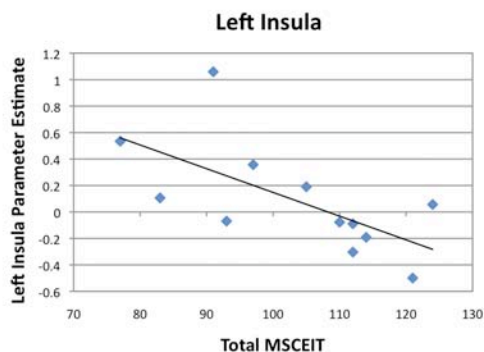
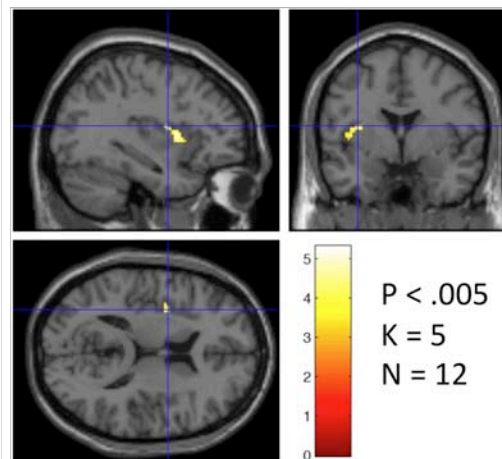
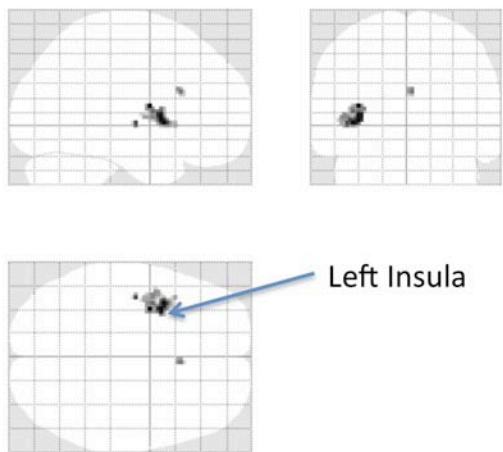
During subliminal perception of low facial trustworthiness, EI was associated with increased responsiveness of insular cortex, a region of the somatic marker circuitry posited to be critical for social emotions and interoceptive processing (i.e., “gut feelings”). Individuals with higher EI may be more interoceptively responsive to socially relevant stimuli.



Activation within the insular cortex is negatively correlated with Total EQ Scores During High > Low Trustworthiness



Activation within the ventromedial prefrontal cortex is positively correlated with Total EQ Scores During High > Low Trustworthiness



Activation within the left insular cortex is negatively correlated with Total MSCEIT Scores During High > Low Trustworthiness

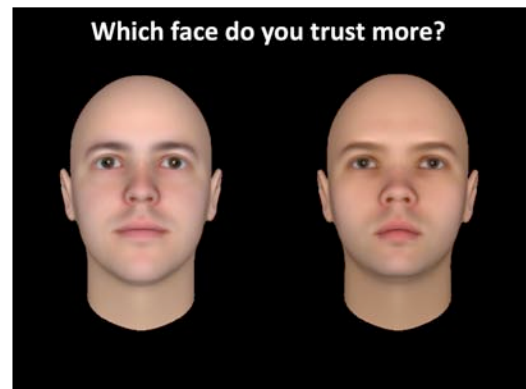
## Preliminary Analysis 2: Neural Correlates of Subliminal Perception of Facial Trustworthiness

Judging the trustworthiness of others is critical to survival and is likely to be a key feature of EI. Prior research suggests that overt perception of untrustworthiness in facial features activates the amygdala, but no study has yet examined how perceptual brain responses relate to behavioral discrimination of facial trustworthiness. We hypothesized that greater accuracy in discriminating trustworthiness would be related to activation of the amygdala and medial prefrontal cortex during subliminal presentation of trustworthiness cues.

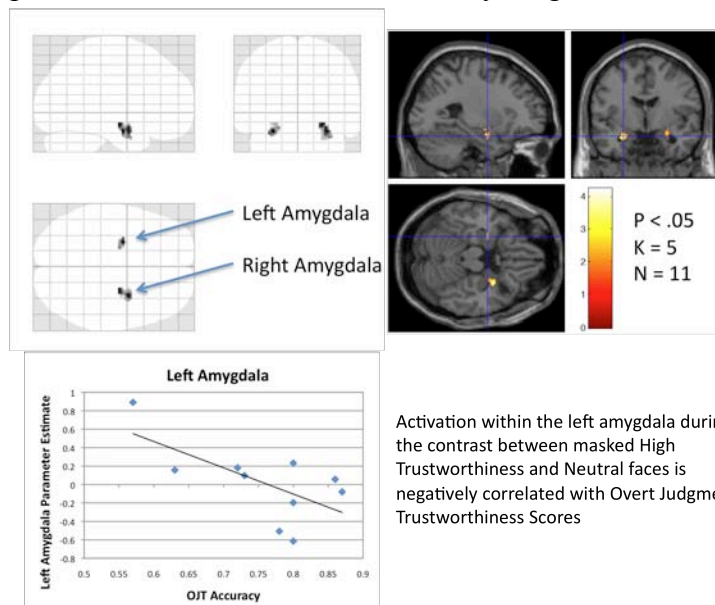
Eleven healthy adults (6 male) ranging from 19 to 45 years of age underwent fMRI while viewing masked presentations of faces classified as either high (H) or low (L) in facial trustworthiness. Conscious awareness of trustworthiness information was prevented via backward stimulus masking that involved rapid presentation of the target face (20 msec) followed by a neutral expression (N) mask (80 msec). Following the scanning session, participants then made overt trustworthiness judgments (OTJ) for 100 pairs of similar faces previously rated on trustworthiness. Performance on the OTJ task provided an assessment of the ability to consciously make

correct judgments about facial trustworthiness. During data analysis, contrast images comparing H and L fMRI conditions with N were entered into a regression analyses with OTJ accuracy as the independent variable. Whole brain analyses were evaluated at  $p < .001$ ,  $k \geq 20$  voxels within SPM5. An amygdala search territory was demarcated using an anatomical mask and interrogated at  $p < .05$ ,  $k \geq 5$  voxels. OTJ accuracy ranged from 57% to 87%. During H > N

contrasts, greater accuracy on the OTJ task correlated with increased activation within the right superior medial frontal gyrus. During L > N, OTJ accuracy correlated with increased activation within right superior frontal, middle frontal, medial orbitofrontal gyri, and left middle frontal gyrus. Greater accuracy was correlated with increased amygdala responses to facial untrustworthiness (see figure at right). Accuracy in discriminating



Example of the Overt Judgment of Trustworthiness Test (OJT)



Activation within the left amygdala during the contrast between masked High Trustworthiness and Neutral faces is negatively correlated with Overt Judgment of Trustworthiness Scores

overt facial trustworthiness is related to the responsiveness of the medial prefrontal cortex and bilateral amygdala during subliminal presentations of facial features communicating trustworthiness information. Results support the hypothesized role of these regions in social evaluation.

### **Preliminary Analysis 3: Neural Correlates of Cognitive and Emotional Intelligence in Adults**

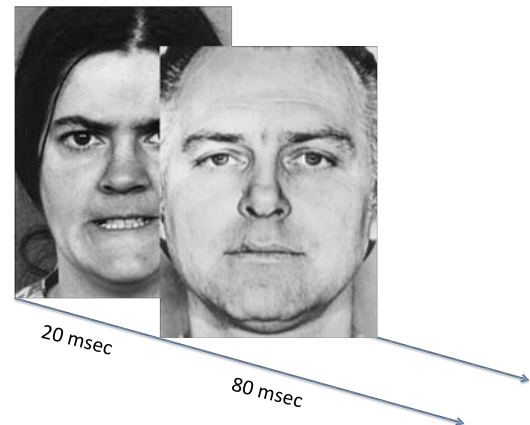
The ability to accurately perceive, understand, and manage emotional information is known as Emotional Intelligence (EI), a construct that is claimed to be distinct from traditional cognitive intelligence (IQ). Construct validity would be bolstered by evidence of neural processing of EI that is distinct from that of IQ during emotion processing tasks. We hypothesized that EI, but not IQ, would correlate negatively with neural responses in emotion processing regions of the amygdala, insula, and ventromedial prefrontal cortex (VMPFC), consistent with greater neural efficiency in higher ability individuals.

Twelve healthy adults ranging in age from 19 to 45 (6 male) underwent functional magnetic resonance imaging (fMRI) while viewing a masked angry-face perception paradigm that minimizes conscious perception of the affective stimulus. Two assessments of EI, the BarOn Emotional Quotient Inventory (EQ-i) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), as well as the Wechsler Abbreviated Scale of Intelligence (WASI), a measure of Full Scale intelligence (FSIQ), were administered. EQ-i, MSCEIT and FSIQ scores were correlated

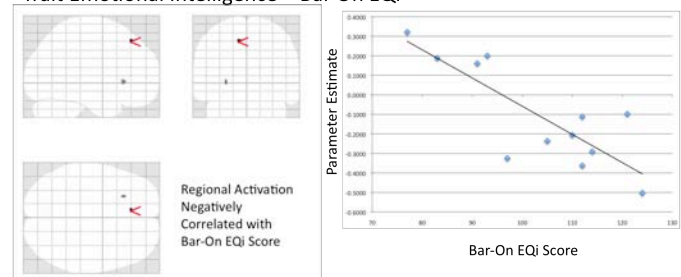
voxel-wise with emotion circuitry activation during the masked anger > neutral contrast using SPM5 ( $p < .005$ ,  $k \geq 5$ ).

Higher EQ-i was associated with reduced left insula and MPFC activation. Similarly, higher MSCEIT was associated with reduced bilateral insula and MPFC activation. Interestingly, higher WASI scores were similarly correlated with reduced bilateral insula and MPFC regions. Amygdala activation was not correlated with EI or IQ. Findings support the neural efficiency hypothesis (i.e., higher EI individuals recruit less neural resources to deal with emotional information), but also suggest that the

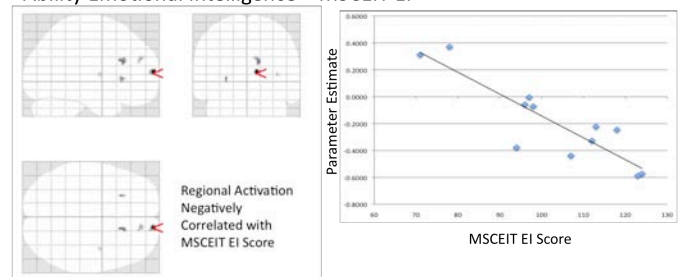
Masked Anger Task



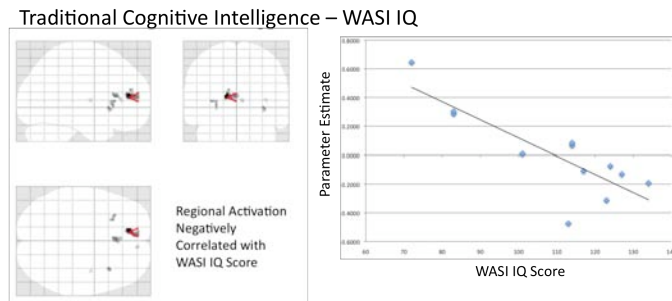
Trait Emotional Intelligence – Bar On EQi



Ability Emotional Intelligence – MSCEIT EI



neural activation patterns were highly similar to that seen for IQ. Findings suggest that the constructs of EI and IQ may share considerable variance and may not be as distinct as suggested by current theoretical conceptualizations.



#### **Preliminary Analysis 4:** Discrepancy Scores Between Standardized Measures of Cognitive and Emotional Intelligence Predict Neural Responses to Affective Stimuli

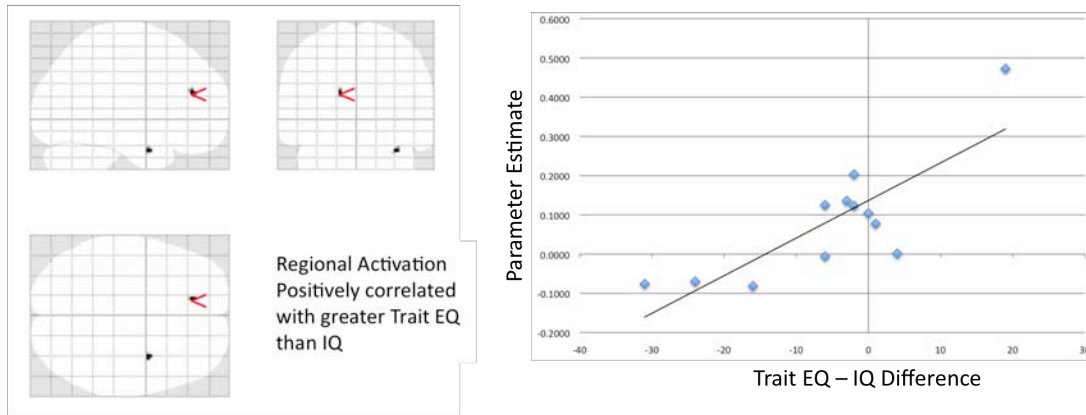
Emotional intelligence (EI) is the ability to perceive, understand, and manage emotional information. As a construct, EI is posited to be independent of cognitive intelligence (IQ). Although EI and IQ are modestly correlated, most individuals show some discrepancy between their EI and IQ scores, and it seems likely that the magnitude and direction of this discrepancy may provide information regarding an individual's emotional processing capabilities relative to their cognitive capabilities. We examined discrepancy scores between both constructs and correlated these difference scores with neural responses during a passive affect perception task. We hypothesized that discrepancies favoring EI over IQ (“Feeling” types) would correlate with task-related activation of limbic and paralimbic emotion processing regions than those with greater IQ than EI (“Thinking” types).

Twelve healthy adults ranging in age from 19 to 45 (6 male) underwent functional magnetic resonance imaging (fMRI) while viewing a masked angry-face perception task that minimizes conscious perception of the affective stimulus. Participants completed measures of EI (BarOn Emotional Quotient Inventory (EQ-i); Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)), and IQ (Wechsler Abbreviated Scale of Intelligence (WASI)). Discrepancy scores (EQ-i–WASI; MSCEIT–WASI) were calculated and correlated voxel-wise with activation within the search territory defined by the medial prefrontal cortex, insula, and amygdala during the masked anger > neutral contrast using SPM5 ( $p < .005$ ,  $k \geq 5$ ).

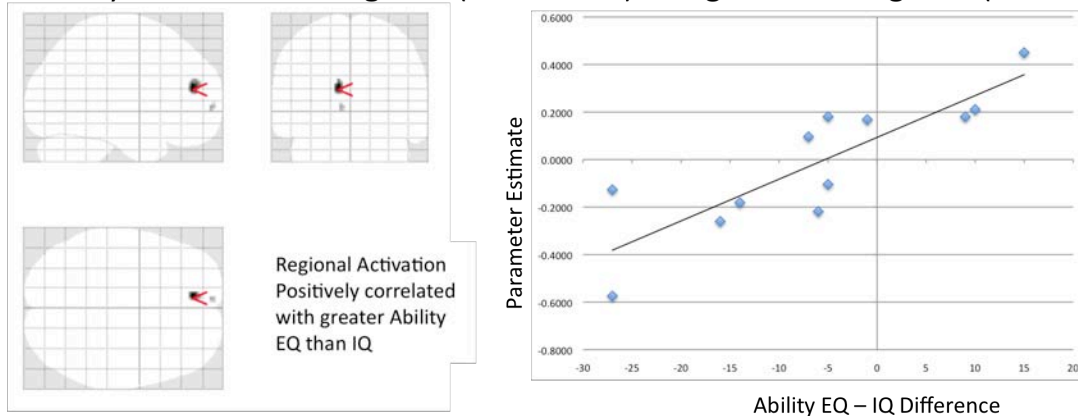
On the EQ-i, feeling scores correlated with activation of the right amygdala and anterior cingulate gyrus. Similarly, on the MSCEIT, feeling correlated with activation in the anterior cingulate gyrus. In contrast, discrepancy scores favoring a “thinking” style were unrelated to activation within the limbic and paralimbic search territories. During a passive emotion-viewing task, participants with relatively greater EI than IQ scores showed increased activation within a network of regions involved in emotional processing. Findings support the construct validity of EI by showing that it may provide useful information about emotional functioning when juxtaposed with measures of related but distinct constructs.



### Trait Emotional Intelligence (Bar-On EQi) – Cognitive Intelligence (WASI IQ)



### Ability Emotional Intelligence (MSCEIT EQ) – Cognitive Intelligence (WASI IQ)



### Preliminary Analysis 5: Evaluation of Cognitive and Emotional Intelligence as Distinct versus Related Constructs

Emotional intelligence (EI), the ability to accurately perceive, understand, and manage emotional information to guide decision-making, is proposed to be a distinct construct, unrelated to personality or traditional cognitive intelligence (IQ). Despite widespread claims that indices of EI, such as the BarOn Emotional Quotient Inventory (EQ-i) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) are unrelated to IQ, there are no published studies correlating EI measures with the gold standard Wechsler scales of intelligence. We hypothesized that 1) EQ-i and MSCEIT would be correlated with one another, 2) EQ-i would correlate with personality but not IQ, and 3) the MSCEIT would correlate with IQ but not personality. Thirteen healthy adults (7 females) ranging from 19 to 45 completed the MSCEIT, EQ-i, Revised NEO Personality Inventory (NEO), and the Verbal (VIQ), Performance (PIQ), and Full (FSIQ) scales of the Wechsler Abbreviated Scale of Intelligence (WASI). Data were analyzed with bivariate correlation and stepwise linear regression ( $\alpha=.05$ ). MSCEIT and EQ-i were significantly correlated ( $r=0.62$ ). The EQ-i correlated with FSIQ ( $r=0.74$ ), VIQ ( $r=0.69$ ), PIQ ( $r=0.72$ ), Neuroticism (NEO-N) ( $r=-0.83$ ), and Openness (NEO-O) ( $r=0.64$ ). MSCEIT correlated with FSIQ ( $r=0.74$ ), VIQ ( $r=0.67$ ), PIQ ( $r=0.74$ ), and NEO-O ( $r=0.71$ ). In the regression analysis, MSCEIT was predicted by PIQ only ( $R=0.74$ ). The EQ-i was significantly predicted by a linear combination of VIQ and NEO-N ( $R=0.92$ ). Contrary to the

theoretical claims of EI, we find a significant correlation between measures of EI and IQ. As predicted, however, EQ-i shared significant variance with personality variables, and to a lesser extent, verbal IQ, whereas MSCEIT was most related to performance IQ. The findings clarify our understanding of emotional intelligence, showing that the two major models share significant common variance, but are each predicted by unique combinations of cognitive ability and personality.

#### **Preliminary Analysis 6: Examination of the Relationship Between Impulsiveness and Activation of Brain Reward Circuitry During Visual Perception of High-Calorie Foods**

One aspect of emotional intelligence involves the ability to control impulses. Impulsive individuals often fail to inhibit behavioral responses to rewarding stimuli. Thus, impulsiveness may be a risk factor for making unhealthy food choices and overeating. We hypothesized that impulsiveness would be positively correlated with activation in areas involved in the anticipation of reward (i.e., nucleus accumbens) and negatively correlated with regions involved in inhibitory control and evaluation of punishing stimuli (i.e., lateral orbitofrontal cortex) during passive perception of high-calorie food images.

#### **Sample High-Calorie Stimuli**



#### **Sample Low-Calorie Stimuli**

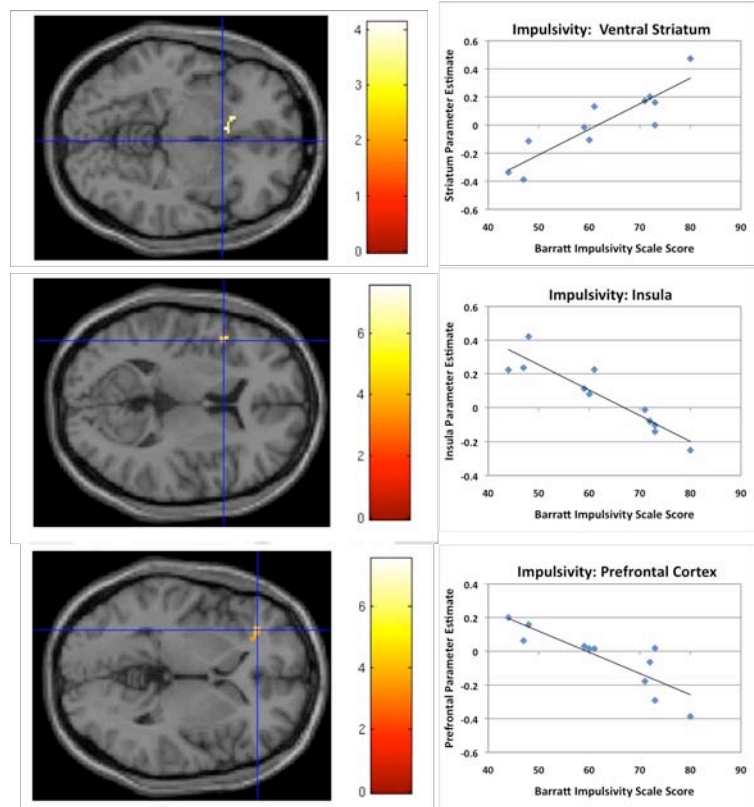


Eleven healthy adults (5 men) aged 19 to 45 underwent functional magnetic resonance imaging (fMRI) while viewing pictures of high-calorie foods, low-calorie foods, and control images of plants and rocks. Subjects viewed 5 alternating 30-second blocks of experimental and control stimuli, each consisting of ten images. Participants completed the Barratt Impulsiveness Scale (BIS-11A), a self-report questionnaire of impulsive personality traits. Contrast images comparing brain activation to high-calorie versus low-calorie conditions were created using SPM5 and then correlated voxel-wise with total BIS scores in a second-level regression model ( $p < .005$ ,  $k > 10$ ).

As hypothesized, total BIS scores were positively correlated with activation for high-calorie versus low-calorie foods in the left nucleus accumbens ( $r=0.89$ ,  $p<.001$ ). BIS scores were negatively correlated with activation in the left lateral orbitofrontal cortex ( $r=-0.85$ ,  $p=0.001$ ) and left anterior insula ( $r=-0.92$ ,  $p<.001$ ).

Results are consistent with our hypothesis that when confronted with unhealthy high calorie food options, individuals with greater impulsiveness show increased activation in regions involved in the anticipation of reward and reduced activation within regions involved in suppression and control of appetite and behavior.

Findings suggest a potential neurobiological link between impulsiveness and responses to food stimuli that may relate to unhealthy food intake.



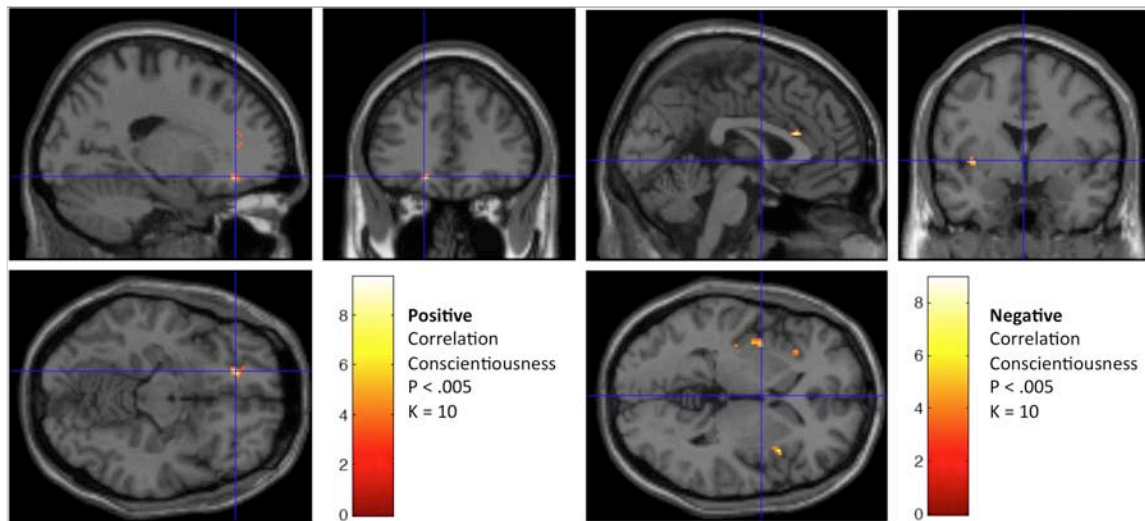
### **Preliminary Analysis 7:** Examination of the Relationship Between the Personality Trait of Conscientiousness and Brain Activation During Visual Perception of High-Calorie Foods

With the growing obesity epidemic, it is important to understand the behavioral, characterological, and neural bases of human responses to unhealthy food stimuli. Conscientiousness (C), a personality trait defined by the tendency to be self-disciplined, controlled, and motivated, may contribute to an individual's behavioral responses when confronted with unhealthy dietary choices. We hypothesized that C would be positively correlated with activation in areas involved in inhibitory control (i.e. prefrontal cortex) and negatively correlated with regions involved in hunger, craving, and other visceral responses (i.e., insula) during passive viewing of high-calorie food images.

Eleven healthy adults (5 men) aged 19 to 45 underwent functional magnetic resonance imaging (fMRI) while viewing images of high-calorie foods, low-calorie foods, and control images of plants and rocks. Subjects viewed 5 alternating 30-second periods of experimental and control stimuli, each consisting of ten images (2500 msec stimulus presentation; 500 msec inter-stimulus interval). Subjects completed the Revised NEO personality inventory (NEO-PI-R), which includes a factor scale measuring C. Contrast images comparing high-calorie versus low-calorie conditions were correlated voxel-wise



with C scores in a random-effects regression model in SPM5 ( $p < .005$ ,  $k > 10$ ). Images were masked using an anatomical atlas to define a search territory encompassing the prefrontal cortex, insula, and amygdala.



Regions showing positive or negative correlations with conscientiousness during perception of high > low calorie food images.

C positively correlated with greater activation to high-calorie foods in the left medial orbitofrontal cortex. In contrast, C was negatively correlated with activation in the dorsal anterior cingulate gyrus as well as anterior and posterior insular cortex bilaterally. Individuals with higher C responded to appetizing high calorie food images with increased activation of regions involved in inhibitory control and reduced activation within areas involved in craving, hunger, and visceral sensations. Understanding the neural basis of C may contribute to efforts help individuals modulate their responses to food and minimize dietary excesses.

#### **Preliminary Analysis 8:** Comparison of Inhibitory Capacity to Facial Threat Cues Among Adults versus Adolescents

An important component of Emotional Intelligence is the ability to inhibit inappropriate responses. These capacities are believed to develop from childhood, through adolescence, until full maturation in adulthood. Adolescence is a time of notable alterations in brain functioning, including significant gains in behavioral self-control and an improved ability to ascribe emotional significance to stimuli. It was, therefore, of interest to compare the subjects in our present study with a sample of adolescents on an emotionally based inhibitory task.

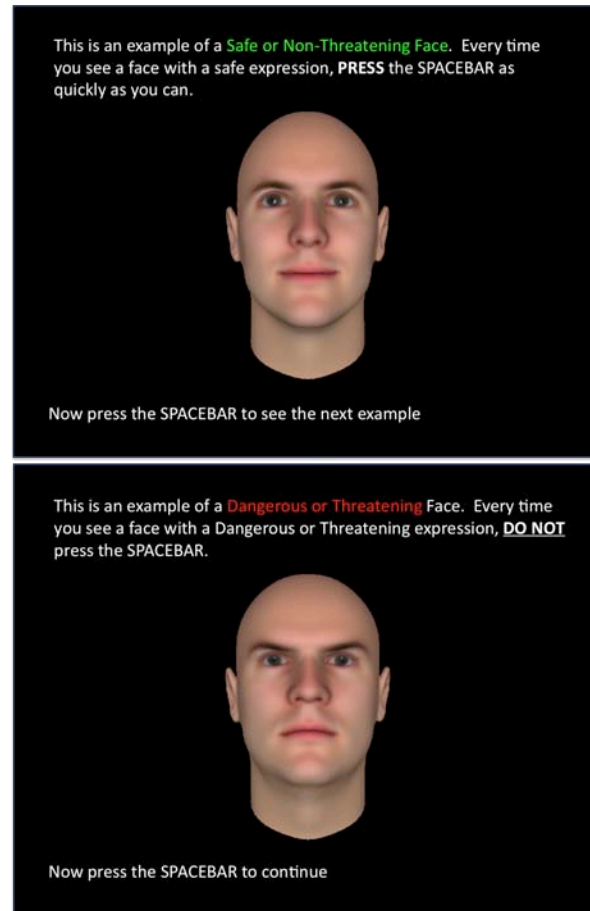
Presently, we examined age differences in response inhibition using a Go No Go behavioral paradigm, which required subjects to respond or inhibit responding to facial stimuli based on threat or safety cues present in the face presented. Subjects were instructed to respond (Go) to safe faces while inhibiting responding (No Go) to threatening faces, and on a second trial, respond (Go) to threatening faces and to inhibit responding (No Go) to safe faces. Percent accuracy data for Go and No Go trials were acquired from thirty-two subjects, 19 adolescents aged  $13.5 \pm 0.9$  years and 13 adults aged  $33.8 \pm 9.4$  years.

Adults exhibited significantly better accuracy, on both Go and No Go trials, when safe faces were presented (93% and 92%, respectively) compared to when threatening faces were presented (76% and 81%, respectively). While adolescents also exhibited significantly better accuracy for safe faces than for threatening faces, this pattern was only observed on Go trials. Adolescent percent accuracies were 93% for safe faces and 84% for threatening faces on Go trials, but significantly poorer regardless of facial expression, as compared to adults on No Go trials (61% for safe faces and 56% for threatening faces). Findings provide evidence for an age-related influence of facial expression on inhibitory capacity.

Consistent with previous reports, adolescents in the present study demonstrated worse inhibitory control than adults. These data also indicate that while facial expression does not influence response inhibition in adolescents, the presence of a safe stimulus serves to enhance inhibitory capacity in adults. Thus, developmental changes in the ability to discriminate and utilize social information may contribute to age-related improvements in inhibitory capacity.

### KEY RESEARCH ACCOMPLISHMENTS:

- Human Use protocols were written, submitted and approved locally and by USAMRMC
- Assessment instruments were purchased, acquired, or developed
- Computerized stimulation paradigms were created for use during fMRI scanning
- Research assistants were hired and trained on all study procedures
- Advertisement and recruitment were initiated and are ongoing



- Databases have been constructed and data entry is ongoing
- 15 participants have been enrolled to date
- 13 participants have completed scanning/study procedures
- Preliminary data analysis has begun
- 8 scientific abstracts have been submitted to scientific conferences based on preliminary findings

#### **REPORTABLE OUTCOMES:**

- 8 scientific abstracts have been written and submitted for presentation at the 39<sup>th</sup> Annual Meeting of the International Neuropsychological Society in Boston, MA, February 2-5, 2011, based on preliminary findings (see Appendix)
- 2 scientific abstracts are in preparation for submission for presentation at the Associated Professional Sleep Societies Meeting in Minneapolis, MN, June 11-15, 2011

#### **CONCLUSION:**

The study is progressing as planned and is consistent with the requirements of the SOW. During the funded period, we have submitted to and received approval from all IRB and USAMRMC human use committees to conduct the present investigation. All assessment instruments, equipment, and SOPs needed for carrying out the study have been purchased, programmed, or created, and all tasks have been piloted in the scanning environment. Necessary research staff have been hired and trained. Advertising and recruitment have been initiated and 15 subjects have been enrolled to date. Of these, complete and usable data have been successfully obtained from 13 participants. Although not specified in the SOW, we have already undertaken initial data quality checks and preliminary analyses have been completed. These preliminary analyses have yielded 8 scientific abstracts submitted for presentation at an upcoming professional conference.

Preliminary data analyses have yielded a number of interesting tentative findings. First, we found that, consistent with the study hypotheses, individuals with higher EI scores tend to have lower responses within the insular cortex to subliminally presented facial expressions of trustworthiness but show higher insular responses to less trustworthy faces. This suggests that high EI individuals may have greater interoceptive (i.e., “gut feelings”) to unconsciously perceived stimuli with biological/social relevance. Second, we also showed that activation of the amygdala to the same task shows a similar pattern that relates directly to the accuracy of overt judgments of trustworthiness. Greater accuracy in judging trustworthiness was linearly related to amygdala responses to subliminal facial cues of trustworthiness. Third, direct correlations between the “somatic marker circuitry” (amygdala, insula, ventromedial prefrontal cortex) and two different measures of EI provided support for the study hypothesis of greater neural efficiency among those with higher EI capacities. However, these findings closely paralleled

findings for traditional cognitive intelligence, suggesting that the hypothetical construct of EI may share considerable variance with IQ and not be as conceptually distinct as suggested by current theoretical conceptualizations. Fourth, we examined whether discrepancy between EI and IQ scores would provide useful information regarding the regional networks activated during affective processing tasks (i.e., do “thinkers” use different neural circuitry to solve the same emotional problems as “feelers”?). Preliminary findings suggest that, indeed, greater discrepancy favoring EI over IQ (i.e., “feelers”) was associated with greater activation within the dorsal medial prefrontal cortex and right amygdala. Fifth, we found preliminary evidence suggesting that the trait and ability measures of EI and IQ are highly correlated with one another. However, the trait measure of EI appeared most strongly correlated with measures of personality, whereas the ability measure of EI was most strongly related to performance IQ, suggesting that these two indices of EI are measuring similar but distinct constructs. Sixth, we examined responses within reward and inhibitory circuitry as they relate to measures of impulsivity. We found that greater impulsiveness was associated with increased responsiveness of the nucleus accumbens and reduced activation within the left prefrontal cortex and insula during viewing of highly rewarding food images. These findings suggest that more impulsive individuals may have greater difficulty modulating their brain responses to rewarding stimuli. Seventh, this pattern was also related to the personality trait of conscientiousness. Finally, we evaluated our data from a developmental perspective. Specifically, we compared our data to another data set on a sample of adolescent subjects using an affective inhibition task. We found that the ability to inhibit responses was more strongly influenced by social cues among adults than among adolescents, suggesting that this capacity develops between the period of adolescence and adulthood.

Overall, data collection is on schedule and preliminary analyses are significantly ahead of schedule. Preliminary evidence suggests that the construct of EI is meaningfully related to an identifiable and measurable neurocircuitry within the brain. These findings are encouraging, as they suggest that with further data collection and analyses, it should be possible to effectively map this circuitry and its relationship to related constructs, including cognitive intelligence, personality, and coping/resilience. This data will provide a firm basis for evaluating subsequent efforts to develop an EI modification program.

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## **APPENDICES:**

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The Neurobiological Basis and Potential Modification of Emotional Intelligence Through  
Affective / Behavioral Training

PI: William D. “Scott” Killgore, Ph.D.

**Appendix: Study Measures**

**Day 1 (Scanning Day)**

PRE SCAN

1. Pre-Scan Information Questionnaire (PSIQ)
2. Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT V2.0)
3. Bar-On Emotional Quotient Inventory (EQi)
4. Self-Rated Emotional Intelligence Scale (SREIS)
5. Memory Suppression Task Training (2-4 Trials)
6. Memory Suppression Phases: A, B, C
7. Positive and Negative Affect Schedule (PANAS)

SCAN

8. Memory Suppression Task-Suppression (4<sup>th</sup> phase) (MST1)
9. Memory Suppression Recall (MST2; NO SCANNING)
10. Memory Suppression Task-Face Interference (MST3)
11. Memory Suppression Task-Scene Interference (MST4)
12. Emotional Distraction Task (EDT)
13. Food Perception Task (FPT)
14. BMAT Anger
15. BMAT Fear
16. BMAT Happy
17. BMAT Trustworthy
18. Resting fMRI

POST SCAN

19. Memory Suppression Task Post Test
20. Emotion Distraction Post Test
21. Masked Affect Post Test
22. Food Recognition Post Test
23. Food Ratings

The Neurobiological Basis and Potential Modification of Emotional Intelligence Through  
Affective / Behavioral Training

PI: William D. “Scott” Killgore, Ph.D.

**Day 2 (Assessment Day)**

- 24. Barratt Impulsivity Scale (BIS11)
- 25. Connor-Davidson Resilience Scale (CD-RISC)
- 26. Invincibility Belief Index (IBI)
- 27. Evaluation of Risks Questionnaire (EVAR)
- 28. Brief Sensation Seeking Scale (BSSS)
- 29. Happy Chimeric Test (CFT)
- 30. Sad Chimeric Test (CFT)
- 31. Balloon Analogue Risk Task (BART)
- 32. Ekman 60 Face Test (60 FT)
- 33. Wechsler Abbreviated Scale of Intelligence (WASI)
- 34. Karolinska Airport Trustworthiness Test (KATT)
- 35. Intuition Test
- 36. Facial Assessment of Trustworthiness Test (FATT)
- 37. Design Organization Test (DOT) – FORM A and B
- 38. Iowa Gambling Task (IGT)
- 39. Revised NEO Personality Inventory (NEO-PI-R)
- 40. Anxiety Sensitivity Index (ASI)
- 41. Morningness-Eveningness Questionnaire (MEQ)
- 42. Courtauld Emotion Control Scale (CECS)
- 43. Beck Depression Inventory (BDI)
- 44. Trust Go/NoGo (Form A or X)/Trust Go/NoGo Reversed (Form B or Y)
- 45. Personality Assessment Inventory (PAI)
- 46. Humor Appreciation Test (HAT)
- 47. Global Assessment Tool (GAT)



## Day of Scan Information Questionnaire

**Subject #:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**DATE OF BIRTH** \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
month day year

**AGE** ..... years  
**HEIGHT** ..... ft/inches  
**WEIGHT** ..... lbs  
**SEX** ..... **Male** **Female**

**RIGHT or LEFT-HANDED?** ..... **RIGHT** **LEFT** **BOTH/NEITHER**

**How far did you go in school?**

<9<sup>th</sup>; 9<sup>th</sup>; 10<sup>th</sup>; 11<sup>th</sup>; HS Grad; 2yr College; College Grad; Some Grad School; Masters, Doctorate

**Do you have any problems with reading?** **NO** **YES** \_\_\_\_\_

**What is your primary language (what do you speak at home most of the time)?**

**English** **Spanish** **Other** \_\_\_\_\_

### **CAFFEINE USE**

Did you have any caffeine containing products today? If so, how much? \_\_\_\_\_

On average, how many cups of caffeinated coffee do you drink per day? \_\_\_\_\_

On average, how many cups of caffeinated tea do you drink per day? \_\_\_\_\_

On average, how many cans of caffeinated soda do you drink per day? \_\_\_\_\_

On average, how many caffeinated sports drinks do you drink per day? \_\_\_\_\_ (brand)

Do you use any other caffeinated products, such as Vivarin? **YES** **NO**

If YES, **WHAT?** \_\_\_\_\_ How much? \_\_\_\_\_ How often? \_\_\_\_\_

### **PHYSICAL INFORMATION**

If female, when was your last menstrual period (be as precise as possible)?

Date of period: \_\_\_\_\_ or about \_\_\_\_\_ days ago.

Do you engage in regular exercise: **YES** **NO**

If 'YES':

How many days per week do you exercise (circle one)? **1 2 3 4 5 6 7**

How many minutes per exercise session (on average): \_\_\_\_\_

What is your appetite like (circle one)?

Always hungry **1 2 3 4 5 6 7 8 9 10** Never hungry

Do you feel you eat more than you intend to (circle one)?  
Never 1 2 3 4 5 6 7 8 9 10 Always

When hungry, how much do you crave carbohydrates (e.g., sweets, breads, pastas) (circle one)?  
Not at all 1 2 3 4 5 6 7 8 9 10 Always

When hungry, how much do you crave fats (e.g., fried food, red meats, dairy) (circle one)?  
Not at all 1 2 3 4 5 6 7 8 9 10 Always

Are you a vegetarian or a vegan? YES NO

Briefly list anything you had to eat today, how many servings, and when:

|              |       |                    |               |    |    |
|--------------|-------|--------------------|---------------|----|----|
| Food Item 1. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 2. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 3. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 4. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 5. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 6. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 7. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 8. | _____ | , # servings _____ | , Time: _____ | AM | PM |
| Food Item 9. | _____ | , # servings _____ | , Time: _____ | AM | PM |

## **SLEEP HABITS**

How much sleep did you get last night? \_\_\_\_\_  
How much do you typically sleep on weeknights (Sun-Thur)? \_\_\_\_\_  
How much do you typically sleep on weekend nights (Fri-Sat)? \_\_\_\_\_

At what time do you normally go to bed at night on:  
week nights (Sun-Thur)? \_\_\_\_\_ AM PM (midnight = 12 AM; noon = 12 PM)  
weekends (Fri-Sat)? \_\_\_\_\_ AM PM

What time do you typically awaken on:  
weekdays (Mon-Fri)? \_\_\_\_\_ AM PM  
weekends (Sat-Sun)? \_\_\_\_\_ AM PM

How long does it typically take you to fall asleep at night?  
on week nights (Sun-Thur)? \_\_\_\_\_ MIN HRS  
on weekends (Fri-Sat)? \_\_\_\_\_ MIN HRS

At what time of day do you feel sleepiest? \_\_\_\_\_ AM PM  
At what time of day do you feel most alert? \_\_\_\_\_ AM PM

How many hours do you need to sleep to feel your best? \_\_\_\_\_  
“If I get less than \_\_\_\_\_ hours of sleep, I notice an impairment in my ability to function at work.”

“If I get more than \_\_\_\_\_ hours of sleep, I notice an impairment in my ability to function at work.”

Is daytime sleepiness currently a problem for you? .....YES NO

Are you currently doing shift work, that is, working early morning, evening, or night shifts?...YES NO

Do you ever have trouble falling asleep? .....YES NO

If yes, how often? \_\_\_\_\_ times per WEEK MONTH YEAR (circle one)

Do you ever have trouble staying asleep? .....YES NO

If yes, how often? \_\_\_\_\_ times per WEEK MONTH YEAR (circle one)

Do you take more than two daytime naps per month? ..... YES NO

If yes, about how many times per week do you nap? .....

At what time of day do you normally take your nap? \_\_\_\_:\_\_\_\_ AM/PM to \_\_\_\_:\_\_\_\_ AM/PM

Do you consider yourself a light, normal, or heavy sleeper? .....**LIGHT** **NORMAL** **HEAVY**

I yawn often

Never **1 2 3 4 5 6 7 8 9 10** Always yawning

When I see or hear someone else yawn, I will yawn too

Never **1 2 3 4 5 6 7 8 9 10** Every time

## **RECENT RISK OF DOZING OFF (ESS)**

How likely are to doze off or fall asleep in the following situations, in contrast to feeling just tired? This refers to your **usual way of life in recent times**. Even if you have not done some of these things recently try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation:

0 = would never doze

1 = slight chance of dozing

2 = moderate chance of dozing

3 = high chance of dozing

### **SITUATION**

### **CHANCE OF DOZING (0-3)**

|                                                                 |   |   |   |   |
|-----------------------------------------------------------------|---|---|---|---|
| Sitting and reading                                             | 0 | 1 | 2 | 3 |
| Watching TV                                                     | 0 | 1 | 2 | 3 |
| Sitting, inactive in a public place (e.g. a theatre or meeting) | 0 | 1 | 2 | 3 |
| As a passenger in a car for an hour without a break             | 0 | 1 | 2 | 3 |
| Lying down to rest in the afternoon when circumstances permit   | 0 | 1 | 2 | 3 |
| Sitting and talking to someone                                  | 0 | 1 | 2 | 3 |
| Sitting quietly after a lunch without alcohol                   | 0 | 1 | 2 | 3 |
| In a car, while stopped for a few minutes in the traffic        | 0 | 1 | 2 | 3 |

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## Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)

John D. Mayer, Ph.D., Peter Salovey, Ph.D., & David R. Caruso, Ph.D.

[Product Overview](#)[Research & Resources](#)[Pricing & Details](#)[Description](#) | [Scales and Forms](#)

### Description

Developed by academics at Yale and the University of New Hampshire in cooperation with MHS, the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT™) evaluates Emotional Intelligence through a series of objective and impersonal questions. It tests the respondent's ability to perceive, use, understand, and regulate emotions. Based on scenarios typical of everyday life, the MSCEIT measures how well people perform tasks and solve emotional problems, rather than having them provide their own subjective assessment of their emotional skills.

The MSCEIT test uses a variety of interesting and creative tasks to measure a person's capacity for reasoning with emotional information by directly testing their ability. This ability-based model makes the MSCEIT test ideal for situations where respondents may want to create a positive impression or 'fake good'. The MSCEIT is suitable for all manner of corporate, educational, research, and therapeutic settings.

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### Scales & Forms

- **Perceiving Emotions**
  - Faces
  - Pictures
- **Facilitating Thought**
  - Facilitation
  - Sensations
- **Understanding Emotions**
  - Changes
  - Blends
- **Managing Emotions**
  - Emotion Management
  - Emotional Relations

[back to the top](#)

### Quick Facts

**Ages:**  
17 and older

**Administration:**  
Client-completed

**Administration Time:**  
30–45 minutes

**Qualification Level:**  
B-Level

#### Format:

- Software
- Online
- Scoring service



#### Related Product: EQ-360

® The EQ-360 offers you a 360-degree Emotional Intelligence assessment, useful for building on the individualized work you do with the MSCEIT...

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## EQ-i®

### Emotional Quotient-Inventory

Reuven Bar-On, Ph.D.

[Product Overview](#)[Research & Resources](#)[Pricing & Details](#)[Description](#) | [Scales and Forms](#)

#### Description

The Emotional Quotient Inventory (EQ-i®) is the first scientifically validated and most widely used Emotional Intelligence assessment in the world. Based on more than 20 years of research worldwide, the EQ-i examines an individual's social and emotional strengths and weaknesses.

Respondents self-report on their life and workplace performance in 15 key areas of emotional skill that have been proven to contribute to proficiency in complex business activities such as conflict resolution and planning. By identifying the areas that need improvement, the client can immediately begin developing those areas. At the same time, areas where the client excels can be leveraged to their full potential to maximize effectiveness in daily tasks.

A number of manuals are available to help you administer and interpret EQ-i results. The Technical Manual provides detailed information about the administration, scoring, interpretation, development, norming, reliability, and the validity of the EQ-i. The User's Manual is ideal for professionals who require only essential information on administration, scoring, and interpretation. The Administrator's Guide provides users with step-by-step information on administration procedures, maintaining confidentiality, and obtaining informed consent. This guide is ideal for use during the administration of the EQ-i inventory. A number of different reports are available for the EQ-i to help you interpret scores and communicate results to clients.

A 125-item EQ-i, with Negative Impression items omitted, is also available. Call for details.

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#### Scales & Forms

- **Intrapersonal**
  - Self-Regard
  - Emotional Self-Awareness
  - Assertiveness
  - Independence
  - Self-Actualization
- **Interpersonal**
  - Empathy
  - Social Responsibility
  - Interpersonal Relationships
- **Stress Management**
  - Stress Tolerance
  - Impulse Control
- **Adaptability**
  - Reality Testing
  - Flexibility
  - Problem Solving
- **General Mood**
  - Optimism
  - Happiness
- **Positive Impression**



#### QUICK FACTS

##### Age Range

16 and older

##### Administration

Self-report

##### Administration Time

30 minutes

##### Qualification Level

B (North America Only)

##### Formats

- Online (administration and scoring)
- Software (administration and scoring)
- Scoring Service



#### Related Product: EQ-i® Business Report

This new report for the EQ-i® uses business language and provides development strategies for all 15 subscales...

[>>more](#)

## SREIS

Subject ID: \_\_\_\_\_

Date: \_\_\_\_\_

The following set of items pertains to your insight into emotions. Please use the rating scale to describe how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. Please read each statement carefully, and then circle the response that corresponds to how inaccurately or accurately each statement describes you.

**1. By looking at people's facial expressions, I recognize the emotions they are experiencing**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**2. I am a rational person and I rarely, if ever, consult my feelings to make a decision**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**3. I have a rich vocabulary to describe my emotions**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**4. I have problems dealing with my feelings of anger**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**5. When someone I know is in a bad mood, I can help the person calm down and feel better quickly**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**6. I am aware of the nonverbal messages other people send**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**7. When making decisions, I listen to my feelings to see if the decision feels right**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**8. I could easily write a lot of synonyms for emotion words like happiness or sadness**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**9. I can handle stressful situations without getting too nervous**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**10. I know the strategies to make or improve other people's moods**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**11. I can tell when a person is lying to me by looking at his or her facial expression**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**12. I am a rational person and don't like to rely on my feelings to make decisions**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**13. I have the vocabulary to describe how most emotions progress from simple to complex feelings**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**14. I am able to handle most upsetting problems**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**15. I am not very good at helping others to feel better when they are feeling down or angry**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**16. My quick impressions of what people are feeling are usually wrong**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**17. My "feelings" vocabulary is probably better than most other persons' "feeling" vocabularies**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**18. I know how to keep calm in difficult or stressful situations**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

**19. I am the type of person to whom others go when they need help with a difficult situation**

|                        |                              |                    |                            |                      |
|------------------------|------------------------------|--------------------|----------------------------|----------------------|
| <i>Very inaccurate</i> | <i>Moderately inaccurate</i> | <i>Neither nor</i> | <i>Moderately accurate</i> | <i>Very accurate</i> |
| 1                      | 2                            | 3                  | 4                          | 5                    |

## PANAS

Subject: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way RIGHT NOW, that is, at the present moment.

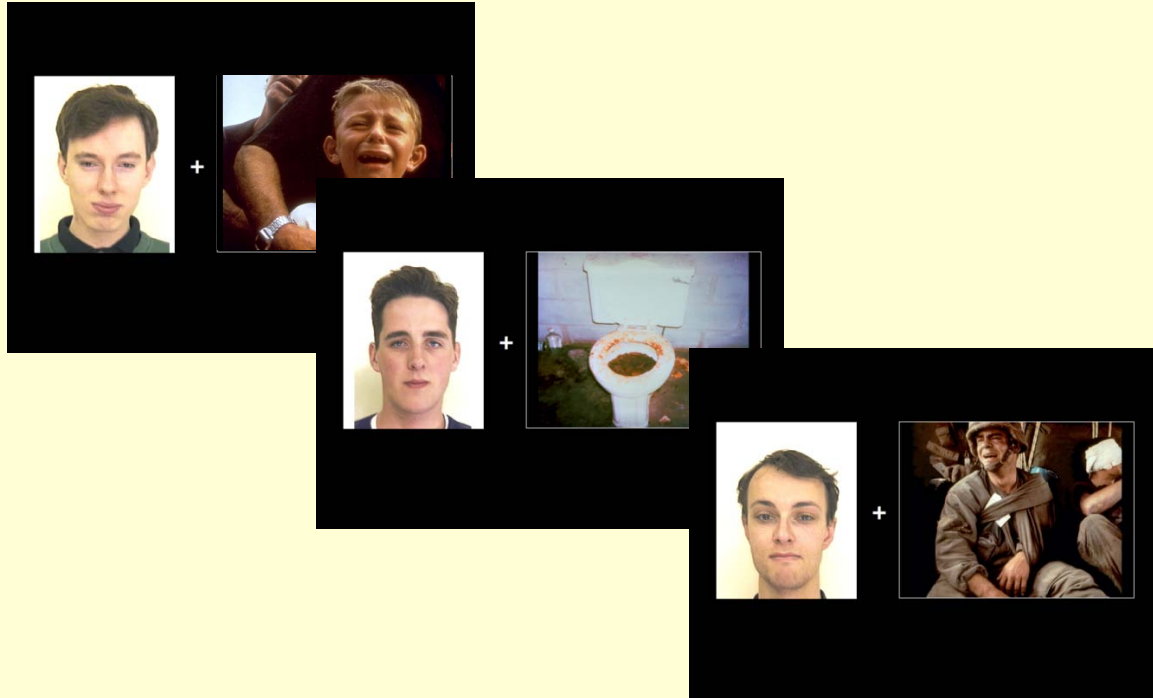
|                                |          |            |             |           |
|--------------------------------|----------|------------|-------------|-----------|
| 1                              | 2        | 3          | 4           | 5         |
| very slightly<br>or not at all | a little | moderately | quite a bit | extremely |

|                    |                  |
|--------------------|------------------|
| _____ interested   | _____ irritable  |
| _____ distressed   | _____ alert      |
| _____ excited      | _____ ashamed    |
| _____ upset        | _____ inspired   |
| _____ strong       | _____ nervous    |
| _____ guilty       | _____ determined |
| _____ scared       | _____ attentive  |
| _____ hostile      | _____ jittery    |
| _____ enthusiastic | _____ active     |
| _____ proud        | _____ afraid     |

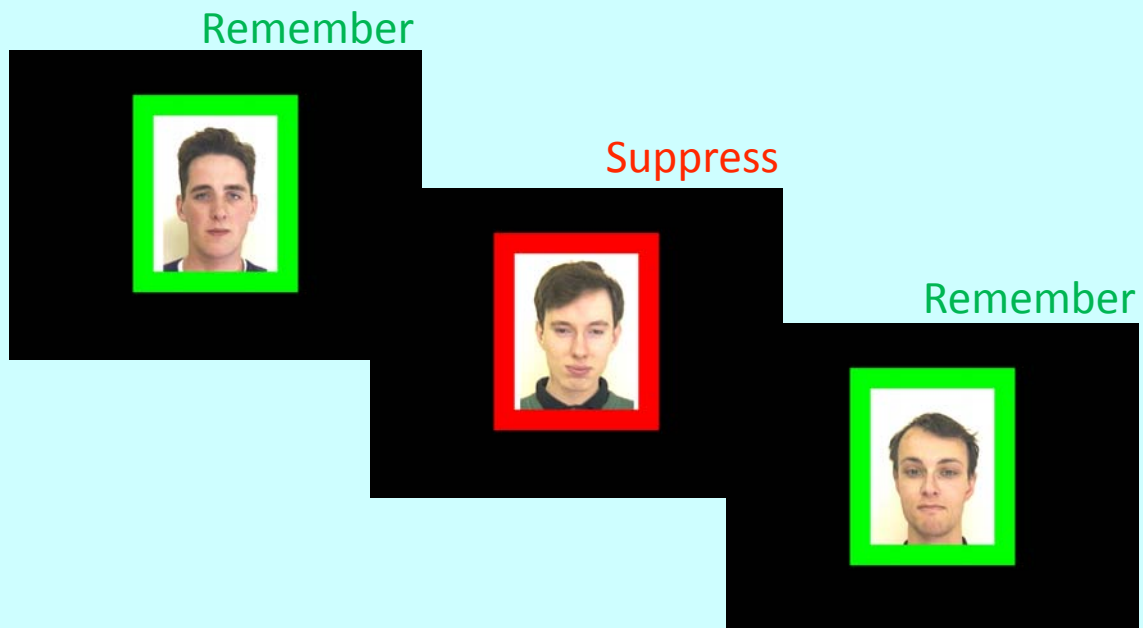


# Memory Suppression Phase (MST1)

Training: Learn Face + Image Pairs

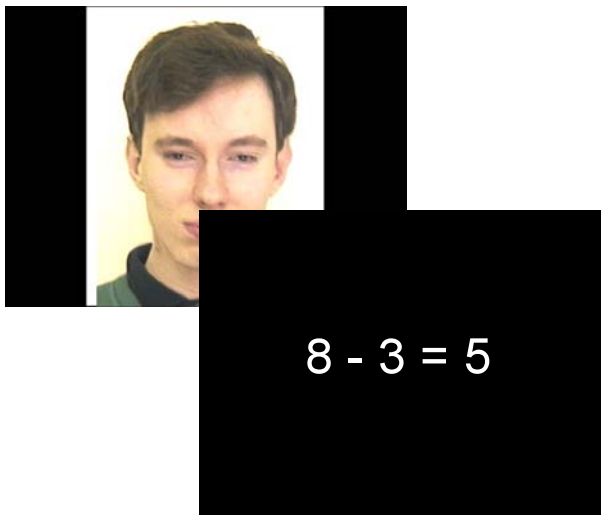


Think/No Think (Remember vs. Suppress)

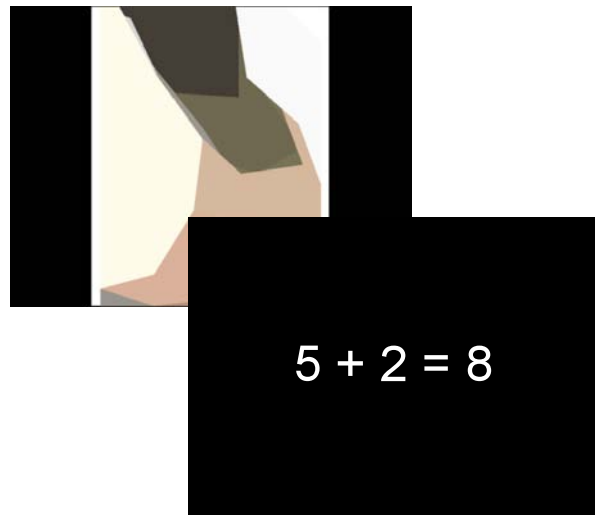


## Face Interference Phase (MST2)

Experimental



Pixel Control



## Scene Interference Phase (MST3)

Experimental



$$8 - 3 = 5$$

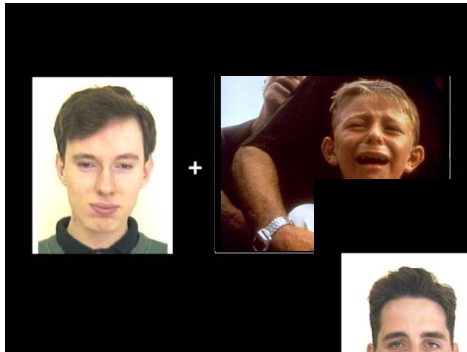
Pixel Control



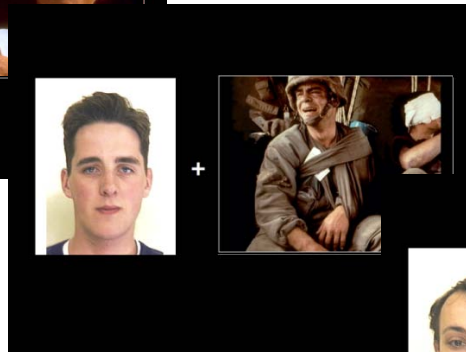
$$5 + 2 = 8$$

## Recognition Phase (MST4)

Answer: "YES"



Answer: "NO"



Answer: "NO"



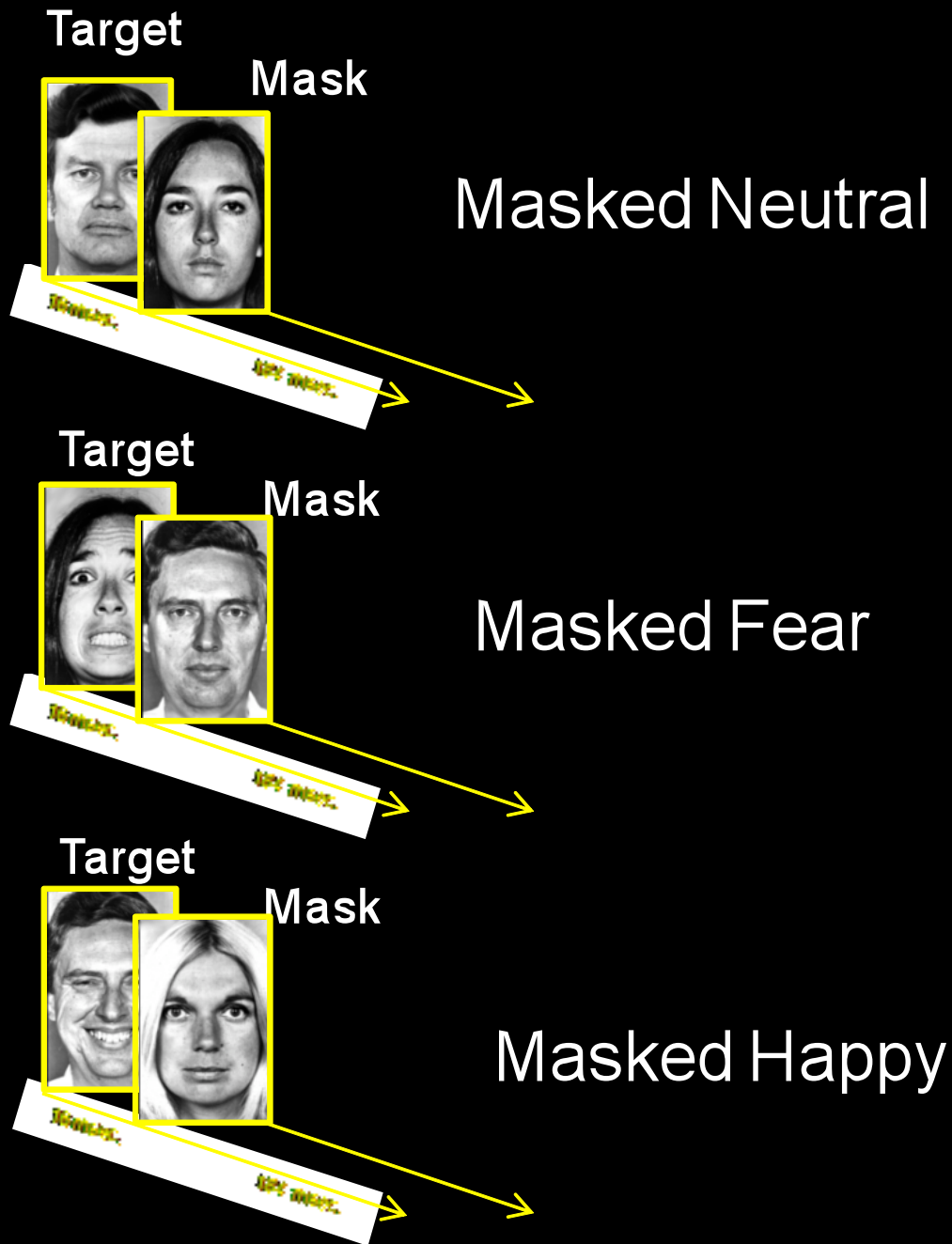
## Emotional Distraction Task (EDT)



Press LEFT for a NONTHREATENING FACE  
Press RIGHT for a THREATENING FACE

## Backward Masked Affect Task (BMAT)

### Masked Affect fMRI Paradigms



# Food Perception Task (FPT)

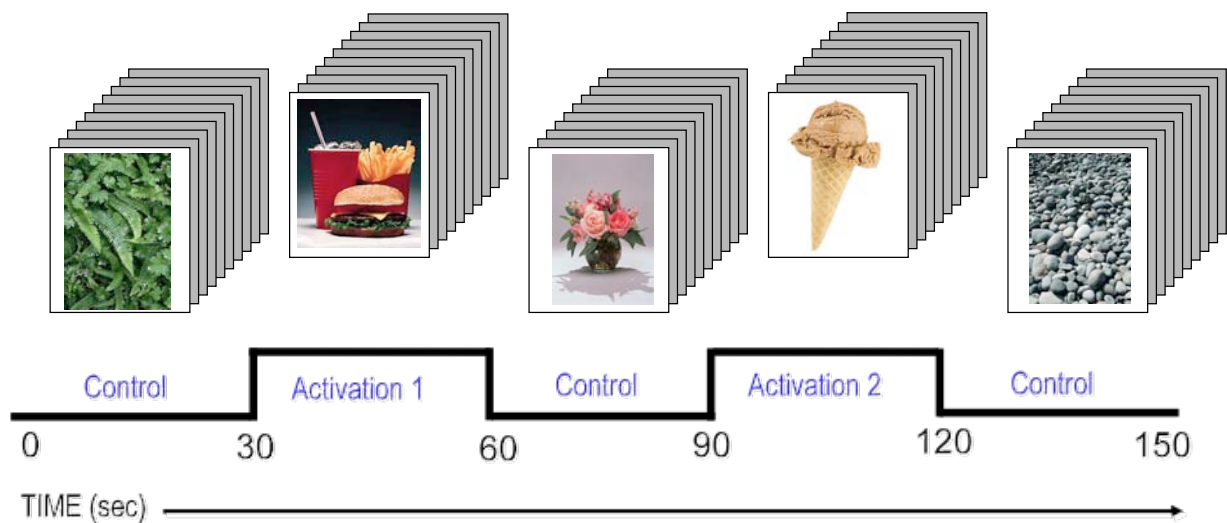
## Sample High Calorie Stimuli



## Sample Low Calorie Stimuli



10 Stimuli per block  
Stimulus: 2500 msec.  
ISI: 150 msec.



# BIS 11

Name \_\_\_\_\_ Date \_\_\_\_\_

Non Planning Score \_\_\_\_\_  
 Motor Score \_\_\_\_\_  
 Attentional Score \_\_\_\_\_  
 # of sessions \_\_\_\_\_

| <b>Directions:</b> People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and place a check in the appropriate box on the right side of the page. Do not spend too much time on any statement. Answer quickly and honestly. |                                                      | Rarely/Never | Occasionally | Often | Almost always/<br>Always |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------|--------------|-------|--------------------------|
| 1.                                                                                                                                                                                                                                                                                                                                    | I plan tasks carefully                               |              |              |       |                          |
| 2.                                                                                                                                                                                                                                                                                                                                    | I do things without thinking                         |              |              |       |                          |
| 3.                                                                                                                                                                                                                                                                                                                                    | I am happy-go-lucky                                  |              |              |       |                          |
| 4.                                                                                                                                                                                                                                                                                                                                    | I have "racing" thoughts                             |              |              |       |                          |
| 5.                                                                                                                                                                                                                                                                                                                                    | I plan trips well ahead of time                      |              |              |       |                          |
| 6.                                                                                                                                                                                                                                                                                                                                    | I am self-controlled                                 |              |              |       |                          |
| 7.                                                                                                                                                                                                                                                                                                                                    | I concentrate easily                                 |              |              |       |                          |
| 8.                                                                                                                                                                                                                                                                                                                                    | I save regularly                                     |              |              |       |                          |
| 9.                                                                                                                                                                                                                                                                                                                                    | I find it hard to sit still for long periods of time |              |              |       |                          |
| 10.                                                                                                                                                                                                                                                                                                                                   | I am a careful thinker                               |              |              |       |                          |
| 11.                                                                                                                                                                                                                                                                                                                                   | I plan for job security                              |              |              |       |                          |
| 12.                                                                                                                                                                                                                                                                                                                                   | I say things without thinking                        |              |              |       |                          |
| 13.                                                                                                                                                                                                                                                                                                                                   | I like to think about complex problems               |              |              |       |                          |
| 14.                                                                                                                                                                                                                                                                                                                                   | I change jobs                                        |              |              |       |                          |
| 15.                                                                                                                                                                                                                                                                                                                                   | I act "on impulse"                                   |              |              |       |                          |
| 16.                                                                                                                                                                                                                                                                                                                                   | I get easily bored when solving thought problems     |              |              |       |                          |
| 17.                                                                                                                                                                                                                                                                                                                                   | I have regular medical/dental checkups               |              |              |       |                          |
| 18.                                                                                                                                                                                                                                                                                                                                   | I act on the spur of the moment                      |              |              |       |                          |
| 19.                                                                                                                                                                                                                                                                                                                                   | I am a steady thinker                                |              |              |       |                          |
| 20.                                                                                                                                                                                                                                                                                                                                   | I change where I live                                |              |              |       |                          |
| 21.                                                                                                                                                                                                                                                                                                                                   | I buy things on impulse                              |              |              |       |                          |
| 22.                                                                                                                                                                                                                                                                                                                                   | I finish what I start                                |              |              |       |                          |
| 23.                                                                                                                                                                                                                                                                                                                                   | I walk and move fast                                 |              |              |       |                          |
| 24.                                                                                                                                                                                                                                                                                                                                   | I solve problems by trial-and-error                  |              |              |       |                          |
| 25.                                                                                                                                                                                                                                                                                                                                   | I spend or charge more than I earn                   |              |              |       |                          |
| 26.                                                                                                                                                                                                                                                                                                                                   | I talk fast                                          |              |              |       |                          |
| 27.                                                                                                                                                                                                                                                                                                                                   | I have outside thoughts when thinking                |              |              |       |                          |
| 28.                                                                                                                                                                                                                                                                                                                                   | I am more interested in the present than the future  |              |              |       |                          |
| 29.                                                                                                                                                                                                                                                                                                                                   | I am restless at lectures or talks                   |              |              |       |                          |
| 30.                                                                                                                                                                                                                                                                                                                                   | I plan for the future                                |              |              |       |                          |



## CD-RISC

Subject: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Think about how you have been feeling over the past month. Using the scale below, please rate each of the following statements for how well they describe you **DURING THE PAST MONTH.**

| 0               | 1           | 2              | 3          | 4                        |
|-----------------|-------------|----------------|------------|--------------------------|
| not true at all | rarely true | sometimes true | often true | true nearly all the time |

1. \_\_\_\_\_ Able to adapt to change
2. \_\_\_\_\_ Close and secure relationships
3. \_\_\_\_\_ Sometimes fate or God can help
4. \_\_\_\_\_ Can deal with whatever comes
5. \_\_\_\_\_ Past success gives confidence for new challenge
6. \_\_\_\_\_ See the humorous side of things
7. \_\_\_\_\_ Coping with stress strengthens
8. \_\_\_\_\_ Tend to bounce back after illness or hardship
9. \_\_\_\_\_ Things happen for a reason
10. \_\_\_\_\_ Best effort no matter what
11. \_\_\_\_\_ You can achieve your goals
12. \_\_\_\_\_ When things look hopeless, I don't give up
13. \_\_\_\_\_ Know where to turn for help
14. \_\_\_\_\_ Under pressure, focus and think clearly
15. \_\_\_\_\_ Prefer to take the lead in problem solving
16. \_\_\_\_\_ Not easily discouraged by failure
17. \_\_\_\_\_ Think of self as strong person
18. \_\_\_\_\_ Make unpopular or difficult decisions
19. \_\_\_\_\_ Can handle unpleasant feelings
20. \_\_\_\_\_ Have to act on a hunch
21. \_\_\_\_\_ Strong sense of purpose
22. \_\_\_\_\_ In control of your life
23. \_\_\_\_\_ I like challenges
24. \_\_\_\_\_ You work to attain your goals
25. \_\_\_\_\_ Pride in your achievements

Subject: \_\_\_\_\_

Date: \_\_\_\_\_

Read the following scenarios. Each scenario presents a situation and asks a question about the chance or likelihood that you would experience a particular outcome. For each one, think about how likely that outcome would be for YOU in that situation. Do NOT worry about how most people would do in a particular situation—just think about the chance that a particular outcome would happen to YOU in that situation. Circle the percent chance that best represents the probability that the outcome would happen to YOU.

1. You arrive 25 minutes late for a big job interview. What is the probability that YOU will get the job?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

2. If you were to find yourself confronted by a vicious angry dog, what is the probability that YOU could get away unharmed?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

3. Regardless of your moral convictions, if you were to shoplift a pair of \$50 sunglasses from a chain drug store, what is the probability that YOU could get away with it without being caught?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

4. While leaving a popular night club, you are attacked by a drunk man in his early 20s wielding a 10 inch knife. During the scuffle, your friend is stabbed, but not fatally. What is the chance that YOU will be killed during the attack?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

5. While on vacation, you meet up with a stranger asking for help. Although the story the stranger tells you is heart wrenching and he seems very sincere, you are aware that he may just be a con-artist trying to scam you. If the stranger truly is a con-artist, what is the probability YOU will end up being scammed out of some of your money?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

6. You awaken one morning realizing that you engaged in unprotected sex with someone you just met. Now that the alcohol has worn off, your partner remorsefully tells you that he/she has suffered for a long time with a very serious sexually transmitted disease. What is the chance that YOU will contract the sexually transmitted disease yourself after this contact?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

7. While on vacation in a far away country, your 3 traveling companions have all contracted a bad case of diarrhea after drinking the water. You realize that you just drank some of the same water about an hour ago. What is the likelihood that YOU will come down with diarrhea too?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%
8. While on vacation in the woods, you decide to go hiking in an unfamiliar and thickly wooded area without a map or guide. What is the likelihood that YOU will get lost?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%
9. You have been at a nightclub for 4 hours. During that time you have had 7 alcoholic beverages. You are feeling a little “buzzed” but you decide to drive yourself home anyway because it is only about 5 miles away. What is the probability that YOU will make it home without any negative incident?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%
10. While playing golf one afternoon a thunderstorm comes up quickly. There is much wind and occasional lightning is hitting nearby. Because you are winning the game and only have two more holes to play, you decide to continue to the end. What is the likelihood that YOU will be struck by lightning before finishing the game?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%
11. While at your job you discover that one of your superiors has been embezzling large amounts of money from your organization. You decide to inform higher management of his illegal behavior. What is the chance that YOUR future career at the company will be harmed by reporting him?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%
12. Your company has a strict policy forbidding the removal of computer equipment from the work premises. However, you have a big project due that can only be completed if you “borrow” a company laptop computer over the weekend. What is the probability that YOU could secretly remove the computer for the weekend and return it to work on Monday without ever being caught?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%
13. You are a foreigner living in a war-torn country that is filled with violence and frequent sniper attacks. Although it is dark outside and there are many hostile insurgents in the area, you decide to drive alone and unarmed down a 10 mile stretch of empty highway to spend the weekend in the next town. What is the probability that YOU will be killed while making the trip?  
  
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

14. While staying at a high rise hotel a bad fire breaks out several floors below yours. After hearing the fire alarm and smelling smoke, you quickly devise a plan of escape. What is the likelihood that YOU would be unable to figure out a way to escape and would die in the fire?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

15. A severe natural disaster has devastated your town, resulting in widespread panic, looting, and deadly violence. The escape routes leading from the town are blocked with gridlock traffic and street gangs are killing at random and using violent means to steal limited necessities and survive. What is the chance that YOU will be able to outmaneuver the looters and escape the town unharmed?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

16. You enter a competition in an arena in which you are particularly talented. What is the chance that YOU will ultimately win the competition?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

17. You are sightseeing off a tall bridge where many individuals have tried to commit suicide by jumping to their deaths in the water below. Approximately half of all jumpers have not survived the long drop into the bay. Unfortunately, you stumble and are accidentally knocked off of the bridge. What is the likelihood that YOU would die in the fall?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

18. Your biggest rival has challenged you in some way. What is the likelihood that YOU will ultimately defeat your rival at whatever he/she has challenged you with?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

19. A bad automobile accident has just occurred in front of you. In one of the cars, the driver is unconscious and bleeding. You smell gas and notice that smoke is starting to billow out from the car. Afraid that the car may explode at any moment, you work to pull the unconscious driver from the car. What is the chance that YOU will die in the process of saving the driver?

0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

20. While on vacation on a tropical island you decided to rent a small motor boat to do some sightseeing and fishing out along the island coast. After stopping the boat some distance from the shore you lay down to take a brief nap. Upon awakening you realize that you can no longer see the shore and notice that there is a fierce storm coming. What is the likelihood that YOU will die at sea?

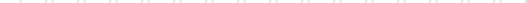
0%    10%    20%    30%    40%    50%    60%    70%    80%    90%    100%

not at all ○○○○○○○○○○○○○○○○○○○○ very much

stopping ○○○○○○○○○○○○○○○○○○○○ accelerating

I don't move ○○○○○○○○○○○○○○○○○○○○ I proceed immediately

avoiding everyone  taking on the world

very high  very low

routine ○○○○○○○○○○○○○○○○○○ adventure

the thrill of danger ○○○○○○○○○○○○○○○○ tranquillity

I take a dangerous shortcut ○○○○○○○○○○○○○○○○○○ I take a safe detour

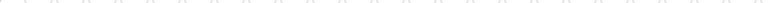
negotiation ○○○○○○○○○○○○○○○○○○ confrontation

**direct** ○○○○○○○○○○○○○○○○○○○○○○ **be supervised**

reason ○○○○○○○○○○○○○○○○○○○○○○○○○○○○○ action

at a loud volume ○○○○○○○○○○○○○○ very softly

not at all ○○○○○○○○○○○○○○○○○○○○○○ completely

animated  calm

weakens me ○○○○○○○○○○○○○○○○○○○○○○ reinforces me

I confront it ○○○○○○○○○○○○○○○○○○○○ I run away

| Gender | Percentage |
|--------|------------|
| Male   | 65%        |
| Female | 35%        |

Please read each item carefully. Using the key below, write in the number which bests how much you agree with the following statements **RIGHT NOW**.

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neither Disagree nor Agree
- 4 = Agree
- 5 = Strongly Agree

**Right now I feel like...**

\_\_\_\_\_ I would like to explore strange places.

\_\_\_\_\_ I get restless when I spend too much time at home.

\_\_\_\_\_ I like to do frightening things.

\_\_\_\_\_ I like wild parties.

\_\_\_\_\_ I would like to take off on a trip with no pre-planned routes or timetables.

\_\_\_\_\_ I prefer friends who are excitingly unpredictable.

\_\_\_\_\_ I would like to try bungee jumping.

\_\_\_\_\_ I would love to have new and exciting experiences, even if they are illegal.

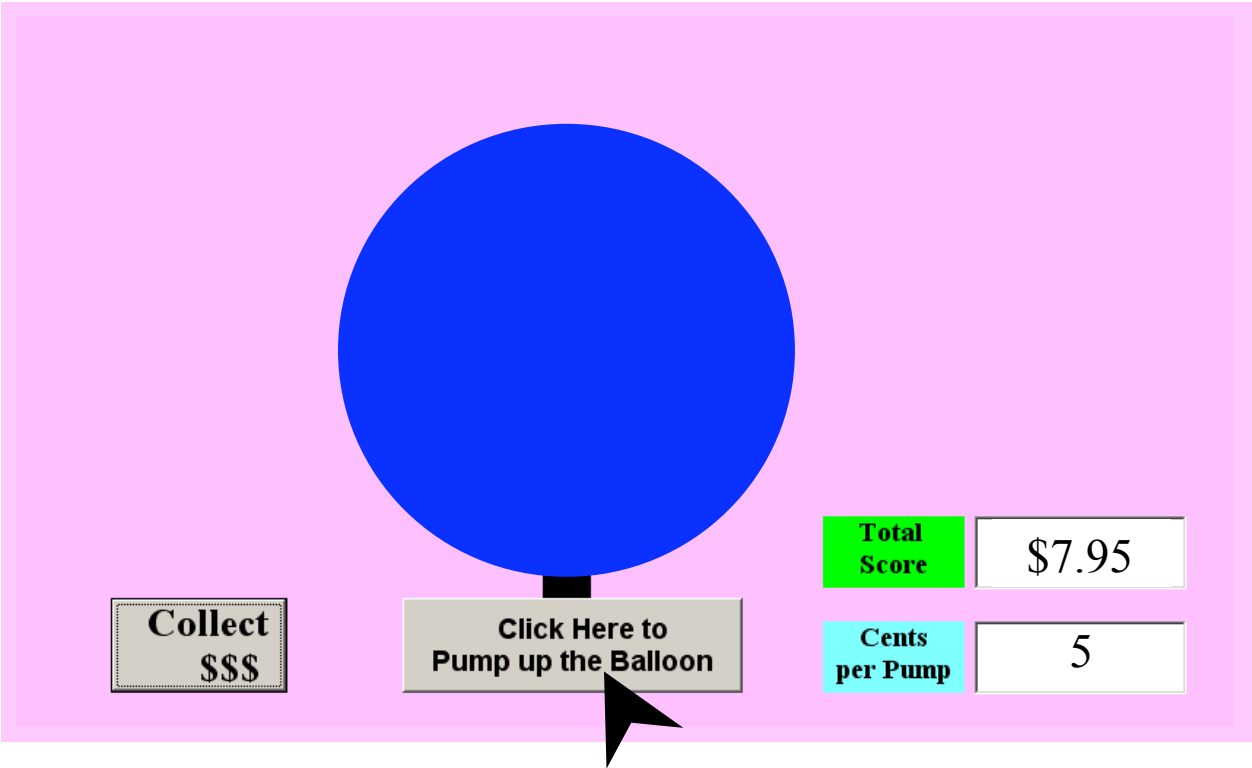
## Chimeric Face Task (CFT)



Which face appears “happier”?



# Balloon Analog Risk Task (BART)



# WASI



[Home](#) > [Psychologists](#) > [Adult Cognition, Neuropsychology and Language](#) > [Adult General Abilities](#)

## Wechsler Abbreviated Scale of Intelligence (WASI)

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**Obtain a reliable brief measure of intelligence**

### Author/s:

David Wechsler, 1999

### Age Range:

6 years to 89 years

### Administration:

Individual - Four Subtest Form = 30 minutes; Two Subtest Form = 15 minutes

**Qualification code:** [CL1](#)

### Norms:

Standardised with 2,245 cases

### Description:

The WASI meets the demand for a reliable, brief measure of intellectual ability in clinical, educational and research settings for ages 6 to 89 years.

With parallel forms of [WAIS-III<sup>UK</sup>](#) and [WISC-III<sup>UK</sup>](#) subtests, it offers the clinician a means of reducing practice effects on repeat testing.

The WASI provides you with more information than is typically available from other brief intelligence tests.

This efficient assessment yields traditional verbal, performance and full scale IQ scores and is linked to the [WISC-III<sup>UK</sup>](#) and [WAIS-III<sup>UK</sup>](#).

This linkage allows you to estimate a range of full-scale IQ scores on the comprehensive batteries and increases the WASI's clinical utility.

While the WASI is not intended to replace detailed assessment using the [WISC-III<sup>UK</sup>](#) and [WAIS-III<sup>UK</sup>](#), it is the perfect instrument for quickly measuring an individual's general level of cognitive functioning.

The WASI is unique because it allows you to choose whether to use the four or two

# Karolinska Airport Trustworthiness Test (KATT)



For example, if you think this person should be:

...**allowed to board the plane**, press the “**1**” key.

...**detained, searched, and questioned**, press the “**2**” key.

## Airport Task

Subject: \_\_\_\_\_

Date: \_\_\_\_\_

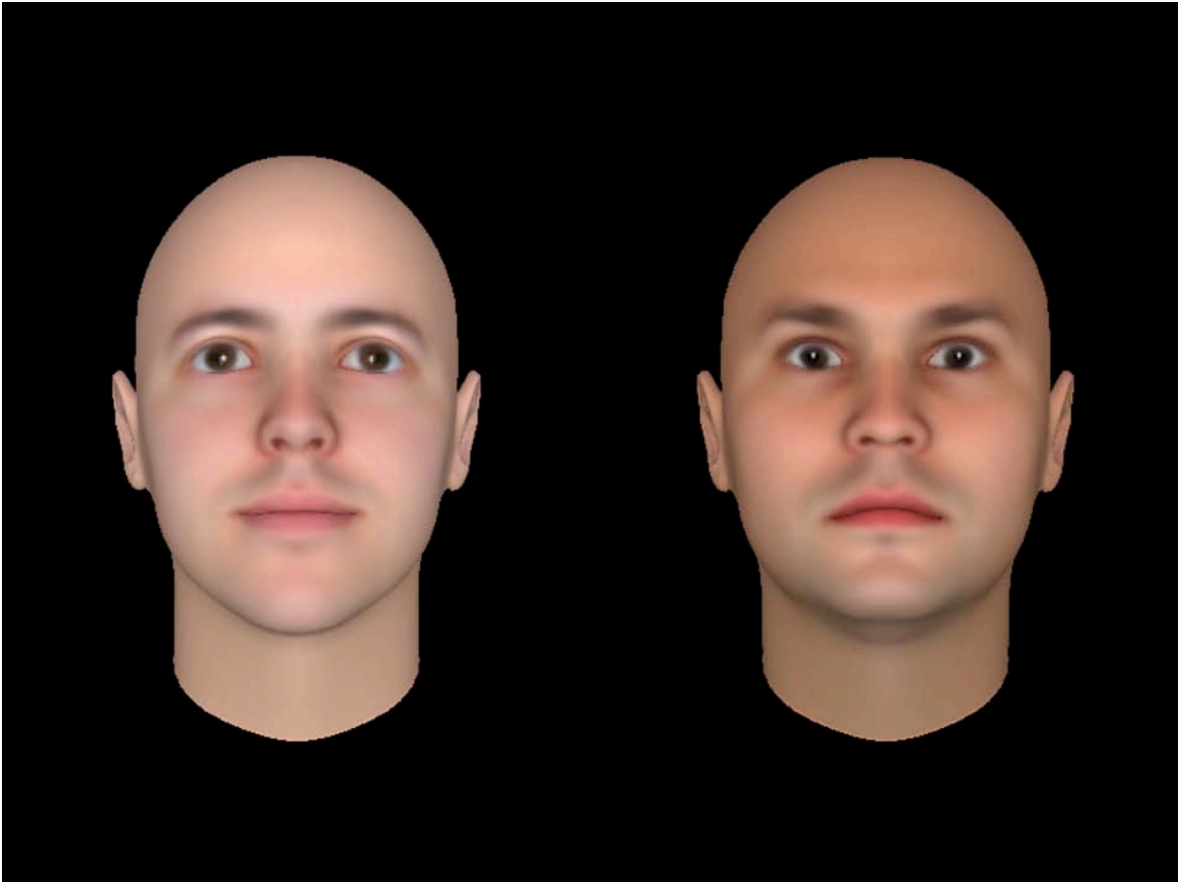
**Think about the airport task you just did. When determining whether to allow people through or to stop/question/detain, think about what factors you took into account. Rate each characteristic on the level of importance it had on your decision.**

| 1                                     | 2        | 3    | 4    | 5                     |
|---------------------------------------|----------|------|------|-----------------------|
| No importance                         | A little | Some | Much | Very Much             |
| _____ Gender                          |          |      |      | _____ Sociability     |
| _____ Attractiveness                  |          |      |      | _____ Weirdness       |
| _____ How caring he/she appeared      |          |      |      | _____ Unhappiness     |
| _____ Aggressiveness                  |          |      |      | _____ Dominance       |
| _____ Meanness                        |          |      |      | _____ Intelligence    |
| _____ Confidence                      |          |      |      | _____ Trustworthiness |
| _____ Emotional stability             |          |      |      | _____ Other:          |
| _____ How threatening he/she appeared |          |      |      | _____ Other:          |
| _____ How responsible he/she appeared |          |      |      | _____ Other:          |

For Examiner Use Only:

Post Task Response: \_\_\_\_\_

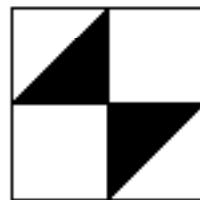
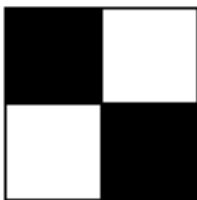
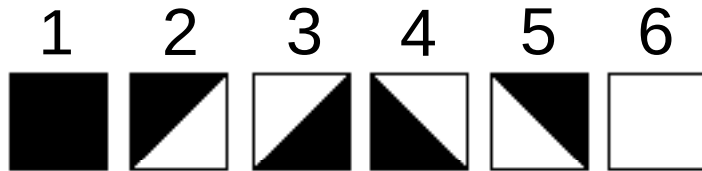
## Facial Assessment of Trustworthiness Test (FATT)



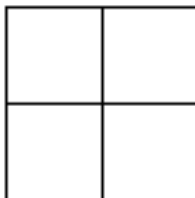
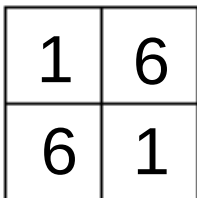
Which face would you trust more?

# Design Organization Test

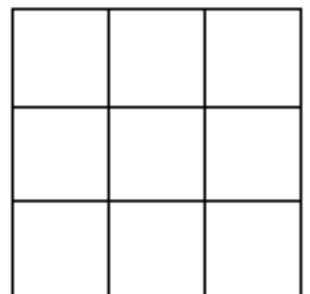
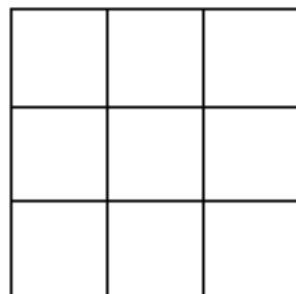
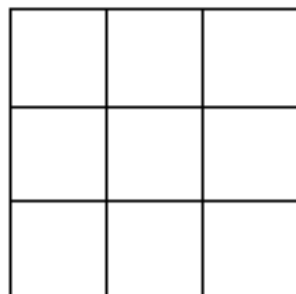
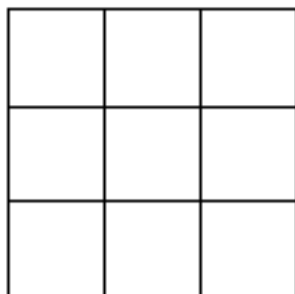
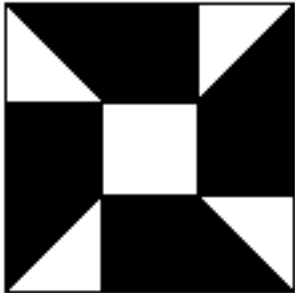
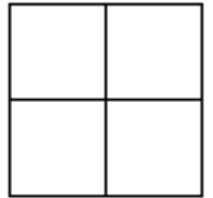
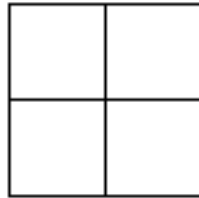
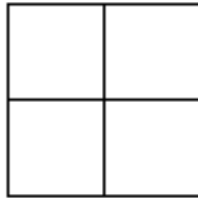
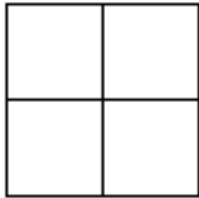
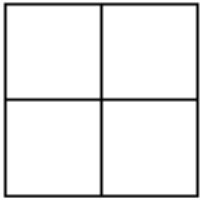
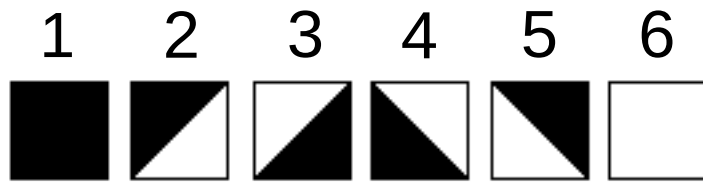
## Practice



Example:

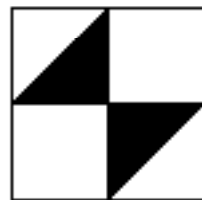
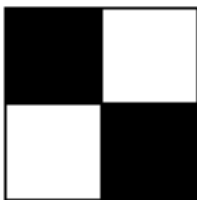
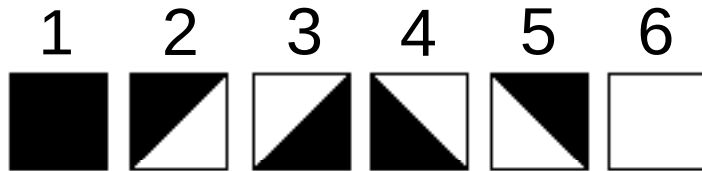


# Form A

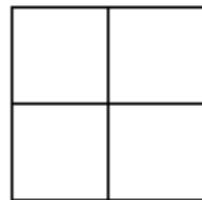
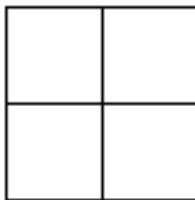
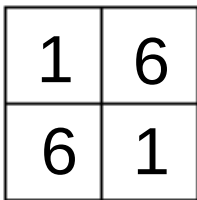


# Design Organization Test

## Practice

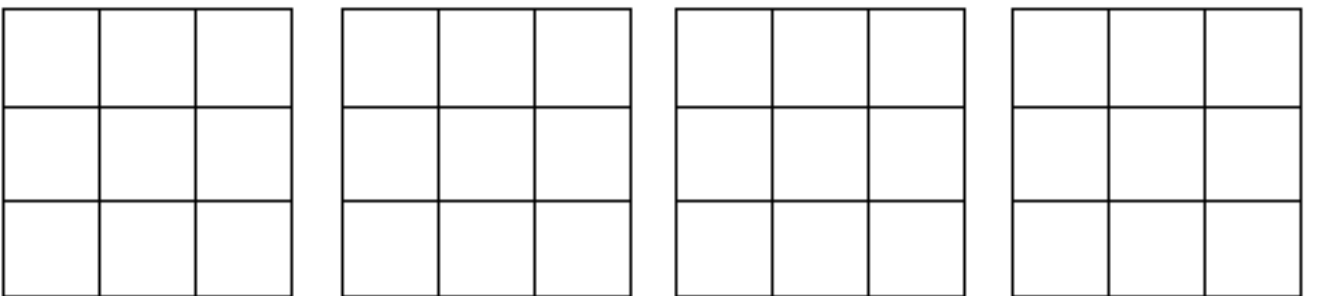
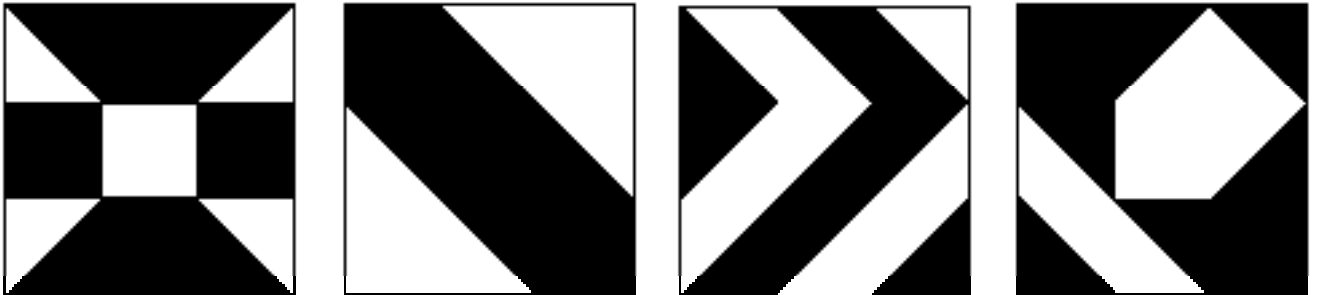
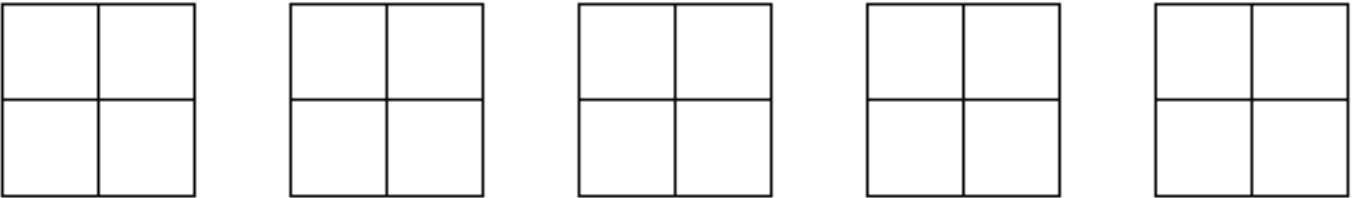
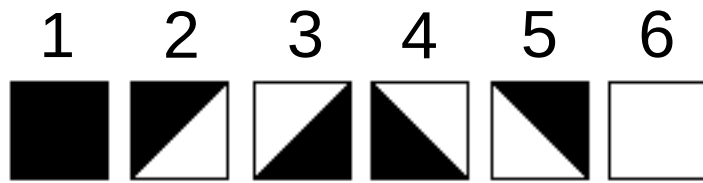


Example:

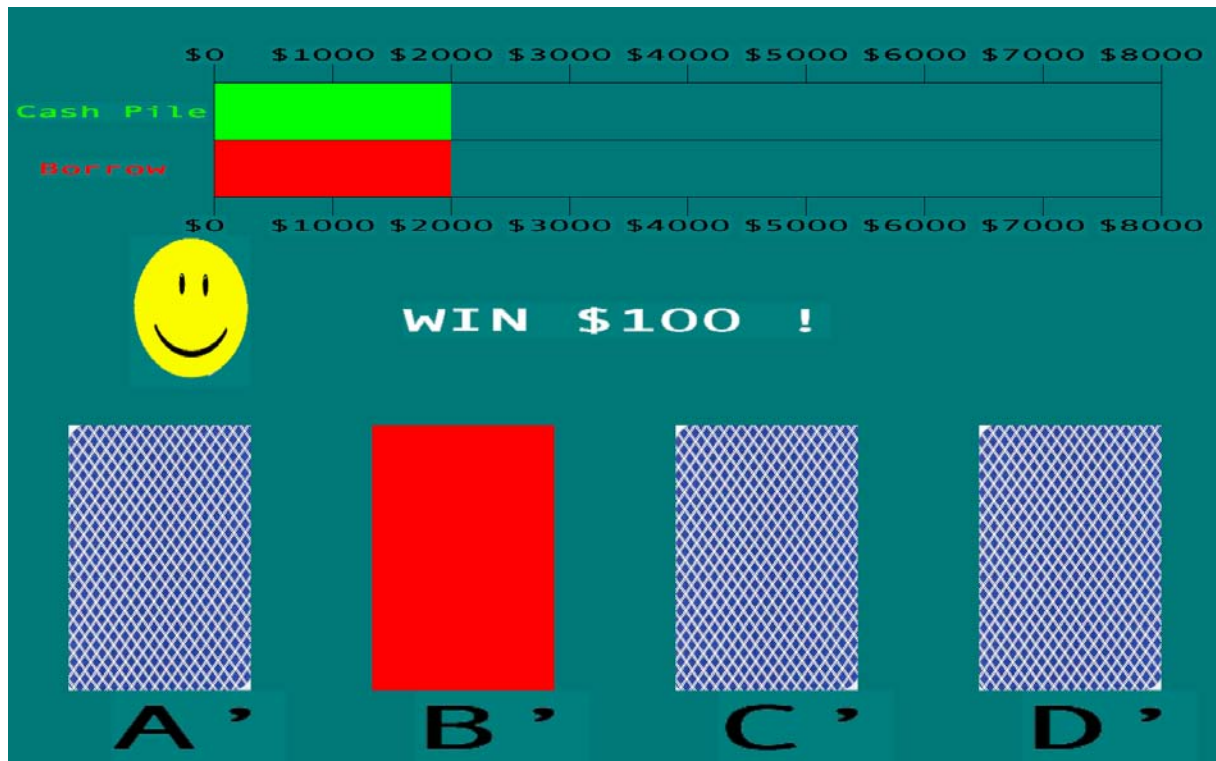




# Form B



# Iowa Gambling Task (IGT)



# NEO-PI-R



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## NEO Personality Inventory-Revised (NEO PI-R™)

Paul T. Costa, Jr., PhD, Robert R. McCrae, PhD



The NEO PI-R is based on decades of factor analytic research with adult populations.

**Purpose:** Obtain a detailed assessment of normal personality in ages 17 years and older

**Age Range:** Adult  
 Elder Adult

**Admin:** Individual or group

**Time:** 35-45 minutes

**Qualification:** [S](#) or [B](#)

**Sample Reports:** N/A

**Related Products:** [NEO PI-R™: Professional Report Service](#)  
[NEO Personality Inventory \(NEO PI-R™\) Spanish Edition](#)  
[Self-Directed Search® Career Explorer](#)  
[NEO Professional Development Report™](#)  
[NEO Software System™ with NEO PI-R™ and NEO-FFI™ Modules](#)

The NEO PI-R, the standard questionnaire measure of the Five Factor Model (FFM), provides a systematic assessment of emotional, interpersonal, experiential, attitudinal, and motivational styles—a detailed personality description that can be a valuable resource for a variety of professionals. The NEO PI-R is a concise measure of the five major domains of personality, as well as the six traits or facets that define each domain. Taken together, the five domain scales and 30 facet scales of the NEO PI-R, including the scales for the Agreeableness and the Conscientiousness domains, facilitate a comprehensive and detailed assessment of normal adult personality. It has useful applications in counseling, clinical psychology, psychiatry, behavioral medicine and health psychology, vocational counseling and industrial/organizational psychology, and educational and personality research.

The NEO PI-R is based on decades of factor analytic research with both clinical and normal adult populations. The five domains measured by the instrument provide a clear and concise description summarizing an individual's emotional, interpersonal, experiential, attitudinal, and motivational styles.

## Administration/Scoring

The NEO PI-R is self-administered and is available in two parallel versions. Each version contains 240 items and three validity items, and requires a 6th-grade reading level.

- Form S, designed for self-reports, is appropriate for use with adults, including individuals of college age.
- Form R, designed for observer reports, is written in the third person for peer, spouse, or expert ratings. It can be used as an alternative measure or as a supplement to self-reports from adult clients.
- Each item is rated on a 5-point scale.
- 2-part carbonless Answer Sheet, usable with either form, eliminates the need for separate scoring keys or templates.
- Self-carbon page of the Answer Sheet contains item values for rapid computation of scale raw scores.
- Three profile forms facilitate score-plotting and conversion to *T* scores.
- 1-page "Your NEO Summary" feedback sheet gives clients easy-to-understand information about the five domains of personality.
- Internal consistency coefficients for both Forms R and S range from .86 to .95 for domain scales and from .56 to .90 for facet scales.
- The NEO PI-R is validated against other personality inventories as well as projective techniques.

Subject ID: \_\_\_\_\_

Date: \_\_\_\_\_

Circle the one phrase that best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience (e.g., “It scares me when I feel shaky” for someone who has never trembled or had the “shakes”), answer on the basis of how you think you might feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience.

1. It is important to me not to appear nervous.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

2. When I cannot keep my mind on a task, I worry that I might be going crazy.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

3. It scares me when I feel “shaky” (trembling).

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

4. It scares me when I feel faint.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

5. It is important to me to stay in control of my emotions.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

6. It scares me when my heart beats rapidly.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

7. It embarrasses me when my stomach growls.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

8. It scares me when I am nauseous

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

9. When I notice that my heart is beating rapidly, I worry that I might have a heart attack.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

10. It scares me when I become short of breath.

*Very Little*                      *A Little*                      *Some*                      *Much*                      *Very Much*

11. When my stomach is upset, I worry that I might be seriously ill.

|                    |                 |             |             |                  |
|--------------------|-----------------|-------------|-------------|------------------|
| <i>Very Little</i> | <i>A Little</i> | <i>Some</i> | <i>Much</i> | <i>Very Much</i> |
|--------------------|-----------------|-------------|-------------|------------------|

12. It scares me when I am unable to keep my mind on a task.

|                    |                 |             |             |                  |
|--------------------|-----------------|-------------|-------------|------------------|
| <i>Very Little</i> | <i>A Little</i> | <i>Some</i> | <i>Much</i> | <i>Very Much</i> |
|--------------------|-----------------|-------------|-------------|------------------|

13. Other people notice when I feel shaky.

|                    |                 |             |             |                  |
|--------------------|-----------------|-------------|-------------|------------------|
| <i>Very Little</i> | <i>A Little</i> | <i>Some</i> | <i>Much</i> | <i>Very Much</i> |
|--------------------|-----------------|-------------|-------------|------------------|

14. Unusual body sensations scare me.

|                    |                 |             |             |                  |
|--------------------|-----------------|-------------|-------------|------------------|
| <i>Very Little</i> | <i>A Little</i> | <i>Some</i> | <i>Much</i> | <i>Very Much</i> |
|--------------------|-----------------|-------------|-------------|------------------|

15. When I am nervous, I worry that I might be mentally ill.

|                    |                 |             |             |                  |
|--------------------|-----------------|-------------|-------------|------------------|
| <i>Very Little</i> | <i>A Little</i> | <i>Some</i> | <i>Much</i> | <i>Very Much</i> |
|--------------------|-----------------|-------------|-------------|------------------|

16. It scares me when I am nervous.

|                    |                 |             |             |                  |
|--------------------|-----------------|-------------|-------------|------------------|
| <i>Very Little</i> | <i>A Little</i> | <i>Some</i> | <i>Much</i> | <i>Very Much</i> |
|--------------------|-----------------|-------------|-------------|------------------|

## MEQ

SUBJECT: \_\_\_\_\_ DATE: \_\_\_\_/\_\_\_\_/\_\_\_\_

1. Considering only your own “feeling best” rhythm, at what time would you get up if you were entirely free to plan your day?  
☐ 5:00 - 6:30 AM  
☐ 6:30 - 7:45 AM  
☐ 7:45 - 9:45 AM  
☐ 9:45 - 11:00 AM  
☐ 11:00 AM - 12:00 PM
2. Considering only your own “feeling best” rhythm, at what time would you go to bed if you were entirely free to plan your evening?  
☐ 8:00 - 9:00 PM  
☐ 9:00 - 10:15 PM  
☐ 10:15 PM - 12:30 AM  
☐ 12:30 - 1:45 AM  
☐ 1:45 - 3:00 AM
3. If there is a specific time at which you have to get up in the morning, to what extent are you dependent on being woken up by an alarm clock?  
☐ not at all dependent  
☐ slightly dependent  
☐ fairly dependent  
☐ very dependent
4. Assuming adequate environmental conditions, how easy do you find getting up in the mornings?  
☐ not at all easy  
☐ not very easy  
☐ fairly easy  
☐ very easy
5. How alert do you feel during the first half hour after having woken in the mornings?  
☐ not at all alert  
☐ slightly alert  
☐ fairly alert  
☐ very alert
6. How is your appetite during the first half-hour after having woken in the mornings?  
☐ very poor  
☐ fairly poor  
☐ fairly good  
☐ very good
7. During the first half-hour after having woken in the morning, how tired do you feel?  
☐ very tired  
☐ fairly tired  
☐ fairly refreshed  
☐ very refreshed

8. When you have no commitments the next day, at what time do you go to bed compared to your usual bedtime?

- ☐ seldom or never later
- ☐ less than one hour later
- ☐ 1-2 hours later
- ☐ more than two hours later

9. You have decided to engage in some physical exercise. A friend suggests that you do this one hour twice a week and the best time for him is between 7:00-8:00 AM. Bearing in mind nothing else but your own “feeling best” rhythm how do you think you would perform?

- ☐ would be in good form
- ☐ would be in reasonable for
- ☐ would find it difficult
- ☐ would find it very difficult

10. At what time in the evening do you feel tired and as a result in need of sleep?

- ☐ 8:00 - 9:00 PM
- ☐ 9:00 - 10:15 PM
- ☐ 10:15 PM - 12:45 AM
- ☐ 12:45 - 2:00 AM
- ☐ 2:00 - 3:00 AM

11. You wish to be at your peak performance for a test which you know is going to be mentally exhausting and lasting for two hours. You are entirely free to plan your day and considering only your own “feeling best” rhythm which ONE of the four testing times would you choose?

- ☐ 8:00 - 10:00 AM
- ☐ 11:00 AM - 1:00 PM
- ☐ 3:00 - 5:00 PM
- ☐ 7:00 - 9:00 PM

12. If you went to bed at 11:00 PM at what level of tiredness would you be?

- ☐ not at all tired
- ☐ a little tired
- ☐ fairly tired
- ☐ very tired

13. For some reason you have gone to bed several hours later than usual, but there is no need to get up at any particular time the next morning. Which ONE of the following events are you most likely to experience?

- ☐ will wake up at usual time and will NOT fall asleep
- ☐ will wake up at usual time and will doze thereafter
- ☐ will wake up at usual time but will fall asleep again
- ☐ will NOT wake up until later than usual

14. One night you have to remain awake between 4:00 - 6:00 AM in order to carry out a night watch. You have no commitments the next day. Which ONE of the following alternatives will suit you best?

- ☐ would NOT go to bed until watch was over
- ☐ would take a nap before and sleep after
- ☐ would take a good sleep before and nap after
- ☐ would take ALL sleep before watch

15. You have to do two hours of hard physical work. You are entirely free to plan your day and considering only your own “feeling best” rhythm which ONE of the following times would you choose?
- ☐ 8:00 - 10:00 AM
  - ☐ 11:00 AM - 1:00 PM
  - ☐ 3:00 - 5:00 PM
  - ☐ 7:00 - 9:00 PM
16. You have decided to engage in hard physical exercise. A friend suggests that you do this for one hour twice a week and the best time for him is between 10:00 - 11:00 PM. Bearing in mind nothing else but your own “feeling best” rhythm how well do you think you would perform?
- ☐ would be in good form
  - ☐ would be in reasonable form
  - ☐ would find it difficult
  - ☐ would find it very difficult
17. Suppose that you can choose your own work hours. Assume that you worked a FIVE-hour day (including breaks) and that your job was interesting and paid by results. During which time period would you want that five consecutive hours to END?
- ☐ 12:00 - 4:00 AM
  - ☐ 4:00 - 8:00 AM
  - ☐ 8:00 - 9:00 AM
  - ☐ 9:00 AM - 2:00 PM
  - ☐ 2:00 - 5:00 PM
  - ☐ 5:00 PM - 12:00 AM
18. At what time of the day do you think that you reach your “feeling best” peak?
- ☐ 12:00 - 5:00 AM
  - ☐ 5:00 - 8:00 AM
  - ☐ 8:00 - 10:00 AM
  - ☐ 10:00 AM - 5:00 PM
  - ☐ 5:00 - 10:00 PM
  - ☐ 10:00 PM - 12:00 AM
19. One hears about “morning” and “evening” types of people. Which ONE of these types do you consider yourself to be?
- ☐ definitely a “morning” person
  - ☐ rather more a “morning” than an “evening” type
  - ☐ rather more an “evening” than a “morning” type
  - ☐ definitely an “evening” type



**CECS**

Below are listed some of the reactions people have to certain feelings or emotions. Read each one and indicate how far it describes the way you **generally** react. Indicate your answer by circling the appropriate number on the scale. Please work quickly.

**When I feel angry (very annoyed):**

Almost never   Sometimes   Often   Almost always

- |                                       |   |   |   |   |
|---------------------------------------|---|---|---|---|
| 1. I keep quiet.                      | 1 | 2 | 3 | 4 |
| 2. I refuse to argue or say anything. | 1 | 2 | 3 | 4 |
| 3. I bottle it up.                    | 1 | 2 | 3 | 4 |
| 4. I say what I feel.                 | 1 | 2 | 3 | 4 |
| 5. I avoid making a scene.            | 1 | 2 | 3 | 4 |
| 6. I smother my feelings.             | 1 | 2 | 3 | 4 |
| 7. I hide my annoyance.               | 1 | 2 | 3 | 4 |

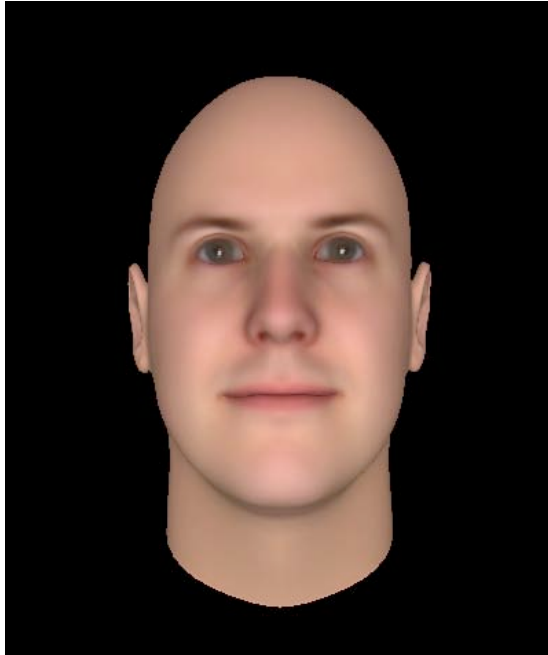
**When I feel unhappy (miserable):**

- |                                       |   |   |   |   |
|---------------------------------------|---|---|---|---|
| 8. I refuse to say anything about it. | 1 | 2 | 3 | 4 |
| 9. I hide my unhappiness.             | 1 | 2 | 3 | 4 |
| 10. I put on a bold face.             | 1 | 2 | 3 | 4 |
| 11. I keep quiet.                     | 1 | 2 | 3 | 4 |
| 12. I let others see how I feel.      | 1 | 2 | 3 | 4 |
| 13. I smother my feelings.            | 1 | 2 | 3 | 4 |
| 14. I bottle it up.                   | 1 | 2 | 3 | 4 |

**When I feel afraid (worried):**

- |                                        |   |   |   |   |
|----------------------------------------|---|---|---|---|
| 15. I let others see how I feel.       | 1 | 2 | 3 | 4 |
| 16. I keep quiet.                      | 1 | 2 | 3 | 4 |
| 17. I refuse to say anything about it. | 1 | 2 | 3 | 4 |
| 18. I tell others all about it.        | 1 | 2 | 3 | 4 |
| 19. I say what I feel.                 | 1 | 2 | 3 | 4 |
| 20. I bottle it up.                    | 1 | 2 | 3 | 4 |
| 21. I smother my feelings.             | 1 | 2 | 3 | 4 |

## Emotional Face Go/No-Go



**GO**



**NO-GO**

Subject ID: \_\_\_\_\_

## BECK DEPRESSION INVENTORY

Rate for the last week:

- A. (Sadness)  
0. I do not feel sad  
1. I feel sad  
2. I am sad all the time and I can't snap out of it  
3. I am so sad or unhappy that I can't stand it
- B. (Pessimism)  
0. I do not feel particularly discouraged about the future  
1. I feel discouraged about the future  
2. I feel I have nothing to look forward to  
3. The future is hopeless and things cannot improve
- C. (Sense of Failure)  
0. I do not feel like a failure  
1. I feel like I have failed more than the average person  
2. As I look back on my life all I can see is failures  
3. I feel I am a complete failure as a person
- D. (Dissatisfaction)  
0. I get as much satisfaction out of things as I used to  
1. I don't enjoy things the way I used to  
2. I don't get any real satisfaction out of anything  
3. I am dissatisfied or bored with everything
- E. (Guilt)  
0. I don't feel particularly guilty  
1. I feel guilty a good part of the time  
2. I feel quite guilty most of the time  
3. I feel guilty all of the time
- F. (Sense of Punishment)  
0. I don't feel I am being punished  
1. I feel I may be punished  
2. I expect to be punished  
3. I feel I am being punished
- G. (Self-Dislike)  
0. I don't feel disappointed in myself  
1. I am disappointed in myself  
2. I am disgusted with myself  
3. I hate myself
- H. (Self-Accusations)  
0. I don't feel I am any worse than anybody else  
1. I am critical of myself for my weaknesses  
2. I blame myself all the time for my faults  
3. I blame myself for everything bad that happens
- I. (Self-Harm)  
0. I don't have any thoughts of killing myself  
1. I have thoughts of killing myself but I would not  
2. I would like to kill myself  
3. I would kill myself if I had the chance
- J. (Crying Spells)  
0. I don't cry any more than usual  
1. I cry more now than I used to  
2. I cry all the time now  
3. I used to be able to cry but now I can't cry
- K. (Irritability)  
0. I am no more irritated now than I ever am  
1. I get annoyed or irritated more easily  
2. I feel irritated all the time now  
3. I don't get irritated by all the things that used to irritate me
- L. (Social Withdrawal)  
0. I have not lost interest in other people  
1. I am less interested in people than I used to be  
2. I have lost most of my interest in other people  
3. I have lost all of my interest in other people
- M. (Indecisiveness)  
0. I make decisions about as well as I ever could  
1. I put off making decisions more than I used to  
2. I have greater difficulty in making decisions  
3. I can't make decisions at all any more
- N. (Self-Image Change)  
0. I don't feel I look any worse than I used to  
1. I am worried that I am looking old or unattractive  
2. I feel there are permanent changes in my appearance that make me look unattractive  
3. I believe that I look ugly
- O. (Work Difficulty)  
0. I can work about as well as before  
1. It takes extra effort to get started  
2. I have to push myself very hard to do anything  
3. I can't do any work at all
- P. (Sleep Disturbance)  
0. I can sleep as well as usual  
1. I don't sleep as well as I used to  
2. I wake up 1-2 hours earlier than usual and find it hard to get back to sleep  
3. I wake up several hours earlier than I used to and cannot get back to sleep
- Q. (Fatigability)  
0. I don't get any more tired than usual  
1. I get tired more easily than I used to  
2. I get tired from going almost anything  
3. I am too tired to do anything
- R. (Anorexia)  
0. My appetite is no worse than usual  
1. My appetite is not as good as it used to be  
2. My appetite is much worse now  
3. I have no appetite at all any more
- S. (Weight Loss)  
0. I haven't lost much weight, if any, lately  
1. I have lost more than 5 pounds  
2. I have lost more than 10 pounds  
3. I have lost more than 15 pounds
- I am purposely trying to lose weight by eating less  
Yes \_\_\_\_\_ No \_\_\_\_\_
- T. (Somatic Preoccupation)  
0. I am no more worried about my health than usual  
1. I am worried about physical problems such as aches and pains, upset stomach, and constipation  
2. I am very worried about physical problems and it's hard to think about much else  
3. I am so worried about my physical problems that I cannot think about anything else
- U. (Loss of Libido)  
0. I have not noticed change in my interest in sex  
1. I am less interested in sex than I used to be  
2. I am much less interested in sex now  
3. I have lost interest in sex completely

# Personality Assessment Inventory (PAI)



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Revised and updated materials help increase the accuracy of personality assessment.

**Purpose:** 22 nonoverlapping full scales provide a comprehensive assessment of adult psychopathology in ages 18 years and older

**Age Range:** Adult  
Elder Adult

**Admin:** Individual or group

**Time:** 50-60 minutes to administer; 15-20 minutes to score

**Qualification:** [C](#)

**Sample Reports:** N/A

**Related Products:** [PAI® Professional Report Service](#)

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[Personality Assessment Inventory™-Adolescent](#)

With its newly revised Professional Manual, Profile Form Adults-Revised, and Critical Items Form-Revised, the PAI® continues to raise the standard for the assessment of adult psychopathology. This objective inventory of adult personality assesses psychopathological syndromes and provides information relevant for clinical diagnosis, treatment planning, and screening for psychopathology. Since its introduction, the PAI has been heralded as one of the most important innovations in the field of clinical assessment.

### PAI® Scales and Subscales

The 344 PAI items constitute 22 nonoverlapping scales covering the constructs most relevant to a broad-based assessment of mental disorders: 4 validity scales, 11 clinical scales, 5 treatment scales, and 2 interpersonal scales. To facilitate interpretation and to cover the full range of complex clinical constructs, 10 scales contain conceptually derived subscales.

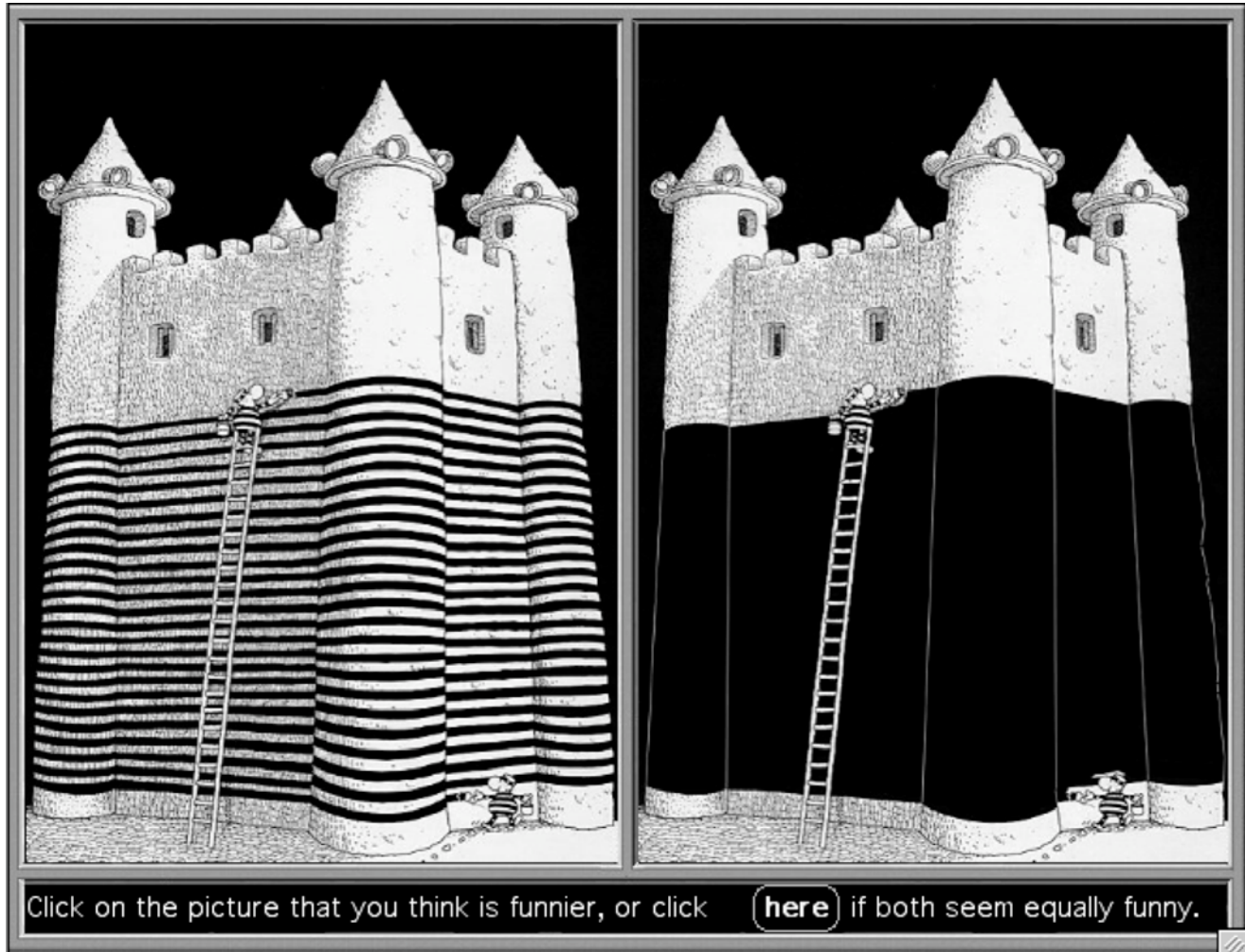
The PAI Clinical scales were developed to provide information about critical diagnostic features of 11 important clinical constructs. These 11 scales may be divided into three broad classes of disorders: those within the neurotic spectrum, those within the psychotic spectrum, and those associated with behavior disorder or impulse control problems.

The Treatment scales were developed to provide indicators of potential complications in treatment that would not necessarily be apparent from diagnostic information. These five scales include two indicators of potential for harm to self or others, two measures of the respondent's environmental circumstances, and one indicator of the respondent's motivation for treatment.

The Interpersonal scales were developed to provide an assessment of the respondent's interpersonal style along two dimensions: a warmly affiliative versus a cold rejecting style, and a dominating/controlling versus a meekly submissive style. These axes provide a useful way of conceptualizing many different mental disorders: persons at the extremes of these dimensions may present with a variety of disorders. A number of studies provide evidence that diagnostic groups differ on these dimensions.

The PAI includes a Borderline Features scale and an Antisocial Features scale. Both of these scales specifically assess character pathology. The Borderline Features scale is the only PAI scale that has four subscales, reflecting the factorial complexity of the construct. The Antisocial Features scale includes a total of three facets: one assessing antisocial behaviors, and the other two assessing antisocial traits.

## Humor Appreciation Test (HAT)



Subject: \_\_\_\_\_

**GAT**

Date: \_\_\_\_\_

**During the past four weeks, how have you felt about your relationship (spouse/significant other) and your family?**

|                                                        | Not at all<br>satisfied | Somewhat<br>satisfied | Neutral               | Satisfied             | Extremely<br>satisfied | Not Applicable<br>- no family or<br>relationship |
|--------------------------------------------------------|-------------------------|-----------------------|-----------------------|-----------------------|------------------------|--------------------------------------------------|
| How satisfied are you with your marriage/relationship? | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  | <input type="radio"/>                            |
| How satisfied are you with your family?                | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  | <input type="radio"/>                            |

**Think about how you have acted in actual situations during the past four weeks. Please answer only in terms of what YOU actually did. Please read carefully. Select a number from 0 to 10 according to how often you showed/used the qualities listed?**

|                                                         | Never<br>0            | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | Always<br>10          |
|---------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Creativity-coming up with new ideas                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Curiosity or interest                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Critical thinking, open-mindedness, or good judgement   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Love of learning                                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Perspective or wisdom                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bravery or courage                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Persistence                                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Honesty                                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Zest or enthusiasm                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Love or closeness with others (friends, family members) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Kindness or generosity to others                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Social skills or social awareness or street smarts      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Think about how you have acted in actual situations during the past four weeks. Please answer only in terms of what YOU actually did. Please read carefully. Select a number from 0 to 10 according to how often you showed/used the qualities listed?**

|                                       | Never<br>0            | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     | 8                     | 9                     | Always<br>10          |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Teamwork                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fairness                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Leadership                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Forgiveness or mercy                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Modesty or humility                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Prudence or caution                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Self-control                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Appreciation of beauty and excellence | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Gratitude and thankfulness            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hope or optimism                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Playfulness or humor                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Spirituality                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



**How well do these statements describe you?**

|                                                               | Not like me           | Not much like me      | Somewhat like me      | Mostly like me        | Very much like me     |
|---------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I am good at changing myself to adjust to changes in my life. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It is difficult for me to adjust to changes.                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can usually fit myself into any situation.                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**How well do these statements describe you?**

|                                                                          | Not like me           | Not much like me      | Somewhat like me      | Mostly like me        | Very much like me     |
|--------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| For things I cannot change, I accept them and move on.                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I control my emotions by changing how I think about things.              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When something stresses me out, I try to avoid it or not think about it. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When something stresses me out, I try to solve the problem.              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When bad things happen, I try to see the positive sides.                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I usually keep my emotions to myself.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When something stresses me out, I have effective ways to deal with it.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When I am feeling upset, I keep my feelings to myself.                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Answer in terms of whether the statement describes how you actually live your life.**

|                                                                                            | Not like me at all    | A little like me      | Somewhat like me      | Mostly like me        | Very much like me     |
|--------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I am a spiritual person.                                                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My life has a lasting meaning.                                                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe that in some way my life is closely connected to all humanity and all the world. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The job I am doing at my work has lasting meaning.                                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I believe there is a purpose for my life.                                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Answer in terms of how you usually think.

|                                                                                            | Not like me           | Not much like me      | Somewhat like me      | Mostly like me        | Very much like me     |
|--------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| When bad things happen to me, I expect more bad things to happen.                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When bad things happen to me, I blame myself for them.                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have no control over the things that happen to me.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When bad things happen to me, I cannot stop thinking about how much worse things will get. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When I have a physical problem, I am likely to think that it is something very serious.    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| When I fail at something, I give up all hope.                                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I respond to stress by making things worse than they are.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please be as honest as possible

|                                        | Never                 | Hardly ever           | Some of the time      | Often                 | Most of the time      |
|----------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| How often do you feel left out?        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| How often do you feel close to people? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| How often do you feel part of a group? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please be as honest and accurate as you can throughout. Answer according to your own feelings, rather than how you think most people would answer.

|                                                              | I disagree a lot      | I disagree a little   | I neither agree nor disagree | I agree a little      | I agree a lot         |
|--------------------------------------------------------------|-----------------------|-----------------------|------------------------------|-----------------------|-----------------------|
| In uncertain times, I usually expect the best.               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>        | <input type="radio"/> | <input type="radio"/> |
| If something can go wrong for me, it will.                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>        | <input type="radio"/> | <input type="radio"/> |
| I rarely count on good things happening to me.               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>        | <input type="radio"/> | <input type="radio"/> |
| Overall, I expect more good things to happen to me than bad. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>        | <input type="radio"/> | <input type="radio"/> |

How well do these statements describe your feelings about your job?

|                                                          | Not like me           | Not much like me      | Somewhat like me      | Mostly like me        | Very much like me     | Not Applicable        |
|----------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| My work is one of the most important things in my life   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am committed to my job.                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I would choose my current work again if I had the chance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| How I do in my job influences how I feel.                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



Please indicate how strongly you agree or disagree with each of the following statements.

|                                                                                          | Strongly disagree     | Disagree              | Neutral               | Agree                 | Strongly agree        | Not Applicable        |
|------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| My immediate supervisor has much knowledge about the work that needs to be done.         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I trust my fellow co-workers to look out for my welfare and safety.                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I think we are better trained than most other work groups in my company or organization. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Overall, I trust my immediate supervisor.                                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My superiors/supervisors respect and value me.                                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

How many people are there who you can always count on if you have serious problems?

- ☐ None  
☐ 1  
☐ 2  
☐ 3  
☐ 4 or more

I have a best friend.

- ☐ Yes ☐ No

I am very close to my family.

- ☐ Yes ☐ No

I have someone to talk to when I feel down.

- ☐ Yes ☐ No

I have as much contact with friends (non-work) and family members as I want or need.

- ☐ Yes ☐ No

I spend time at interests or hobbies other than work.

- ☐ Yes ☐ No

**In the past four weeks, how often have you been bothered by any of the following problems?**

|                                                                                                                                                                           | Not at all            | Several days          | More than half the days | Nearly every day      | Every day             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|
| Little interest or pleasure in doing things                                                                                                                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Feeling down, depressed, or hopeless                                                                                                                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Trouble falling or staying asleep, or sleeping too much                                                                                                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Feeling tired or having little energy                                                                                                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Poor appetite or overeating                                                                                                                                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Feeling very angry                                                                                                                                                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Feeling bad about yourself, or that you are a failure, or have let yourself or your family down                                                                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Trouble concentrating on things, such as reading the newspaper or watching television                                                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Feeling very frustrated                                                                                                                                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |
| Moving or speaking so slowly that other people could have noticed. Or the opposite -- being so fidgety or restless that you have been moving around a lot more than usual | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>   | <input type="radio"/> | <input type="radio"/> |

**Please indicate how strongly you agree or disagree with each of the following statements.**

|                                                | Strongly disagree     | Disagree              | Neutral               | Agree                 | Strongly agree        | Not Applicable        |
|------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| My family supports my job/career decisions.    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My job/career meets my family's needs.         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My job/career makes it easy for me to do well. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Here are a number of words that describe different feelings and emotions. How often you have felt this way during the past four weeks?

|                 | Never                 | Hardly ever           | Some of the time      | Often                 | Most of the time      |
|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| joyful          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| sad             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| distressed      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| peaceful/calm   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| excited         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ashamed         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| amused /playful | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| upset           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| inspired        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| hopeful         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| angry           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Here are a number of words that describe different feelings and emotions. How often you have felt this way during the past four weeks?

|                        | Never                 | Hardly ever           | Some of the time      | Often                 | Most of the time      |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| guilty                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| happy/content          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| scared/fearful         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| bored                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| hostile                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| love                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| enthusiastic/energized | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| proud                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| anxious/nervous        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| frustrated             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## **Smart People Go with Their Gut: Emotional Intelligence Correlates with Non-Conscious Insular Responses to Facial Trustworthiness**

William D. S. Killgore, Zachary J. Schwab, Melissa R. Weiner, & Scott L. Rauch

Affective Neuroscience Laboratory, McLean Hospital, Harvard Medical School

Emotional intelligence (EI) is the ability to accurately perceive, understand, and use emotional information to guide decision-making. The neural basis of EI is not well delineated but it has been proposed to involve the Damasio somatic marker circuitry (medial prefrontal cortex [MPFC], insula, and amygdala). We hypothesized that activation within this circuitry during subliminal presentations of facial cues of trustworthiness would be correlated with EI.

Twelve healthy adults (6 male; 6 female) ranging from 19 to 45 years of age completed the Bar-On Emotional Quotient Inventory (EQi) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). During fMRI, participants viewed masked presentations of faces rated high (H) or low (L) in trustworthiness in a blocked paradigm. Conscious awareness of the trustworthiness of each face was effectively prevented via rapid presentation of the target (H or L) face (20 msec) followed by a neutral expression mask (80 msec). Contrast images comparing H vs L conditions were constructed in SPM5 and entered into second level regression analyses with EQi and MSCEIT. Three bilateral search territories comprising the somatic marker circuitry were interrogated ( $p < .005$ ,  $k \geq 5$ ), including MPFC, insula, and amygdala.

Higher EQi scores were associated with reduced MPFC and increased anterior insula responses to lower trustworthiness in faces. EQi was unrelated to amygdala responses. Higher MSCEIT was similarly associated with greater left middle insula and dorsal anterior cingulate gyrus responses to low facial trustworthiness. Amygdala responses were unrelated to MSCEIT.

During subliminal perception of low facial trustworthiness, EI was associated with increased responsiveness of insular cortex, a region of the somatic marker circuitry posited to be critical for social emotions and interoceptive processing (i.e., “gut feelings”). Individuals with higher EI may be more interoceptively responsive to socially relevant stimuli.

# **Whom Can You Trust? Neural Correlates of Subliminal Perception of Facial Trustworthiness**

William D. S. Killgore, Melissa R. Weiner, Zachary J. Schwab, & Scott L. Rauch

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Judging the trustworthiness of others is critical to survival. Prior research suggests that overt perception of untrustworthiness activates the amygdala, but no study has yet examined how perceptual brain responses relate to behavioral discrimination of facial trustworthiness. We hypothesized that greater accuracy in discriminating trustworthiness would be related to activation of the amygdala and medial prefrontal cortex during subliminal presentation of trustworthiness cues.

Eleven healthy adults (6 male) ranging from 19 to 45 years of age underwent fMRI while viewing masked presentations of faces classified as either high (H) or low (L) in facial trustworthiness. Conscious awareness of trustworthiness information was prevented via rapid presentation of the target face (20 msec) followed by a neutral expression (N) mask (80 msec). Participants then made overt trustworthiness judgments (OTJ) for 100 pairs of similar faces previously rated on trustworthiness. Contrast images comparing H and L fMRI conditions with N were entered into a regression analyses with OTJ accuracy as the independent variable. Whole brain analyses were evaluated at  $p < .001$ ,  $k \geq 20$  voxels. An amygdala search territory was interrogated at  $p < .05$ ,  $k \geq 5$  voxels.

OTJ accuracy ranged from 57% to 87%. During H>N, greater accuracy on the OTJ task correlated with increased activation within the right superior medial frontal gyrus. During L>N, OTJ accuracy correlated with increased activation within right superior frontal, middle frontal, medial orbitofrontal gyri, and left middle frontal gyrus. Greater accuracy was correlated with increased amygdala responses to facial untrustworthiness.

Accuracy in discriminating overt facial trustworthiness is related to the responsiveness of the medial prefrontal cortex and bilateral amygdala during subliminal presentations of facial features communicating trustworthiness information. Results support the hypothesized role of these regions in social evaluation.

# Neural Correlates of Cognitive and Emotional Intelligence in Adults

Zachary J. Schwab, Melissa R. Weiner, Scott L. Rauch, & William D. S. Killgore

Affective Neuroscience Laboratory, McLean Hospital, Harvard Medical School

The ability to accurately perceive, understand, and manage emotional information is known as Emotional Intelligence (EI), a construct that is claimed to be distinct from traditional cognitive intelligence (IQ). Construct validity would be bolstered by evidence of neural processing of EI that is distinct from that of IQ during emotion processing tasks. We hypothesized that EI, but not IQ, would correlate negatively with neural responses in emotion processing regions of the amygdala, insula, and ventromedial prefrontal cortex (VMPFC), consistent with greater neural efficiency in higher ability individuals.

Twelve healthy adults ranging in age from 19 to 45 (6 male) underwent functional magnetic resonance imaging (fMRI) while viewing a masked angry-face perception paradigm that minimizes conscious perception of the affective stimulus. Two assessments of EI, the BarOn Emotional Quotient Inventory (EQ-i) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), as well as the Wechsler Abbreviated Scale of Intelligence (WASI), a measure of Full Scale intelligence (FSIQ), were administered. EQ-i, MSCEIT and FSIQ scores were correlated voxel-wise with emotion circuitry activation during the masked anger > neutral contrast using SPM5 ( $p < .005$ ,  $k \geq 5$ ).

Higher EQ-i was associated with reduced left insula and MPFC activation. Similarly, higher MSCEIT was associated with reduced bilateral insula and MPFC activation. Interestingly, higher WASI scores were similarly correlated with reduced bilateral insula and MPFC regions. Amygdala activation was not correlated with EI or IQ.

Findings support the neural efficiency hypothesis (i.e., higher EI individuals recruit less neural resources to deal with emotional information), but also suggest that the neural activation patterns were highly similar to that seen for IQ. Findings suggest that the constructs of EI and IQ may share considerable variance and may not be as distinct as suggested by current theoretical conceptualizations.

## **Cognitive and Emotional Intelligences: Are they Distinct or Related Constructs?**

Zachary J. Schwab, Melissa R. Weiner, Scott L. Rauch, & William D. S. Killgore

Affective Neuroscience Laboratory, McLean Hospital, Harvard Medical School

Emotional intelligence (EI), the ability to accurately perceive, understand, and manage emotional information to guide decision-making, is proposed to be a distinct construct, unrelated to personality or traditional cognitive intelligence (IQ). Despite widespread claims that indices of EI, such as the BarOn Emotional Quotient Inventory (EQ-i) and Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) are unrelated to IQ, there are no published studies correlating EI measures with the gold standard Wechsler scales of intelligence. We hypothesized that 1) EQ-i and MSCEIT would be correlated with one another, 2) EQ-i would correlate with personality but not IQ, and 3) the MSCEIT would correlate with IQ but not personality.

Thirteen healthy adults (7 females) ranging from 19 to 45 completed the MSCEIT, EQ-i, Revised NEO Personality Inventory (NEO), and the Verbal (VIQ), Performance (PIQ), and Full (FSIQ) scales of the Wechsler Abbreviated Scale of Intelligence (WASI). Data were analyzed with bivariate correlation and stepwise linear regression ( $\alpha=.05$ ).

MSCEIT and EQ-i were significantly correlated ( $r=0.62$ ). The EQ-i correlated with FSIQ ( $r=0.74$ ), VIQ ( $r=0.69$ ), PIQ ( $r=0.72$ ), Neuroticism (NEO-N) ( $r=-0.83$ ), and Openness (NEO-O) ( $r=0.64$ ). MSCEIT correlated with FSIQ ( $r=0.74$ ), VIQ ( $r=0.67$ ), PIQ ( $r=0.74$ ), and NEO-O ( $r=0.71$ ). In the regression analysis, MSCEIT was predicted by PIQ only ( $R=0.74$ ). The EQ-i was significantly predicted by a linear combination of VIQ and NEO-N ( $R=0.92$ ).

Contrary to the theoretical claims of EI, we find a significant correlation between measures of EI and IQ. As predicted, however, EQ-i shared significant variance with personality variables, and to a lesser extent, verbal IQ, whereas MSCEIT was most related to performance IQ. The findings clarify our understanding of emotional intelligence, showing that the two major models share significant common variance, but are each predicted by unique combinations of cognitive ability and personality.

# **Discrepancy Scores Between Cognitive and Emotional Intelligence Predict Neural Responses to Affective Stimuli**

Zachary J. Schwab, Melissa R. Weiner, Scott L. Rauch, & William D. S. Killgore

Affective Neuroscience Laboratory, McLean Hospital, Harvard Medical School

Emotional intelligence (EI) is the ability to perceive, understand, and manage emotional information. As a construct, EI is posited to be independent of cognitive intelligence (IQ). We examined discrepancy scores between both constructs and correlated these difference scores with neural responses during a passive affect perception task. We hypothesized that discrepancies favoring EI over IQ (“Feeling” types) would correlate with task-related activation of limbic and paralimbic emotion processing regions than those with greater IQ than EI (“Thinking” types).

Twelve healthy adults ranging in age from 19 to 45 (6 male) underwent functional magnetic resonance imaging (fMRI) while viewing a masked angry-face perception task that minimizes conscious perception of the affective stimulus. Participants completed measures of EI (BarOn Emotional Quotient Inventory (EQ-i); Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)), and IQ (Wechsler Abbreviated Scale of Intelligence (WASI)). Discrepancy scores (EQ-i–WASI; MSCEIT–WASI) were calculated and correlated voxel-wise with activation within the search territory defined by the medial prefrontal cortex, insula, and amygdala during the masked anger > neutral contrast using SPM5 ( $p < .005$ ,  $k \geq 5$ ).

On the EQ-i, feeling scores correlated with activation of the right amygdala and anterior cingulate gyrus. Similarly, on the MSCEIT, feeling correlated with activation in the anterior cingulate gyrus. In contrast, discrepancy scores favoring a “thinking” style were unrelated to activation within the limbic and paralimbic search territories.

During a passive emotion-viewing task, participants with relatively greater EI than IQ scores showed increased activation within a network of regions involved in emotional processing. Findings support the construct validity of EI by showing that it may provide useful information about emotional functioning when juxtaposed with measures of related but distinct constructs.



# **Impulsiveness Predicts Responses of Brain Reward Circuitry to High Calorie Foods**

Melissa R. Weiner, Zachary J. Schwab, Scott L. Rauch, & William D. S. Killgore,

Affective Neuroscience Laboratory, McLean Hospital, Harvard Medical School

Impulsive individuals often fail to inhibit behavioral responses to rewarding stimuli. Thus, impulsiveness may be a risk factor for making unhealthy food choices and overeating. We hypothesized that impulsiveness would be positively correlated with activation in areas involved in the anticipation of reward (i.e., nucleus accumbens) and negatively correlated with regions involved in inhibitory control and evaluation of punishing stimuli (i.e., lateral orbitofrontal cortex) during passive perception of high-calorie food images.

Eleven healthy adults (5 men) aged 19 to 45 underwent functional magnetic resonance imaging (fMRI) while viewing pictures of high-calorie foods, low-calorie foods, and control images of plants and rocks. Subjects viewed 5 alternating 30-second blocks of experimental and control stimuli, each consisting of ten images. Participants completed the Barratt Impulsiveness Scale (BIS-11A), a self-report questionnaire of impulsive personality traits. Contrast images comparing brain activation to high-calorie versus low-calorie conditions were created using SPM5 and then correlated voxel-wise with total BIS scores in a second-level regression model ( $p < .005$ ,  $k > 10$ ).

As hypothesized, total BIS scores were positively correlated with activation for high-calorie versus low-calorie foods in the left nucleus accumbens ( $r = 0.89$ ,  $p < .001$ ). BIS scores were negatively correlated with activation in the left lateral orbitofrontal cortex ( $r = -0.85$ ,  $p = 0.001$ ) and left anterior insula ( $r = -0.92$ ,  $p < .001$ ).

Results are consistent with our hypothesis that when confronted with unhealthy high calorie food options, individuals with greater impulsiveness show increased activation in regions involved in the anticipation of reward and reduced activation within regions involved in suppression and control of appetite and behavior. Findings suggest a potential neurobiological link between impulsiveness and responses to food stimuli that may relate to unhealthy food intake.

# **Conscientiousness Predicts Brain Responses to Images of High-Calorie Foods**

Melissa R. Weiner, Zachary J. Schwab, Scott L. Rauch, & William D. S. Killgore,

Affective Neuroscience Laboratory, McLean Hospital, Harvard Medical School

With the growing obesity epidemic, it is important to understand the behavioral, characterological, and neural bases of human responses to unhealthy food stimuli. Conscientiousness (C), a personality trait defined by the tendency to be self-disciplined, controlled, and motivated, may contribute to an individual's behavioral responses when confronted with unhealthy dietary choices. We hypothesized that C would be positively correlated with activation in areas involved in inhibitory control (i.e. prefrontal cortex) and negatively correlated with regions involved in hunger, craving, and other visceral responses (i.e., insula) during passive viewing of high-calorie food images.

Eleven healthy adults (5 men) aged 19 to 45 underwent functional magnetic resonance imaging (fMRI) while viewing images of high-calorie foods, low-calorie foods, and control images of plants and rocks. Subjects viewed 5 alternating 30-second periods of experimental and control stimuli, each consisting of ten images (2500 msec stimulus presentation; 500 msec inter-stimulus interval). Subjects completed the Revised NEO personality inventory (NEO-PI-R), which includes a factor scale measuring C. Contrast images comparing high-calorie versus low-calorie conditions were correlated voxel-wise with C scores in a random-effects regression model in SPM5 ( $p < .005$ ,  $k > 10$ ).

C positively correlated with greater activation to high-calorie foods in the left medial orbitofrontal cortex. In contrast, C was negatively correlated with activation in the dorsal anterior cingulate gyrus as well as anterior and posterior insular cortex bilaterally.

Individuals with higher C responded to appetizing high-calorie food images with increased activation of regions involved in inhibitory control and reduced activation within areas involved in craving, hunger, and visceral sensations. Understanding the neural basis of C may contribute to efforts to help individuals modulate their responses to food and minimize dietary excesses.

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**CONTROL ID:** 956079**CONTACT (NAME ONLY):** Marisa Silveri**PRESENTER:** David Crowley**Abstract Details****PRESENTATION TYPE:** Poster Only**CURRENT CATEGORY:** Emotional Processes**KEYWORDS:** adolescence, inhibitory control, affective processing, normal.**Abstract****TITLE:** Differential Influence of Facial Expression on Inhibitory Capacity in Adolescents versus Adults**AUTHORS (FIRST NAME INITIAL LAST NAME):** D. J. Crowley, M. J. Covell, W. D. Killgore, Z. J. Schwab, M. R. Weiner, D. Acharya, I. M. Rosso, M. M. Silveri**ABSTRACT BODY:**

**Objective :** Adolescence is a time of notable alterations in cognitive functioning, including significant gains in behavioral self-control and an improved ability to ascribe emotional significance to stimuli. In the present study, we examined age differences in response inhibition using a Go No Go behavioral paradigm, which required subjects to respond or inhibit responding based on threat or safety cues present in the expression of facial stimuli.

**Participants and Methods:** Subjects were first required to respond (Go) to safe faces while inhibiting responding (No Go) to threatening faces, and then to respond (Go) to threatening faces and inhibit responding (No Go) to safe faces. Percent accuracy data for Go and No Go trials were acquired from 32 subjects, 19 adolescents aged  $13.5 \pm 0.9$  years and 13 adults aged  $33.8 \pm 9.4$  years.

**Results :** Adults exhibited significantly better accuracy, on both Go and No Go trials, when safe faces were presented (93% and 92%, respectively) compared to when threatening faces were presented (76% and 81%, respectively). While adolescents also exhibited significantly better accuracy for safe faces than for threatening faces, this pattern was only observed on Go trials (93% for safe faces and 84% for threatening faces). In contrast, adolescents performed significantly worse than adults on No Go trials, regardless of facial expression (61% for safe faces and 56% for threatening faces).

**Conclusions :** These findings suggest an age-related influence of facial expression on inhibitory capacity. Consistent with previous reports, adolescents in the present study demonstrated worse inhibitory control than adults. These data also indicate that while facial expression does not influence response inhibition in adolescents, the presence of a safe stimulus serves to enhance inhibitory capacity in adults. Thus, developmental changes in the ability to discriminate and utilize social information may contribute to improvements in inhibitory capacity with age. Supported by K01AA014651 & R01AA018153 (MMS).

## CURRICULUM VITAE

**DATE PREPARED:** October 6, 2010

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### **Education:**

|      |                                                      |
|------|------------------------------------------------------|
| 1985 | A.A. (Liberal Arts), San Antonio College             |
| 1985 | A.A.S (Radio-TV-Film), San Antonio College           |
| 1990 | B.A. (Psychology), Summa cum laude, U. Of New Mexico |
| 1992 | M.A. (Clinical Psychology), Texas Tech University    |
| 1996 | PH.D. (Clinical Psychology), Texas Tech University   |

### **Postdoctoral Training:**

|             |                                                                                              |
|-------------|----------------------------------------------------------------------------------------------|
| 08/95-07/96 | Predoctoral Fellow, Clinical Psychology, Yale School of Medicine                             |
| 08/96-07/97 | Postdoctoral Fellow, Clinical Neuropsychology, University of Oklahoma Health Sciences Center |
| 08/97-07/99 | Postdoctoral Fellow, Clinical Neuropsychology, University of Pennsylvania Medical School     |
| 08/99-07/00 | Research Fellow, Neuroimaging, McLean Hospital, Harvard Medical School                       |

### **Licensure and Certification:**

|       |                                                     |
|-------|-----------------------------------------------------|
| 2001- | Clinical Psychologist, New Hampshire, License #966. |
|-------|-----------------------------------------------------|

### **Faculty Academic Appointments:**

|       |                                                                                               |
|-------|-----------------------------------------------------------------------------------------------|
| 2000- | Instructor in Psychology in the Department of Psychiatry, Harvard Medical School, Belmont, MA |
| 2008- | Faculty Affiliate, Div of Sleep Medicine, Harvard Medical School, Boston, MA                  |

**Appointments at Hospitals/Affiliated Institutions:**

|             |                                                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 08/99-07/00 | Research Fellow in Psychology, McLean Hospital, Belmont, MA                                                                                    |
| 08/00-09/02 | Assistant Research Psychologist, McLean Hospital, Belmont, MA                                                                                  |
| 08/02-07/04 | Research Psychologist, Department of Behavioral Biology, Walter Reed Army Institute of Research, Silver Spring, MD                             |
| 09/02-04/05 | Special Volunteer, National Institute on Deafness and Other Communication Disorders (NIDCD), National Institutes of Health (NIH), Bethesda, MD |
| 10/02-07/07 | Consultant in Psychology, McLean Hospital, Belmont, MA                                                                                         |
| 08/04-10/07 | Chief, Neurocognitive Performance Branch, Walter Reed Army Institute of Research, Silver Spring, MD                                            |
| 08/05-07/06 | Neuropsychology Postdoctoral Program Research Training Site Supervisor, Walter Reed Hospital, Washington, DC                                   |
| 08/07-      | Research Psychologist, McLean Hospital, Belmont, MA                                                                                            |

**Other Professional Positions:**

|             |                                                                                       |
|-------------|---------------------------------------------------------------------------------------|
| 08/02-07/05 | Captain, Medical Service Corps, United States Army                                    |
| 08/05-10/07 | Major, Medical Service Corps, United States Army                                      |
| 10/07-      | Major, Medical Service Corps, United States Army Reserve (USAR)                       |
| 10/07-04/10 | Chief Psychologist, GovSource, Inc., U.S. Department of Defense Government Contractor |
| 8/08-       | Consulting Psychologist, The Brain Institute, University of Utah                      |

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|      |                                                                                                |
|------|------------------------------------------------------------------------------------------------|
| 2003 | Scientific Review Committee, Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD |
| 2005 | Scientific Review Committee, Walter Reed Army Institute of Research (WRAIR), Silver Spring, MD |

**Regional**

|           |                                                                                                                 |
|-----------|-----------------------------------------------------------------------------------------------------------------|
| 2005-2006 | Undergraduate Honors Thesis Committee, Jessica Richards [Chairperson], University of Maryland, Baltimore County |
|-----------|-----------------------------------------------------------------------------------------------------------------|

**National**

|           |                                                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------|
| 2004      | University of Alabama, Clinical Nutrition Research Center (UAB CNRC) Pilot/Feasibility Study Program Review Committee                |
| 2006      | U.S. Small Business Administration, Small Business Technology Transfer (STTR) Program Review Committee                               |
| 2006-2008 | Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program           |
| 2009      | Sleep Physiology and Fatigue Interventions Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program |

**International**

2005                      Doctoral Thesis Committee, Belinda J. Liddell, University of Sydney, Australia

**Professional Societies:**

1995-1997              American Psychological Association, Member  
1998-2000              National Academy of Neuropsychology, Member

**Grant Review Activities:**

**National**

2004                      University of Alabama, Clinical Nutrition Research Center (UAB CNRC)  
Pilot/Feasibility Study Program Review Committee  
2006                      U.S. Small Business Administration, Small Business Technology Transfer  
(STTR) Program Review Committee  
2006                      Cognitive Performance Assessment Program Area Steering Committee, U.S.  
Army Military Operational Medicine Research Program Funding Panel  
2007                      Cognitive Performance Assessment Program Area Steering Committee, U.S.  
Army Military Operational Medicine Research Program Funding Panel  
2008                      United States Army Medical Research and Materiel Command (USAMRMC)  
Congressionally Directed Medical Research Programs (CDMRP) Extramural  
Grant Review Panel  
2009                      NIH-CSR Brain Disorders and Clinical Neuroscience N02 Member Study  
Conflict Section Review Panel

**International**

2009                      Scotland, UK, Biomedical and Therapeutic Research Committee, Grant  
Reviewer  
2010                      Canada, Social Sciences and Humanities Research Council of Canada, Grant  
Reviewer

**Editorial Boards:**

2009-                      Editorial Board Member, International Journal of Eating Disorders

**Journal Reviewer:**

2001-2010              Reviewer, Psychological Reports  
2001-2010              Reviewer, Perceptual and Motor Skills  
2002                      Reviewer, American Journal of Psychiatry  
2002-2009              Reviewer, Biological Psychiatry  
2003                      Reviewer, Clinical Neurology and Neurosurgery  
2004                      Reviewer, NeuroImage  
2004                      Reviewer, Neuropsychologia  
2004                      Reviewer, Journal of Neuroscience  
2004                      Reviewer, Consciousness and Cognition  
2005                      Reviewer, Experimental Brain Research  
2005                      Reviewer, Schizophrenia Research  
2005-2009              Reviewer, Archives of General Psychiatry  
2005                      Reviewer, Behavioral Brain Research

|           |                                                                |
|-----------|----------------------------------------------------------------|
| 2005-2009 | Reviewer, Human Brain Mapping                                  |
| 2005-2006 | Reviewer, Psychiatry Research: Neuroimaging                    |
| 2006      | Reviewer, Journal of Abnormal Psychology                       |
| 2006      | Reviewer, Neuropsychologia                                     |
| 2006      | Reviewer, Psychopharmacology                                   |
| 2006      | Reviewer, Developmental Science                                |
| 2006      | Reviewer, Acta Psychologica                                    |
| 2006      | Reviewer, Neuroscience Letters                                 |
| 2006-2008 | Reviewer, Journal of Sleep Research                            |
| 2006-2007 | Reviewer, Physiology and Behavior                              |
| 2006-2009 | Reviewer, SLEEP                                                |
| 2007      | Reviewer, Journal of Clinical and Experimental Neuropsychology |
| 2008      | Reviewer, European Journal of Child and Adolescent Psychiatry  |
| 2008      | Reviewer, Judgment and Decision Making                         |
| 2008-2010 | Reviewer, Aviation, Space, & Environmental Medicine            |
| 2008      | Reviewer, Journal of Psychophysiology                          |
| 2008      | Reviewer, Brazilian Journal of Medical and Biological Research |
| 2008      | Reviewer, The Harvard Undergraduate Research Journal           |
| 2008      | Reviewer, Bipolar Disorders                                    |
| 2008-2010 | Reviewer, Chronobiology International                          |
| 2008      | Reviewer, International Journal of Obesity                     |
| 2009      | Reviewer, European Journal of Neuroscience                     |
| 2009-2010 | Reviewer, International Journal of Eating Disorders            |
| 2009      | Reviewer, Psychophysiology                                     |
| 2009      | Reviewer, Traumatology                                         |
| 2009      | Reviewer, Clinical Medicine: Therapeutics                      |
| 2009      | Reviewer, Acta Pharmacologica Sinica                           |
| 2009      | Reviewer, Collegium Antropologicum                             |
| 2009      | Reviewer, Journal of Psychopharmacology                        |
| 2009-2010 | Reviewer, Obesity                                              |
| 2009      | Reviewer, Scientific Research and Essays                       |
| 2009      | Reviewer, Child Development Perspectives                       |
| 2009-2010 | Reviewer, Personality and Individual Differences               |
| 2009-2010 | Reviewer, Noise and Health                                     |
| 2009-2010 | Reviewer, Sleep Medicine                                       |
| 2010      | Reviewer, Nature and Science of Sleep                          |
| 2010      | Reviewer, Psychiatry and Clinical Neurosciences                |
| 2010      | Reviewer, Learning and Individual Differences                  |
| 2010      | Reviewer, Cognitive, Affective, and Behavioral Neuroscience    |
| 2010      | Reviewer, BMC Medical Research Methodology                     |
| 2010      | Reviewer, Journal of Adolescence                               |
| 2010      | Reviewer, Brain Research                                       |

#### **Awards and Honors:**

|           |                                                                           |
|-----------|---------------------------------------------------------------------------|
| 1990      | Outstanding Senior Honors Thesis in Psychology, U. of New Mexico          |
| 1990      | <i>Summa Cum Laude</i> with Distinction in Psychology, U. of New Mexico   |
| 1990-1995 | Maxey Scholarship in Psychology, Texas Tech University                    |
| 1992-1993 | Co-President, Clinical Psychology Graduate Student Council, Texas Tech U. |

|           |                                                                                                                                                 |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 2001      | Rennick Research Award, Co-Authored Paper, International Neuropsychological Society                                                             |
| 2002      | Honor Graduate, AMEDD Officer Basic Course, U.S. Army Medical Department Center and School                                                      |
| 2002      | Lynch Leadership Award Nominee, AMEDD Officer Basic Course, U.S. Army Medical Department Center and School                                      |
| 2003-2007 | Who's Who in America, Marquis Who's Who                                                                                                         |
| 2003      | Outstanding Research Presentation Award, 2003 Force Health Protection Conference, U.S. Army Center for Health Promotion and Preventive Medicine |
| 2004-2005 | Who's Who in Medicine and Healthcare, Marquis Who's Who                                                                                         |
| 2005      | Edward L. Buescher Award for Excellence in Research by a Young Scientist, Walter Reed Army Institute of Research (WRAIR) Association            |
| 2009      | Merit Poster Award, International Neuropsychological Society                                                                                    |
| 2009      | First Place Research Presentation Award, 2009 Force Health Protection Conference, U.S. Army Center for Health Promotion and Preventive Medicine |

## **Part II: Research, Teaching, and Clinical Contributions**

### **A. Narrative report of Research, Teaching, and Clinical Contributions**

My research has emphasized the study of higher order cognition and executive functions and how these cognitive abilities are influenced and guided by subtle affective processes. My early work focused on the perception, experience, and expression of normal and pathological affect, including perceptual asymmetries that occur during visual perception of emotional faces and the clues that these asymmetries provide about the neurobiological substrates of affective processing. In the mid to late 1990s, this work focused primarily on the interaction between mood-induced shifts in hemispheric arousal and sex differences in cerebral laterality. These processes were investigated at several levels, ranging from visual-hemifield biases to functional neuroimaging studies of subcortical structures involved in memory and emotion. Over the past 8 years, my research has utilized functional and structural magnetic resonance imaging to study the interaction of affective processes and cognition within limbic networks of the medial temporal lobes and prefrontal cortex. This line of research has led to the refinement of a developmental model of prefrontal cortical-limbic maturation that explains how these processes contribute to the way adolescents perceive emotionally and motivationally relevant stimuli such as affective faces and visual images of food. As a result of the Iraq War, I took an extended leave of absence to serve in the Active Duty Army as the Chief of the Neurocognitive Performance Branch at the Walter Reed Army Institute of Research from 2002-2007. During that time, I extended the scope of my affective processing research to also examine the effects of stressors such as prolonged sleep deprivation, chronic sleep restriction, nutritional deprivation, and the use of stimulant countermeasures on the cognitive-affective systems within the brain. This line of investigation suggests that sleep deprivation alters the metabolic activity within the medial prefrontal cortex, resulting in subtle but profound effects on specific aspects of cognition. These sleep-loss related prefrontal decrements impair the ability to use affective processes to guide judgment and decision-making, particularly in high-risk or morally relevant situations. My recent investigations also suggest that while commonly used stimulants such as caffeine, modafinil, and dextroamphetamine are highly effective at reversing sleep-loss induced deficits in alertness and vigilance, they have virtually no restorative effect on the cognitive-affective decision-making systems of the brain. Having left military service to return to McLean Hospital full time in the summer of 2007, I am now focusing on extending my previous work to identify the extent to which these cognitive-affective decision-making systems and their neurobiological substrates are impaired or altered in patients suffering from affective psychosis and post-traumatic stress.

My recent teaching activities have primarily involved daily supervision and training of student research assistants and occasional seminar presentations. Over the past 5 years, I have closely and regularly mentored more than 25 students at the undergraduate, graduate, and post-doctoral level. This involvement has included one-on-one supervision and training in basic research methods, neuropsychological



assessment, statistical analysis, and manuscript preparation. Nearly all of my advisees have served as co-authors on abstracts, posters, talks, and published manuscripts based on my research program.

## **B. Funding Information**

|           |                                                                                                                                                                                                                                                                                                                 |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2001-2003 | <b>P.I.—Killgore, W.</b> , N.I.H., 1R03HD41542-01, fMRI of Unconscious Affect Processing in Adolescence. \$79,000.                                                                                                                                                                                              |
| 2003-2006 | <b>P.I.—Killgore, W.</b> , U.S. Army Medical Research and Materiel Command (MRMC) Competitive Medical Research Proposal Program (CMRP), The Effects of Sleep-Loss and Stimulant Countermeasures on Judgment and Decision Making. Total Award: \$1,345,000.                                                      |
| 2004-2005 | <b>P.I. —Killgore, W.</b> , Defense Advanced Research Projects Agency (DARPA), Sleep/wake Schedules in 3ID Aviation Brigade Soldiers. Total Award: \$60,000.                                                                                                                                                    |
| 2005-2006 | <b>P.I. —Killgore, W.</b> , U.S. Army Medical Research and Materiel Command, Task Area C (Warfighter Judgment and Decision Making) Program Funding, Functional Neuroimaging Studies of Neural Processing Changes with Sleep and Sleep Deprivation. Total Award: \$219,400.                                      |
| 2006-2007 | <b>P.I. —Killgore, W.</b> , U.S. Army Medical Research and Materiel Command (MRMC), Task Area C (Warfighter Judgment and Decision Making) Program Funding, Establishing Normative Data Sets for a Series of Tasks to Measure the Cognitive Effects of Operationally Relevant Stressors. Total Award: \$154,000. |
| 2006-2007 | <b>P.I. —Killgore, W.</b> , U.S. Army Medical Research and Materiel Command (MRMC) Military Operational Medicine Research Program (MOM-RP), Development of the Sleep History and Readiness Predictor (SHARP). Total Award: \$291,000.                                                                           |
| 2009-2012 | <b>P.I. —Killgore, W.</b> , U.S. Army Medical Research and Materiel Command (MRMC), Award W81XWH-09-1-0730, The Neurobiological Basis and Potential Modification of Emotional Intelligence through Affective Behavioral Training. Total Award: \$414,461.                                                       |

## **D. Report of Teaching**

### **1. Local contributions**

#### **Lecture**

|      |                                                                                                                                                                                          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2000 | The Neurobiology of Emotion in Children, McLean Hospital<br>Lecturer: 30 participants, 2 hours contact time per year,<br>10 hours prep time per year                                     |
| 2001 | The Neurobiology of Emotion in Children and Adolescents, McLean Hospital<br>Lecturer: 60 participants, 2 hours contact time per year,<br>10 hours prep time per year                     |
| 2002 | Cortico-Limbic Activation in Adolescence and Adulthood, Youth Advocacy Project, Cape Cod, MA<br>Lecturer: 45 participants, 2 hours contact time per year,<br>10 hours prep time per year |

#### **Seminar**

2001 Using Functional MRI to Study the Developing Brain, Judge Baker Children's Center  
Lecturer: 8 participants, 2 hours contact time per year, 10 hours prep time per year

**e. Advisory and Supervisory Responsibilities in Clinical or Laboratory Setting**

2005-2006 1 Fellows for 250 hrs/year, Neuropsychology Postdoctoral Research Training Program Supervisor, Walter Reed Hospital

**f. Leadership Roles**

1988-1989 Undergraduate Teaching Assistant-Introduction to Psychology 102, University of New Mexico  
Responsibility: Responsible for instructing two independent discussion sections of a large introductory psychology course. Responsibilities included lecture preparation, leading discussion, writing and administering quizzes, grading reports, tests, and weekly assignments as well as proctoring major exams.

1990-1991 Graduate Teaching Assistant-General Psychology 1300, Texas Tech University  
Responsibility: Complete instructional responsibility for two introductory level psychology courses per semester. Responsibilities included curriculum development, preparation and administration of lectures, test and report grading, supervision of computerized student testing, and assignment of final course grades.

1991-1992 Graduate Teaching Assistant-Psychology of Learning Laboratory 3317, Texas Tech University  
Responsibility: Instructional responsibility for two upper division level psychology laboratory courses per semester. Responsibilities included curriculum development, lesson writing, classroom lecture, experiment demonstrations, test and report grading for a writing intensive laboratory course.

**g. Advisees/Trainees**

| <i>Training Duration Name</i>     | <i>Current Position</i>                                                      |
|-----------------------------------|------------------------------------------------------------------------------|
| 1997-1999 David Glahn, Ph.D.      | <i>Associate Professor</i> , Yale University School of Medicine              |
| 1997-1999 Daniel Casasanto, Ph.D. | <i>Senior Scientist/Lecturer</i> , Max Plank Institute for Psycholinguistics |
| 2002-2005 Alexander Vo, Ph.D.     | <i>Associate Professor</i> , UTMB, Executive Director of Telemedicine        |
| 2002-2007 Rebecca Reichardt, M.A. | Human Subjects Protection Scientist, USAMRMC                                 |
| 2003-2004 Stan Liu, M.D.          | Medical Intern, Johns Hopkins Medical School                                 |
| 2003-2004 Neil Arora, B.A.        | Student, Yale University                                                     |
| 2003-2005 Nancy Grugle, Ph.D.     | <i>Assistant Professor</i> , Cleveland State University                      |
| 2003-2005 Joshua Bailey, B.A.     | Seminary Student                                                             |
| 2003-2006 Athena Kendall, M.A.    | Lab Manager, Walter Reed Army Medical Center                                 |
| 2003-2006 Lisa Day, M.S.W.        | Clinical Social Worker, Washington D.C.                                      |
| 2004-2005 Merica Shepherd, B.A.   | Laboratory Coordinator                                                       |
| 2004-2005 Cynthia Hawes, B.A.     | Research Program Coordinator                                                 |
| 2004-2006 Christopher Li, B.A.    | Graduate Student                                                             |

|           |                          |                                                                    |
|-----------|--------------------------|--------------------------------------------------------------------|
| 2004-2007 | Jessica Richards, B.A.   | Ph.D. Student, University of Maryland College Park                 |
| 2004-2007 | Erica Lipizzi, B.A.      | Graduate Student, Emory University                                 |
| 2004-2007 | Brian Leavitt, B.S.      | Research Technician, Walter Reed Army Institute of Research        |
| 2004-2007 | Rachel Newman, B.S.      | Senior Laboratory Manager, Walter Reed                             |
| 2004-2007 | Alexandra Krugler, B.S.  | Medical Student, Louisiana State University                        |
| 2005      | Amy Conrad, PH.D.        | Clinical Psychologist, Washington D.C.                             |
| 2005-2006 | Nathan Huck, PH.D.       | Clinical Neuropsychologist, Walter Reed Army Institute of Research |
| 2005-2006 | Ellen Kahn-Greene, PH.D. | Post-Doctoral Fellow, Boston VA                                    |
| 2005-2006 | Alison Muckle, B.A.      | Research Technician                                                |
| 2005-2006 | Christina Murray, B.S.   | Medical Student, Drexel University                                 |
| 2005-2007 | Gautham Ganesan          | Medical Student, UC Irvine                                         |
| 2005-2007 | Dante Picchioni, Ph.D.   | Research Psychologist, Walter Reed Army Institute of Research      |
| 2006-2007 | Tracy Rupp, Ph.D.        | Research Psychologist, Walter Reed Army Institute of Research      |
| 2006-2007 | Kacie Smith, B.A.        | Study Manager, Walter Reed Army Institute of Research              |
| 2006-2007 | Shane Smith, B.S.        | Medical Student, University of the West Indies                     |
| 2006-2007 | Shanelle McNair          | Research Technician, Walter Reed Army Institute of Research        |
| 2006-2007 | George Watlington        | Research Technician, Walter Reed Army Institute of Research        |
| 2008      | Grady O'Brien            | Undergraduate Student                                              |
| 2008-2009 | Alex Post                | Undergraduate Student, Carnegie Mellon University                  |
| 2008-2009 | Lauren Price, B.A.       | Senior Clinical Research Assistant, McLean Hospital                |
| 2009-     | Zachary Schwab, B.S.     | Research Assistant, McLean Hospital                                |
| 2009-     | Melissa Weiner, B.S.     | Research Assistant, McLean Hospital                                |
| 2010-     | Norah Simpson, Ph.D.     | Post-Doctoral Fellow, Beth Israel Deaconess Medical/Harvard        |
| 2010-     | Vincent Capaldi, M.D.    | Medical Resident, Walter Reed Army Medical Center                  |
| 2010-     | Deepa Acharya, Ph.D.     | Clinical Neuropsychologist, McLean Hospital/Harvard Med Sch        |
| 2010-     | Christina Song           | Undergraduate Student, Smith College                               |

## 2. Regional, national, or international contributions

### a. Invited Presentations

#### Local

|      |                                                                                                                                                                                                                                                                                                                                       |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2005 | Briefing to the Chairman of the Committee on Strategies to Protect the Health of Deployed U.S. Forces, John H. Moxley, on the Optimization of Judgment and Decision Making Capacities in Soldiers Following Sleep Deprivation, Walter Reed Army Institute of Research, Washington, DC <i>[Invited Lecture]</i>                        |
| 2005 | Lecture on Functional Neuroimaging, Cognitive Assessment, and the Enhancement of Soldier Performance, Walter Reed Army Institute of Research, Washington, DC <i>[Invited Lecture]</i>                                                                                                                                                 |
| 2006 | Lecture on Optimization of Judgment and Decision Making Capacities in Soldiers Following Sleep Deprivation, Brain Imaging Center, McLean Hospital, Belmont MA <i>[Invited Lecture]</i>                                                                                                                                                |
| 2006 | Briefing to the Chairman of the Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program, entitled Optimization of Judgment and Decision Making Capacities in Soldiers Following Sleep Deprivation, Walter Reed Army Institute of Research <i>[Invited Lecture]</i> |

2010 Lecture on Shared and Differential Patterns of Cortico-Limbic Activation Across Anxiety Disorders, Center for Anxiety, Depression, and Stress, McLean Hospital, Belmont, MA *[Invited Lecture]*

## **Regional**

2006 Lecture on Norming a Battery of Tasks to Measure the Cognitive Effects of Operationally Relevant Stressors, Cognitive Performance Assessment Program Area Steering Committee, U.S. Army Military Operational Medicine Research Program, Washington, DC *[Invited Lecture]*

2007 Lecture on Cerebral Responses During Visual Processing of Food, U.S. Army Institute of Environmental Medicine, Natick, MA *[Invited Lecture]*

2007 Briefing on the Measurement of Sleep-Wake Cycles and Cognitive Performance in Combat Aviators, U.S. Department of Defense, Defense Advanced Research Projects Agency (DARPA), Washington, DC

2008 Lecture on Sleep Deprivation, Executive Function, and Resilience to Sleep Loss; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve Boston, MA *[Invited Lecture]*

2008 Lecture on the Role of Research Psychology in the Army; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

2008 Lecture on Combat Stress Control: Basic Battlemind Training; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

2009 Lecture on Combat Exposure and Sleep Deprivation Effects on Risky Decision-Making; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

2009 Lecture on the Sleep History and Readiness Predictor (SHARP); 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

2009 Lecture on The Use of Actigraphy for Measuring Sleep in Combat and Military Training; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

2010 Lecture entitled Combat Stress and Risk-Taking Behavior Following Deployment; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

2010 Lecture entitled Sleep Loss, Stimulants, and Decision-Making; 105<sup>th</sup> IMA Detachment, U.S. Army Reserve, Boston, MA *[Invited Lecture]*

## **National**

2000 Lecture on the Neurobiology of Emotional Development in Children, 9th Annual Parents as Teachers Born to Learn Conference, St. Louis, MO *[Invited Lecture]*

2002 Lecture on the Changes in the Lateralized Structure and Function of the Brain

- during Adolescent Development, Walter Reed Army Institute of Research, Washington, DC*[Invited Lecture]*
- 2004      Lecture on Sleep Deprivation, Cognition, and Stimulant Countermeasures: Seminar Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Detrick, MD, U.S. Army Medical Research and Materiel Command*[Invited Lecture]*
- 2004      Lecture on the Regional Cerebral Blood Flow Correlates of Electroencephalographic Activity During Stage 2 and Slow Wave Sleep: An H2150 PET Study: Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Detrick, MD, U.S. Army Medical Research and Materiel Command*[Invited Lecture]*
- 2004      Oral Platform Presentation: Regional cerebral metabolic correlates of electroencephalographic activity during stage-2 and slow-wave sleep: An H2150 PET Study, 18th Associated Professional Sleep Societies Annual Meeting, Philadelphia, PA.
- 2005      Lecture on The Sleep History and Readiness Predictor: Presented to the Medical Research and Materiel Command, Ft. Detrick, MD,*[Invited Lecture]*
- 2006      Lecture on The Sleep History and Readiness Predictor: Presented at the Bi-Annual 71F Research Psychology Short Course, Ft. Rucker, AL, U.S. Army Medical Research and Materiel Command*[Invited Lecture]*
- 2007      Lecture on the Effects of Fatigue and Pharmacological Countermeasures on Judgment and Decision-Making, U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL *[Invited Lecture]*
- 2008      Lecture on the Validation of Actigraphy and the SHARP as Methods of Measuring Sleep and Performance in Soldiers, U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL*[Seminar]*
- 2009      Lecture on Sleep Deprivation, Executive Function, and Resilience to Sleep Loss: Walter Reed Army Institute of Research AIBS Review, Washington DC*[Invited Lecture]*
- 2009      Lecture Entitled: Influences of Combat Exposure and Sleep Deprivation on Risky Decision-Making, Evans U.S. Army Hospital, Fort Carson, CO*[Invited Lecture]*
- 2009      Lecture Entitled Making Bad Choices: The Effects of Combat Exposure and Sleep Deprivation on Risky Decision-Making, 4<sup>th</sup> Army, Division West, Quarterly Safety Briefing to the Commanding General and Staff, Fort Carson, CO*[Invited Lecture]*
- 2009      Symposium on Sleep Deprivation, Judgment, and Decision-Making, 23<sup>rd</sup> Annual Meeting of the Associated Professional Sleep Societies, Seattle, WA*[Invited Lecture]*
- 2009      Symposium Session Moderator: Workshop on Components of Cognition and Fatigue: From Laboratory Experiments to Mathematical Modeling and

Operational Applications, Washington State University, Spokane, WA [*Invited Speaker*]

- 2009 Lecture on Comparative Studies of Stimulant Action as Countermeasures for Higher Order Cognition and Executive Function Impairment that Results from Disrupted Sleep Patterns, Presented at the NIDA-ODS Symposium entitled: Caffeine: Is the Next Problem Already Brewing, Rockville, MD [*Invited Lecture*]

### **International**

- 1999 Oral Platform Presentation: Functional MRI lateralization during memory encoding predicts seizure outcome following anterior temporal lobectomy, 27<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Boston, MA.
- 2001 Oral Platform Presentation: Sex differences in functional activation of the amygdala during the perception of happy faces, 29<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Chicago, IL.
- 2002 Oral Platform Presentation: Developmental changes in the lateralized activation of the prefrontal cortex and amygdala during the processing of facial affect, 30<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Toronto, Ontario, Canada.
- 2002 Oral Platform Presentation: Gray and white matter volume during adolescence correlates with cognitive performance: A morphometric MRI study, 30<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Toronto, Ontario, Canada.
- 2007 Symposium on Cortical and Limbic Activation in Response to Visual Images of Low and High-Caloric Foods, 6th Annual Meeting of the International Society for Behavioral Nutrition and Physical Activity (ISBNPA), Oslo, Norway [*Invited Lecture*]
- 2008 Lecture on Sleep Deprivation, Executive Function, & Resilience to Sleep Loss, First Franco-American Workshop on War Traumatism, IMN SSA, Toulon, France [*Invited Lecture*]

### **E. Report of Clinical Activities**

- 1991-1995 Psychology, Clinical, Psychology Clinic, Texas Tech University, Lubbock, TX  
Clinical Activity Description: Provided psychotherapy and other supervised psychological services for a broad spectrum of client problems. Duties included regular therapy contacts with four to eight clients per week for approximately four years. Clients ranged in age from preschool through middle age. Clinical responsibilities included intake evaluations, formal testing and assessment, case formulation and treatment plan development, and delivery of a wide range of psychotherapy services including crisis intervention, behavior modification, short-term cognitive restructuring, and long-term psychotherapy.  
Patient Load: 6/week
- 1993-1995 Psychology, Neuropsychology, Methodist Hospital Rehabilitation Institute, Lubbock, TX

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           | <p><u>Clinical Activity Description:</u> A two year placement consisting of two days per week within a large rehabilitation unit of a major regional medical center. Responsibilities included administration, scoring, and writing of neuropsychological assessments/reports, primarily emphasizing the Halstead-Reitan Neuropsychological Battery. Assessment services were provided on both inpatient and outpatient basis.</p> <p><u>Patient Load:</u> 2/week</p>                                                                                                                                          |
| 1995-1996 | <p>Psychology, Neuropsychology, Yale University School of Medicine, Connecticut Mental Health Center</p> <p><u>Clinical Activity Description:</u> Neuropsychological and psychodiagnostic assessment of chronic and severe mentally ill patients. Duties included patient interviewing, test administration, scoring, interpretation, and report writing. Assessment and consultation services were provided for both the inpatient and outpatient units.</p> <p><u>Patient Load:</u> 2/week</p>                                                                                                               |
| 1995-1996 | <p>Psychology, Clinical, Yale University School of Medicine, West Haven Mental Health Clinic</p> <p><u>Clinical Activity Description:</u> Provided short-term, long-term, and group psychotherapy services, consultation, and psychological assessments for adults, children, and families. Duties also included co-leading a regular outpatient group devoted to treatment of moderate to severe personality disorders.</p> <p><u>Patient Load:</u> 12/week</p>                                                                                                                                               |
| 1996-1997 | <p>Psychology, Neuropsychology, University of Oklahoma Health Sciences Center</p> <p><u>Clinical Activity Description:</u> Full-time placement in the Neuropsychological Assessment Laboratory, which meets INS/Division 40 guidelines for post-doctoral training in clinical neuropsychology. Responsibilities included comprehensive neuropsychological assessment and consultation services, including test administration, scoring, interpretation, and report writing. Regular outpatient psychotherapy was also provided for approximately two patients per week.</p> <p><u>Patient Load:</u> 4/week</p> |
| 1997-1999 | <p>Psychology, Neuropsychology, University of Pennsylvania Medical Center</p> <p><u>Clinical Activity Description:</u> Full-time two-year placement in the Department of Neurology, which meets INS/Division 40 guidelines for post-doctoral training in clinical neuropsychology. Responsibilities included neuropsychological assessment, consultation, and psychotherapy services for the Departments of Neurology and Neurosurgery.</p> <p><u>Patient Load:</u> 3/week</p>                                                                                                                                 |

### Part III: Bibliography

#### Original Articles

1. **Killgore WD.** The Affect Grid: a moderately valid, nonspecific measure of pleasure and arousal. Psychol Rep. 83(2):639-42, 1998.
2. **Killgore WD.** Empirically derived factor indices for the Beck Depression Inventory. Psychol Rep. 84(3 Pt 1):1005-13, 1999.
3. **Killgore WD.** Affective valence and arousal in self-rated depression and anxiety. Percept Mot Skills. 89(1):301-4, 1999.

4. **Killgore WD**, Adams RL. Prediction of Boston Naming Test performance from vocabulary scores: preliminary guidelines for interpretation. *Percept Mot Skills*. 89(1):327-37, 1999.
5. **Killgore WD**, Gangestad SW. Sex differences in asymmetrically perceiving the intensity of facial expressions. *Percept Mot Skills*. 89(1):311-4, 1999.
6. **Killgore WD**. The visual analogue mood scale: can a single-item scale accurately classify depressive mood state?. *Psychol Rep*. 85(3 Pt 2):1238-43, 1999.
7. **Killgore WD**, DellaPietra L, Casasanto DJ. Hemispheric laterality and self-rated personality traits. *Percept Mot Skills*. 89(3 Pt 1):994-6, 1999.
8. **Killgore WD**, Glosser G, Casasanto DJ, French JA, Alsop DC, Detre JA. Functional MRI and the Wada test provide complementary information for predicting post-operative seizure control. *Seizure*. 8(8):450-5, 1999.
9. **Killgore WD**. Evidence for a third factor on the Positive and Negative Affect Schedule in a college student sample. *Percept Mot Skills*. 90(1):147-52, 2000.
10. **Killgore WD**, Dellapietra L. Item response biases on the logical memory delayed recognition subtest of the Wechsler Memory Scale-III. *Psychol Rep*. 86(3 Pt 1):851-7, 2000.
11. **Killgore WD**, Casasanto DJ, Yurgelun-Todd DA, Maldjian JA, Detre JA. Functional activation of the left amygdala and hippocampus during associative encoding. *Neuroreport*. 11(10):2259-63, 2000.
12. Yurgelun-Todd DA, Gruber SA, Kanayama G, **Killgore WD**, Baird AA, Young AD. fMRI during affect discrimination in bipolar affective disorder. *Bipolar Disord*. 2(3 Pt 2):237-48, 2000.
13. **Killgore WD**. Sex differences in identifying the facial affect of normal and mirror-reversed faces. *Percept Mot Skills*. 91(2):525-30, 2000.
14. **Killgore WD**, DellaPietra L. Using the WMS-III to detect malingering: empirical validation of the rarely missed index (RMI). *J Clin Exp Neuropsychol*. 22(6):761-71, 2000.
15. **Killgore WD**. Academic and research interest in several approaches to psychotherapy: a computerized search of literature in the past 16 years. *Psychol Rep*. 87(3 Pt 1):717-20, 2000.
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40. Wesensten, N, **Killgore, WDS**, Belenky, G, Reichardt, R, Thorne, D, & Balkin, T. Caffeine, dextroamphetamine, and modafinil during 85 H of sleep deprivation. II. Effects of tasks of executive function [abstract]. Poster presented at the 17th Congress of the European Sleep Research Society, Prauge, Czech Republic, October 5-9, 2004.
41. Balkin, T, Reichardt, R, Thorne, D, **Killgore, WDS**, Belenky, G, & Wesensten, N. Caffeine, dextroamphetamine, and modafinil during 85 hours of sleep deprivation. I. Psychomotor vigilance and objective alertness effects [abstract]. Oral paper presentation at the 17th Congress of the European Sleep Research Society, Prauge, Czech Republic, October 5-9, 2004.
42. Belenky, G, Reichardt, R, Thorne, D, **Killgore, WDS**, Balkin, T, & Wesensten, N. Caffeine, dextroamphetamine, and modafinil during 85 hours of sleep deprivation. III. Effect on recovery sleep and post-recovery sleep performance [abstract]. Oral paper presentation at the 17th Congress of the European Sleep Research Society, Prauge, Czech Republic, October 5-9, 2004.
43. Vo, A, Green, J, Campbell, W, **Killgore, WDS**, Labutta, R, & Redmond, D. The quantification of disrupted sleep in migraine via actigraphy: A pilot study [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A281.
44. Kendall, AP, **Killgore, WDS**, Kautz, M, & Russo, MB. Left-visual field deficits in attentional processing after 40 hours of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A143.
45. Reichardt, RM, Grugle, NL, Balkin, TJ, & **Killgore, WDS**. Stimulant countermeasures, risk propensity, and IQ across 2 nights of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A145.
46. Killgore, DB, McBride, SA, Balkin, TJ, & **Killgore, WDS**. Post-stimulant hangover: The effects of caffeine, modafinil, and dextroamphetamine on sustained verbal fluency following sleep deprivation and recovery sleep [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A137.
47. **Killgore, WDS**, Balkin, TJ, & Wesensten, NJ. Impaired decision-making following 49 hours of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A138.
48. **Killgore, WDS**, McBride, SA, Killgore, DB, & Balkin, TJ. Stimulant countermeasures and risk propensity across 2 nights of sleep deprivation [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual

Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A136.

49. McBride, SA, Balkin, TJ, & **Killgore, WDS**. The effects of 24 hours of sleep deprivation on odor identification accuracy [abstract]. Abstract presented at the Associated Professional Sleep Societies 19th Annual Meeting, Denver, CO, June 18-23, 2005. SLEEP, 28 (Supplement), A137.
50. Picchioni, D, **Killgore, WDS**, Braun, AR, & Balkin, TJ. PET correlates of EEG activity during non-REM sleep. Poster presentation at the annual UCLA/Webosciences Sleep Training Workshop, Lake Arrowhead, CA, September, 2005.
51. **Killgore, WDS**, Killgore, DB, McBride, SA, & Balkin, TJ. Sustained verbal fluency following sleep deprivation and recovery sleep: The effects of caffeine, modafinil, and dextroamphetamine. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.
52. **Killgore, WDS**, Balkin, TJ, & Wesensten, NJ. Decision-making is impaired following 2-days of sleep deprivation. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.
53. **Killgore, WDS**, & Yurgelun-Todd, DA. Neural correlates of emotional intelligence in adolescent children. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.
54. **Killgore, WDS**, & Yurgelun-Todd, DA. Social anxiety predicts amygdala activation in adolescents viewing fearful faces. Poster presented at the 34th Meeting of the International Neuropsychological Society, Boston, MA, February 1-4, 2006.
55. McBride, SA & **Killgore, WDS**. Sleepy people smell worse: Olfactory deficits following extended wakefulness. Paper presented at the Workshop on Trace Gas Detection Using Artificial, Biological, and Computational Olfaction. Monell Chemical Senses Center, Philadelphia, PA, March 29-31, 2006.
56. **Killgore, WDS**, Day LM, Li, C, Kamimori, GH, Balkin, TJ, & Killgore DB. Moral reasoning is affected by sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A137.
57. **Killgore, WDS**, Killgore DB, Kahn-Green, E, Conrad, A, Balkin, TJ, & Kamimori, G. H. Introversion-Extroversion predicts resilience to sleep loss [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A137.
58. Newman, R, Kamimori, GH, **Killgore, WDS**. Sleep deprivation diminishes constructive thinking [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A136-137.
59. Huck, NO, Kendall, AP, McBride, SA, **Killgore, WDS**. The perception of facial emotion is enhanced by psychostimulants following two nights of sleep deprivation

- [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A136.
60. O'Sullivan, M, Reichardt, RM, Krugler, AL, Killgore, DB, & **Killgore, WDS**. Premorbid intelligence correlates with duration and quality of recovery sleep following sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A372.
  61. McBride, SA, **Killgore, WDS**, Kahn-Green, E, Conrad, A, & Kamimori, GH. Caffeine administered to maintain overnight alertness does not disrupt performance during the daytime withdrawal period [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A136.
  62. McBride, SA, Killgore DB, Balkin, TJ, Kamimori, GH, & **Killgore, WDS**. Sleepy people smell worse: Olfactory decrements as a function of sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A135.
  63. Day, LM, Li, C, Killgore, DB, Kamimori, GH, & **Killgore, WDS**. Emotional intelligence moderates the effect of sleep deprivation on moral reasoning [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A135.
  64. Murray, CJ, Killgore, DB, Kamimori, GH, & **Killgore, WDS**. Individual differences in stress management capacity predict responsiveness to caffeine during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A43.
  65. Murray, CJ, Newman, R, O'Sullivan, M, Killgore, DB, Balkin, TJ, & **Killgore, WDS**. Caffeine, dextroamphetamine, and modafinil fail to restore Stroop performance during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A370-371.
  66. Richards, J, Killgore, DB, & **Killgore, WDS**. The effect of 44 hours of sleep deprivation on mood using the Visual Analog Mood Scales [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A132.
  67. Richards, J, & **Killgore, WDS**. The effect of caffeine, dextroamphetamine, and modafinil on alertness and mood during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A43.
  68. Lipizzi, EL, Leavitt, BP, Killgore, DB, Kamimori, GH, & **Killgore, WDS**. Decision making capabilities decline with increasing duration of wakefulness [abstract].

Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A131.

69. Lipizzi, EL, Killgore, DB, Kahn-Green, E, Kamimori, GH, & **Killgore, WDS**. Emotional intelligence scores decline during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A131.
70. Kahn-Green, E, Day, L, Conrad, A, Leavitt, BP, Killgore, DB, & **Killgore, WDS**. Short-term vs. long-term planning abilities: Differential effects of stimulants on executive function in sleep deprived individuals [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A370.
71. Kahn-Green, E, Conrad, A, Killgore, DB, Kamimori, GH, & **Killgore, WDS**. Tired and frustrated: Using a projective technique for assessing responses to stress during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A130.
72. Killgore, DB, Kahn-Green, E, Balkin, TJ, Kamimori, GH, & **Killgore, WDS**. 56 hours of wakefulness is associated with a sub-clinical increase in symptoms of psychopathology [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A130.
73. Killgore, DB, McBride, SA, Balkin, TJ, Leavitt, BP, & **Killgore, WDS**. Modafinil improves humor appreciation during sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A42.
74. Reichardt, RM, Killgore, DB, Lipizzi, EL, Li, CJ, Krugler, AL, & **Killgore, WDS**. The effects of stimulants on recovery sleep and post-recovery verbal performance following 61-hours of sleep deprivation [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A42.
75. Bailey, JD, Richards, J, & **Killgore, WDS**. Prediction of mood fluctuations during sleep deprivation with the SAFTE Model [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A60.
76. Kendall, AP, McBride, S. A, & **Killgore, WDS**. Visuospatial perception of line orientation is resistant to one night of sleep loss [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A369.
77. Kendall, AP, McBride, SA, Kamimori, GH, & **Killgore, WDS**. The interaction of coping skills and stimulants on sustaining vigilance: Poor coping may keep you up at night [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29

(Supplement), A129.

78. Muckle, A, Killgore, DB, & **Killgore, WDS**. Gender differences in the effects of stimulant medications on the ability to estimate unknown quantities when sleep deprived [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A369.
79. Krugler, AL, **Killgore, WDS**, & Kamimori, G. H. Trait anger predicts resistance to sleep loss [abstract]. Abstract presented at the 20th Meeting of the Associated Professional Sleep Societies, Salt Lake City, UT, June 17-22, 2006. SLEEP, 29 (Supplement), A129.
80. **Killgore, WDS**, Cotting, DI, Vo, A. H, Castro, CA, & Hoge, CW. The invincibility syndrome: Combat experiences predict risk-taking propensity following redeployment [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.
81. **Killgore, WDS**, Wesensten, NJ, & Balkin, TJ. Stimulants improve tactical but not strategic planning during prolonged wakefulness [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.
82. **Killgore, WDS**, Balkin, TJ, Wesensten, NJ, & Kamimori, G. H. The effects of sleep loss and caffeine on decision-making [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.
83. **Killgore, WDS**, Balkin, TJ, & Kamimori, GH. Sleep loss can impair moral judgment [abstract]. Abstract presented at the 9th Annual Force Health Protection Conference, Albuquerque, NM, August 6-11, 2006.
84. **Killgore, WDS**, Lipizzi, EL, Reichardt, RM, Kamimori, GH, & Balkin, TJ. Can stimulants reverse the effects of sleep deprivation on risky decision-making [abstract]? Abstract presented at the 25th Army Science Conference, Orlando, FL, November 27-30, 2006.
85. **Killgore, WDS**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Sleep deprivation impairs the emotional intelligence and moral judgment capacities of Soldiers [abstract]. Abstract presented at the 25th Army Science Conference, Orlando, FL, November 27-30, 2006.
86. **Killgore, WDS**, Cotting, DI, Vo, AH, Castro, C.A, & Hoge, CW. The post-combat invincibility syndrome: Combat experiences increase risk-taking propensity following deployment [abstract]. Abstract presented at the 25th Army Science Conference, Orlando, FL, November 27-30, 2006.
87. Adam, GE, Szelenyi, ER, **Killgore, WDS**, & Lieberman, HR. A double-blind study of two days of caloric deprivation: Effects on judgment and decision-making. Oral paper presentation at the Annual Scientific Meeting of the Aerospace Medical Association, New Orleans, LA, May, 2007.

88. Killgore, DB, Kahn-Greene, ET, Kamimori, GH, & **Killgore, WDS**. The effects of acute caffeine withdrawal on short category test performance in sleep deprived individuals [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A43.
89. Richards, JM, Lipizzi, EL, Kamimori, GH, & **Killgore, WDS**. Extroversion predicts change in attentional lapses during sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A137.
90. Lipizzi, EL, Richards, JM, Balkin, TJ, Grugle, NL, & **Killgore, WDS**. Morningness-Eveningness and Intelligence [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A345.
91. Lipizzi, EL, Richards, Balkin, TJ, Grugle, NL, & **Killgore WDS**. Morningness-Eveningness affects risk-taking propensity during sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A136.
92. McBride, SA, Ganesan, G, Kamimori, GH, & **Killgore, WDS**. Odor identification ability predicts vulnerability to attentional lapses during 77 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A135.
93. Smith, KL, McBride, S. A, Kamimori, GH, & **Killgore, WDS**. Individual differences in odor discrimination predict mood dysregulation following 56 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A136.
94. McBride, SA, Leavitt, BP, Kamimori, GH, & **Killgore, WDS**. Odor identification accuracy predicts resistance to sleep loss. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A137.
95. Killgore, DB, McBride, SA, Balkin, TJ, Grugle, NL. & **Killgore, WDS**. Changes in odor discrimination predict executive function deficits following 45 hours of wakefulness [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A136.
96. Rupp, TL, Killgore, DB, Balkin, TJ, Grugle, NL, & **Killgore, WDS**. The effects of modafinil, dextroamphetamine, and caffeine on verbal and nonverbal fluency in sleep deprived individuals [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A43.
97. Newman, RA, Krugler, AL, Kamimori, GH, & **Killgore, WDS**. Changes in state and



trait anger following 56 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A138.

98. Rupp, TL, Grugle, NL, Krugler, AL, Balkin, TJ, & **Killgore, WDS**. Caffeine, dextroamphetamine, and modafinil improve PVT performance after sleep deprivation and recovery sleep [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A44.
99. **Killgore, WDS**, Lipizzi, EL, Balkin, TJ, Grugle, NL, & Killgore, DB. The effects of sleep deprivation and stimulants on self-reported sensation seeking propensity [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A42.
100. **Killgore, WDS**, Richards, JM, Balkin, TJ, Grugle, NL, & Killgore DB. The effects of sleep deprivation and stimulants on risky behavior [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A41.
101. Newman, RA, Smith, KL, Balkin, TJ, Grugle, NL, & **Killgore, WDS**. The effects of caffeine, dextroamphetamine, and modafinil on executive functioning following 45 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A45.
102. Richards, JM, Lipizzi, EL, Balkin, TJ, Grugle, NL, & **Killgore, WDS**. Objective alertness predicts mood changes during 44 hours of sleep deprivation [abstract]. Abstract presented at the 21st Meeting of the Associated Professional Sleep Societies, Minneapolis, MN, June 9-14, 2007. SLEEP, 30 (Supplement), A56.
103. **Killgore, WDS**, & Yurgelun-Todd, DA. Cortical and Limbic Activation in Response to Visual Images of Low and High-Caloric Food [abstract]. Oral symposium presented at the 6<sup>th</sup> Annual Conference of the Society of Behavioral Nutrition and Physical Activity (ISBNPA), Oslo, Norway, June 20-23, 2007. Proceedings of the ISBNPA, 2007, 75.
104. Estrada, A, **Killgore, WDS**, Rouse, T, Balkin, TJ, & Wildzunas, RM. Total sleep time measured by actigraphy predicts academic performance during military training [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A134.
105. **Killgore, WDS**, Lipizzi, EL, Smith, KL, Killgore, DB, Rupp, TL, Kamimori, GH, & Balkin, T. J. Nonverbal intelligence is inversely related to the ability to resist sleep loss [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A134.
106. **Killgore, WDS**, Lipizzi, EL, Killgore, DB, Rupp, TL, Kamimori, GH, & Balkin, TJ. Emotional intelligence predicts declines in emotion-based decision-making following sleep deprivation [abstract]. Abstract presented at the 22nd Meeting of the

Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A134.

107. Reid, CT, Smith, K, **Killgore, WDS**, Rupp, TL, & Balkin, TJ. Higher intelligence is associated with less subjective sleepiness during sleep restriction [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A375.
108. Newman, R, **Killgore, WDS**, Rupp, T. L, & Balkin, TJ. Better baseline olfactory discrimination is associated with worse PVT and MWT performance with sleep restriction and recovery [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A375.
109. Smith, KL, Reid, CT, **Killgore, WDS**, Rupp, TL, & Balkin, TJ. Personality factors associated with performance and sleepiness during sleep restriction and recovery [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A376.
110. Lipizzi, EL, **Killgore, WDS**, Rupp, TL, & Balkin, TJ. Risk-taking behavior is elevated during recovery from sleep restriction [abstract]. Abstract presented at the 22nd Meeting of the Associated Professional Sleep Societies, Baltimore, MD, June 7-12, 2008. SLEEP, 31 (Supplement), A376.
111. Lipizzi, EL, Rupp, TL, **Killgore, WDS**, & Balkin, TJ. Sleep restriction increases risk-taking behavior [abstract]. Poster presented at the 11th Annual Force Health Protection Conference, Albuquerque, NM, August, 9-15, 2008.
112. **Killgore, WDS**, Estrada, A, Balkin, TJ, & Wildzunas, RM. Sleep duration during army training predicts course performance [abstract]. Poster presented at the 6th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.
113. **Killgore, WDS**, Lipizzi, EL, Smith, KL, Killgore, DB, Rupp, TL, Kamimori, GH, & Balkin, TJ. Higher cognitive ability is associated with reduced relative resistance to sleep loss [abstract]. Poster presented at the 6th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.
114. **Killgore, WDS**, Rupp, TL, Grugle, NL, Lipizzi, EL, & Balkin, TJ. Maintaining alertness during sustained operations: Which stimulant is most effective after 44 hours without sleep [abstract]? Poster presented at the 6th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.
115. **Killgore, WDS**, Newman, RA, Lipizzi, EL, Kamimori, GH, & Balkin, TJ. Sleep deprivation increases feelings of anger but reduces verbal and physical aggression in Soldiers [abstract]. Poster presented at the 6th Annual Force Health Protection Conference, Albuquerque, NM, August, 11-17, 2008.
116. Kelley, AM, Dretsch, M, **Killgore, WDS**, & Athy, JR. Risky behaviors and attitudes about risk in Soldiers. Abstract presented at the 29<sup>th</sup> Annual Meeting of the Society for Judgment and Decision Making, Chicago, IL, November, 2008.

117. **Killgore, WDS**, Ross, AJ, Silveri, MM, Gruber, SA, Kamiya, T, Kawada, Y, Renshaw, PF, & Yurgelun-Todd, DA. Citicoline affects appetite and cortico-limbic responses to images of high calorie foods. Abstract presented at the Society for Neuroscience, Washington DC, November 19, 2008.
118. Britton, JC, Stewart, SE, Price, LM, **Killgore, WDS**, Gold, AL, Jenike, MA, & Rauch, SL. Reduced amygdalar activation in response to emotional faces in pediatric Obsessive-Compulsive Disorder. Abstract presented at the Annual meeting of the American College of Neuropsychopharmacology, Scottsdale, AZ, December 7-11, 2008.
119. **Killgore, WDS**, Balkin, TJ, Estrada, A, & Wildzunas, RM. Sleep and performance measures in soldiers undergoing military relevant training. Abstract presented at the 26<sup>th</sup> Army Science Conference, Orlando, FL, December 1-4, 2008.
120. **Killgore, WDS** & Yurgelun-Todd, DA. Cerebral correlates of amygdala responses during non-conscious perception of affective faces in adolescent children. Abstract presented at the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.
121. **Killgore, WDS**, Killgore, DB, Grugle, NL, & Balkin, TJ. Odor identification ability predicts executive function deficits following sleep deprivation. Abstract presented the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.
122. **Killgore, WDS**, Rupp, TL, Killgore, DB, Grugle, NL, and Balkin, TJ. Differential effects of stimulant medications on verbal and nonverbal fluency during sleep deprivation. Abstract presented the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.
123. **Killgore, WDS**, Killgore, DB, Kamimori, GH, & Balkin, TJ. When being smart is a liability: More intelligent individuals may be less resistant to sleep deprivation. Abstract presented the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.
124. **Killgore, WDS**, Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Introversion is associated with greater amygdala and insula activation during viewing of masked affective stimuli. Abstract presented the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.
125. **Killgore, WDS**, Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Amygdala responses of specific animal phobics do not differ from healthy controls during masked fearful face perception. Abstract presented the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.
126. **Killgore, WDS**, Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Small animal phobics show sustained amygdala activation in response to masked happy facial expressions. Abstract presented the 37<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Atlanta, GA, February 11-14, 2009.  
[\*Merit Poster Award]

127. Price, LM, **Killgore, WDS**, Britton, JC, Kaufman, ML, Gold, AL, Deckersbach, T, & Rauch, SL. Anxiety sensitivity correlates with insula activation in response to masked fearful faces in specific animal phobics and healthy subjects. Abstract presented at the Annual Conference of the Anxiety Disorders Association of America, Santa Ana Pueblo, New Mexico, March 12-15, 2009.
128. **Killgore, WDS**, Britton, JC, Price, LM, Gold, AL, Deckersbach, T, & Rauch, SL. Neuroticism is inversely correlated with amygdala and insula activation during masked presentations of affective stimuli. Abstract presented at the Annual Conference of the Anxiety Disorders Association of America, Santa Ana Pueblo, New Mexico, March 12-15, 2009.
129. **Killgore, WDS**, Kelley, AM, & Balkin, TJ. Development and validation of a scale to measure the perception of invincibility. Abstract presented at the Annual Conference of the Anxiety Disorders Association of America, Santa Ana Pueblo, New Mexico, March 12-15, 2009.
130. Kelly, AM, **Killgore WDS**, Athy, J, & Dretsch, M. Risk propensity, risk perception, risk aversion, and sensation seeking in U.S. Army soldiers. Abstract presented at the 80<sup>th</sup> Annual Scientific Meeting of the Aerospace Medical Association, Los Angeles, CA, May 3-7, 2009.
131. Britton, JC, Stewart, SE, Price, LM, **Killgore, WDS**, Jenike, MA, & Rauch, SL. The neural correlates of negative priming in pediatric obsessive-compulsive disorder (OCD). Abstract presented at the 64<sup>th</sup> Annual Scientific Meeting of the Society of Biological Psychiatry, Vancouver, Canada, May 14-16, 2009.
132. **Killgore, WDS**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine protects against increased risk-taking behavior during severe sleep deprivation. Abstract presented at the 23<sup>rd</sup> Annual Meeting of the Associated Professional Sleep Societies, Seattle, Washington, June 7-12, 2009.
133. Killgore, DB, **Killgore, WDS**, Grugle, NL, & Balkin, TJ. Executive functions predict the ability to sustain psychomotor vigilance during sleep loss. Abstract presented at the 23<sup>rd</sup> Annual Meeting of the Associated Professional Sleep Societies, Seattle, Washington, June 7-12, 2009.
134. **Killgore, WDS**, & Yurgelun-Todd, DA. Trouble falling asleep is associated with reduced activation of dorsolateral prefrontal cortex during a simple attention task. Abstract presented at the 23<sup>rd</sup> Annual Meeting of the Associated Professional Sleep Societies, Seattle, Washington, June 7-12, 2009.
135. **Killgore, WDS**, Kelley, AM, & Balkin, TJ. A new scale for measuring the perception of invincibility. Abstract presented at the 12<sup>th</sup> Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.
136. **Killgore, WDS**, Killgore, DB, Grugle, NL, & Balkin, TJ. Executive functions contribute to the ability to resist sleep loss. Abstract presented at the 12<sup>th</sup> Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.

137. **Killgore, WDS**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine reduces risk-taking behavior during severe sleep deprivation. Abstract presented at the 12<sup>th</sup> Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009. [\*First Place Research Presentation Award]
138. **Killgore, WDS**, Castro, CA, & Hoge, CW. Normative data for the Evaluation of Risks Scale—Bubble Sheet Version (EVAR-B) for large scale surveys of returning combat veterans. Abstract presented at the 12<sup>th</sup> Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.
139. **Killgore, WDS**, Castro, CA, & Hoge, CW. Combat exposure and post-deployment risky behavior. Abstract presented at the 12<sup>th</sup> Annual Force Health Protection Conference, Albuquerque, New Mexico, August 14-21, 2009.
140. **Killgore, WDS**, Price, LM, Britton, JC, Simon, N, Pollack, MH, Weiner, MR, Schwab, ZJ, Rosso, IM, & Rauch, SL. Paralimbic responses to masked emotional faces in PTSD: Disorder and valence specificity. Abstract presented at the Annual McLean Hospital Research Day, January 29, 2010.
141. **Killgore, WDS**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine minimizes behavioral risk-taking during 75 hours of sleep deprivation. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.
142. **Killgore, WDS** & Balkin, TJ. Vulnerability to sleep loss is affected by baseline executive function capacity. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.
143. **Killgore, WDS**, Smith, KL, Reichardt, RM., Killgore, DB, & Balkin, TJ. Intellectual capacity is related to REM sleep following sleep deprivation. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.
144. **Killgore, WDS** & Yurgelun-Todd, DA. Cerebral correlates of amygdala responses to masked fear, anger, and happiness in adolescent and pre-adolescent children. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.
145. **Killgore, WDS**, Post, A, & Yurgelun-Todd, DA. Sex differences in cortico-limbic responses to images of high calorie food. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.
146. **Killgore, WDS** & Yurgelun-Todd, DA. Self-reported insomnia is associated with increased activation within the default-mode network during a simple attention task. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.
147. **Killgore, WDS**, Price, LM, Britton, JC, Gold, AL, Deckersbach, T, & Rauch, SL. Neural correlates of anxiety sensitivity factors during presentation of masked fearful

faces. Abstract presented at the 38<sup>th</sup> Annual Meeting of the International Neuropsychological Society, Acapulco, Mexico, February 3-6, 2010.

148. **Killgore, WDS**, Grugle, NL, Conrad, TA, & Balkin, TJ. Baseline executive function abilities predict risky behavior following sleep deprivation. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
149. **Killgore, WDS**, Grugle, NL, & Balkin, TJ. Judgment of objective vigilance performance is affected by sleep deprivation and stimulants. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
150. Killgore, DB, **Killgore, WDS**, Grugle, NL, & Balkin, TJ. Resistance to sleep loss and its relationship to decision making during sleep deprivation. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
151. Killgore DB, **Killgore, WDS**, Grugle, NL, & Balkin, TJ. Subjective sleepiness and objective performance: Differential effects of stimulants during sleep deprivation. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
152. Rupp, TL, **Killgore, WDS**, & Balkin, TJ. Vulnerability to sleep deprivation is differentially mediated by social exposure in extraverts vs. introverts. Oral presentation at the “Data Blitz” section at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
153. Rupp, TL, **Killgore, WDS**, & Balkin, TJ. Extraverts may be more vulnerable than introverts to sleep deprivation on some measures of risk-taking and executive functioning. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
154. Rupp, TL, **Killgore, WDS**, & Balkin, TJ. Vulnerability to sleep deprivation is differentially mediated by social exposure in extraverts vs. introverts. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
155. Capaldi, VF, Guerrero, ML, & **Killgore, WDS**. Sleep disorders among OIF and OEF Soldiers. Abstract presented at the 24th Annual Meeting of the Associated Professional Sleep Societies, San Antonio, Texas, June 5-9, 2010.
156. **Killgore, WDS**, Killgore, DB, Kamimori, GH, & Balkin, TJ. Caffeine reduces behavioral risk-taking during sleep deprivation. Abstract presented at the 65<sup>th</sup> Annual Meeting of the Society for Biological Psychiatry, New Orleans, Louisiana, May 20-22, 2010.
157. **Killgore, WDS**, Price, LM, Britton, JC, Simon, N, Pollack, MH, Weiner, MR, Schwab, ZJ, Rosso, IM, & Rauch, SL. Paralimbic responses to masked emotional faces in PTSD: Disorder and valence specificity. Abstract presented at the 65<sup>th</sup> Annual Meeting of the Society for Biological Psychiatry, New Orleans, Louisiana,

May 20-22, 2010.

158. Rosso, IM, Makris, N, Britton, JC, Price, LM, Gold, AL, Deckersbach, T, **Killgore, WDS**, & Rauch SL. Anxiety sensitivity correlates with insular cortex volume and thickness in specific animal phobia. Abstract presented at the 65<sup>th</sup> Annual Meeting of the Society for Biological Psychiatry, New Orleans, Louisiana, May 20-22, 2010.
159. Rupp, TL, **Killgore, WDS**, & Balkin, TJ. Vulnerability to sleep deprivation is mediated by social exposure in extraverts versus introverts. Oral platform presentation accepted for presentation at the 20<sup>th</sup> Congress of the European Sleep Research Society, Lisbon, Portugal, September 14-18, 2010.
160. **Killgore, WDS**, Estrada, A, & Balkin, TJ. A tool for monitoring soldier fatigue and predicting cognitive readiness: The Sleep History and Readiness Predictor (SHARP). Abstract accepted for presentation at the 27<sup>th</sup> Army Science Conference, Orlando, FL, November 29-December 2, 2010.
161. **Killgore, WDS**, Kamimori, GH, & Balkin, TJ. Caffeinated gum minimizes risk-taking in soldiers during prolonged sleep deprivation. Abstract accepted for presentation at the 27<sup>th</sup> Army Science Conference, Orlando, FL, November 29-December 2, 2010.
162. **Killgore, WDS**, Britton, JC, Schwab, ZJ, Weiner, MR, Rosso, IM, & Rauch, SL. Exaggerated amygdala responses to masked fearful faces are specific to PTSD versus simple phobia. Abstract accepted for oral platform presentation at the 27<sup>th</sup> Army Science Conference, Orlando, FL, November 29-December 2, 2010.
163. **Killgore, WDS**, Kamimori, GH, & Balkin, TJ. Sleep deprivation selectively impairs emotional aspects of cognitive functioning. Abstract accepted for oral platform presentation at the 27<sup>th</sup> Army Science Conference, Orlando, FL, November 29-December 2, 2010.
164. Rupp, TL, **Killgore, WDS**, & Balkin, TJ. Evaluation of personality and social exposure as individual difference factors influencing response to sleep deprivation. Abstract accepted for oral platform presentation at the 27<sup>th</sup> Army Science Conference, Orlando, FL, November 29-December 2, 2010.
165. **Killgore, WDS**, Britton, JC, Rosso, IM, Schwab, ZJ, Weiner, MR, & Rauch, SL. Shared and differential patterns of amygdalo-cortical activation across anxiety disorders. Abstract submitted for presentation at the 49<sup>th</sup> Annual Meeting of the American College of Neuropsychopharmacology, Miami Beach, FL, December 5-9, 2010.
166. Rosso, IM, **Killgore, WDS**, Britton, JC, Weiner, MR, Schwab, ZJ, & Rauch, SL. Neural correlates of PTSD symptom dimensions during emotional processing: A functional magnetic resonance imaging study. Abstract submitted for presentation at the 49<sup>th</sup> Annual Meeting of the American College of Neuropsychopharmacology, Miami Beach, FL, December 5-9, 2010.
167. **Killgore, WDS**, Britton, JC, Rosso, IM, Schwab, ZJ, Weiner, MR, & Rauch, SL. Similarities and differences in cortico-limbic responses to masked affect probes

across anxiety disorders. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.

168. Rosso, IM, **Killgore, WDS**, Britton, JC, Weiner, MR, Schwab, ZJ, & Rauch, SL. Hyperarousal and reexperiencing symptoms of post-traumatic stress disorder are differentially associated with limbic-prefrontal brain responses to threatening stimuli. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
169. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WDS**. Neural correlates of cognitive and emotional intelligence in adults. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
170. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WDS**. Cognitive and emotional intelligences: Are they distinct or related constructs? Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
171. Schwab, ZJ, Weiner, MR, Rauch, SL, & **Killgore, WDS**. Discrepancy scores between cognitive and emotional intelligence predict neural responses to affective stimuli. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
172. **Killgore, WDS**, Schwab, ZJ, Weiner, MR, & Rauch, SL. Smart people go with their gut: Emotional intelligence correlates with non-conscious insular responses to facial trustworthiness. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
173. **Killgore, WDS**, Weiner, MR, Schwab, ZJ, & Rauch, SL. Whom can you trust? Neural correlates of subliminal perception of facial trustworthiness. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
174. Weiner, MR, Schwab, ZJ, & Rauch, SL, **Killgore, WDS**. Impulsiveness predicts responses of brain reward circuitry to high-calorie foods. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
175. Weiner, MR, Schwab, ZJ, & Rauch, SL, **Killgore, WDS**. Conscientiousness predicts brain responses to images of high-calorie foods. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
176. Crowley, DJ, Covell, MJ, **Killgore, WDS**, Schwab, ZJ, Weiner, MR, Acharya, D, Rosso, IM, & Silveri, MM. Differential influence of facial expression on inhibitory capacity in adolescents versus adults. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.



177. Gruber, SA, Dahlgren, MK, **Killgore, WDS**, Sagar, KA, & Racine, MT. Marijuana: Age of onset of use impacts executive function and brain activation. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
178. **Killgore, WDS**, Conrad, TA, Grugle, NL, & Balkin, TJ. Baseline executive function abilities correlate with risky behavior following sleep deprivation. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.
179. **Killgore, WDS**, Grugle, NL, Killgore, DB, & Balkin, TJ. Resistance to sleep loss and decision making during sleep deprivation. Abstract submitted for presentation at the at the 39th Annual Meeting of the International Neuropsychological Society, Boston, MA, February 2-5, 2011.