Poster Session A

Aging and Dementia: Healthy Aging and Cognition

A-1
Fuld Object-Memory Evaluation: Development of a New Alternate Form
Anderson-Hanley C, Miele A, Dunnam M

Objective: The Fuld Object Memory Evaluation (FOME) uses a multi-sensory method to evaluate encoding, storage, and retrieval, and is a highly useful tool for assessing memory functions in older adults. The present study describes the development of an additional alternate form of the test, comparability with prior forms, and evidence of construct validity. Method: As part of participation in a larger study, 101 older adult examinees completed the original FOME at Time 1, the published alternate version of the FOME at Time 2, and a new version of the FOME at Time 3. Convergent and discriminant validity were examined using correlations between the FOME and other neuropsychological tests. Results: FOME Recall and Delayed scores at Time 1 were highly correlated to FOME Recall and Delayed scores at Time 2 and Time 3. The same relationship was also demonstrated for FOME Recall and Delayed scores between Times 2 and 3. Consistent with a priori hypotheses, the FOME Semantic subscale was highly correlated with Category Fluency at Times 1, 2 and 3. In addition, FOME Recall and Delayed scores at Times 1, 2 and 3 were highly correlated with RAVLT Total Recall, Immediate Recall and Delayed Recall at Times 1, 2, and 3, respectively. Conclusion: Results of this study provide evidence for the comparability of a new alternate form of the FOME with prior forms, and also evidence of construct validity. Having an additional validated form of the FOME has practical implications for serial testing as often required in research and clinical practice.

A-2
Negative Impact of Groundwater Aluminum Exposure on Neuropsychological Status
Edwards M, O'Bryant S, Johnson L, Barber R

Objective: Few studies to date have examined the impact of aluminum levels in groundwater on cognition. Animal studies have shown that the intake of aluminum through dietary means increases the expression of amyloid proteins found in the brain tissues of rodents, thereby liking it with one of the fundamental pathological aspects of Alzheimer's disease. The aim of the study was to investigate the impact of groundwater aluminum exposure on neuropsychological status. Methods: Data were analyzed from 1390 participants enrolled in the Texas Alzheimer's Research & Care Consortium (TARCC) longitudinal study. Results: The results of the study showed that higher groundwater aluminum levels were associated with lower scores on global cognition (B(SE)=-0.194(0.044), t=-4.424, p<0.001). Additionally, it was shown that higher groundwater aluminum levels were related to higher scores on ratings of disease severity (CDR Sum of Boxes, B(SE)=0.155(0.032), t=4.84, p<0.001). Furthermore, aluminum was found to be significantly negatively associated with executive functioning (B(SE)= -0.097(0.031), t=-3.14, p=0.002), immediate verbal memory (B(SE)=-0.24(0.043), t=-5.61, p<0.001), delayed verbal memory (B(SE)=-0.31(0.045), t=-7.05, p<0.001), immediate visual memory (B(SE)=-0.19(0.037), t=-5.288, p<0.001), and delayed visual memory (B(SE)=-0.20(0.039), t=-5.09, p<0.001). Conclusions: Higher

aluminum levels were found to be negatively associated with cognitive functioning and neuropsychological status.

A-3
Neurocognitive Effects of Yoga and Caloric Restriction to Treat Obesity in Postmenopausal Women
Inscore A, Kegel J, Kozlovsky A, Tarantino B, Goldberg A

Objective: Stress, dietary indiscretion, and physical inactivity contribute to the high prevalence of obesity in middle-aged women. We hypothesized that yoga, which has stress-relieving and cognitive benefits, when combined with weight loss would improve cognitive functioning in overweight to obese postmenopausal women. Method: A community sample of 9 postmenopausal women (age 52-63 years, 12-18 years education, BMI 25-42 kg/m2) participated in a 4-month yoga and weight loss intervention. Pre- and post-intervention stress, mood, and cognitive data were compared with paired t-tests. Results: The women reported increased tension (POMS Tension T 45 to 47, $p<0.01$), vitality (SF-36 Vitality raw 55 to 59, $p<.04$), and vigor (POMS Vigor T 49 to 53, $p<.02$) post intervention. Perceived stress and emotional eating scores were unchanged. There were improvements in processing speed (SDMT raw 56 to 60; $p<.01$), executive functioning (Trails B raw 63" to 54", $p<.04$), and dominant hand fine motor speed (Grooved Pegboard dominant hand 61" to 55", $p<.047$). Attention and memory remained stable. Conclusions: While self-reported mood and stress were essentially unaffected, women reported increased vigor and vitality, and had improved processing and motor speed and executive functioning after participating in a 4-month yoga and weight loss intervention. Further research examining the benefits of yoga as an adjunct to weight loss compared to other exercise interventions will help to elucidate the unique neurocognitive benefits of yoga.

A-4
Predictive Ability of the MMSE in Detecting Impairments of Higher Cerebral Functions in Hispanic Patients that Report Memory Difficulties
Jubiz-Bassi N

Objective: The aim of the present study was to determine the predictive capacity of the Mini Mental Status Examination (MMSE) in the detection of cognitive disorders in patients who report memory complaints. Method: The sample consisted of 103 Hispanic participants who reported memory complaints to their primary care physician and were referred to an outpatient neurobehavioral service. The sample was polarized obtaining two study groups: 30 participants with the lowest total scores in the MMSE, and 30 participants with the highest total scores in the MMSE. All the participants were administered a formal battery of neuropsychological instruments including the following tests Symbol Digit Modalities, Controlled Oral Word Association, Boston Naming, Rey Auditory Verbal Learning, Rey Osterrieth Complex Figure, Benton Visual Retention, and Grooved Pegboard. Results: The results of this study indicate that the MMSE is capable of predicting significant differences ($p = 0.000$) between the groups in terms of certain higher cortical functions as measured by neuropsychological instruments. The MMSE was not capable of predicting significant differences in two measures related to verbal memory. Conclusions: The MMSE is capable of predicting the presence of impairment of higher cerebral functions as evidenced through a formal battery of neuropsychological tests. Obtaining low total scores or scores below the cut off score in the MMSE could indicate the beginning or progression of a

condition related to cognitive impairment. High total scores in the MMSE should be interpreted carefully and confirmed through the use of a neuropsychological evaluation.

A-5
Working Memory versus Processing Speed in Predicting Speech Perception during Background Noise in Older Adults
Rashid K, Noniyeva Y, Vo K, Stephens V, Gomez R

Objective: This study wanted to determine if working memory or processing speed is a better predictor of understanding speech with background noise in older adults, after controlling for age and hearing loss. Background noise is common in real-world situations in which older adults interact and communicate. Therefore, we hypothesized that information processing and working memory would be a significant predictor of speech recognition during background noise. Method: The sample included 112 healthy older adults (41 men, 71 women). Participants with cognitive impairment, including dementia, were not included in the present study. Participants were given a hearing test, as well as two computerized measures of information processing speed (the semantic judgment task and the rhyme judgment task) and two computerized measures of working memory (the dual working memory span task and the reading span task). Participants then completed the Speech Perception in Noise Test, which was a measure of speech understanding in the presence of background noise. Results: Based on a hierarchical regression, after controlling for age and hearing loss, processing speed was a significant predictor (p = .018) of understanding speech in the presence of background noise, whereas working memory was not. Conclusion: Processing speed was a significant predictor of older adults understanding speech in the presence of background noise, whereas working memory was not. One clinical implication for this study is that, in speech situations with significant background noise, having the speaker not just talked louder, but also more slowly, can improve older adult's comprehension of what is being said.

A-6
Identifying the Nature of Impairment in Planning Ability with Normal Aging
Sanders C, Kovacs M, Walton B, Schmitter-Edgecombe M

Objective: Planning ability, an important subset of executive functioning, has been shown to decline with normal aging. However, the exact nature of this decline has yet to be adequately examined. In this study, cognitively healthy younger and older adults completed a novel map/orientation task designed to tease apart the formulation and execution stages of planning. Method: Fifty younger adults and 50 older adults were tasked with reading a map layout of a campus apartment and planning an efficient route that would allow them to complete a series of tasks. There were two conditions, aid and no-aid. During the formulation stage, all participants were instructed to write out their plan for later task completion. In the execution stage, half of the participants in each group were instructed to utilize their written plan to aid their completion of tasks while the other half cognitively guided their completion of the tasks without the use of their written plan. Results: Older adults performed more poorly than younger adults during the formulation and execution stages on measures of accuracy and efficiency. However, older adults' executed performance was not disproportionately poorer than that of younger adults, for both conditions. Both groups actually performed better during execution in comparison to formulation. Conclusions: The results suggest that deficits in planning ability with normal aging may relate to

the formulation component of planning and not necessarily to the execution component. In addition, the results may reflect intact abilities to update and adjust task performance during execution in younger and older adults.

A-7
Cognitive Correlates of Functional Performance in Older Adults: Comparison of Self-Report, Direct Observation and Performance-Based Measures
Schmitter-Edgecombe M, Parsey C, Cook D

Objective: Neuropsychologists are often asked to answer questions about the effects of cognitive deficits on everyday functioning. This study examined the relationship between and the cognitive correlates of self-report, performance-based and direct observation measures commonly used as proxy measures for everyday functioning. Method: Participants were 88 community-dwelling, cognitively healthy older adults (age 50-86). Participants completed standardized neuropsychological tests and questionnaires, and performed eight activities of daily living (e.g., water plants, fill a medication dispenser) while under direct observation in a campus apartment. Results: All proxy measures of everyday function were sensitive to the effects of healthy cognitive aging. After controlling for age, cognitive predictors explained a unique amount of the variance for only the performance-based behavioral simulation measure (i.e., OTDL-R). The self-report IADL and the performance-based everyday problem-solving test (i.e., EPT) did not correlate with each other; however, both were unique predictors of the direct observation measure. Conclusions: These findings suggest that neuropsychologists must be cautious in making predictions about the quality of everyday activity completion in cognitively healthy older adults from specific cognitive functions. The findings further suggest that a self-report of IADLs and the performance-based EPT may be useful measures for assessing everyday functional status in cognitively healthy older adults.

A-8
Prospective Memory is Uniquely Associated with Instrumental Activities of Daily Living in Healthy Older Adults
Woods S, Weinborn M, Velnoweth A, Rooney A, Bucks R

Objective: The primary aim of this study was to examine the relationship between prospective memory (PM) and instrumental activities of daily living (IADL) in healthy older adults. It is widely known that healthy older adults are at risk for mild-to-moderate declines in PM, which is the complex cognitive process of accurately executing a delayed intention. Although a growing literature shows that PM is incrementally predictive of everyday functioning problems (e.g., medication nonadherence) in some clinical populations (e.g., HIV infection), we are unaware of any prior studies on this important topic in healthy older adults. Method: Study participants were 50 healthy older Australian adults (M age = 69.2±8.4 years) who completed the research version of the Memory for Intentions Screening Test (MIST), the Prospective and Retrospective Memory Questionnaire (PRMQ), and the Weintraub Activities of Daily Living Scale (WADLS) as part of a larger neuropsychological battery. Results: In a linear regression controlling for demographics and global neurocognitive status, the MIST event-based score and PRMQ PM scale were significantly (ps<.05) associated with the total number of IADL domains in which participants reported needing assistance (adjusted R^2=0.47, p<.0001). The significance of the MIST and PRMQ

in predicting IADLs was not affected by inclusion of current affective distress in the regression model. Conclusions: Findings indicate that deficits in both performance-based and self-reported PM are uniquely associated with mild, concurrent IADL problems in healthy older adults. Investigation of the potentially moderating effects of compensatory strategies and the value of PM as a predictor of incident dementia appear warranted.

Developmental and Pediatric: Other

A-9
Youth with Conduct Disorder and Callous-Unemotional Traits Respond Differentially in a Posner Dot-Probe Task Based on Emotional Valence and Animacy.
Adalio C, White S, Blair J

Objective: Youth with Conduct Disorder and Callous-Unemotional traits (CD+CU) have shown behavioral deficits in the processing of emotionally distressing stimuli (Kimonis, Frick, Fazekas, & Loney, 2006), which has been linked to amygdala impairment (Blair, 2003). This study sought to determine if the animacy of a cue would differentially impact responses to emotional cues for CD+CU youth. Method: Participants included a community sample of CD+CU youth and healthy controls. CU traits were determined using the Inventory for Callous and Unemotional Traits (ICU; Frick, 2004). Participants completed a computer-based Posner dot-probe task. The pictorial stimuli varied by animacy, emotional valence, and target congruence. Performance was based on response time. Results: A group x emotional valence x animacy x congruence repeated-measures ANOVA showed no significant main effects, though the main effect of group approached significance [F = 3.808, p = .068]. A significant group by emotional valence interaction [F = 16.00, p = .039] and a highly significant group x valence x animacy x congruency interaction were observed [F = 16.00, p = .001]. The two groups of youth exhibited different response patterns in relation to the impact of congruency and animacy on responding based on emotional valence of cues. Conclusions: In addition to differential patterns of responding to emotionally distressing cues, the current data indicate CD+CU youth have differential patterns of response to the animacy of cues relative to control youth. These findings have implications for understanding the development of CU traits and will help inform etiological theories of CD+CU.

A-10
Case Report: Neurocognitive Effects and Transition Support in a Pediatric Patient with the 47, XYY Genotype
Barber B, Marcy S

Objective: This case highlights the significant internalizing symptoms and neurocognitive deficits present in an adolescent transitioning into adulthood with XYY. XYY is a rare chromosomal disorder that is caused by the presence of an extra Y chromosome. Research has found that those with XYY are taller in stature and have lower IQ's with significant deficits in verbal IQ (Leggett et al., 2010). Deficits have been found in attention, executive functioning, motor tasks, and externalizing behaviors (Davey & Vance, 2007). Method: Follow up neuropsychological testing was conducted on a 17-year-old Latino male in the 12th grade. He was found to possess the XYY phenotype at age 10 and was referred for a neuropsychological evaluation in 2005 due to delayed emotional maturity, learning disabilities, speech delays, inattention and depressive mood. Results:

Neuropsychological testing documented similar findings to his 2003 scores with low average IQ and deficits in language, attention, memory, and motor skills. His academic scores were significantly lower than grade level with no appreciable gains in these areas since his last assessment. He also met the criteria for generalized depressive disorder. Conclusions: This case emphasizes the need for early neuropsychological testing, meeting the criteria for depression in addition to lacking the vocational readiness to leave high school being that he cannot read, write, or verbally express himself higher than a fifth grade level. Often the growth velocity during puberty in combination with decreased cognitive abilities lead to increased difficulties into late adolescence and adulthood, requiring academic accommodations that specifically include counseling and vocational training.

A-11
Social Skills Deficits in Children with Fetal Alcohol Spectrum Disorder and Autism Spectrum Disorder
Boseck J, McCormick C, Davis A, Berry K, Koehn E, Tiberi N, Gelder B

Objective: Social skills deficits have been shown to be among the most impacted adaptive skill in children with Fetal Alcohol Spectrum Disorder (FASD) and Autism Spectrum Disorders (ASD). However, the way in which these social skills deficits present is qualitatively different. Thus it is imperative to understand the correlational factors guiding these social impairments in order to guide interventions. Method: The samples consisted of 144 children with FASD (mean age = 10.07, SD = 3.6) and 31 children with ASD (mean age = 8.42, SD = 3.1). All participants were administered the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) and Vineland Adaptive Behavior Scale (VABS) as part of a comprehensive neuropsychological evaluation. Results: Significant correlations existed between the VABS Socialization Composite and WISC-IV Verbal Comprehension Index (VCI; .291**), Working Memory Index (WMI; .341**), and Processing Speed Index (PSI; .201*) in children with FASD. Significant correlations occurred in children with ASD between the Socialization Composite and VCI (.533*) and WMI (.480*). Follow-up sequential logistic regression indicated that the Socialization Composite was only able to account for a significant amount of the variance in the WMI (R2=.376; p < .001) in children with FASD and the VCI (R^2=.533; p = .01) in children with ASD. Conclusions: There were significant correlations between multiple WISC-IV Composites and the VABS Socialization Composite for children with FASD or ASD. However, social skills deficits are most highly attributable to working memory deficits in children with FASD and verbal comprehension deficits in children with ASD.

A-12
Detecting Cognitive Impairment in Pediatric Neurology Patients Using the CNS Vital Signs Computerized Neuropsychological Battery
Brooks B, Sherman E

Objective: Computerized neuropsychological testing represents a viable method for rapidly screening a person's cognitive abilities. Little is known, however, on the validity of the CNS Vital Signs battery in pediatric patients. The purpose of the present study is to explore the clinical validity of the CNS Vital Signs computerized battery in a large mixed pediatric neurology sample. Method: CNS Vital Signs is a 30-minute computerized battery that provides information about verbal and visual memory, psychomotor speed, reaction time, and executive functioning.

Participants in this study included 221 neurology patients and 281 healthy control participants between 7-19 years of age (mean age=13.1, SD=3.1). Results indicated that the neurology sample performed significantly worse on all domain scores and nearly all subtest scores. Results: Cohen's d effect sizes were small for the verbal memory (d=.38), visual memory (d=.43), and reaction time (d=.41) indexes, medium for the complex attention (d=.70) and cognitive flexibility (d=.76) indexes, and large for the psychomotor speed index (d=1.01) and the overall composite score (i.e., NeuroCognition Index, d=.90). Developing a criterion for cognitive impairment, based on 2 or more scores ≤5th percentile, identified 3.4% of the healthy control sample and 31.3% of the neurology sample as being cognitively impaired. Conclusion: This study adds to the validity evidence for the CNS Vital Signs in pediatric patients with neurological disorders.

A-13
Emotional and Behavioral Late Effects in Pediatric Oncology Survivors
Garcia MI, Robillard R

Objective: Current available data on long-term psychological sequelae for Acute Lymphoblastic Leukemia (ALL) pediatric survivors is mixed (Kazak, 1994; Brown et al., 1992). Thus, the purpose of this pilot study was to investigate emotional and behavioral late-effects for ALL survivors, and to investigate risk factors that may make it more (or less) likely to develop emotional and behavioral difficulties. Method: This study included ALL pediatric survivors (N=20) and caregivers (N=17). Fifteen survivors were male and five were female. Survivors' ages ranged from 10 to 21.8 years at the time of assessment. Age at treatment initiation ranged from 1.5 and 11.5 years. Participants had completed chemotherapy for at least one year. Participants currently undergoing treatment, those that underwent a bone-marrow transplant, received radiation, or had a recurrence of cancer were excluded. Results: Emotional and behavioral functioning was assessed using the Behavioral Assessment Scale for Children, Second Edition (BASC-2). The BASC-2 scales analyzed included: depression, anxiety, attention and hyperactivity. Separate one-way MANOVA's were conducted in order to analyze the data. Analysis revealed significant differences in reporting of anxiety, depression, attention and hyperactivity symptoms combined, based on age when treatment started. However, BASC-2 scales did not indicate significant difficulty with emotional or behavioral functioning in this population. Conclusions: Despite significant differences in reporting of symptoms, BASC-2 mean scores were not in the at-risk or clinically significant range of impairment suggesting adequate emotional and behavioral functioning overall. Additional information such as genetic-risk and protective factors may contribute to psychological and behavioral outcomes and should guide future research.

A-14
Peak Blood Lead Levels and Neuropsychological Functioning in Children
Gunner J, Miele A, Lynch J, McCaffrey R

Objective: To examine the relationship of peak blood lead levels (BLLs) and neuropsychological status among a group of children evaluated in the context of litigation. Method: Sixty-eight children were administered either the Reitan-Indiana Neuropsychological Battery Younger Children (n=30; mean age of 6.8 years (SD = 1.04)) or the Halstead-Reitan Neuropsychological Battery for Older Children (n=38; mean age of 11.2 years (SD = 1.7)). Results: The average peak BLLs was µg/dL (SD = 15.3) among older children and µg/dL (SD = 30.2) among younger children

were not significantly correlated with the total neuropsychological deficit score (NDS) for either group (r = .09, ns; r= -.29, ns), respectively. While controlling for age, gender, and education, peak BLLs were regressed on the total NDS. Among older children, approximately 10% of the variance in total NDS scores (R^2 = .097, F(4,33) = .89, ns) was accounted for, while the proportion of variance in total NDS scores explained uniquely by peak BLLs was approximately 0.5% (semi-partial correlation = .071, t(37) = .429, ns). Among younger children, approximately 50% of the variance in total NDS scores (R^2 = .518, F (4,24) = 6.45, p< .001) was accounted; however, the variance in total NDS scores (semi-partial= .081, t(28) = .568, ns) was only 0.6%. Conclusion: Consistent with reports by the Center for Disease Control (2005), a history of elevated blood lead levels was found to account for <1% of the variance in overall neuropsychological functioning.

A-15
The Relationship Between Young Children's Emotion Processing Abilities and Classroom Behaviors
Hamilton J, Froming K, Nemeth D, Steger A

Objectives: Proficiency in understanding human emotionally expressive behaviors is associated with social competence. Children's understanding of emotions improves peer interactions and promotes positive social interchanges (Harris, 2000). Abnormalities in emotion perception are associated with adult and child psychiatric disorders (Herba & Phillips, 2004). Early assessment is therefore important. The Comprehensive Affect Testing System (CATS) is an assessment tool that can improve the neuropsychological understanding and awareness of emotion. The CATS assess emotion processing in three broad domains: facial, prosodic, and lexical processing. In a 2010 NAN poster presentation, Hamilton, Froming, Nemeth and Steger identified the differential relationship between 6 and 7 and 12 to 13 year olds' intellectual and emotion processing capabilities. This poster addresses the relationship between 6 to 7 year old children's emotion perception abilities and their teacher assessed classroom behaviors. Method: Thirty five children, ages 6 to 7, participated in a research project involving emotion processing. Each participant completed the computerized version of the CATS and each participant's teacher completed the (BASC-2, TRS). Relationships between the CATS 14 scales and the 16 Clinical and Adaptive Scales of the BASC-2 TRS were examined. Results: Positive and adaptive behaviors assessed by the BASC-2 were positively correlated with CATS Scales and negative and problematic behaviors were negatively correlated with CATS Scales. Conclusions: A significant relationship exists between 6 to 7 year old children's teacher assessed classroom behaviors on the BASC-2 and CATS emotion processing abilities for children. These relationships might assist teachers and/or mental health professionals in identifying at-risk children.

A-16
Performance Differences between TBI versus Non-TBI Children and Adolescents on the LANSE-A and LANSE-C is Represented to a Greater Degree on Measures of Executive Function, Judgment, Orientation, Memory and Motor Function
Lebby P, Harrison J, Mounoutoua A, Preiss J, Brimager A, Gates E, Chang J, Cisneros H

Objective: This study assessed the degree to which the effects of traumatic brain injury are captured by the subtests of the LANSE-A and LANSE-C. It was predicted that those subtests reliant on executive functioning, judgment, orientation and memory would discriminate the TBI subjects

from the normal control subjects to a greater degree than the other subtests. Methods: After obtaining written consent from a parent or guardian, participants were tested on the LANSE-C or LANSE-A based upon on their age. The non-injured control group (NC) consisted of 193 individuals (76 children and 117 adolescents) without a prior history of head injury or neurological disorder. Control group participants were recruited from multiple cultural and ethnic backgrounds within California's Central Valley. The TBI group consisted of 78 individuals (25 children and 53 adolescents) that were assessed at Children's Hospital Central California following a traumatic brain injury. Results: The discriminant function matrix was valid at the $P<0.000$ level. The order of subtests (from most influenced by TBI versus least influenced) was as follows: number-letter sequencing, number-sequencing backwards, visual-motor, judgment, verbal-auditory memory, orientation, number-sequencing forward, receptive-language, visual memory, visual-spatial, sentence repetition, expressive vocabulary, verbal associations and object use. Conclusion: The influence of brain injury had a disproportionate negative influence on those subtests that measure the cognitive hallmarks and the physical effects of TBI.

A-17
Cluster Analysis of the WIAT-II in a School-Referred Sample
Long J, Petrauskas V, Casey J, Picard E

Objective: Past studies have found three distinct subtypes of learning disability profiles, using the original version of the Wide Range Achievement Test. These subtypes were determined by examining the academic profiles of children with different cognitive strengths (e.g. VIQ>PIQ). These groups are a good Reading and Spelling group, a good Arithmetic group, and a relatively equal Reading, Spelling and Arithmetic group. These subtypes have yet to be formally replicated using updated measures. The purpose of the present study was to explore through cluster analysis how many academic subgroups underlie the Wechsler Individual Achievement Test – Second Edition (WIAT-II). Cluster analysis was chosen because the data is allowed to freely form groups without externally imposed structure. Method: WIAT-II scores of children referred for psychological assessment through their school were subjected to a hierarchical cluster analysis using Ward's method and squared Euclidean distance. This cluster analysis was then followed up by k-means clustering to verify the solution. Results: Three clusters were identified. They demonstrated the following patterns: 1) higher Word Reading (WR) and Spelling (Sp), lower Numerical Operations (NO); 2) higher NO, lower WR and Sp; 3) relatively equal low average WR, Sp, and NO with better higher order thinking abilities (i.e., higher Reading Comprehension and Math Reasoning). Conclusions: Compared to the original studies, three clusters with similar patterns but differing severity of impairment were identified with the WIAT-II. This study demonstrates that there are unique profiles associated with academic abilities.

A-18
Does Executive Functioning Affect Performance on the CVLT-C?
Long J, Petrauskas V, Casey J, Picard E

Objective: Previous studies with adult clinical populations have found that individuals with executive functioning (EF) difficulties performed worse on verbal list learning memory tests than those without EF difficulties. These studies have not clearly noted whether other cognitive deficiencies were present that may have contributed to poor EF performance (i.e., global

intellectual deficiency). This study investigated the relationship between EF and performance on the California Verbal Learning Test – Child Edition (CVLT-C). Method: Children referred for psychological assessment through their school were classified as having EF impairment (n = 81) and no EF impairment (n = 41). EF was measured using the Behavior Rating Inventory of Executive Function (BRIEF) – Teacher Form, a measure designed to be ecologically valid. Impairment was defined as T ≥ 65 on the BRIEF Global Executive Composite (GEC). Performance on the CVLT-C was compared between groups using MANOVA. Correlations between BRIEF and CVLT-C scores were examined. Results: Groups did not differ on Full Scale IQ, Verbal Comprehension Index, or Working Memory Index of the WISC-IV. There were no group differences on any of the CVLT-C learning process (F [5,116] = 1.107, p > .05, Wilk's λ = .954) or learning outcome measures (F [7,114] = .542, p > .05, Wilk's λ = .968). No correlations between the BRIEF and CVLT-C scores were significant. Conclusions: EF as measured by the BRIEF does not contribute to either CVLT-C learning process or outcome scores. The BRIEF may measure different aspects of EF as compared to EF measures used in prior studies.

A-19
IQ and Memory Functioning among Children with a History of Elevated Blood Lead Levels
Miele A, Gunner J, Lynch J, McCaffrey R

Objective: To examine the relationship between peak blood lead levels (BLLs), IQ and memory performance among a group of children evaluated in a forensic context. Method: Scores from the Wechsler Intelligence Scale for Children- 3rd edition (WISC-III) and the Children's Memory Scale (CMS) were examined among 68 children with a mean age of 9.3 years (SD = 2.6) and average peak BLLs of 42.5μg/dL (SD= 23.4). Results: Peak BLLs were not significantly correlated with either Full-Scale IQ (FSIQ) (r= .118, ns) or the CMS General Memory Index (GMI; r= -.056, ns). Two regression analyses were completed regressing peak BLLs on FSIQ and the CMS GMI, while controlling for age, gender, and education. The overall model accounted for approximately 16% of the variance in FSIQ scores (R^2 =.16, F(4, 62)=3.0, p< .05). However, the proportion of variance in FSIQ scores explained uniquely by peak BLLs was approximately 0.8% (semi-partial correlation= .092, t(66)= .79, ns). The overall model accounted for approximately 22% of the variance in CMS GMI (R2 =.22, F(4, 27)=1.95, ns). The proportion of variance in CMS GMI explained uniquely by peak BLLs was 2% (semi-partial correlation= -.143, t(31)= -.846, ns). Because peak BLLs were not normally distributed, a logistic transformation was performed on all analyses; however, this did not influence any of the results. Conclusions: Peak BLLs accounted for no more than 2% of the variance in both IQ and memory scores among children with a history of elevated BLLs. These findings are consistent with those reported by the Center for Disease Control (2005).

A-20
The Relationship between Executive Functioning and IQ in Children
Rodriguez M, Fonseca F, Golden C

Objective: Previous studies have found a relationship between executive functioning and IQ in gifted children. The purpose of this study was to determine the correlation between intelligence scores and executive functioning in a sample of children with above average and superior IQ. Methods: Scores from the Full Scale IQ (FSIQ), Verbal Comprehension (VCI), and Perceptual Reasoning (PRI) Indexes of the WISC-IV, Trail Making Test B (Trails B), Stroop Color-Word test,

and Wisconsin Card Sorting Test preservative responses, were examined. The sample consisted of 21 subjects with FSIQ of 116 and above (M=125, SD = 9.32). Age range included 6-15 (M= 9.67, SD= 2.89) and years of education ranged from 1-10 (M=4.19, SD=3.01). The sample consisted of 91% right handed, 38% Caucasian, 43% Hispanic, and 19% of other ethnicities. There were 52% females. Results: At the .05 level, partial correlations controlling for age revealed a significant relationship between VCI and the Stroop interference score, r (18) = .58, p = .007. Significant correlations were also found between FSIQ and Trails B, r(18) = -.47, p = .035. Conclusions: These results indicate that executive functioning performance may be related to FSIQ and VCI. Trails B was related to FSIQ whereas other tests were not. Trails B is unique to the other two tests in that it measures cognitive shifting. This suggests this ability may be a significant contributor to IQ. These findings can be taken into consideration when examining gifted children and can be applied to pediatric clinical populations such as IQ in Attention Deficit Disorders.

A-21
Differences in Social Perception in Children with NLD and Asperger Disorder
Semrud-Clikeman M, Goldenring Fine J, Bledsoe J

Objective: The purpose of this study was to evaluate neuropsychological functioning in children diagnosed with nonverbal learning disability (NLD) and Asperger Disorder (AS). Method: Children with NLD (n = 30), AS (n = 27) or Controls (n = 40) were compared across measures of direct social perception and parent and self-report of social adaptation and communication. Results: On a measure of social perception (CASP) compared to controls children with NLD (p = .005) and AS (p = .001) showed poorer interpretation of nonverbal cues while those with AS (p = .01) also interpreted emotional cues worse. As expected on parent report, both groups showed poorer social functioning (p < .001) and more withdrawal (p < .001) compared to controls. On a questionnaire measuring social communication, both groups experienced significant problems with the AS group showing the most impairment (p < .001) compared to children with NLD or controls. Self-reported behavioral ratings indicated a lack of awareness or reporting of social difficulties for both the NLD and AS groups. Conclusions: These findings indicate children with AS have difficulty with both emotional and nonverbal perception while those with NLD interpret nonverbal cues inaccurately. Difficulties are present in social skills for both groups as well as in social communication with children with AS showing the most difficulty. These findings suggest that the processes underlying the social performance in these groups may differ.

A-22
Neuropsychological Differences in Nonverbal Learning Disability and Asperger Disorder
Semrud-Clikeman M, Goldenring Fine J, Bledsoe J

Objective: The purpose of this study was to evaluate neuropsychological functioning in children diagnosed with nonverbal learning disability (NLD) or Asperger Disorder (AS). Method: 30 children with NLD, AS (n = 27) or Controls (n = 40) were tested on measures of ability, visual-spatial skills, and executive functioning. Results: No overall FSIQ differences were found. The NLD group scored significantly lower on the PIQ (p = .005) from the WASI. Block design was lower for the NLD (p = .01) and AS groups (p < .001) and matrices for the NLD group (p < .002) compared to controls. Mathematics was also poorer for the NLD group (p < .001). Performance on the Rey-Osterreith was significantly poorer for both clinical groups compared to the control (p < .001). The

AS group performed more poorly compared to the NLD and control groups on sort recognition (p = .03), description (p = .02) and verbal sort (p = .01) from the D-KEFS. On the Trails measure both clinical groups performed more poorly on Trails 1 through 4 (p < .001) but not on Trails 5. Conclusions: These findings indicate children with NLD perform more poorly than children with AS or controls on matrices and arithmetic while those with AS performed more poorly on measures of cognitive flexibility. Both clinical groups showed significant difficulty in working memory and visual-spatial skills but not fine motor speed. It is suggested that there are neuropsychological differences between these groups that may be subtle but which are detectable with a comprehensive neuropsychological assessment.

A-23
Confirmatory Factor Analysis of the WISC-IV in Children with ADHD
Thaler N, Allen D, Bello D, Wood N, Etcoff L

Objective: Although exploratory and confirmatory factor analyses of the WISC-IV samples have provided adequate support for its four-factor structure, recent studies suggest that the WISC-IV might better be explained by Cattell-Horn-Carroll (CHC) theory of cognitive ability. The current study was designed to determine whether the WISC-IV is better described with a four-factor solution or whether a model proposed by Keith and colleagues (2006), and derived from CHC theory, is more appropriate in a mixed sample of children referred for neuropsychological evaluation. Method: Participants included 433 youth between 6 and 16 years of age (69.7% boys) who were referred for neuropsychological evaluation and diagnosed with at least one clinical disorder. CFA examined the ten core WISC-IV subtests with the four-factor model and the CHC model. WISC-IV profiles were plotted among disorders to examine differences in the two factor structures. Results: Fit statistics demonstrated that the CHC model was comparable to the four-factor model Plotted factors indicated that when the WISC-IV PRI is split into the Gv and Gf abilities, they represented separate levels of cognitive functioning across disorders. Conclusions: We examined a proposed CHC model in a mixed clinical sample. Results indicate that the CHC model is comparable to the four-factor model and may provide an alternative interpretation of the WISC-IV. However, the four factor model may remain preferable as it is more parsimonious.

A-24
Neuropsychological and Social-Emotional Factors Contributing to Quality of Life for Adults with Asperger's Disorder
Thede L, Oraker J, Gibson F, Stanford L, Gray S

Objective: Individuals with Asperger's Disorder are considered to be high functioning, mainly due to their average to superior cognitive abilities and language skills, but they also have neuropsychological and social impairments. Over half of adults with this condition continue to live at home and rely on their parents for support. The purpose of this study was to identify which neuropsychological and social-emotional factors are most predictive of quality of life. Method: The ADOS was used to assess 33 adults (19 males, 14 females), ages 18-59, for an autism spectrum disorder (24 clinicals; 9 controls), with no significant differences between groups on age, ethnicity, or IQ. Materials included a demographic survey/clinical interview, Interpersonal Behavior Survey, Workplace Skills Survey, Shipley-2 (Vocabulary, Abstract, and Block subtests), Behavioral Assessment of the Dysexecutive Syndrome (BADS), and the Quality of Life Inventory

(QOLI). Results: An objective measure of quality of life (8 demographic variables) was identified by factor analysis. Neuropsychological and social-emotional variables significantly correlated with either dependent variable were then used in multiple regression analyses. Three social-emotional factors, as well as diagnostic group, were predictive of subjective quality of life, accounting for 50% of the variance. Three neuropsychological and five social-emotional factors were predictive of objective quality of life, accounting for 67% of the variance. Conclusion: Both neuropsychological and social-emotional factors were predictive of quality of life. Limitations, recommendations for future research, and implications for treatment are discussed.

A-25
Corpus Callosum Morphology in Retinopathy-Positive and Retinopathy-Negative Malawian Children Diagnosed with Cerebral Malaria
Vroman L, Semrud-Clikeman M, Taylor T, Seydel K

Objective: The current study investigated corpus callosum (CC) morphology in retinopathy-positive and retinopathy-negative pediatric survivors of cerebral malaria (CM). The hypotheses were that retinopathy-positive children would have smaller overall CC area, and that two regions of the CC, the genu and splenium, would be significantly smaller in the retinopathy-positive children. Method: Participants were 20 children, 11 males and 9 females, who were admitted to the Queen Elizabeth Central Hospital in Blantyre, Malawi, and satisfied the clinical case definition of CM. Retinopathy status was determined by direct and indirect ophthalmoscopy. Patients who had any signs of malaria retinopathy (retinal whitening, vessel changes, and hemorrhages) were classified as retinopathy-positive; those with none were classified as retinopathy-negative. There were 16 children in the retinopathy-positive group and 4 in the retinopathy negative group. Area measurements were completed on magnetic resonance imaging (MRI) scans of overall brain area, CC area, and five segments of the CC (genu, body, midbody, isthmus, and splenium). Effect sizes were calculated to determine group differences. Results: A large effect size was noted in overall brain area (d = 1.11). A moderate effect size was detected for total CC area (d = .63). A moderate effect size was also detected for the genu (d = .45), body (d = .56), and midbody (d = .55), and a large effect size was found for the splenium (d = .89). The effect sizes indicate that these regions may be smaller in the retinopathy-positive group. Conclusion: These findings suggest significant decreases in white matter, particularly in the splenium.

Diversity

A-26
Verbal Learning Performance in Spanish/English Bilinguals
Bure-Reyes A, Stewart J, Tourgeman I, Demsky Y, Golden C

Objective: This study compared the performance between a Spanish/English bilingual sample that completed tasks of verbal learning in Spanish and English. Method: Data was collected from volunteers who participated in the Nova Multilingual Neuropsychological Battery Pilot Study. The version of the test administered was contingent on the participant's expressed language preference. The sample included 61 participants. Thirty three participants completed the test in English and 28 participants completed test in Spanish. The mean age was 29 years (SD=9.2). Participants had a mean of 16.09 years of education (SD=1.9). Participants were on the following

subtests: Verbal Learning, Oral Word Recognition, Serial Learning, Verbal Learning Delayed and Oral Word Recognition Delayed. Results: Preliminary analyses revealed significant differences in education between the groups. An ANCOVA was conducted to control the effects of education. Significant differences ($p < .05$) were observed on Verbal Learning $F(2, 59) = 3.747$, $p = .029$, Verbal Learning Delayed $F(2, 59) = 4.662$, $p = .013$, and Oral Word Recognition $F(2, 59) = 4.357$, $p = .017$. Participants who took the test in English learned and identified more words than those who took the test in Spanish. Conclusions: Participants who selected to take the test in English were more adept in manipulating new information through attention and recognition. Results highlight the importance of bilingualism and language preference on the acquisition and retention verbal information.

A-27
School Neuropsychological Assessment of Children Born at High-Risk for Neurological Insults
Burns W, Gray S, Burns K

Objective: Neuropsychological outcome of infants who suffer perinatal complications may not be fully apparent until school age (at which time higher order cognitive demands are made). In this study it was hypothesized primary grade teacher observations could be used to predict of children neuropsychological status in their classrooms. Method: Thirty-three children (five to seven years of age, mean 6 years), who had been hospitalized for an average of 25 days after delivery in an ICU, were administered a uniform neuropsychological evaluation as students of kindergarten, first and second grades. The average gestational age at birth was 35 weeks and the average birthweight was 2100 grams. Eighty-four percent of them had been diagnosed with respiratory distress syndrome and 60% had been given ventilatory assistance. 76% had hyperbilirubenemia or had a blood transfusion. Results: The 33 children were found to have an average FSIQ of 85 and to be approximately one standard deviation below the mean in academic achievement, memory and language. Approximately forty-five percent of the variance in the scores in these neuropsychological domains could be accounted for using a rating scale which was completed by the teachers of these children in school (Pupil Rating Scale-Revised). Conclusions: These results appear to confirm the hypothesis that a teacher rating scale may be used to screen primary grade children for outcome of high-risk birth. The results also support the usefulness of the Pupil Rating Scale for this purpose.

A-28
Does the Nova Multilingual Neuropsychological Battery Accurately Evaluate Performance on Verbal Tasks among Bilinguals Despite Region of Origin?
Calderon C, Tourgeman I, Golden C

Objective: This study attempted to determine if the Nova Multilingual Neuropsychological Battery (NMNB) can be used as a measurement for verbal tasks among bilinguals across different regions of origin. Method: The sample consisted of 66 non-clinical bilingual adults, 60.6% female and 90.9% Hispanic, with a education level of 15.76 (SD = 2.49). A comparison in verbal performance was made between 28 North American participants, 21 Caribbean/Central American participants, and 17 South American participants. Verbal subtests from the NMNB included in this study were: Vocabulary, Intellectual Analysis, Reading Comprehension, Spelling, Phonetic Discrimination, Anomia, Verbal Learning, Verbal Learning Delayed, Categorical Fluency, Oral Word Recognition,

and Oral Word Recognition Delayed. Comparison was made by means of a MANCOVA statistical analysis. Results: Results were considered significant at the p < 0.05 level. Age failed to significantly affect performance, but education was shown to significantly impact performance on four of the subtests (Vocabulary, p=.036; Spelling, p=.035; Oral Word Recognition Delayed, p= .022; and Verbal Learning p=.002). There was no significant difference in performance on the verbal tasks between the regions of origin once education and age were both controlled for. Conclusions: Results indicate that although four subtests were affected by education, it may be because of cultural discrepancies within the educational system between countries, such as a lack of emphasis on rote memorization in the Caribbean/Central America and South America. There are no discrepancies in performance on verbal tasks between regions of origin. This indicates that the NMNB is an effective tool to evaluate verbal development across regions of origin.

A-29
Construct Validity of the Rey Auditory Verbal Learning Test-Spanish in a Clinical Sample of Spanish-Speaking Adults
Neblina C, San Miguel Montes L, Allen D

Objective: The purpose of this investigation was to examine the construct validity of the Rey Auditory Verbal Learning Test-Spanish (RAVLT-S) in a Spanish speaking clinical sample. Method: Participants included 129 individuals referred for clinical neuropsychological evaluation. They were on average 38.6 (SD=16.4) years old, 54% male, and had 13.6 (SD=2.9) years of education. Participants were selected from a consecutive series of cases referred to a neuropsychology consultation service at the Neurology Section of the University of Puerto Rico Medical School, and predominantly diagnosed with TBI (n=45) and MCI (n=31). The RAVLT-S was included a principal components analysis (PCA; varimax rotation) with other measures presumed to assess different neuropsychological abilities, including verbal fluency (FAS) and Trial Making Test Parts A and B. Results: Based on Kaiser-Guttman criteria, the PCA identified three factors that accounted for 82.9% of the variance. The first factor was composed of the RAVLT-S measures, and named verbal learning and memory. The second factor was composed of the fluency measures, while the third was composed of Trail Making tests. With the exception of the RAVLT Total score, which exhibited cross loading with the TMT factor, all other scores exhibited excellent loadings on their respective factors (lambdas>.84), and low cross-loadings on other factors (lambdas<.20). Conclusions: These results provide initial support for the construct validity of the RAVLT-S when used to evaluate Spanish-speaking adults in clinical settings. There continues to be great need for linguistically-diverse and empirically supported neuropsychological measures, and the results of this study provide support for RAVLT-S in this regard.

A-30
Misclassification of Cognitive Impairment on the MOCA with Spanish Speaking Older Adults
Strutt A, Scott B

Objective: To examine the clinical classification accuracy of the Montreal Cognitive Assessment (MOCA) with primarily Spanish-speaking, cognitively-intact, older adults. Method: 125 primarily Spanish-speaking, cognitively-intact (based on neurocognitive evaluation) community volunteers between the ages of 50 and 80, with 6-18 years of education were administered the MOCA as part of a comprehensive neuropsychological battery. Results: MOCA scores were significantly different

between participants with 6-12 [M=23.4 (SD=3.18)] versus 13-18 [M=24.6 (SD=3.17)] years of education [t(123)=-2.06, p=0.04], and utilizing the recommended total score cutoff of >26, 59.0% and 42.2% of these neurocognitively intact community volunteers were respectively misclassified as cognitively impaired. However, a significant between group difference was only observed in the visuospatial-executive (t=-5.27, p<0.001) domain, wherein the greatest performance differences were evident on Trail-making [t(123)=-4.11, p<0.001] and Abstraction [t(123)=-3.55, p=0.001]. The influence of socio-demographic variables (e.g. education, acculturation and years of residency in the U.S.) on this measure will be discussed as poor scores in the visuospatial-executive domain appear to have been influenced by level of education and not true cognitive impairment. For example, some of the BE participants were unable to recite the alphabet and provided basic/concrete responses to questions assessing verbal abstract reasoning. Preliminary normative data will also be included. Conclusion: Healthcare providers and researchers utilizing the MOCA as a screening tool with primarily Spanish-speaking older adults should be aware of the influence of education on this measure and the false positive errors in clinical classification.

A-31
The Verbal Series Attention Test: Performance of Spanish-Speaking Older Adults and the Effects of Education
Strutt A, Scott B

Objective: To investigate a potential performance discrepancy between primarily Spanish- and English-speaking older adults on the Verbal Series Attention Test (VSAT), and to provide preliminary normative data for use with U.S. Spanish-speaking older adults. Method: 122 cognitively-intact, primarily Spanish-speaking older adults completed the VSAT as part of a comprehensive neuropsychological battery. Results: Significant differences were observed between participants with a basic (BE: 6-12 years) versus college (CE: 13-18 years) level of education for VSAT speed (p=0.001) and accuracy (p<0.001) scores. Rates of misclassification for BE and CE groups were 39.0% and 22.6% for total time and 54.2% and 30.6% for total errors, respectively. Nine CE (14.5%) versus 22 BE (37.3%) participants were misclassified as impaired on both indices. BE participants demonstrated significantly greater errors than CE participants reciting the alphabet (p=0.02), months of the year in backward order (p=0.001), and alternating a letter-number sequence (p<0.001). The latter two exercises also required greater time to completion by BE participants [Months: (p=0.01); Letter-number: (p<0.001). BE participants also required greater time to complete serial subtractions (p=0.004), but did not commit significantly greater errors than CE participants on this item. Conclusions: Results reveal high rates of misclassification on the VSAT with primarily Spanish speaking older adults. The influence of socio-demographic variables will be discussed and age and education stratified normative data will be presented.

Neurological and Neuropsychiatric Disorders: Other

A-32
Identifying the Visual Spatial Neuropsychological Deficits Associated with Pierre Robin Sequence: A Case Study
Armstrong P, Booth C

Objective: Our poster presentation will exhibit the neuropsychological profile of a patient born with Pierre Robin sequence (PRS). This case study will outline the patient's areas of cognitive deficits found by the battery of tests given during an outpatient neuropsychological evaluation. This case study highlights a 7-year-old male of Indian descent born with Pierre Robin sequence. He has undergone approximately 15 facial surgeries to correct PRS, and can only open his jaw 1cm. Method: The test battery assessed the following domains: overall intellectual functioning, motor functioning, visual and oculomotor functioning, speech and language, verbal/auditory memory, visual memory, attention, receptive language, expressive vocabulary, reasoning skills, visual-spatial ability, and visual-motor integration. Results: Results of extensive neuropsychological testing revealed average range verbal skills (WISC-IV VCI) and extremely low range visual skills (WISC-IV PRI). Neuropsychological deficits were obtained with sustained visual memory, poor visuomotor processing speed, visualspatial block construction, attention to visual detail, and coordinating visual-spatial perception with motor skills. Within normal range functioning was achieved with several areas including verbal reasoning skills, naming skills, verbal memory skills, reading fluency, writing skills, and math fluency. The results showed many deficits that were primarily visually based. Conclusions: Our poster presentation will display findings from the neuropsychological evaluation results. The poster will review the patient's neuropsychological deficits associated with PRS, with an emphasis on the patient's visual neglect/visualspatial deficits.

A-33
Neurocognitive Impairment and Antiretroviral Nonadherence among HIV+ Persons with Co-Occurring Bipolar Disorder
Blackstone K, Moore D, Gouaux B, Ellis R, Atkinson J, Grant I, The HNRP Group

Objective: Neuropsychological (NP) impairment and bipolar disorder (BD) are risk factors for antiretroviral (ARV) nonadherence in HIV; we examined the differential contribution of these risk factors for ARV nonadherence in HIV+/BD+ participants as compared to HIV participants without BD (HIV+/BD-). Method: Neurocognitive and adherence abilities were assessed in 43 HIV+/BD+ and 33 HIV+/BD- individuals. DSM-IV BD diagnoses were determined by the SCID. ARV adherence was measured as the proportion of correct bottle openings over a 30-day period using the Medication Event Monitoring System with nonadherence defined as <90% adherent. NP functioning was assessed with a seven-domain comprehensive battery. Results: Participants were comparable across all demographic and disease variables (i.e., age, education, gender, CD4 count, and plasma viral load; p's>0.05); however, lifetime methamphetamine and hallucinogen abuse/dependence diagnoses were more common in the HIV/BD+ group (p's<0.04) and were subsequently entered in all models to account for possible contributions to nonadherence. When group membership was not included in the model, NP-impairment accounted for a small, but significant, proportion of ARV nonadherence (R2=.04; p=0.04). When group membership

(HIV+/BD+ v. HIV+/BD-) was included, NP impairment was no longer significant and group membership was the only significant predictor of ARV adherence (R2=.19; p<0.001), with HIV+/BD+ were more nonadherent than HIV+/BD- participants. Conclusions: Although NP impairment is associated with ARV nonadherence, BD diagnosis predicts nonadherence beyond impairment. These findings demonstrate that although NP impairment may be used as an indicator of ARV nonadherence, there are processes specific to BD that may influence adherence behaviors in the context of HIV.

A-34
Evaluation of Two Commonly Used Clinical Measures of Global Cognition to Inform Everyday Functioning in Parkinson's Disease
Brennan L, Schultheis M, Hurtig H, Weintraub D, Duda J, Moberg P, Chute D, Siderowf A

Objective: Individuals with Parkinson's disease (PD) often suffer from deficits in everyday functional activities due to cognitive impairment. This study aimed to examine the clinical utility of two commonly used measures of global cognition, the Mini-Mental State Examination (MMSE) and Dementia Rating Scale-2 (DRS-2), in informing functional status in PD. Method: PD patients 60 years of age or greater (n=182) were assessed using the MMSE and DRS-2. Functional status was assessed via caregiver report using the Alzheimer's Disease Cooperative Study Activities of Daily Living Inventory (ADCS-ADL). The Hoehn and Yahr, a standardized neurologist rating of motor disability, was used to adjust for differences in motor performance that might impact functional abilities. Partial correlation coefficients, adjusting for age, education, gender and motor disability, were calculated to determine the association between the ADCS-ADL and MMSE and DRS-2, respectively. Results: ADCS-ADL scores were significantly correlated with both the MMSE (r=0.25; p<0.01) and DRS-2 (r=0.27; p<0.01) total scores. Conclusions: The data support the clinical utility of the MMSE and DRS-2 in informing everyday functioning status in PD. Although the DRS-2 may provide more information regarding domain-specific cognitive deficits, the MMSE and DRS-2 total scores demonstrate comparable sensitivity in association with everyday functioning.

A-35
Childhood Adaptive Functioning Predicts Adult Adaptive Functioning in Survivors of Childhood Brain Tumors without Exposure to Radiation Therapy
Brewster R, King T, Morris R, Krawiecki N

Objective: Changes in adaptive functioning are a particular concern for survivors of childhood brain tumors. We examined the relationship between measures of adaptive functioning collected at childhood and adulthood in survivors treated with radiation therapy and in survivors not treated with radiation. Method: Twenty-nine survivors were on average 18.64 (SD=3.95) years post-diagnosis. Childhood (mean age=5.52, SD=3.98; 39% female; Vineland Adaptive Behavior Scales; VABS) and adulthood (mean age=24.91, SD=4.35; mean education=12.00, SD=1.81; Scales of Independent Behavior-Revised; SIB-R) adaptive functioning were collected from caregivers of 18 survivors treated with radiation. Childhood (mean age=6.67, SD=4.36; 46% female) and adulthood (mean age=23.85, SD=7.97; mean education=13.00, SD=1.55) adaptive functioning were also collected from caregivers of 11 survivors without exposure to radiation. Regression analyses examined the relationship overtime between measures. Results: VABS was a significant predictor of SIB-R in survivors without exposure to radiation (Beta=.70, p=.018, R2=.48), but not

in survivors treated with radiation. Mean SIB-R scores (No Radiation=100.27, SD=26.7; Radiation=74.11, SD=20.63) were significantly lower for survivors treated with radiation $t(27)=2.96$, $p=.006$, Cohen's d=1.10. Conclusions: Childhood VABS score emerges as an important factor in estimating adult adaptive functioning for survivors without radiation treatment, but not in estimating adult adaptive functioning in survivors treated with radiation. Mean adult adaptive functioning scores were significantly lower for survivors treated with radiation.

A-36
Neuropsychological Sequelae in Adult Polyglucosan Body Disease: A Case Study
Dinishak D, Richardson G

Objective: The purpose of this study is examine the neuropsychological function of a 57 year-old female diagnosed with Adult polyglucosan body disease (APBD), a rare neurological condition characterized by progressive upper and lower motor neuron involvement, early urinary dysfunction, and cognitive impairment. This case is unique because the patient had premorbid neuropsychological testing done 7 years before she was diagnosed with APBD and again during the early stages of the disease. We hope to add to the body of literature examining the cognitive effects over time of this rare neurological disease. Method: Quantitative serial neuropsychological testing and MRI in one female with APBD and review of the literature. Results: A comparison between neuropsychological function at baseline and at the time of diagnosis of APBD demonstrates significant change in cognitive function. Specifically, the patient demonstrated impairments in immediate memory, executive function, processing speed, and motor functions; in addition, she demonstrated normal, but reduced, ability in visuospatial construction, naming, and attention compared to baseline. Conclusions: The results of this study add to the limited body of data regarding the neuropsychological effects of APBD. This case study is unique because of the availability of premorbid test data that add to the validity of results. The patient in this study is being followed by the authors and additional testing is planned in the coming year to track changes in function.

A-37
Arnold Chiari Malformation with Synkinesia and Asperger's Syndrome
Estes B, Knight M, Hertza J

Objective: The objective of this case study is to explore the neuroanatomical underpinnings of synkinesia and associated symptomology by presentation of a unique case of synkinesia, Arnold-Chiari malformation, and Asperger's syndrome. Synkinesia is an involuntary movement of muscles during voluntary movements, which in this particular case presented as an inability to perform upper and lower extremity movements unilaterally. Little is known of the neuroanatomical bases of synkinesia. There is limited evidence of being based in cerebellar pathology, as is suggested by this case study. Method: A 15-year-old male with a history of Asperger's, who also had a long-standing history of coordination delays, was evaluated. History included a fusion defect of the posterior arch of C1 and C2, and an Arnold-Chiari malformation. Evaluation procedures included administration, scoring, and interpretation of quantitative and qualitative measures as well as a review of his medical and neurological history. Results: Neuropsychological testing revealed deficits in motor functioning and in aspects of executive functioning, with cognitive abilities being otherwise within normal limits or above average. His sensorimotor examination demonstrated

disturbances in how movements are modulated (i.e., how smoothly the movements are executed and inhibited/stopped). Furthermore, social and emotional difficulties were exhibited across various measures. Results were used to guide psychotherapeutic interventions, including compensatory strategies, social skills training, and anxiety reduction. Conclusion: Synkinesia has been conceptualized as a disturbance in inhibitory pathways of the corpus callosum, though the unique presentation and known neuropathology of this patient raises concerns for a cerebellar basis.

A-38
No Effect of Psychotropic Medication on Cognitive Function in Morbidly Obese Adults
Garcia S, Strain G, Devlin M, Cohen R, Paul R, Crosby R, Mitchell J, Gunstad J

Objective: Psychological symptoms are common in obese individuals and psychotropic medication is widely prescribed for patients in this population. Medications such as antidepressants and anxiolytics are inconsistently associated with cognitive function in past studies, though no study has examined their possible effects in a morbidly obese sample. Method: A sample of obese individuals were drawn from a larger project. Obese patients on psychotropic medication(s) (age 44.63 ± 10.07 years; BMI 43.87 ± 7.47) were matched to those not on psychotropic medication (age 41.53 ± 10.92 years; BMI 44.17 ± 6.57) on hypertension, diabetes, and sleep apnea status (N=38). Participants reported medical history and completed the Integneuro, a computerized cognitive test battery, during a single session. Results: All cognitive test scores were converted to z-scores based on age, gender, and estimated IQ. T-tests indicated that the non-medication group generated more words on Animal Naming (t(34) = -2.39, p = .02). No other differences emerged, including on tests of attention [Digit Span Backwards (t(34) = -.62, p = .54)], executive function [Switching of Attention (t(34) = -1.19, p = .25)], and memory [Verbal List Learning (t(34) = -.37, p = .71)]. Conclusions: Results indicate that psychotropic medications do not adversely impact cognitive abilities in morbidly obese individuals. Further work in larger samples is needed to confirm these findings and clarify whether pharmacokinetics of these medications operate in a similar manner in this population.

A-39
Case Study: A Patient with Agenesis of the Corpus Callosum with Minimal Associated Neuropsychological Impairment
Gass C, Gass C

Objective: This is a neuropsychological case study involving an 88-year-old right-handed man with recent onset of intermittent left-hand apraxia that he noted while driving and dressing himself, occurring approximately twice per week over the past year. He has lifelong corpus callosum agenesis (CCA) and other associated structural brain abnormalities. Method: The patient underwent a variety of neurodiagnostic procedures, including MRI, EEG, neurological and comprehensive neuropsychological examination. Results: A brain MRI evidenced mild generalized parenchymal volume loss and complete agenesis of the corpus callosum, with marked dilatation of the occipital horns of the lateral ventricles (colpocephaly), as well as moderate dilatation of the temporal horns. EEG findings suggested bitemporal slowing with a left temporal focus. In contrast with the highly abnormal MRI, the results of his neuropsychological examination reflected wide-ranging normal neurobehavioral functioning and only mild compromise of speech perception,

verbal learning ability, and bilateral proprioception. Conclusion: This case underscores the plasticity of the developing brain and, in specific, compensatory mechanisms for interhemispheric connectivity in the absence of a corpus callosum and in the presence of several congenitally based structural abnormalities.

A-40
Decision-Making Ability is Associated with Appointment Adherence in MS
Hancock L, Bruce J, Roberg B, Lynch S

Objective: Between 40-65% of multiple sclerosis (MS) patients show cognitive decline over the course of the disease, including decreased decision-making ability. MS patients also cancel or no-show to up to 63% of their neurology appointments, missing valuable time with their clinicians. Researchers have also established a relationship between appointment and medication adherence in MS. This study examined the association between decision-making, appointment adherence, and medication adherence in MS. Method: Medical records for 86 MS patients were reviewed to obtain information regarding scheduling activity for approximately a six-year period prior to participant's enrollment in the study. Adherence was assessed retrospectively by self-report and prospectively for eight weeks using Medication Event Monitoring System caps and a medication diary. Decision-making was assessed by the Iowa Gambling Task (IGT). Results: Patients with lower levels of impulsivity had fewer no-show appointments (r=-.30,p<.01) and kept more scheduled appointments (r=.24, p<.05). Participants who amassed more money also had fewer no-shows (r=-.270, p<.05). However, all other relationships between appointment adherence, medication adherence, and IGT variables were non-significant. Categorical analysis of revealed that patients without a no-show earned more money (U=526, p<.05) and used a conservative deck more (U=495, p<.01). Conclusions: Lower levels of impulsivity in decision-making were associated with lower rates of no-shows and higher rates of keeping scheduled appointments. In contrast, no medication adherence variables were significantly related to decision-making. It appears that appointment adherence is related to decision-making ability. Future research should consider whether appointment adherence can provide clinicians with valuable information about disease activity in MS.

A-41
Neurosyphilis: A Case Study
Hertza J, Varnadore E, Estes B

Objective: The objective of this study is to explore the utility of neuropsychological assessment in examining cognitive deficits in light of advanced syphilis. Tertiary syphilis can follow the initial infection by 3-15 years and lesions can cause significant damage to central nervous system tissue. Neurosyphilis can develop if the infection goes untreated and patients generally display confusion, depression, irritability, and dementia. Blood tests can be performed to determine the presence of tertiary syphilis however; supplemental neuropsychological data can provide a clearer picture of individual deficits due to the infection. Method: 48 year-old right-handed Caucasian female was assessed in a hospital setting following concerns of short-term memory loss. Patient reported changes in cognitive abilities 2+ years ago with difficulty recalling the date, increased misplacement of personal objects, and difficulty making decisions. The patient also reported difficulty at work and word-finding problems. Personality changes, visual/auditory hallucinations,

and motor/sensory changes were denied. Archival neuropsychological data, de-identified history, and neurologist report will be organized and presented in a single study case summary. Evaluation procedures included administration, scoring and interpretation of comprehensive quantitative and qualitative measures. Results: Assessment revealed globally impaired abilities. Specifically, significant difficulties were noted in attention, executive abilities, receptive language, naming, abstract verbal and non-verbal reasoning, visual organization, visual perception, and memory. Abilities were so impaired, that most test scores fell in the bottom 5 %ile, especially those related to anterior and limbic system function. Conclusion: Neuropsychological assessment can be an extremely effective tool in determining deficits due to advanced syphilis.

A-42
Comparison of the Wechsler Memory Scale Third Edition and the Wechsler Memory Scale Fourth Edition in Patients with Temporal Lobe Epilepsy
Kaufman RS, Rinehardt E, Schoenberg M, Mattingly M, Rosado Y, Velamuri S

Objectives: The Wechsler Memory Scale – Third Edition (WMS-III) and the updated Wechsler Memory Scale – Fourth Edition (WMS-IV) are used in the neuropsychological evaluation of epileptics, but the WMS-IV has not been analyzed as extensively as its previous version. The purpose of this study is to see if there are any significant differences between each version in measuring the memory functioning of patients with temporal lobe epilepsy (TLE). We hypothesize that there will be no significant differences between the WMS-III and WMS-IV. Method: Participants included 40 left TLE (LTLE) patients and 44 right TLE (RTLE) patients. Fifty-eight patients were given the WMS-III and 26 patients were given the WMS-IV. Age, education and intelligence (Full Scale IQ) were similar between testing groups. The WMS-III Logical Memory I and Logical Memory II sub-tests were compared with the WMS-IV Logical Memory I and Logical Memory II sub-tests and the WMS-III Faces I and Faces II sub-tests were compared with the WM-IV Designs I and Designs II sub-tests. Differences between groups were measured using three one-way ANOVAs: one comparing the total sample of TLE patients, one comparing LTLE patients and one comparing RTLE patients. Results: No significant results were found between groups for any of the analyses. Conclusions: Results confirm our hypothesis that the WMS-IV is not significantly different from the WMS-III. Despite the restructuring and updated norms of the WMS-IV, it is consistent with the WMS-III in evaluating the memory functioning of patients with TLE.

A-43
Hepatic Encephalopathy with Incident Dementia Overlay: Etiology, Pathogenesis, and Protracted Neuropsychological Decline
LeBlanc M, Pimental D

Objective: Hepatic encephalopathy (HE) occurs when impaired liver function causes neurotoxic and encephalopathic processes resulting in cerebral dysfunction. Etiological agents in the pathogenesis of HE may include elevated ammonia levels, endogenous benzodiazepines, and diazepam-binding inhibitor/neurosteroids. HE may cause symptoms of metabolic and/or CNS dysfunction including asterixis, EEG abnormalities, and neurocognitive disturbances. Incident dementia describes the neurocognitive changes seen post-hospitalization for acute/critical illness and can include changes in executive functioning, attention, and memory that may persist up to six-years post-discharge. The co-occurrence of protracted HE and liver transplant with an overlay

of incident dementia from repeated acute hospitalizations (secondary to seizures, falls from ataxia with subsequent hydrocephalus/VP shunt placement) all adding exponentially to the neurocognitive burden has not been extensively reported. Method: The present case involves a 52-year-old, right-handed, Caucasian male with 16-years of education referred for neuropsychological evaluation. The patient's complex medical history included HE and liver failure/transplant. Results: Neuropsychological testing revealed diffuse bihemispheric deficits (right hemisphere greater than left) including deficits in attention, executive functioning, memory, and visuoperception/visuomotor skills. MRI results revealed a defect in the corpus callosum, cortical atrophy, foci of increased signal in the periventicular and subcortical white matter, and high signal intensity in the right occipital and posterior parietal lobes. EEG revealed diffuse background slowing activity of 5Hz-6Hz bilaterally, consistent with HE. Conclusion: This case study will elucidate causative factors of the primary diagnosis of HE and the series of related CNS "incidents" that were etiological for multiple occurrences of incident dementia and the resultant peaks and troughs in neurocognitive status.

A-44
Case Report: Neurocognitive Findings in an Adult with Previously Undiagnosed Dandy Walker Variant and Cerebellar Cognitive Affective Syndrome
Lynch-Chee S, Broshek D, Lyons P

Objective: Dandy Walker Variant (DWV) is a congenital brain malformation which commonly presents in infancy and is rarely asymptomatic and undiagnosed in adults. Our aim is to report the neurocognitive findings of an adult with previously undiagnosed DWV and Cerebellar Cognitive Affective Syndrome (CCAS). Given that initial diagnosis in adulthood is less common, this study will contribute to our knowledge of the neuropsychological profile of patients with DWV. Method: Neuropsychological test results were obtained from a 64year-old, right handed female after a recent CT scan confirmed previously undiagnosed DWV. Premorbid intelligence was estimated at high average as she obtained a Doctorate of Theology. Results: On the WAIS-IV, assessed verbal intelligence was high average (VCI=114) and nonverbal intelligence was low average (PRI=86). Working Memory and Processing Speed were borderline (WMI = 80, PSI = 74). Verbal memory was average to high average. Visual memory and perceptual reasoning abilities were low average. Variability and mild weakness (below average) in attention and aspects of executive functioning were noted with the weakest performance in verbal fluency, set shifting, and organizational/planning skills. There was also evidence of psychological distress, including a focus on somatic symptoms and anxiety that likely contributed to her attentional difficulties. Conclusion: Diagnosed as an adult with confirmed DWV, this patient demonstrated intact verbal memory in the context of executive deficits, impaired verbal fluency, and affective distress which are consistent with CCAS.

A-45
Physical Factors Mediate the Relationship Between Cognitive Impairment and Driving Ability in Multiple Sclerosis
McKeever J, Morse C, Ang J, Schultheis M

Objective: The Trail Making Test, particularly Trails B (TMTB), has traditionally been used as a simple cognitive measure of driving capacity. The fact that TMTB performance is correlated with

driving ability has been shown in populations with significant cognitive impairment. However, individuals with Multiple Sclerosis (MS) often have motor as well as cognitive impairments, and the interaction of these factors in relation to driving remains to be examined. The current study investigated driving using a virtual reality driving simulator (VRDS) and considered both cognitive measures thought to correlate with driving capacity and physical measures in drivers with MS. Method: Eight individuals with MS (mean age= 50.3 yrs) engaged in 20-30 minutes of driving in a virtual environment, and measures of lane management (lane deviation SD) were collected. Behavioral measures thought to correlate with driving (TMTB) and a measure of motor symptoms (9 Hole Peg Test, 9HPT) were also collected. Results: Results of a mediation analysis (Using Baron & Kenny method) indicated that the regression coefficient between TMTB performance and standard deviation of lane deviation increased substantially when controlling for 9HPT performance, and this model approached significance, R^2 = .65, p = .07. Conclusions: These preliminary results provide initial evidence that in the MS population, Trails B may not be an adequate measure of driving capacity without accounting for physical symptoms. These findings, supported by further research, highlight the need to examine the interaction of factors contributing to driving capacity in populations with complex constellations of motor and cognitive impairments.

A-46
Hepatitis C (HCV) Impacts Neurocognitive Dispersion: Greater Within-Person Variability Across Cognitive Domains among HCV-Seropositive Individuals
Morgan E, Woods S, Rooney A, Perry W, Grant I, Letendre S, The HNRP Group

Objective: Approximately one third of patients with hepatitis C infection (HCV) evidence cognitive impairment consistent with frontal-subcortical systems dysfunction, including cognitive dyscontrol, inattention, and psychomotor slowing. As such, the present study hypothesized that HCV status would significantly impact neurocognitive dispersion, or within-person variability in cognitive performance across domains, because increased dispersion is purportedly a function of deficient cognitive control via fronto-striato-thalamo-cortical circuit dysfunction. Method: The study sample included 37 individuals with HCV infection (HCV+) and 45 uninfected comparison participants (HCV-). The groups were comparable with regard to demographic factors, and no participants had current psychiatric diagnoses. The dispersion variable represented an intraindividual standard deviation (ISD) calculated across 13 summary measures of standard neuropsychological tests (i.e., demographically-adjusted T-scores). Results: HCV status significantly predicted dispersion (p=0.002), even when history of alcohol dependence, current psychiatric distress, and mean level of performance were included in the regression model. Planned follow-up comparisons revealed that results were demonstrated in the expected direction (i.e., higher dispersion in the HCV+ group relative to HCV-; Cohen's d=0.64) and were not better explained by fatigue or a history of other substance dependence. Within the HCV+ group, dispersion was not significantly associated with standard laboratory values of liver functioning (ps>0.05). Conclusion: Consistent with the demonstrated frontal-subcortical pattern of cognitive deficits in HCV infection, increased neurocognitive dispersion among HCV+ individuals is suggestive of the vulnerability of this population to cognitive dyscontrol expressed as poor regulation of performance across tasks that may manifest as functional difficulties in daily life, thereby indicating the potential clinical utility of this measure.

A-47
Virtual Reality Driving and Cognition in Multiple Sclerosis
Morse C, McKeever J, Schultheis M

Objective: To examine the relationship between driving ability as measured in a virtual reality driving simulator (VRDS) and cognition among drivers with multiple sclerosis (MS). Method: Community dwelling persons (n =8) with clinically defined MS were included. VRDS included driving measures of speed and lane deviation during basic (straight highway) and complex (following a vehicle) environments. All participants were administered neuropsychological measures shown to be associated with driving ability. Results: Average velocity while driving in a highway environment was significantly correlated to the PASAT 2" (R^2= -.96, p < .001) and SDMT (R^2= -.73, p = .039). During driving while following a vehicle, the PASAT 2" and SDMT were significantly correlated to number of lane busts [PASAT; R^2= .71, p = .048 and SMDT; R^2= -.75, p = .032] and total time spent outside the designated lane [PASAT; R^2= .81, p = .016 and SDMT; R^2= .83, p = .0110]. Using a composite cognitive score participants with cognitive impairment (n =4) demonstrated more lane busts (t = -2.46, p = .048), spent a longer time outside the designated lane (t = 2.49, p = .047), and drove faster (t = -2.89, p = .028) than those without cognitive impairment (n = 4). Conclusions: The domains of processing speed and working memory were found to be most strongly related to performance measures in a driving simulator in this preliminary study. Results are consistent with previous findings and provide initial support for the use of driving simulation for examining driving in this clinical population.

A-48
Using the MoCA as a Screen for HIV Dementia in an Urban Sample
Musso M, Jones G, Hill B, Proto D, Barker A, Gouvier W

Objective: To examine relation between the Montreal Cognitive Assessment (MoCA) and Modified HIV Dementia Scale (MHDS) in patients with Human Immunodeficiency Virus (HIV). Recommended cutoff scores for the MHDS (<7.5) and MoCA (<26) have demonstrated utility in screening for dementia in HIV and Alzheimer's disease, respectively. Method: Data were obtained from 69 HIV+ patients seeking medical treatment at a community interdisciplinary clinic. Neuropsychological screening was conducted upon initiation of treatment. Participants: 58% were male and 95.7% were African-American. Mean (SD) descriptive values: 37.19 (11.59) years of age, 11.22 (2.27) years of education, 49.73 (75.80) months with HIV diagnosis, 376.6 (353.4) T-cell count, 88.73 (8.21) North American Adult Reading Test-Revised score, 20.94 (4.0) MoCA score, and 8 (3) MHDS score. Results: MoCA scores were significantly correlated (p<.05) with MHDS scores (r = .53). A logistic regression analysis using total MoCA score and dichotomously coded pass/fail MHDS score (<7.5) was significant (Chi-square = 7.65, p < .01). The Odds Ratio was 1.21 (95% CI = 1.04-1.41). ROC curves indicated that a cutoff score of 25.5 yielded poor sensitivity (.08) but excellent specificity (.96). A MoCA score of 23.5 demonstrated improved sensitivity (.35) and retained good specificity (.91). Conclusions: The MoCA was significantly correlated with the MHDS indicating that may be useful in screening for HIV dementia. As a MoCA cutoff score of <26 did not demonstrate acceptable psychometric properties, a slightly lower cutoff of <24 is proposed for this population. Future research should include follow-up evaluations using comprehensive neuropsychological test batteries.

A-49

Neuropsychological Performance Predicts Driving Ability among Individuals Infected with Hepatitis C Virus

Sakamoto M, Marcotte T, Hilsabeck R, Perry W, Carlson M, Barakat F, Hassanein T

Objective: Patients with Hepatitis C virus (HCV) frequently demonstrate neuropsychological (NP) impairments. Little is known about the relationship between HCV-associated NP function and driving. The aims of this study were to assess 1) whether global NP status was associated with driving performance in HCV-infected individuals, and, if so, 2) which NP tests were the most sensitive predictors of driving behaviors. Method: Thirty-one HCV-infected liver patients (age = 51 ± 7.6 years, education = 13 ± 2.3 years, 21 with cirrhosis) completed 9 NP tests and fully-interactive driving simulator tests in which they were to 1) drive through city/country environs, obey traffic laws, and engage in crash avoidance (Advanced Routine and Emergency Driving: ARED) and 2) navigate to and from a store by looking at a 2-dimentional map (Virtual City: VC). For the NP summary variable, mean scaled score (MSS) was used. Results: Age, education, and gender were not predictive of driving performance; neither were liver-related medical characteristics. MSS was associated with both ARED weighted errors ($R2 = .15$, $p = .03$) and illegal turns on VC ($R2 = .18$, $p = .02$). Worse visuospatial learning/memory (Brief Visual Memory Test), visual attention (Symbol Search), psychomotor speed (Symbol Digit Modalities Test), attention/executive function (Trail Making Test-B, Digit Span) and manual dexterity (Grooved Pegboard Test) were most strongly associated with driving errors. Conclusion: Clinicians should be aware that driving ability can be compromised in persons with HCV, and that NP testing may help identify individuals who are at risk for poor driving.

A-50

Duplication of Self: A Rare Case Study of Capgras Delusion in an ACA Aneurysm Rupture

Shevchik K, McCaw W, Schrock B

Objective: Our objective is to add to our understanding of Capgras Syndrome by presenting the case of a 45-year-old Caucasian woman who suffered a right frontal aneurysm rupture and subsequently developed the delusion that a friend had suffered the aneurysm instead of herself. Capgras syndrome usually involves the delusion that significant others have been replaced by "imposters" and thought to implicate defective familiarity of faces. Capgras syndrome is associated with mental illness, right hemisphere or bifrontal injury. Duplication of self instead of others is even more rare, and has only been reported in the literature as associated with mental illness. The literature suggests that the right frontal lobe monitors the appropriateness of familiarity decisions, particularly in relation to the self. This case extends our understanding that Capgras Syndrome can occur as a duplication of self with right frontal injury and in the absence of mental illness. Method: A neuropsychological assessment was performed for treatment-planning purposes upon admission to a brain-injury rehabilitation program following a right ACA ruptured intracranial aneurysm and subsequent right frontal craniotomy and clipping. Results: Primary findings were that the patient believed her friend suffered the aneurysm, rather than herself. Associated deficits were found in dexterity bilaterally, visual scanning, memory, fluency, and ideational perseveration. Conclusion: Duplication of self is a variant of Capgras Syndrome that can follow right frontal injury in the absence of mental illness and supports the theory that the right frontal lobe is involved in familiarity assessments.

A-51

Severity of Depressive Symptoms and Cognitive Impairment in Prodromal Huntington Disease

Smith M, Moser D, Mills J, Epping E, Paulsen J

Objective: Depression is associated with more severe cognitive deficits in many neurological disorders, though the investigation of this relationship in Huntington disease (HD) has been limited. This study examined the relationship between depressive symptom severity and measures of executive functioning, learning/memory, and attention in prodromal HD. Method: Participants (814 with prodromal HD and 230 gene negative) completed a neuropsychological test battery and the Beck Depression Inventory-II (BDI-II). Based on the BDI-II, there were 637 participants with minimal depression, 89 with mild depression, 61 with moderate depression, and 27 with severe depression in the prodromal HD group. Results: ANCOVA (controlling for age, sex, and education) revealed that performance on SDMT, Trails B, HVLT-R Immediate Recall, and Stroop interference was significantly different between the BDI-II severity groups, with the moderate and severe groups performing worse than the minimal and mild groups. There were no significant differences between the BDI-II severity groups for Trails A or HVLT-R Delayed Recall. Linear regression revealed that both gene status and depression severity were significant predictors of performance on all cognitive tests examined, with the contributions of BDI-II and gene status comparable for Trails A, SDMT, and Stroop interference. Gene status had a higher contribution for HVLT-R Immediate and Delayed Recall and Trails B. Conclusion: Our results suggest that depressive symptom severity is related to poorer cognitive performance in individuals with prodromal HD. Though there are currently no approved therapies for cognitive impairment in HD, our findings suggest that depression may be a treatable contributor to cognitive impairment in this population.

A-52

Semi-Autromated Speech Segmentation as an Instrument to Measure the Effects of Speech Rate on Neuropsychological Test Performance

Somogie M, Bruce J, Bryan F, Buscher L, Tyrer J, Stabler A, Thelen J, Lovelace C

Objective: Recent studies suggest oral motor slowing may be a common symptom of Multiple Sclerosis (MS) which confounds neuropsychological test scores. One commonly administered test is the oral Symbol Digit Modalities Test (SDMT). The purpose of this study was to examine whether speech rate influences performance on the SDMT. Method: Forty-one MS patients (Age- 48.5±9.26, 35 female) and twenty-four matched controls (Age- 46.08±8.94, 21 female) were recruited through local advertisements. A neuropsychological battery was administered that included the SDMT and addition measures of motor speed, memory, executive functioning, and emotional functioning. Audio files of SDMT performance were segmented into periods of silence and sound to calculate speech and processing rates. Results: The MS group had significantly lower scores on the SDMT (t(63)=2.09, p<.05) and lower processing rate (t(63)=.87, p=.05) than controls. No significant between-group differences were found for speech rate (t(63)=.58, p=n.s.). The MS group demonstrated a highly significant correlation between processing rate and SDMT score (r=.95, p<.001). The relationship between speech rate and SDMT score was not significant (r=-.09, p=n.s.). Conclusions: Results indicate that SDMT scores are a strong indicator of processing rate; however there was no evidence for an effect of speech rate on SDMT scores. There was no evidence of oral motor slowing in MS patients. Our findings conflict with recent

studies that suggest oral motor slowing negatively impacts SDMT performance. Future studies should explore potential effects of disease progression on speech rate. The potential for speech initiation impairments in MS patients should also be considered.

A-53
Psychological and Clinical Predictors of Executive Dysfunction in Pediatric Multiple Sclerosis
Spurgin A, Graves D, Greenberg B, Harder L

Objective: Fatigue, depression, anxiety, and executive dysfunction are associated with multiple sclerosis (MS) in adults, particularly with increased disease duration. Existing research suggests such problems in pediatric MS but has not investigated relationships between these variables. The objective was to determine influence of fatigue, depression, anxiety, and disease duration on executive functioning in pediatric MS. It was hypothesized that these variables would predict parent-reported and performance-based executive function. Method: Eighteen MS patients, ages 7 to 18 with mean disease duration 15.5 months, were recruited through a multi-disciplinary demyelinating diseases clinic. The sample was 67% female and 55% Caucasian. Participants completed a neuropsychological screening battery including Verbal Fluency, Digit Span, and Trails A/B. Parents completed the Behavior Rating Inventory of Executive Function, Behavior Assessment System for Children-Second Edition, and Pediatric Quality of Life Inventory Multidimensional Fatigue Scale. Results: Mean parent-reported fatigue was severe. Mean parent-reported anxiety, depression, and executive function scores were not clinically significant though scores varied widely. Means were below average on Trails B and average on Verbal Fluency and Digit Span. Multiple regression analyses indicated fatigue, depression, anxiety, and disease duration predicted variability in parent-reported cognitive flexibility (p=.02), behavioral regulation (p=.01), attention problems (p=.04), and Trails B performance (p=.05). Independently, these predictors accounted for variability in various parent-reported executive functions. Conclusions: Results indicate pediatric MS is associated with fatigue and some degree of executive dysfunction. Disease duration, fatigue, depression, and anxiety predicted more parent-reported than performance-based executive dysfunction. Results advance understanding of psychological and clinical variables related to neurocognitive outcomes in pediatric MS.

A-54
The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) in Assessing Cognitive Deficits in Chronic Heavy Alcohol Consumers
Szczebak M, Glisky M

Objective: To investigate the cognitive profile of chronic alcoholics with heavy alcohol consumption as measured by the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Method: 18 residents of a housing project for chronic inebriates completed the RBANS. Participants had long history of alcohol dependency (mean= 25 years, SD=7) and a high level of daily consumption of alcohol by unit (mean=12, SD=3). Results: Impairment was noted in all measured domains with a total RBANS score at this first percentile. Highest subscale scores were found on the Language and Visuospatial Construction subtests with scores at the 9th percentile, followed by attention subtest scores at the 3rd percentile and immediate Memory at the 1st percentile. Delayed memory scores were the lowest, below 1st percentile. Delayed memory was significantly lower than immediate memory (t=-2.1,p<.04) Language(t=-3.8,p<.001) and

Visuospatial construction (t=-3.6,p<.002). The number of years of alcohol dependency, but not age of subject, was related to poorer performance on the coding subtest (f=1.0; p<0.04), figure recall (f = 3.9; p<0.01) and story memory (f = 9.0 p<0.01). No relationship was found between test scores and variables such as years of education, co-occurring mental health diagnosis, or gender. Conclusion: The RBANS is a useful instrument for detecting and characterizing differences in visuospatial skills, language and declarative memory functions for this population and suggests the need for further research into drinking patterns and cognitive deficits.

A-55
Polypharmacy is Associated with Fatigue and Cognitive Difficulties in Multiple Sclerosis
Thelen J, Lynch S, Hancock L, Bruce J

Objective: Patients with MS are frequently prescribed multiple medications for the treatment of various health maladies. Polypharmacy is known to be associated with increased fatigue and poorer cognition among the elderly and various patients groups. Few studies have examined how multiple medication use in MS impacts fatigue and cognition. Method: 75 relapsing-remitting, 9 secondary progressive, and 2 primary progressive MS patients were recruited through a specialty clinic in the Midwest. A neuropsychological battery measuring aspects of memory, information processing speed, and executive functioning was administered along with questionnaires assessing fatigue and perceived cognition. In addition, a neurologist administered the Expanded Disability Status Scale, a neurological exam designed to measure overall disability level. Results: On average patients were prescribed 4.34 medications (±3.40, min = 1 and max = 24). Patients who were taking more medications demonstrated worse prospective memory (r = -.44, p<.001) and reported more fatigue (r = .40, p<.001), more memory problems (r = .31, p<.01), and slowed information processing speed (r =.31, p<.01). Number of prescribed medications continued to predict prospective memory (r = -.36, p<.001), self-reported fatigue (r =.32, p<.01), memory (r = .34, p<.01), and processing speed (r = .24, p<.05) after controlling for participant age, overall disability, disease length, and depression. Conclusions: Results from this study suggest that polypharmacy is associated with fatigue and cognitive difficulties in MS, regardless of age, depression, and disease severity. More research is needed to better understand how to appropriately balance the benefits and risks of polypharmacy in MS.

A-56
Job Stability in Multiple Sclerosis: The Role of Depression
Ukueberuwa D, Arnett P

Objective: Ability to maintain employment may be an important factor in quality of life for people with multiple sclerosis (MS), a functionally impairing neurological disease that typically develops in early adulthood and does not shorten lifespan. Identification of variables that are associated with job stability will help to characterize contributing factors and consequences of inability to maintain lifestyle when challenged by chronic disease. Method: 60 participants (47 female) with a confirmed diagnosis of MS completed a battery of questionnaires and neuropsychological assessments. Participants answered whether they had changed jobs, which included working a new position or retiring, because of their MS symptoms. Analysis of variance determined whether participants in the two groups differed on demographic and clinical variables. Results: Participants in the two groups (yes/no changed jobs due to MS) did not differ in sex, age,

education, or disability (Expanded Disability Status Scale). However, the groups differed significantly in depression (Chicago Multiscale Depression Inventory, combined Mood and Evaluative scales) p<0.05. Conclusions: Participants who changed jobs, and attributed it to their MS symptoms, were experiencing more depression than participants who did not have such a change in job status. Although further research is needed to determine causality, the results indicate that maintenance of a job is linked to lower levels of depression in people with MS.

A-57
Cognitive Dysfunction in Amyotrophic Lateral Sclerosis
Vahter L, Ennok M, Päll K, Gross-Paju K

Objective: Amyothropic lateral sclerosis (ALS) is a disease characterized by motor neuron degeneration and was traditionally believed not to affect cognitive functions. Cognitive impairment mostly in executive functions and language and dementia of the frontotemporal type in persons with ALS have been described lately. The aim of the study is to describe cognitive profile of the persons with ALS. Method: Neuropsychological test battery was administered to 9 persons with ALS (3 F, 6 M, age (M, SD), 61.5, 3.35, education (in years, M, SD) 14.3, 2.1, duration of the disease (in years, M, SD) 0.9, 0.6), and 18 sociodemographically matched healthy controls (6 F, 12 M) participated in the study. The battery included Buschke Selective Reminding Test, 10/36 visuospatial memory test, Cowboy Story, verbal fluency tests, symbol digit modalities test, Trail Making A & B and Mini Mental State Examination. Results: Differences were statistically significant (p< 0.05) in tests measuring executive functions - in symbol digit modalities subtest (p = 0.004) and Trail Making B (p = 0.001), in addition the patients' scores were lower in test measuring later recall in visuospatial memory (p = 0.003). Conclusions: Cognitive dysfunction in ALS can be described as a decline in executive functions and visuospatial memory tests. Implications to the neuropsychological evaluation of persons with ALS, relations to the duration of the disease and possibilities for the further investigation will be discussed.

A-58
Gray Matter Atrophy and Depression in Multiple Sclerosis
Vargas G, Medaglia J, Hillary F

Objective: Gray matter (GM) atrophy has been consistently reported in Multiple Sclerosis (MS) and has been found to be related to depression. Voxel-Based Morphometry (VBM) is a whole-brain data-driven analysis technique that has not yet been used to study depression in MS. The current study sought to use this method to determine the relationship between GM atrophy and depression in an MS sample. It was expected that atrophy in frontal, temporal, and subcortical regions would be particularly associated with depression in this sample. Method: High resolution T1 images (mprages) from 30 MS patients were analyzed using the VBM toolbox in SPM8 (87% female, avg age= 44 yrs, avg educ=16 yrs, 72% relapsing remitting). Patients also completed the Beck Depression Inventory-II (BDI-II) and scores were calculated by summing the mood and evaluative items. Whole brain voxel-by-voxel analyses were done correlating BDI-II scores with GM atrophy and also comparing groups high and low in depression. Results: A significant correlation was found between BDI scores and atrophy in several cortical areas in all four lobes and the parahippocampal gyrus, including the middle and superior frontal gyrus, (p<.001, voxel extend=20, uncorrected). Similar results were found when high and low depression groups were

compared. Conclusions: This study supports the use of VBM in studying depression in MS and shows that atrophy in several cortical areas is related to depression in MS patients. More research is necessary to investigate specific hypotheses and to ensure that VBM analysis is accurate given the lesions and significant atrophy in this population.

Neuropsychological Domains: Attention

A-59
Examining the Relationship Between Performance on the Conners' CPT-II and the WAIS-IV
Andrews A, Golden C

Objective: The purpose of this study was to examine the relationship between performance on the CPT-II and the WAIS-IV across a sample of clinical patients. Method: A total of 87 participants were included in this study, aged 18-64 (M = 33.37, SD = 13.03), 58.6% Caucasian, 66.7% female, 75.9% right-handed, with a mean education level of 13.33 years (SD = 2.00). All WAIS-IV indices and CPT-II variables were included. Results: All analyses reported are at the p < .01 level. The significant correlations ranged from -0.27 to -0.47. FSIQ was correlated with Omissions, Hit Rate SE, Variability, and Neurological Percentage. VCI was correlated with Omissions, Hit Rate SE, Variability, Neurological Percentage, and ADHD Percentage. PRI was correlated with Variability, and Hit Rate ISI Change. WMI was significantly related to Omissions, Hit Rate SE, and Variability. PSI was significantly related to Omissions, Hit Rate, Hit Rate SE, Variability, Response Style, Neurological Percentage, and ADHD Percentage. Conclusion: Deficits in sustained attention, especially inattention, are related to decreased performance in intellectual functioning. These findings represent a general inability to attend to stimuli (e.g., instructions, prompts). It was expected that WMI would correlate most strongly with CPT-II performance, but the results showed that PSI shared the most variance with CPT-II performance. PSI requires more sustained attention than WMI which may account for the finding. The WMI relies less on sustained attention and more on the ability to manipulate information that is held in short term memory.

A-60
Comparison of the Test of Everyday Attention for Children in the United States
Belloni K, Nicewander J, Miller D

Objective: The Test of Everyday Attention for Children (TEA-Ch) is a neuropsychological test that aids in the assessment of attention. However, the test was standardized on an Australian population, putting its generalizability to the United States population in question. The current study sought to determine the generalizability of the TEA-Ch's original three-factor structural model. Method: The TEA-Ch consists of nine subtests that assess a child's performance in three different subtypes of attention: selective, sustained, and shifting. This study included a confirmatory factor analysis of the TEA-Ch performance on a U. S. sample of 158 children (ages 6 to 16) without identified attention problems. Additional comparisons included univariate and multivariate analysis of variance of demographic data, based on ethnicity, gender, age, and parents' education level. Results: Analysis of the data revealed significant differences in TEA-Ch performance between age groups. However, there were no significant differences based on ethnicity, sex, or parents' education level. While several factor subtests did not correlate as expected, results of the latent factor structure of the test was a good fit with the original three-

factor model of attention, (χ^2 (24) = 10.70, p > .05). Additional fit indices also supported the model. Conclusion: The study contributes to the literature and the field of neuropsychology by providing data that supports the TEA-Ch for use in the measurement of attention and the data serves as preliminary normative data for the use of the TEA-Ch in the United States.

A-61
Mindfulness and Attention Tasks
Johnson S, David Z, Weideman E, Lawson D, Johnson S, Morton J, Robinson J
Objective: Mindfulness is operationally defined as the self regulation of attention maintained on immediate experience and has been shown to have positive effects on working memory and focused attention tasks (AT). The current study tested whether trait mindfulness alone explains any of the effects on AT. Method: Sixty five undergraduate students, 72% female, 57% Caucasian with an average age of 21.5 were administered the Symbol Digit Modalities Test (SDMT), Controlled Oral Word Association Test (COWAT), Forward/backward digit span (Wechsler Adult Intelligence Scale-Revised (WAIS-R) and the Trail Making, parts A and B. Mindfulness measures employed were the Freiburg Mindfulness Inventory (FMI), Mindful Attention and Awareness Scale (MAAS), Cognitive and Affective Mindfulness Scale-Revised (CAMS-R) and Toronto Mindfulness Scale (TMS). Mood was assessed with the Community Epidemiology Scale - Depression and State Anxiety Inventory. Daytime sleepiness was measured with the Epworth Sleepiness Scale. Results: Four standardized measures of mindfulness did not correlate significantly with scores on AT, although associations were in the expected directions. There were significant negative correlations with depression and the MAAS (p = .003), CAMS-R (p=.03) and FMI (p = .04), as well as with anxiety and the MAAS (p = .0001), CAMS-R (p=.0001) and FMI (p = .0001). Only Sleepiness was associated with poorer performance on AT (Trails A, p = .03, Trails B, p = .009; SDMT, p = .05). Conclusions: Mindfulness measures are significantly correlated with mood but not attentional performance. While training in mindfulness has been shown to increase performance on AT, this may not be a function of trait mindfulness.

A-62
Thought Disorder Subscale of the Personality Assessment Inventory as a Measure of Self-reported ADHD Symptoms in College Students
Musso M, Hill B, Barker A, Pella R, Jones G, Proto D, Gouvier W

Objective: To investigate the relationship between scores on the Thought Disorder Subscale (TDS) of the Personality Assessment Inventory (PAI) and self-reported symptoms of Attention Deficit Hyperactivity Disorder (ADHD) in college students. Method: Participants were 239 college students seeking psychoeducational evaluations at a clinic associated with a large southern university. 52.7% were male and 86.6% were Caucasian. Mean age of the sample was 22.12 (SD 6.84) years, education was 13.72 (SD 2.33) years, WAIS-III FSIQ was 104.69 (SD 11.66), and TDS score was 66.89 (SD 14.79). 3. Results: The TDS demonstrated higher correlations with the Wender Utah Rating Scale (r = .51) than the Social Detachment (r = .24) or Psychotic Experiences (r = .38) subscales of the PAI. A univariate Analysis of Variance (ANOVA) revealed that individuals diagnosed with ADHD (n = 137) obtained significantly higher TDS scores than those who received no diagnosis [n = 102; F (1, 237) = 19.87, p < .001]). Another ANOVA indicated that, of the individuals who received no diagnosis, those who reported inattention as reason for referral (n = 71) obtained higher TDS scores than those who did not report attention problems [n = 26; F (1,

95) = 6.03, p < .05]. Conclusions: College students with higher TDS scores endorsed more childhood attention problems. Students diagnosed with ADHD obtained higher TDS scores than those with no diagnosis, and higher TDS scores were noted in students that reported problems associated with inattention. Overall, the TDS appears to measure self-reported symptoms of ADHD in college students.

A-63
Construct Validity for the Search Identification Task (SIT)
Vertinski M, Allen D, Thaler N, Heisler D, Park B, Barney S

Objective: The Search Identification Task (SIT) is a cancellation task that assesses visual scanning, processing speed, attention, and executive functions. It consists of four levels of increasing difficulty. Each level has separate subtests that assess verbal and nonverbal abilities. In addition, there are two equivalent alternate forms, A and B. This study was designed to evaluate the psychometric properties of the SIT. Method: Participants included 90 normal controls who were 22.1 years of age (sd = 5.0), and 53.2% male. They were administered the SIT according to standard instructions. Participants were randomly assigned to two groups. The first group was administered SIT Form A and then Form B, while the second group was administered Form B and then Form A. Repeated measures ANOVA was used to examine differences in performance across difficulty levels, with form (A and B), modality (verbal vs. nonverbal) and group serving as factors. Number of cancellations on each subtest served as the dependent variable. Results: Result indicated significant effects for Levels, Modality, and a significant Levels by Modality interaction effect. The forms increased in difficulty from Levels 1 to 3, although the difference between Levels 3 and 4 was not significant. Also, the verbal and non-verbal forms did not significantly differ at any of the levels. Conclusion: Findings provide preliminary evidence for the construct validity of the SIT, although the lack of difference between levels 3 and 4 may indicate that level 4 may not provide any additional information above what is obtained from level 3.

Neuropsychological Domains: Language and Aphasia

A-64
Disentangling the Effects of Febrile Seizures from Mesial Temporal Sclerosis in Temporal Lobe Epilepsy: Is There an Additive Deficit?
Kucukboyaci N, Girard H, Kemmotsu N, Cheng C, Kuperman J, McDonald C

Objective: High prevalence of childhood febrile seizures (CFS) and mesial temporal sclerosis (MTS) in patients with temporal lobe epilepsy (TLE) is well documented. However, there is limited research examining the effects of MTS alone vs. the compound effect of MTS plus CFS on cognitive profiles and brain structure in patients with TLE. Method: We obtained diffusion weighted-imaging (DWI) and volumetric MRI in 34 TLE patients: 9 with TLE-only (no CFS, no MTS), 15 TLE with MTS (TLE+MTS), and 10 with history of CFS and MTS (TLE/MTS+CFS). Thirty patients completed the Boston Naming Test (BNT) and the Wechsler Test of Adult Reading (WTAR). Frontotemporal regions of interest were selected from volumetric MRI and fiber tracts were extracted from DWI (arcuate, uncinate) based on their proposed contribution to language skills. Univariate ANCOVAs were performed to examine group differences in cognitive and structural measures, controlling for age of seizure onset. Results: BNT and WTAR scaled scores were lower

for TLE/CFS+MTS patients compared to TLE-only patients. TLE/CFS+MTS group also showed reduced surface area in left superior temporal and right middle temporal gyri and reduced fractional anisotropy of the uncinate and arcuate fasciculi relative to the other groups. Cortical thinning was observed in the TLE+MTS patients compared to the other groups in the left fusiform and pars triangularis. Conclusion: Our results suggest that, even after controlling for age of seizure onset and hippocampal damage (i.e., MTS), CFS are associated with decreases in surface area and fiber tract integrity in language-dominant cortex that may contribute to poorer naming and reading performance.

Professional Issues: Test Development and Methods

A-65
Rates of Apparently Abnormal WAIS-4 Patterns in the Normal Population
Carroll C, Odland A, Miller L, Mittenberg W

Objective: Interpretation of the WAIS-4 involves examination of patterns of Index and subtest scores. Base rate data from the standardization sample suggests that 15 point differences between Index scores or 3 point differences between a subtest and the subtest mean are uncommon in normal individuals, but these data refer to a single Index or subtest comparison rather than multiple comparisons among Indexes or subtests. Method: The normal incidence of Index and subtest score differences were calculated using Monte Carlo simulations. Correlations among scales from the standardization sample were used to recreate the distributions of expected scores using the scale variance and covariance information contained in the correlation matrix. The frequency of observed Index or subtest discrepancies was then determined. Results: One or more 15 point Index score difference occurred in 49% of normal individuals. Differences of 20 points between any 2 Indexes occurred in 35% of the normative sample, and at least one 25 point Index difference was present in 16% of the normal population. 78% had at least 1 subtest score and 47% had 2 or more subtests that were 3 points below their subtest mean. 61% had 1 or more subtests that were 4 points lower, and 25% had 1 or more subtests 5 points lower than their subtest mean. Conclusions: WAIS-4 Index or subtest score discrepancies are normally common when all possible such comparisons are made, and this reduces their clinical significance. Specific prior interpretive hypotheses are necessary to reduce the number of Index or subtest comparisons and associated false positive conclusions.

A-66
Psychometric and Clinical Properties of New Working Memory and Inhibition Control Subtests on the Wechsler Primary and Preschool Scale of Intelligence–Fourth Edition (WPPSI–IV)
Coalson D, Wahlstrom D, Raiford S, Holdnack J

Objective: The Wechsler Preschool and Primary Scale of Intelligence–Fourth Edition (WPPSI–IV) will publish in 2012 and includes two new working memory subtests and one new optional inhibition control subtest, among other revisions. The current work describes these subtests and provides data from a national tryout supporting their reliability and validity as clinical measures. Method: 340 children aged 2:6-7:6 years were tested as part of a national tryout sample stratified to census targets on age, parent education, sex, and race/ethnicity. Special group studies included Intellectually Gifted, Intellectual Disability, and Attention-Deficit/Hyperactivity Disorder (ADHD).

Picture Retrieval (PR) required children to view stimulus images and select those images from a larger set of response options. Zoo Trip (ZT) required children to view animal cards placed on a zoo grid for a specified time, then place each card in the correct grid location. Feed the Dog (FD), an inhibition measure based on the Simon effect, required children to match a food bowl to a dog based on size. Results: Overall internal consistency reliability ranged from .83 (ZT) to .91 (FD). In addition, matched control studies indicated effect sizes that ranged from small for ADHD on PR (.35) and ZT (.59) to large for Intellectual Disability on PR (1.59) and ZT (1.63) and FD (1.71). Factor analyses further clarify the nature of the new subtests' fit and the structure of the scale as a whole. Conclusion: Preliminary evidence suggests strong psychometric properties and supports the inclusion of working memory and inhibitory control subtests in WPPSI–IV.

A-67
Comparability of Auditory and Spatial Spans
Ennok M, Vahter L

Objective: Although the auditory and spatial span tasks have been considered equivalent this has not been confirmed by some clinical and developmental studies. The aim of our research is to assess the associations between auditory and spatial span tasks in a normative sample. Method: This research is part of an ongoing test norms standardization study with healthy individuals in community setting. Sample includes 124 persons with mean age of 38.1 years and mean education of 14.5 years. Auditory span was assessed with Digit Span (DS) subtest from WAIS III and visual span was assessed with Corsi Block-tapping Test (CBT). In both tests the subject is asked to repeat a sequence of items (numbers in DS, block positions in CBT) with increasing length (two trials per length of one sequence). Both tests have forward and backward condition. Results: The forward condition was easier for both tests (DS: t=15.67, p<.0001; CBT t=4.94, p<.0001). When backward and forward conditions were compared between tests then forward conditions of CBT (t=-4.95, p<.0001) but backward condition of DS (t=2.71, p<.007) appeared more difficult. The difference between tests disappeared when full scores (adding the results of forward and backward conditions) were compared (t=-1.06, p=ns). Conclusions: When considering full scores both tests gave similar results. Still the composition of full score of DS and CBT seems to be different as the difficulty levels of forward and backward conditions were unequal. This is in agreement with different storage mechanisms of auditory and visual information in working memory. Assessments should take these differences into account.

A-68
Teaching Strategy Use on the Ruff Figural Fluency Test
Gardner E, Dasher N, Fowler B, Vik P

Objective: Vik and Ruff (1988) described strategy use on the Ruff Figural Fluency Test (RFFT). Strategies, however, are not typical in young teens, uncommon among children under 11, and only 58% to 65% of adults use strategies. Two types of strategies were identified. In Rotational, the entire figure or some portion is rotated systematically. In Quantitative, the basic figure remained the same while a single line is systematically added or removed. This study examined whether strategy use could be taught to non-strategy users. Method: Seventy-eight undergraduates (M age 22.5) completed a battery including RFFT, NAART, CVLT-SF, WAIS-LNS, WASI Vocabulary and Matrix Reasoning, and D-KEFS Sorting, Twenty Questions, Verbal Fluency, and Tower Test.

Participants who used < 3 strategies were randomly assigned to a training or control group. Training followed Part 3 of the RFFT. Results: Fifty participants used < 3 strategies and were randomly assigned to training or control. ANOVA revealed a Part-by-Training interaction. Groups evidenced few strategies on Parts 1 to 3; however, the Training Group increased strategy use post-training (repeat of RFFT Part I). Three strategy groups were identified (None, Incidental, Systematic) and compared on executive functioning tests. Systematic strategy scored higher than the Non-Strategy and Incidental-Strategy users on Sorting, Tower Test, and Category Fluency. Conclusions: Young adults who do not spontaneously use strategies on the RFFT may be taught to use them. Strategy users performed better on executive function measures associated with pattern identification, organizing, and planning. Future studies should explore clinical correlates of strategy use and failure to learn strategies.

A-69
Magnifying Graphomotor Output to Highlight Intention: A Closer Look at Performance Using a Digitized Clock Drawing Test
Grajewski M, Lamar M, Penney D, Davis R, Korthauer L, Libon D, Kumar A

Objective: The NIA and Alzheimer's Association recently advocated for research focused on 'pre-clinical' phases of pathological aging highlighting the need for more sensitive and subtle cognitive measures. Capitalizing on unique data acquired during a digitized Clock Drawing Test (dCDT) we identified measures related to preparatory strokes of graphomotor output or intention called 'hooklets' not previously visible to the naked eye. We introduce these measures and explore their cognitive associations. Method: 67 community-dwelling healthy controls (HC; age~58.6+12.2; MMSE~29.0+1.2) received the dCDT as part of a comprehensive neuropsychological protocol. To command, participants drew the face of a clock with all the numbers setting the hands to ten after eleven; a copy condition was also administered. Hooklet variables included total number, average speed and length. Correlations between hooklet variables and composite z-scores of learning and memory (L&M; Cronbach's alpha=.646), attention and information processing (CA=.494), executive function (EF; CA=.762), and language (CA=.796) were performed. Results: Total number of command hooklets negatively correlated with the EF z-score while total number of copy hooklets positively correlated with L&M (all p-values<.05). Older (>60 years) and younger (30-59 years) adults contributed to copy correlations but only older adults drove the command hooklet/EF correlation. Conclusions: A previously undetected measure of graphomotor intention on dCDT may represent different cognitive processes at command and copy, particularly for older adults. These results provide evidence that an easily administered clinical tool may help identify 'pre-clinical' risk across the lifespan.

A-70
Identifying Reliable Change in Serial Assessments: Comparing WAIS-III to WAIS-IV Performance
Holdnack J, Iverson G, Chelune G

Objective: The purpose of the study was to identify reliable change in cognitive performance across two testing sessions when different versions of the Wechsler Adult Intelligence Scales are used. Method: Participants were 283 healthy adults (mean age=53.0, SD=24.4, range=16-88) who were administered the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) and the Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV) on different dates. The average time

between test sessions was 53.0 days (SD=24.4, range=6-183). Test administration was counterbalanced, with the WAIS-III being administered first to 45.1% of the participants. The sample was demographically diverse. Results: Hierarchical multiple regression equations were derived to predict WAIS-IV Index scores from WAIS-III test performance. In addition, test sequence (i.e., WAIS-IV administered before or after WAIS-III), time between assessments, education level, and age were evaluated as predictors of WAIS-IV scores. The WAIS-III Index score, test sequence, and education were significant in all regression analyses. The R^2 values ranged from .654 (PRI) to .843 (FSIQ) and all equations were statistically significant (p < .001). Cut-offs for statistical significance between predicted and actual WAIS-IV scores and directional base rates were derived. Conclusions: Clinicians frequently administer the WAIS-IV to patients who previously completed the WAIS-III. This study provides regression equations with supporting statistical and base rate information enabling clinicians to evaluate change in cognitive functioning in examinees who have been administered both batteries.

A-71
Nondominant Hand Performance on the Rey Complex Figure Test (RCFT) Copy Trial: Implications for Normative Comparisons
Hunter C, Zimmerman E

Objective: To examine the utility of administering the Rey Complex Figure Test (RCFT) Copy Trial to individuals using their nondominant hand (NDH). Method: A sample of 143 neurologically intact adult volunteers completed the RCFT Copy Trial using their NDH. Overall scores were obtained using the Myers and Myers (1995) scoring criteria. One-sample t-test comparisons were performed to compare mean scores of the current sample and the corresponding age groups in the Myers and Myers (1995) normative sample. A 2 (sex) x 2 (hand dominance) analysis of variance (ANOVA) was computed to establish whether participants' sex and hand dominance significantly affected the score obtained on their NDH copy of the RCFT. Results: Results of t-test comparisons revealed a statistically significant difference across all age groups, in that the NDH scores were significantly lower than the Myers and Myers (1995) normative sample completed with the DH. The 2 x 2 ANOVA revealed that sex did not have a significant effect on scores, although a trend towards significance for both hand dominance and the interaction between sex and hand dominance was noted, with left-hand dominant (LHD) males producing nearly perfect scores using their NDH. Conclusions: Results suggest that the Myers and Myers (1995) scoring criteria may not produce clinically accurate results when used to score the RCFT Copy Trial completed with the NDH. However, an exception may apply to LHD males, as their NDH scores appear to be comparable to the published norms, although future research is needed to establish the validity of this method.

A-72
Dimensional Analysis and Construct Validity Assessment of the Neurobehavioral Symptom Inventory
Klein R, Prathiba N, Hopewell A, Cooper D

Objective: The purpose of this retrospective study was to assess the dimensionality of post-concussion symptom 3 months post mild traumatic brain injury (MTBI) and to provide evidence of internal construct validity of the Neurobehavioral Symptom Inventory (NSI). Currently, the NSI

does not have reliability or validity estimates. Yet researchers use the total score and summated cluster scores in statistical analyses. Method: Responses on the NSI from 472 concussed service members, 3 month post-MTBI, were analyzed using Spearman's rank correlation to explore relations between symptoms, structural equation modeling (SEM) to determine if data were compatible with one or more factors, and graded response modeling (Samejima, 1969) to assess internal construct validity. Results: All symptoms exhibited strong positive inter-relations and SEM provided a good model fit for a three factor solution (RMSEA = .86, CFI = .98). Fit indices were only slightly weaker for a four factor solution and poor model fit for one and two factor solutions. Overall fit to the graded-response model was poor suggesting a lack of unidimensionality. Conclusions: The observed structure provides support for a three factor model of post-concussion symptoms at 3 month post-MTBI. Further, NSI does not meet modern psychometric standards. Its 22 items do not tap into the same underlying construct and should not be summated in a single score, nor should cluster scores be summated.

A-73
Patterns of Performance on the Serial Digit Learning Test
Long M, Moses, Jr. J

Objective: Years of formal education and age usually determine which version of the Serial Digit Learning Test, 8 or 9, is administered. SDL 8 is usually administered to patients 65 years of age or older and those under 65 with less than 12 years of education. SDL 9 is usually given to those under 65 with 12 years of education or more. Taking a closer look at the demographic variables, age and education, as well as intelligence reveal how these factors uniquely influence performance on both Serial Digit Learning 8 and 9. Method: An unselected serial sample of 148 U.S. Veterans given either the SDL 8 or SDL 9 and the WAIS-R (VCI, FFD, POI) as part of a neuropsychological assessment. Factor scales were derived from the test and demographic variables. SDL 8 and 9 were individually grouped into two groups, 'early' SDL 8 items and 'early 'SDL9 items and 'late' SDL 8 items and 'late' SDL 9 items. Results: Analyses showed that education is related to performance on both SDL8 'early' items and SDL 9 'early' items but not late items on both versions, while age is inversely related to performance on all early and late SDL 8 and SDL 9 items. VCI, as a measure of verbal intellectual ability, related to performance on SDL 8 'late' items. Conclusion: These results suggest implications interpreting performance and re- evaluating the influence of demographic variables on both versions of the test.

A-74
Predicting Anxiety and Depression using the Neuropsychological Symptom Scale (NSS)
Lutz J, Tiberi N, Dean R

Objective: The Neuropsychological Symptom Scale (NSS; Dean, 2010) is an electronic self-report measure of neurological and psychiatric symptoms that has been found to have 3 primary factors related to mood, attention/executive functioning, and sensory-motor functioning (Lutz, 2011). The aim of the present study was to evaluate this measure's ability to predict whether or not a patient had a previous diagnosis of an anxiety and/or depression based disorder using scores derived from responses to items from each of the 3 factors of the NSS. Method: The sample consisted of 342 adults, half of whom reported having a previous diagnosis of an anxiety and/or depression based mood disorder. Each participant completed the NSS after being e-mailed a link

to the measure. Scores were calculated for each participant on each of the 3 factors of the NSS. Logistic regression was utilized to determine if raw scores from these factors contributed significantly to the prediction of a mood disorder diagnosis. Results: Utilization of raw scores based on Factor 1 (mood related symptoms) of the NSS significantly improved the model's ability to predict previous diagnosis of depression and/or anxiety (χ^2 = 87.8, p <.001). Specifically, Factor 1 scores accounted for approximately 19% of the variation in diagnosis (R^2L = .185) and allowed for accurate classification of 68.4% of participants. Including Factors 2 and 3 did not improve predictive ability. Conclusions: These findings suggest that the NSS may have clinical and research utility for identifying individuals with anxiety or depression. Possible applications as well as limitations and plans for future research will be discussed.

A-75
Parsimonious Prediction of Wechsler Memory Scale, Fourth Edition Scores: Immediate and Delayed Memory Indexes
Miller J, Axelrod B, Van Dyke S, Rapport L, Schutte C, Hanks R

Objective: Research on previous versions of the Wechsler Memory Scale (WMS) found that index scores could be predicted using a parsimonious selection of subtests (e.g., Axelrod & Woodard, 2000). New to the fourth edition (WMS –IV) is the ability to substitute scores from the California Verbal Learning Test, 2nd Edition (CVLT-II) for Verbal Paired Associates (VPA). The release of the WMS-IV requires reassessment of these predictive formulas as well as use of CVLT-II indices. Method: Complete WMS-IV and CVLT-II data were obtained from 295 individuals. Six regression models were fit using WMS-IV subtest scaled scores and CVLT-II substituted scores to predict Immediate Memory (IMI) and Delayed Memory Index (DMI) scores. Subtests entered included Logical Memory (LM), Visual Reproduction (VR) and VPA. Predicted values from each model were saved and correlated with actual values and compared via paired-sample t tests. Results: All 6 models fit were statistically significant (p < .05; (R2 = .84-.95): 1) IMI-2=VR+LM; 2) IMI-3W=VR+LM+VPA; 3) IMI-3C=VR+LM+CVLT-T; 4) DMI-2=VR+LM; 5) DMI-3W=VR+LM+VPA; 6) DMI-3C=VR+LM+CVLT-Z. All predicted values significantly correlated with actual values;all t-tests were non-significant. Statistical preference was indicated for the models using LM, VR, and VPA. Conclusions: The present findings demonstrate that the IMI and DMI can be reliably generated when less than the full battery of subtests is given. In addition, evidence is offered suggesting little to no improvement in predictive accuracy with the inclusion of CVLT-II indices when added to LM and VR.

A-76
Collateral Information Predicts Basic Medication Management Skills
Pella R, Fallows R, McCoy K, O'Rourke J, Hilsabeck R

Objective: Self- and informant-report of cognitive functioning have shown weak relationship with objective cognitive performance. This project evaluated the relationship of an informant's perception of an individual's ability to perform cognitively mediated daily tasks using the Everyday Cognition (ECog) scale (six subscales: Memory, Language, Visuospatial, Planning, Organization, and Attention) with the Pillbox Test, a performance-based measure of medication management skills. It was hypothesized that the Planning, Organization, and Attention subscales would account for the most variance in Pillbox Test performance. Method: Participants were 96

veterans (90% male, 45% White, 56 years old) administered a neuropsychological battery. Correlation coefficients of the ECog and Pillbox Test were calculated and a logistic regression analysis was conducted to determine the likelihood of failing the Pillbox (errors and time). Results: ECog subscales demonstrated weak to moderate relationships ($r = 0.21 – 0.42$), with Pillbox Test failure. Logistic regression indicated that the Visuospatial, Organization, and Attention subscales of the ECog predicted failure on the Pillbox Test, and resulted in a 75.3% classification accuracy rate. Odds ratios for the significant predictors ($0.39 – 3.49$) indicated that higher scores on the ECog generally predicted Pillbox failure. Conclusions: Collateral reports of behaviors that require cognitive functioning, as assessed by the ECog, provide information related to skills utilized in managing medications. Considering informant reports of daily living skills when determining an individual's level of functional impairment is important, and may be particularly relevant for the evaluation of higher levels of functioning. Further studies are needed to assess the ability of the ECog to predict other functional abilities.

A-77
Digits Forwards Does Not Equal Digits Backwards: A Four-Factor Solution to Digit Span
Petrauskas V, Bowden S

Objective: This study examined the dimensionality of the WMS-III Digit Span (DS). In the standard administration and scoring, item scores on DS are summed to form an overall score (i.e, item parcel). Creating parcels may confound assumptions about the trait composition of the items which, in the case of DS remain untested. Perhaps in recognition of complicated trait composition, many clinicians adopt different interpretive strategies, for example, the forwards items may be interpreted separately from the backwards items. Method: Consecutive files of individuals referred for neuropsychological assessment at a tertiary hospital were reviewed. Item level DS scores of a sample of heterogeneous neurosciences patients ($n = 267$) were used to examine the dimensionality of the DS subtest using exploratory (EFA) and confirmatory factor analysis (CFA). The model derived from the final CFA model was then cross validated in a seizure disorders sample ($n = 233$). Results: The best fitting CFA model in the heterogeneous neurosciences sample was a four-factor model (RMSEA = .090; CFI = .942; TLI = .951). The same four-factor model was the best-fitting in the seizure disorders sample as well (RMSEA = .095; CFI = .911; TLI = .930). These two models were found to be invariant. The four correlated factors represented item presentation order and item difficulty. Conclusions: Future scoring strategies for DS may adopt one of two approaches. Either items may be retained as discrete items, or bundled into four parcels corresponding to the four factors. The results do not lend support to the practice of treating forward and backward span as different traits.

A-78
Developing a Longitudinal Protocol for Neurodevelopmental Assessment in Children under Age 5 in Developing Countries
Romero R, Hulkonen R, Boivin M, Bangirana P, John C, Shapiro E

Objective: In low and middle income countries, infections, malnutrition and other diseases can have significant effects on neurodevelopment. Measurement of these effects require sensitive and culturally relevant tests. Our goal is to develop guidelines for selection of appropriate neurodevelopmental tests for children under 5 in these countries. Method: We reviewed

developmental screening tests and neuropsychological tests for infants and preschool-aged children developed and normed in the United States and abroad. We gathered information from test manuals, test publishers, correspondence with authors, and published validation/research studies. We generated criteria for assessing their usefulness in developing countries including psychometric standards (age range, norms and standardization, reliability/validity, and administration/scoring) and culture-specific guidelines. Results: Guidelines were then developed for generating a protocol. The first step was defining the purpose of assessment such as measuring developmental status and measuring brain–behavior relationships associated with specific diseases. Each test was evaluated based on knowledge of brain basis of measured deficits. The second step was to determine how well the test met specific psychometric standards. The third step was to select which important covariates (socioeconomic, environmental, and biological factors) would have an impact on neuropsychological outcomes. Conclusions: We have developed guidelines for determination of appropriate screening and neuropsychological tests to assess neuropsychological and developmental outcomes in children under 5 in low and middle income countries. The guidelines, which will be continuously updated, provide an important new tool for researchers who aim to assess the effects of disease on long-term neurologic, developmental and cognitive outcomes in children in these countries.

A-79
Neuropsychological Assessment in the Schools: A Nationwide Survey
Slonaker A, Pass L

Objective: The purpose of the study was to examine the extent to which various psychological assessment measures are used in the schools, including neuropsychological assessment. The reasons why school psychologists choose to use or not use neuropsychological assessment also was examined. Method: A questionnaire developed by the researcher was randomly distributed to members of the National Association of School Psychologists (NASP) who were listed as practicing in a public school setting within the United States. A total of 205 participants responded to the questionnaire. Results: Descriptive analysis was used to analyze the data. The majority of respondents indicated they use measures of cognitive ability as well as academic achievement. However, only 23% of participants reported they use neuropsychological assessment in the schools. Frequency distributions were calculated to determine the types of measures used by participants as well as the reasons for using or not using neuropsychological assessment. Conclusions: Results suggest a need for additional neuropsychology training for school psychologists due to the limited use of such assessment in the schools. In addition, it is recommended school and clinical settings establish greater connections so proper referrals to neuropsychologists also may be made if warranted.

A-80
Utility of RBANS for Neurocognitive Screening in a Mixed Chemically Dependent Treatment Sample
Smigielski J, Biernacka J, Geske J, Hall-Flavin D, Loukianova L, Schneekloth T, Abulseoud O, Mrazek D, Frye M, Karpyak V

Objective: To describe the feasibility and effectiveness of RBANS for neurocognitive screening for a mixed chemically dependent (CD) treatment sample while in active participation in

programmatic treatment. Method: RBANS was administered to 365 consecutively referred patients who were actively participating in an intensive 28-day residential level CD treatment program. Most patients also completed additional standardized measures assessing global intellectual functioning, complex attention, executive reasoning ability and word recognition reading achievement. Results: The study group obtained a mean RBANS Total Scale Score of 94.8. Subscale score means ranged from 93.4 to 98.7. This same group obtained a mean Full Scale IQ score of 104.6. Mean scores of other neurocognitive measures ranged from average to lower average levels. For subgroups completing the additional tests, correlations between RBANS scores and other measures were computed. Conclusions: These results confirm the utility of RBANS as a feasible alternative to lengthier test batteries for neurocognitive screening with individuals actively involved in CD treatment. Findings also showed a trend toward a lower level of neurocognitive performance for individuals comprising this CD sample in comparison to those individuals in the test standardization sample, though this was not statistically significant. Nonetheless, together with the correlations between RBANS score and other neurocognitive measures, this trend suggests that RBANS may be effective in efficiently characterizing neurocognitive status in a CD treatment population.

A-81
Factor Structure and Convergent Validity of the Search Identification Task
Terranova J, Safko E, Heisler D, Thaler N, Allen D

Objective: The Search Identification Task (SIT) is a novel measure designed to assess discrete components of attention, working memory, and executive functions using a hierarchical series of trials. Each trial requires participants to identify and cross out an increasingly-complex sequence of targets. This study examined the factor structure of the SIT, then correlated extracted factors with established neuropsychological measures to examine its construct validity. Method: Participants included 111 undergraduate students (53.2% men) recruited from the psychology subject pool (mean age = 22.1, sd = 5.0). The SIT includes four letter trials and four figure trials which complement each other and increase in complexity. Principle components analysis examined these eight trials using a Varimax rotation. Regression scores were correlated with WAIS-III subtests and Trails A and B. Results: Three factors were extracted: a simple factor, composed of letter and figure trials 1 and 2; an intermediate factor, with letter and figure trial 3, and; a complex factor, with letter and figure trial 4. Correlations of factor scores suggest that the simple factor correlated with Trails A, the intermediate factor with Trails B and Coding, and the complex factor with Digit Span and Block Design. Conclusions: These findings offer preliminary evidence that the SIT is a multifactorial measure. The simple factor appears to tap focused attention, the intermediate factor taps focused attention and executive processes, and the complex factor taps working memory and visuospatial processing.

A-82
Development of MMPI-2 and MMPI-2-RC Short Forms with a Veteran Sample
Van Dyke S, Axelrod B

Objective: In the aging veteran population, patients can be resistant to completing a full 567-item MMPI-2 questionnaire. Despite the tepid support for short forms of the MMPI and MMPI-2, certain clinical circumstances warrant them, as long as they are interpreted with caution. The current

study sought to create and validate a short form of the MMPI-2, which could provide valid estimations of validity and clinical scales was well as the MMPI-RC scales. Method: This study established and cross-validated short forms for the MMPI-2 using 150 protocols from patients referred for neuropsychological evaluation using regression analyses. The resulting equations were cross-validated using bootstrapping with an independent sample of 100 individuals. The final 115-item short form (SF) protocol (available from the authors upon request) generated estimated validity, traditional clinical, and restructured clinical (RC) scales from the MMPI-2. Results: None of the SF validity, clinical, or RC scales differed significantly from the scales from the full version of the MMPI-2. All 11 SF-MMPI-2 and all 9 SF-MMPI-RC scales fell within the Excellent range of Intraclass Correlation Coefficients (ICCs for all 20 scales fell > 0.80). Conclusions: Considering the weaknesses associated with short forms, ongoing caution with the SF-MMPI-2 and SF-MMPI-RC is recommended. However, the current findings are nonetheless encouraging and warrant further validation with more specific clinical samples often seen within Veterans Affairs medical centers (e.g., individuals with posttraumatic stress disorder, aging individuals, and individuals with complex medical and mental health concerns). The interpretability and limitations the SF-MMPI-2 and SF-MMPI-RC are discussed.

A-83
The Development of a Neuropsychological Test Battery for the Evaluation of Spanish Speakers
Zink D, Puente A

Objective: Ojeda (2010) completed a study that showed that there are only 25-50 neuropsychological tests in Spanish that are used frequently and most of these do not meet the criteria for the Standards for Educational and Psychological Testing and have norms that are not clinical and were obtained outside the U.S. The current study focused on extending these findings by examining existing neuropsychological batteries for Spanish speakers. Method: The most widely used batteries in English and the available batteries in Spanish and their scientific literature were analyzed. Results: Presently, there are a total of seven batteries available in Spanish and their norming samples do not represent the Hispanic U.S. population properly. Most of their norms were obtained outside the U.S. and lack a clinical sample. The typical battery focuses on measuring attention, memory, executive function, and language. Based on these findings, a model is proposed of what a battery for Spanish speakers should look like based on such factors as meeting the Standards for Educational and Psychological Testing, norms, theoretical framework, domains, items, length, costs, availability, and a comparison with available batteries in English. Based on these variables, the new battery would measure memory, attention, executive function, language, visuospatial abilities, and sensory motor skills, a measure of intelligence would be optional. Its norms would represent the distribution of Hispanics in the U.S. according to the latest census data, including clinical and non-clinical norms. Conclusions: This review is the empirical foundation and first phase of the development of such a battery for use both in the United States and in other Spanish speaking countries.

Poster Session B

Aging and Dementia: Other

B-1
Cognistat Utility in Special Patient Populations
Ames H, LePage J

Objective: We studied select scales of the Cognistat, a multiscale neuropsychological screening exam, that allow use with populations that limit use of testing props, visual stimuli, and motor tasks. We hypothesized that specific scales would show good sensitivity/specificity regarding the presence/absence of a cognitive disorder. Method: The Cognistat was administered to 68 consecutive outpatient referrals to a VA hospital geriatric service that included geropsychiatry and memory disorder clinics. Most patients were male (67) and Caucasian (71%). Mean age and education were 74 and 11, respectively. The most common disorders were Mood (35%), Cognitive (30%), and Anxiety (12%). Independent, blind diagnostic ratings were made retrospectively by 2 geropsychiatrists, excluding Cognistat findings. This is 2 group nonrandomized design evaluating those with and without cognitive disorders. The primary independent variable is the presence of a cognitive disorder. The dependent variable is the sum of Cognistat domain scales requiring auditory input and verbal responses (Orientation; Attention; Memory; Calculations; Similarities; Judgment). Results: Logistic Regression determined whether cut scores could be identified to maximize predictive ability. Results indicated significant predictive ability (X = 65.6; Wald test = 17.4; p < .0001). The statistically derived cut score of <38 found an Odds Ratio of 47.1, sensitivity of .88, specificity of .87, PPP of .88, NPP of .87, and hit rate of 87.3%. Conclusions: Simple variations in administration/interpretation of the Cognistat can provide useful information in special populations. The raw score sum best predicts the presence/absence of a cognitive disorder. Cross validation should be studied before routine use in clinical situations.

B-2
Cognitive Improvement Following Antiretroviral Treatment for HIV
Carroll C, Knee K, Mittenberg W

Objectives: Human immunodeficiency virus (HIV) often leads to neurocognitive deficits. HIV progression is slowed by antiretroviral therapy. Antiretrovirals may reduce the incidence of HIV related dementia but not HIV associated cognitive impairment. This case demonstrates mild cognitive improvement following one year of antiretroviral treatment. The patient was a 44 year-old with HIV and mild cognitive impairment. Impairment of memory and executive functioning was less pronounced following one year of antiretroviral therapy. Method: Examination of intellectual, memory, executive, and language functioning were conducted prior to and following one year of antiretroviral treatment. Results: Intelligence (WAIS-4 IQ = 118, 126), Perceptual Reasoning (100,98) and Processing Speed (114, 111) remained relatively intact over time, consistent with premorbid estimates (WAIS Vocabulary = 14, 13). Language remained intact (FAS = 18, 16, BNT = 116, 116). Auditory Memory (102) was mildly impaired prior to treatment but was not administered at follow-up as the client recalled complete stories from Logical Memory

and Verbal Paired Associates from prior administration. There was significant improvement in ability to reproduce designs immediately (Visual Reproduction I = 7, 10). Executive functioning (RUFF = 74, 100, WCST Preservative Errors = 73, 85) Verbal Comprehension (127, 143) and Working Memory (122, 136) improved. Conclusion: HIV related cognitive impairment may be reduced following antiretroviral treatment. Intelligence and perceptual reasoning are more resistant to HIV cognitive impairment while executive functioning and memory are more susceptible to impairment. Following a one-year course of antiretroviral treatment impairments in executive functioning and memory may improve.

B-3
White Matter Hyperintensities and Neurocognitive Function in a Treatment Seeking Population
Cummings T, Webbe F, Shepherd E, Marcinak J

Objective: White matter hyperintensities (WMH), both periventricular and deep, as well as subcortical atrophy, have been linked to neurodegenerative disease. WMH, particularly those within frontal and deep regions, have also been associated with postmortem neurofibrillary pathology. The present study aimed to elaborate relationships between regional WMH, subcortical atrophy, and neurocognitive measures. Method: Eighty four consecutive referrals to the East Central Florida Memory Disorder Clinic who received MR imaging and neuropsychological testing were utilized. Selected sections from standard clinical MRI were graded for severity of WMH using the template-based Visual Rating System (VRS). WMH severity was correlated with neurocognitive performance. Results: Subcortical atrophy differentiated dementia groups from normal and mood groups, ($F(4, 72)=2.925$, $p=0.027$), and correlated negatively with verbal learning ($r=-.27$, $p=0.017$) and recall ($r=-.25$, $p=0.028$). Periventricular WMH differed between diagnostic groups ($F(4, 78)=2.551$, $p=0.046$) with the normal group displaying greater PWMH than MCI, Mood, and AD groups. Measures of executive function correlated negatively with PWMH found in parietal ($r=-.24$, $p=0.041$) and frontal ($r=-.32$, $p=0.007$) regions. Conclusions: The subcortical atrophy findings were consistent with previous literature and lend confidence to our use of the VRS procedure. Although, global PWMH was not related systematically with cognitive impairment, regional PWMH was associated with frontal and parietal-based measures of executive function. Consistent with current theory, this suggests that PWMH disrupts association fibers connecting distant brain regions, affecting performance that requires assimilation across distant cortical areas. Regional analysis of PWMH may portray cognitive impairment more accurately than global analysis.

B-4
Relation between Objective Measurements of Activities of Daily Living and Cognition in Non-Demented Parkinson's Disease
Diaz-Santos M, Seichepine D, Sullivan K, Neargarder S, Cronin-Golomb A

Objective: Self-report questionnaires are often used to examine the relation of cognition to impairments in activities of daily living (ADL) in Parkinson's disease (PD). We assessed the validity of such findings through the use of objective ADL tasks and also explored the contributions of vision and motor functioning to ADL performance. Method: We assessed 23 mild-to-moderate non-demented PD patients. ADL tasks included using a telephone, measuring dry and wet ingredients, counting change, and organizing medications into a weekly planner. Cognition measures included global cognitive status, verbal fluency, learning and memory. Motor function

(pegboard) and visual contrast sensitivity were also assessed. Results: Accuracy was high for all conditions; correlations are reported for ADL reaction time (RT). A significant correlation was observed between making a phone call and total recall acquisition (r = .42; p = .044). Other ADL measures did not correlate with cognition. Contrast sensitivity at low spatial frequencies (1.5 and 3 cycles per degree) correlated with measuring wet ingredients (r = -.75 and r = -.54, respectively; both p < 0.01). Motor functioning correlated with measuring dry (r = -.56; p = .005) and wet ingredients (r = -.58; p = .003) and counting change (r = -.47; p = .025). Conclusions: These findings indicated that cognition in non-demented PD patients plays a limited role in ADL performance as indexed by RT, and revealed that vision and motor functioning may be as important as cognition in this regard. The discrepancy in findings between self-report and objective measures of ADLs requires further investigation.

B-5
Cognitive and Personality Predictors of Attrition Risk in Longitudinal Studies of Older Adults
Franchow E, Suchy Y, Kraybill M

Objective: Attrition compromises validity in longitudinal studies. Additionally, attrition is a financial concern in studies involving costly baseline assessments. Identification of participants at risk for dropping out can save considerable time and resources. Attrition risk factors include depression, low social support (Shaw, 1994), older age, and functional impairment (Ahlner-Elmqvist, 2009). The current study investigates cognitive and personality predictors of attrition among community-dwelling older adults. Method: Participants were 75 community-dwelling older adults (47 female, mean age=69.88, s.d.= 6.68). 75 participants completed baseline assessments, with 50 returning one year later (33% attrition). The Dementia Rating Scale-2nd Edition (DRS-2) and the Revised NEO Personality Inventory (NEO-PI-R) were administered at baseline. Results: Receiver operating characteristic analyses showed that lower DRS-2 scores (AUC=.718, p<.05) and lower NEO-PI-R Agreeableness (AUC=.676, p<.05) were significant attrition risk factors. DRS-2 cutoff score of <130 identified 5 of the 25 non-returners (sensitivity= 20%), with ALL returners classified correctly (specificity = 100%), lowering attrition to 29%. For the remaining 70 participants, a NEO-PI-R Agreeableness cutoff score of <117 identified an additional 10 non-returners (sensitivity= 50%); however, 8 returners were incorrectly classified as being at-risk (specificity= 84%). After both screenings, a sample of 42 returners and 10 non-returners remained, lowering attrition to 19%. Conclusions: Results identify lower global cognition and lower levels of trait agreeableness as attrition risks in community-dwelling older adults. Identifying individuals at risk can conserve resources by either excluding them from research (if validity is not compromised), or by employing extra retention efforts.

B-6
An Application of the Capacity Model to Left Hemisphere Functional Cerebral Systems: Changes in Verbal Fluency Performance as a Function of Diabetes Classification in Older Adults
Holland A, Newton S, Hinson D, Smith A, Coe M, Carmona J, Harrison D

Objective: The left hemisphere has been demonstrated to regulate the parasympathetic nervous system (Wittling, 1995), including regulation of diastolic blood pressure and digestive functions. Functional cerebral systems in the left hemisphere may be compromised in individuals with Type II diabetes. For the current research the process of food ingestion, absorption, and pre-digestion

was conceptualized as a left hemisphere stressor. It was predicted that diabetic individuals would evidence a diminished capacity to complete a verbal fluency task after undergoing pre-digestive stress. Method: Individuals diagnosed with Type II diabetes (N=8) and individuals without Type II diabetes (N=10) completed the Controlled Oral Word Association Task (COWAT) before and after eating a sandwich containing between 44-48 grams of carbohydrates. Blood pressure measures were taken after both administrations of the COWAT, and 5 minutes after eating. Results: A main effect for diastolic blood pressure (DBP) was found ($F(4, 64)=3.63$, $p=.01$), indicating that DBP was elevated during absorption and after both administrations of the COWAT. Moreover, a Diabetes x Condition x Trial interaction was found for unique words produced ($F(2, 30)=3.62$, $p<.05$), indicating that diabetic individuals failed maintain consistent levels of verbal fluency in the post stress condition compared to non diabetic individuals. Conclusions: The current results indicate that functional cerebral systems in the left hemisphere may be compromised in individuals with Type II diabetes. Diabetic individuals demonstrated a reduced capacity to complete a task requiring relative activation of cerebral systems in the left hemisphere after food ingestion.

B-7
Cognitive Intervention: Cogmed Applied to Older Adults with Mild Cognitive Impairment
Hyer L, Atkinson M, Dalibwala J, Yeager C

Objective: One defining element of Mild Cognitive Impairment (MCI) is a deficit in working memory (WM). WM is sensitive to cognitive decline and has been identified as a core factor underlying cognitive impairment in old age and in dementia. To date, only a handful of studies has shown change in the cognitive training of MCI. Cogmed is a computerized cognitive rehabilitation program designed to enhance WM. This poster examined the effectiveness of Cogmed in older MCI adults compared with a sham control group. Method: Participants (N=70) met criteria for MCI with memory impairment on screening (RBANS) and had normal IADLs and average scores on other neuropsychological domains. Participants were randomized to either Cogmed or to a Sham cognitive program (no adaptivity). Each received 25 sessions over 5-7 weeks and were assessed pre-, post- and 2-months post-intervention. Cognitive measures included Cogmed index scores, RBANS subtests, WMS-III subtests, Trails A&B, among others. There were also adjustment and mood measures applied. Results: All Ss had gains relative to the pre-measures. Controlling for medical complications, pre-measures, and affect, Cogmed improved over Sham on group post and 2-month assessments of Digit Span and Span Board. Cogmed Ss also liked the program and showed gains in adjustment and quality of life. Conclusion: Although both groups improved over pre-measures, the cogmed group performed better on core working memory measures. This was a difficult group to provide change, an older population with MCI. Discussion will relate to the overall advantage of cognitive training at late life as well as with MCI.

B-8
Development and Application of Holistic Memory Clinic for Older Adults
Hyer L, Scott C, Atkinson M, Yeager C

Objective: Training that targets attention and working memory and does so in a holistic manner optimizes the chance of durability and transferability with older adults. We conducted a targeted, working memory program using a "holistic" package for older adults with memory complaints, ranging from age associated memory complaints to early dementia. From this array of subjects

with memory complaints we sought both to develop an empirically supported memory program and to identify who was successful. Method: We piloted a manualized, 6-session memory program on three cohorts (N=32) and applied this program to nine cohorts of older adults (N=104). Participants learned a memory technique based on focused concentration, practical linking and loci techniques, along with mindfulness, exercise, stress reduction, socialization, and diet. We conducted pre and post testing on memory (List Learning, Story Memory, Coding, Digit Span, Recall and Recognition), memory habits, attitudes, function/adjustment, and compliance. Results: Positive changes on all measures with some reaching clinical significance (Digit Span and Recall) were found. We identified high, medium, low risk subjects, based on pre-recall measures and first session participation. Here we found differences between low/medium risk groups and high risk Ss on all cognitive measures, as well as in memory habits, attitudes, function and adjustment. Conclusion: This holistic memory program targeted attention/concentration strategies and correlative techniques in older adults with memory complaints. Its success was clearly noted in low and medium subjects who complied. We discuss the results in the context of improved health care and quality of life.

B-9
Meta-Analysis of Current Research Addressing the Ecological Validity of Neuropsychological Evaluations of Elderly Dementia Patients
Jacobson K, Olson K

Objective: Neuropsychological evaluation of elderly patients continues to be important in establishing the presence of disorders not readily diagnosed using neuroimaging technology. Among patients with dementia, clinicians use neuropsychological measures to establish the presence or absence of disease, determine if and to what extent deficits exist in specific neuropsychological domains, and establish a baseline upon which to measure change or treatment effects. The purpose of this review was to evaluate the ecological validity of such evaluations and identify resultant benefits to both patients and caregivers. Method: A literature review was conducted using five authoritative information search engines (e.g., PubMed). Studies of interest were those that identified ecological validity of geriatric neuropsychology, as well as benefits to patients and caregivers. Search terms included geriatric, neuropsychology, ecological validity, benefits, caregiver, and dementia. Outcome data were reviewed. Results: Studies reviewed indicated that neuropsychological measures alone cannot determine or predict the functional capacity of individuals with dementia. Neuropsychological evaluation may be useful in clarifying a diagnosis or obtaining services; however, more research is needed to determine if it is beneficial to patients and caregivers. Conclusions: Current attempts to evaluate the functional capacity of individuals with dementia using neuropsychological measures appear inadequate with regard to ascertaining the functional capacity of these patients. As a result, neuropsychological evaluations are potentially failing to meet the needs of, and provide benefit to, dementia patients and their caregivers. Current measures may benefit from modification in order to prove both more beneficial and ecologically valid.

B-10

Performance-Based Measures of Daily Activities Differentiate Patients with Various Types of Cognitive Impairment

Pella R, Fallows R, McCoy K, O'Rourke J, Hilsabeck R

Objective: To determine the utility of performance-based measures of instrumental activities of daily living (IADL) in distinguishing among individuals with dementia, other cognitive disorder, and no cognitive impairment. Method: Participants were predominately male veterans (N = 63), with an average age of 59 years (SD = 10.6) and mean education of 13.8 years (SD = 2.7). Group differences on failure rate of the Pillbox Test, a performance-based measure of medication management skills, and frequency of borderline/extremely low performance (≤ 9th percentile) on each subscale of another measure of daily activities, the Texas Functional Living Scale (TFLS; Time/Orientation, Money, Communication, and Memory), were calculated. A one-way ANOVA was conducted to determine group differences in the mean number of low/impaired performances. Results: Of the entire sample, 41% performed within normal limits on all measures. A significantly greater percentage of the dementia group performed in the low/impaired range on all measures. The TFLS Communication subtest was the only measure that significantly differentiated the other cognitive disorders and no cognitive impairment groups. There were significant group differences in total number of low/impaired performances, with the dementia group averaging 2.9, the cognitive disorders group 1.0, and the no cognitive impairment group 0.5. Conclusions: Overall, low scores on performance-based measures directly related to IADLs were associated with level of cognitive impairment. This study adds support for the utility of performance-based measures of daily activities in dementia cases and allows the clinician to make relevant inferences regarding IADL behaviors.

B-11

Contribution of Depression to RBANS Scores in Amnestic Multiple Domain MCI patients.

Rosado Y, Kaufman R, Velamuri S, Rinehardt E, Mattingly M

Objective: Mild Cognitive Impairment (MCI) is considered a transitional stage between normal cognitive functioning and a neurodegenerative disease such as Alzheimer's disease or Dementia. Previous studies show an inconsistent effect of depression on cognitive functioning. In this study this relationship was studied in patients with MCI. Method: Participants were 23 amnesic multiple domain MCI patients between the ages of 50-85. Eighty-seven percent of the participants were Caucasian with a mean of 14.52 years of education. Participants were administered the RBANS during the course of care and neuropsychological evaluation. A hierarchical multiple regression analysis was performed using RBANS Total Scale score (TSS) and the patient's BDI raw score. Covariates were age, gender, race and years of education. Results: Regression analysis suggests a negative effect of depression to RBANS Total Scale Score. Depression significantly predicted RBANS Total Scale Score: β=-.503, t=-2.66, p=.014, with a variance of $R2$=.253, $F(1,21)$=158.95, p=.014. Individually, age, gender, race, or years of education did not influence significantly the RBANS TSS, all with p>.05, but in conjunction with depression they did explain a proportion of the variance of the RBANS TSS: $R2$=.375, $F(5,17)$=97.735, p=.003. Conclusions: Results indicate a negative relationship between depression and MCI .Years of education, age, race and gender did not produce significant difference in our analysis when analyzed individually. However, the

combination of these covariates with depression accounted for higher variability in the results, indicating that depression is not the only contributing variable towards decline in this sample.

B-12
Age and Cognitive Function are Associated with Diabetes Knowledge
Sartori A, Clay O, Ovalle F, Rothman R, Crowe M

Objective: Diabetes is a common problem in older adults and may contribute to increased risk of additional health problems, including cognitive impairment. Adequate control of diabetes is therefore crucial and requires basic knowledge of disease symptoms and consequences, yet health literacy varies widely among older adults. We examined the roles of cognitive function, depressive symptoms, and demographic factors in relation to diabetes knowledge in a cross-sectional sample of community-dwelling adults age 65+ with diabetes. Method: Participants were enrolled in the Diabetes Aging Study of Health and completed one-hour telephone interviews by trained technicians. Demographic factors included age, race, gender, level of education, and marital status. The Geriatric Depression Scale captured depressive symptoms, and cognitive function was assessed using the modified Telephone Interview of Cognitive Status (TICS-M) and measures of phonemic fluency, vocabulary, and numeracy. Diabetes knowledge was evaluated by the Spoken Knowledge in Low Literacy in Diabetes Scale (SKILL-D). Results: The mean age of the 174 participants utilized was 74 years. The sample was 65% female and 38% African American. Median SKILL-D accuracy was 70%. In hierarchical multiple regression models adjusted for the variables of interest, factors significantly associated with diabetes knowledge included age (B=-.148;p=.038), total TICS-M score (B=.385;p<.001), and phonemic fluency (B=.168;p=.029). Additionally, persons with low cognitive status (TICS-M score ≤20) were 84% less likely to achieve >50% accuracy on the SKILL-D (OR=.157;CI=.074,.334). Conclusions: Results indicate that older individuals and those with lower cognitive function have poorer diabetes knowledge and therefore may require more comprehensive education regarding diabetes control and management upon diagnosis.

B-13
Predictive Utility of Neuropsychological Assessment Battery Screening Module for Preoperative Assessment of Patients with Normal Pressure Hydrocephalus
Schmid A, Horne L, Horn G, Johnson-Markve B, Gorman P

Objective: The aim of the present study was to determine whether cognitive improvement after lumbar drain was maintained after Venticuloperitoneal (VP) shunt placement in patients diagnosed with Normal Pressure Hydrocephalus (NPH). Method: 39 patients (59% female, mean age = 77.46(6.67)) were evaluated by a multi-disciplinary team in a hospital setting. A diagnostic lumbar drain was used to assess the likelihood of success of VP shunt placement. The screening module of the Neuropsychological Assessment Battery (NAB; Stern & White, 2003) was used to measure changes across several cognitive of cognitive functioning pre- and post-lumbar drain. Patients who showed improvement in overall symptoms, including cognitive functioning, gait, and urinary incontinence, were referred for VP shunt placement. Post-surgery, Patients were administered the NAB screening module at 6-month intervals. 23 patients were evaluated at 6-month follow-up and 10 were evaluated at 12-month follow-up. Repeated-measures ANOVAs were performed to determine whether cognitive gains after lumbar drain were maintained at each

follow-up. Results: Analyses revealed that post-drain improvement in several domains of cognitive functioning were maintained, whereas improvement in other domains of cognitive functioning were not maintained. Conclusions: The present findings suggest that improvement in some domains of cognitive functioning after lumbar drain may be maintained at 6- and 12-month follow-up. Present findings also underscore the usefulness of the NAB screening module in measuring changes in cognitive functioning pre- and post-lumbar drain.

B-14
Influence of IQ on Older Adults: Performance on Measures of Executive Functioning
Stewart J, Bure-Reyes A, Golden C

Objective: The present study examined the influence of intellectual ability on executive processing in a normal older adult sample. Method: Participants included 99 older adult, non-patient volunteers between the ages of 55 and 88 years (M=68.81, SD= 8.90). The sample was ethnically diverse and 72% was female. Measures included the Stroop Color/Word trial T-score, Stroop Interference T-score, Trail Making A & B T-scores and full scale IQ (FSIQ) from the WAIS-III. Participants with a measured FSIQ less than 85 and greater than 115 were excluded from the analysis. Results: Participants were assigned to either a low average (85-94), average (95-105) or high average (104-115) IQ group. All results were considered to be significant at the .05 level. One-way ANOVA results showed overall significant differences between the three groups Trails A (F(2,95)=7.90, p=.001;ƒnƒØ2 = .143) and B (F(2,94)=10.761, p<.001; ƒØ2=.186). Performance on trails A as was poorer for low-average (t(97)=-3.85, p=.001) and average (t(97)=-2.58, p=.034) IQ groups compared to the high-average group. For trails B, the low average group performed significantly worse than the average (t(97)=-2.76, p=.021) and high average (t(97)=-4.63, p<.001) group. No differences were found on other measures. Conclusions: While performance on the Stroop test was not found to be sensitive to the effect of intellectual ability; performance on Trails A and B was. Therefore, caution is necessary when measuring executive processing using Trails A and B, particularly with older adults whose IQ falls within normal bounds.

B-15
Prospective Memory and Everyday Memory Lapses in Individuals with Mild Cognitive Impairment
Tam J, McAlister C, Schmitter-Edgecombe M

Objective: The ability to remember to do things in the future is an important component of everyday remembering. We used an event-based prospective memory (PM) task with a peripheral cue to investigate PM ability in individuals with Mild Cognitive Impairment (MCI). We also explored the relationship between PM and everyday memory lapses. Method: Twenty-five participants with MCI were matched with 25 healthy older adults in age and education. An event-based PM task embedded within but peripheral to a working memory task was used to evaluate PM. Words with different patterned backgrounds were displayed on a computer screen one at a time. In the working memory task, participants were instructed to continuously remember the last three words presented. For the PM task, they were to indicate when the target background appeared on the screen by a button press. Self-report and informant-report ratings were collected on each participant's everyday memory lapses. Results: Individuals with MCI were less accurate compared to the healthy older adults on both the PM task, t(48) = 2.28, p < 0.05, 95% CI [0.03, 0.42] and the working memory task, t(48) = 2.47, p < 0.05, 95% CI [0.03, 0.27]. Regression

analysis also showed that PM performance was a unique predictor of self-reported everyday memory lapses in the MCI group, β = -0.46, t = -2.24, p < 0.05. Conclusions: Event-based peripheral cues were sensitive in measuring PM deficits in older adults with MCI. Prospective memory ability contributed unique variance in explaining self-reported everyday memory lapses in the MCI population.

B-16
Specificity of the Diagnosis of "Worried Well" for Individuals Presenting for Memory Evaluation with Fears of Developing Alzheimer Disease
Wagner M, Brenner L, Walker A

Objective: In a memory disorder clinic, there is always concern for the validity of a diagnosis of "worried well." There is little prospective data on the accuracy of the benign diagnosis of normal age-associated memory change using neuropsychological methodology. Method: The study design was retrospective chart review. The subjects were adults between the ages of 48 and 90 (M=64.26, SD=7.17) presenting with memory complaints in a major medical university memory disorder clinic. This was a stratified sample to match a prior Alzheimer disease (AD) study (Wagner et al, 2010). Thirty-one (31) cases were selected using the following criteria: (1) subjective presenting complaint of insidious, progressive memory loss, (2) final diagnosis of benign, age-associated cognitive change, (3) absence of systemic disorder or other brain disease that could account for the subjective complaint, (4) follow-up at least 12 months after the benign diagnosis (M=48.74, SD=17.53). Follow-up had to have been with neurology, neuropsychology, psychiatry, or a detailed note from medicine or other provider. Two raters had to have concordance with respect to progression of cognitive symptoms or lack thereof. Results: Of the 31 cases diagnosed as worried well, 12% (4 cases) showed evidence of progression and 88% (37 cases) showed no evidence of any change. Conclusions: These data suggest that in this sample of elderly individuals presenting at a university medical hospital with fears of Alzheimer disease, neuropsychological findings correctly identified a benign course in 88% of individuals. The conclusions of this study are limited by sample size and lack of serial neuropsychological outcome data.

Developmental and Pediatric: Learning Disability

B-17
Examining the Utility of the Discrepancy Model for Learning Disability Diagnosis in Post-Secondary Educational Settings: A Pilot Study
Armstrong L, Inman E, Grimmett J, Gray S, Cornelius A

Objective: The purpose of this study was to examine the utility of the IQ/Achievement discrepancy model for learning disability (LD) diagnosis at the post-secondary education (i.e., collegiate) level. In contrast to the response to intervention (RTI) model, which has recently been shown to be more effective for diagnosing LD's in elementary and secondary education settings, the discrepancy model has been shown to be an inadequate method for diagnosing LD's in students at collegiate levels. This model may therefore limit the assistance available to students performing at sub-optimal academic levels who do not also show significant discrepancies between intellectual functioning and achievement on typical IQ/Achievement standardized tests. Method: For this study, 48 participants were selected from archival data (2009-2011) from a university counseling

center in Colorado Springs. All participants (Age range: 18-64) were referred from a local community college to assess for suspected learning disabilities due to sub-optimal academic performance. Standard scores (M = 100, SD = 15) from WAIS-IV and WJ-III (ACH) were collected from each participant. Results: The arithmetic mean for all participants' subtest scores was calculated (WAIS-IV scores, M = 91.38, SD = 8.78; WJ-III (ACH) scores, M = 89.68, SD = 10.29). Conclusions: The findings suggest a lack of discrepancy between IQ/Achievement correlated subtests for most participants. Upon observing individual scores on specific subtests, a more prescriptive pattern emerges regarding participants' needs; supporting an individualized approach to recommending appropriate academic accommodations for college students.

B-18
Deficits in Attention, Motor Control, and Perception (DAMP Syndrome): A Case Study
Hertza J, Klosson E, Varnadore E, Schiff W, Estes B

Objective: The objective of this single case study is to explore DAMP syndrome (Deficits in Attention, Motor control, and Perception). DAMP syndrome encompasses a combination of symptoms usually used to describe children who present with coordination difficulties, poor attention, and perception deficits. This case will discuss a patient diagnosed with DAMP. Method: This case describes a 16-year-old, right-handed female who was referred for a neuropsychological assessment secondary to academic difficulties. History was significant for attention problems and poor coordination since childhood. She reported struggling in school and was currently in specialized math classes. History was also significant for depression and anxiety with past and present suicidal ideations. Neuropsychological data, de-identified history, and neurologist report will be organized and presented in a single case summary. Evaluation procedures included administration, scoring and interpretation of comprehensive quantitative and qualitative measures. Results: Assessment revealed significant weaknesses in initiating and sustaining attention, working memory, cognitive flexibility, set-shifting, inhibition, organizational abilities, visual perception, mathematics, non-verbal memory, and reasoning abilities. A dyspraxia was also observed. Conclusions: The patient presented with deficits consistent with DAMP. Neuropsychological assessment can be extremely helpful in clarifying the exact nature of learning difficulties, thus leading to improved academic accommodations.

B-19
Cognitive/Neuropsychological Profiles in LD/ADHD and Non-Disabled Collegiate Athletes
Johnson L, Willingham M

Objective: The purpose of this study was to examine cognitive profiles of a group of college athletes diagnosed with LD/ADHD on the Wechsler Intelligence Scale for Adults-III ((WAIS-III) and CNS Vital Signs (CNSVS), a computerized cognitive battery. The performance of a group of non-disabled athletes was also compared to the LD/ADHD athletes on the CNSVS battery. Method: 46 freshman athletes (Football and Womens basketball) at a Division I university were screened for LD/ADHD. The screening battery consisted of: the screening subtests of the Scholastic Abilities Test for Adults (SATA), CNSVS, the Wender Utah Rating Scale (WURS) and the Brown ADD Scale for Adults (BADD). Results: 26 students were referred for further evaluations based on the screening results. 21 were diagnosed with ADHD and LD. The student athletes diagnosed with ADHD/LD were significantly below average on the Working Memory and Processing Speed Index

scores on the WAIS-III. In addition, their scores on the CNSVS battery were significantly below the normal athletes on Complex Reaction Time, Cognitive Flexibility and Attention. Conclusions: Weaknesses in Processing Speed on the Wechsler Intelligence Scale for Adults are frequently found in student athletes, despite their strengths in athletic endeavors. Although this may seem counterintuitive, many of the students identified as LD/ADHD had a history of early speech/language and reading problems. The relationship of these problems to later deficits on timed psychomotor tasks deserves further study.

B-20
Do Working Memory Deficits Persist in Adults with Learning Disabilities
Restrepo L, Bolanos J, Patel F, Golden C

Objective: The purpose of this study is to find whether or not Working Memory (WM) deficits persist in adults with Learning Disabilities (LD). Method: Participants consisted of adults with Mathematics Learning Disorders (MLD) (N=80) and Reading Disorders (RD) (N= 65); 63% were Caucasian, 38% were male; 80% were right-handed, education (M= 13.9, SD= 2.1); age (M= 28.8, SD= 11.8). Measures included participants' WMI and subtests scaled scores, Arithmetic, Digit Span (DS) from the WAIS III, and WMI, Letter Number Sequencing (LNS), and Spatial Span (SS) from the WMS III. Results: Data on WM was analyzed using 6 one-way between subjects ANOVAs. There were significant differences at the .05 level between MLD (m= 89.94) and RD (m=97.25) on WMI, Arithmetic MLD (m= 7.15), RD (m= 10.12) F(1,143)=43.29, p = .000; no significant difference was found at the .05 level on DS. There was a significant difference at the .05 level between the MLD (m= 91.19) and RD (m= 96.95) F(1,136)=7.31, p = .008 on WMI (WMS III) and in SS, MLD (m= 7.97) and RD (m= 9.56) F(1,137)=8.875, p = .003. Conclusion: The RD group outperformed the MLD group in overall indexes of WM, but there were differences in performance in some subtests suggesting a possible differentiation in WM abilities. These results indicate that people with MLD may have more difficulties with more complex verbal WM and spatial working memory compared to RD. These results indicate that WM tasks may accurately differentiate between adults with MLD and RD.

B-21
Phonological and Semantic Verbal Short Term Memory in Reading Disorders
Rice J, Dougherty M, Golden C

Objective: The current study examined the relationship between phonological and semantic verbal short term memory and reading abilities in children. Method: Included in this study were 35 children diagnosed with a reading disorder and 38 controls. Seventy one percent of the children with reading disorder were male, the mean age was 9.40(2.57), and the average level of education was 3.06(2.43). WRAML-2 subtests were used to measure verbal short term memory; Story Memory was used as a measure of semantic and Number/Letter as phonological. Reading abilities were measured through the Basic Reading and Reading Comprehension clusters, and Letter-Word Identification, and Word Attack subtests of the WJ-III Achievement test. Partial correlations using a .01 level of significance were conducted between short term memory and reading measures, controlling for FSIQ. Results: In the reading disorder group, Number/Letter was significantly correlated with Basic Reading (r=.59), Reading Comprehension (r=.51), Letter Word Identification (r=.57), and Word Attack (r=.56). In the control group, a significant correlation was found

between Story Memory and Reading Comprehension (r=.50). No other significant correlations were found. Conclusions: For children with reading disorders, phonological short term memory was found to contribute substantially to basic reading skills and reading comprehension. However, semantic short term memory was found to play a limited role in reading abilities. In children without any learning disorders, semantic short term memory substantially contributed to reading comprehension skills. Results of this study provide further clarification of the role of short term memory in reading disorders, suggesting the most prominent impairment is in phonological processing.

B-22
How Do Learning Disordered Individuals Differ on WAIS-III versus WAIS-IV Indices?
Sharma V, Martin P, Golden C

Objective: Studies by Sattler (2008) have found working memory, verbal and perceptual reasoning deficits to be implicated in learning disorders. The following study seeks to investigate the hypothesis that indices on the WAIS-III would differ from WAIS-IV for Learning Disordered (LD) individuals versus other psychiatric diagnoses in an adult clinical population. Method: Thirty one individuals were administered both the WAIS-III and WAIS-IV. Participants ages ranged from 18 to 62, M= 32.0, SD=12.4. Education ranged from 7 to 17 years, M=13.0, SD=2.39, 51.6% were Caucasian, 38.7% male and 45% were diagnosed as LD. 2 X 2 mixed ANOVAs examined if diagnosis as either LD or other psychiatric disorder resulted in differences in WAIS-III and WAIS-IV indices. Education did not differ across diagnostic groups. Results: Within subjects effects were not significant for WAIS test type across working memory, verbal and perceptual indices using a 0.05 cut-off value. Between subjects effects of diagnostic category were not significant across these three indices. Interaction effect of WAIS type and diagnosis was also not found for working memory, verbal or perceptual indices. Conclusions: The WAIS-IV is no more useful than the WAIS-III in differentiating LD from other psychiatric disorders based working memory, perceptual and verbal indices. More specifically, changes such as stricter discontinuation rules from the WAIS-III did not significantly alter performance on working memory, perceptual and verbal tasks. Results suggest differential diagnosis of LD from other disorders adult clinical populations cannot reliably be made using either WAIS version alone, suggesting more sensitive instruments are required.

Neurological and Neuropsychiatric Disorders: Traumatic Brain Injury

B-23
Relationship between Symptoms of Posttraumatic Stress Disorder (PTSD) and Post-Concussive Syndrome (PCS): A Factor Analytical Examination
Bradley E, Dinishak D, Lockwood C, Poole J

Objective: Co-occurrence of Postconcussive Syndrome (PCS) and Posttraumatic Stress Disorder (PTSD) in combat veterans frequently complicates clinical decisions. Several authors have posited that some symptoms are common to both disorders while others are unique to each condition. However, this hypothesis has not been tested. We evaluated this model in veterans with a history of traumatic brain injury (TBI) and traumatic stress. Method: 275 military personnel and veterans who screened positive for mild to moderate TBI were referred to a VA outpatient polytrauma clinic, months to years post-injury, where they completed the Neurobehavioral Symptom

Inventory (NSI) and the PTSD Check List (PCL). Principal components analysis and promax rotation were performed on the 39 NSI and PCL items. Results: Three symptom factors were obtained: Sensorimotor, Cognitive-behavioral, and Stress Response, which were moderately correlated (r= 0.5 to 0.6). Factor loadings indicated that most Cognitive-affective symptoms (memory, concentration, irritability) were multi-factorial, as were several of the Sensorimotor and Stress symptoms. In contrast, there was relatively little overlap in the loadings of seven Sensorimotor symptoms (e.g. headache, dizziness, coordination and vision problems) and six Stress symptoms (re-experiencing, hyperarousal). Conclusions: (1) These analyses support the hypothesized division of symptoms. (2) Most self-reported cognitive problems are non-specific and cannot distinguish the effects of PCS from PTSD. (3) Several sensorimotor and stress-response symptoms appear relatively specific to each disorder. These may serve to differentiate persisting postconcussive syndrome from posttraumatic stress in military veterans. (4) Future studies should examine the relation of these symptom clusters to neuropathologies of PCS and PTSD.

B-24
Self-Reported Postconcussion Symptoms at Two Months Post-Injury are Poor Predictors of Symptom Expression in the First Four Years after Mild TBI in Military Service Members
Brickell T, Lange R, French L

Objective: This study examined postconcussion symptom reporting across the first four years of the recovery trajectory, in service members who sustained a mild traumatic brain injury (MTBI) while deployed. Method: Participants included 75 service members who sustained a MTBI and were evaluated at the Walter Reed Army Medical Center (Mean Age=26.9 years; 78.1% blast, 96.2% male). Participants completed the Neurobehavioral Symptom Inventory within two months [baseline] of injury (M=14.5 days, range=3-60), and follow-up telephone interviews at either 6, 12, 24, or 36-48 months post injury. Results: Approximately half of the sample met DSM-IV criteria for postconcussional disorder (PCD) at baseline (50.5%), and about half at all four follow-up periods (range: 44.4% to 57.1%). However, less than 25% of the sample (i.e., 17.9% to 22.2%) had persistent symptoms from baseline to the four follow-ups; and a substantial minority had improved (25.0% to 33.3%) or worsened (22.2% to 42.9%) symptoms from baseline to follow-up regardless of time post-injury. Using regression analyses, postconcussion symptom reporting at baseline was not a significant predictor of symptom reporting at follow-up (range: p=.171-.620; R2=.001-.114); except at 6 months (p=.015, R2=.206). Conclusions: The prevalence of PCD within the first four years of recovery from MTBI was alarmingly high. In addition, postconcussion symptoms reported acutely was a poor predictor of symptom reporting 1-4 years post-injury. Extended follow-up is recommended for all service members who sustain an MTBI regardless of the presence/absence of symptom reporting within the first few months post-injury.

B-25
Effectiveness of Cognitive Rehabilitation for Individuals with Acquired Brain Injury
Chao L, Klein S

Objective: The present study evaluated the effectiveness of Coastline Community College's Acquired Brain Injury Program (CCCABI) for individuals with brain injury. 1) Does participation in CCCABI result in cognitive gains in attention, memory, and executive functioning? 2) Does participation result in enhanced functional outcome with regard to independent living, social and

leisure participation, and productivity? 3) Do cognitive gains relate to enhanced subsequent functional outcome? Method: Data from 32 individuals who completed the two-year program were used to evaluate the effectiveness of CCCABI. The present study is a pretest-post test, non-experimental longitudinal design that utilized archival data. CCCABI is an outpatient cognitive rehabilitation program that assists brain injury survivors to maximize functional independence and promote community reintegration through retraining of cognitive impairments. Cognitive functioning was measured using the Neuropsychological Assessment Battery. Functional outcome was measured using the Participation Index of the Mayo-Portland Adaptability Inventory. Results: Participation in CCCABI resulted is significant improvement in cognitive functioning in the areas of attention and executive functioning at the $p < .01$ level; and at the $p < .05$ level for memory. There was no significant enhancement in functional outcome with regard to independent living and productivity. Cognitive gains related to subsequent functional outcome for attention and executive functioning only at the $p < .01$ and $p < .05$ respectively. There was no correlation between improvement in memory and functional outcome. Conclusion: CCCABI improves cognitive functioning and enhances subsequent functional outcome.

B-26
Symptom Validity Test Performance in Veterans with Mild Traumatic Brain Injury and Post-Traumatic Stress Disorder: Embedded Versus Free-Standing Measures
Dunnam M, Miele A, Warner G, Donnelly K, Donnelly J, Kittleson J, Bradshaw C, Alt M, Dunnam M

Objective: This study investigated the diagnostic validity of two Embedded Measures (EMs) of effort relative to two free-standing measures in a large veteran cohort. Method: As part of their participation in a larger study, 440 veterans of the wars in Iraq and Afghanistan were administered two commonly used free-standing measures of effort [the TOMM and MSVT] as well as two EMs at predetermined cutoffs (the CVLT Forced-Choice Recognition [FCR] at <14 and Reliable Digit Span [RDS] at ≤7). Diagnoses of PTSD, anxiety and depression and number of TBIs sustained were also included as covariates. The diagnostic validity of the CVLT FCR and RDS to predict suboptimal effort was examined using classification accuracy statistics and logistic regression. Results: The sample base rate for suboptimal effort (failing the TOMM and/or MSVT) was 13%. Logistic regression revealed that as a group, the two EMs significantly predicted suboptimal effort: $F(5, N=439) = 60.24$, $p<.001$. Classification accuracy for the EMs was unacceptably low, with high false positive and false negative rates. Nonetheless, examinees failing RDS and/or the CVLT FCR were significantly more likely to be classified as suboptimal effort (by factors of approximately 4 and 10, respectively). Diagnoses of PTSD, anxiety and depression were not significant predictors. Examinees who sustained more than one TBI were approximately 35% more likely to be classified as suboptimal effort. Conclusions: In this study, RDS and the CVLT FCR emerged as significant predictors of suboptimal effort, but with very poor classification accuracy. Caution is advised against using any of the EMs alone.

B-27
Differential Diagnosis of TBI and PTSD Using the Meyers Neuropsychological Battery
England D, Denney R, Meyers J

Objective: Due to overlapping neuropsychological pathology, differential diagnosis of Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) is often complex and uncertain. The

intent of this study was to demonstrate that that the Meyers Neuropsychological Battery (MNB) would reliably differentiate between PTSD and TBI. Method: This study included160 TBI and 94 Anxiety Disorder adults selected from a MNB database. Forced entry binary logistic regression was employed to predict group membership based on MNB domain scores. The predictor variables were the seven domains of the MNB with TBI and PTSD/Anxiety coded dichotomously as dependent variables. On theoretical grounds, a second logistic regression was conducted using the Verbal Memory and Processing Speed domains with a subset of 26 anxiety disorder individuals diagnosed with PTSD and 28 TBI adults randomly selected from the larger TBI pool. Results: The first logistic regression model using all seven domains correctly classified 74% of those individuals with PTSD/Anxiety and 87% of individuals with TBI. The second logistic regression model using only the Verbal Memory and Processing Speed domains, and PTSD and TBI correctly classified 92% of those individuals with PTSD and 86% of individuals with TBI. Processing Speed and Verbal Memory domains were summed and a Receiver Operating Characteristic (ROC) analysis performed to obtain the discrimination threshold of the model, area =.89, CI 95% [.85-.93]. Conclusion: Results suggest the MNB is a valid and reliable assessment to differentiate between TBI and PTSD based upon the neuropsychological differences in the Verbal Memory and Processing Speed domains.

B-28
Return to Combat Duty after Concussive Blast Injury
Evans J, Lynch-Chee S, Kennedy C, Moore J

Objective: Blasts are responsible for 78% of all injuries to service members. However, little data exists regarding variables effecting return to duty (RTD) in the combat zone. This study will examine if delayed RTD can be predicted based on data collected during the clinical assessment following a concussive blast injury. Method: Participants included 377 consecutive U.S. service members medically evacuated between May 15 and November 1, 2010, who met the mandatory screening criteria for concussion. The sample was assessed for headache severity, total number of acute concussion symptoms, and with the Military Acute Concussion Scale (MACE). Results: Participants were divided into two groups, prompt and delayed RTD. Approximately one-half returned within 13 days of their injury (Prompt group; 0-13 days; mean = 7.6 days), while the other half returned to duty following an average of 24.4 days of observation (Delayed group; 14-51 days; mean = 24.4). Significant group differences were observed on only two continuous variables, total number of symptoms experienced acutely (p <0.001) and reported headache severity (p <0.001). These were the only two variables where the effect size of the group differences was in the moderate range as defined by Cohen. Age, presence of loss of consciousness, number of previous concussions, and MACE score were not significant. Conclusion: While there are many unanswered questions regarding why some service members are able to return to duty more rapidly than others, these findings indicate that both total number of acute symptoms and reported headache severity are predictive of a delayed RTD.

B-29

Knowledge of Concussion Related Symptoms in Collegiate Level Athletes

Fedor A, Spitznagel M, Gunstad J

Objective: It has been estimated that approximately 300,000 sport-related concussions occur in the United States annually. However, the actual number of concussions is most likely much higher due to a substantial number of concussions going unreported. One possible contributor to underreporting is that many athletes lack knowledge of concussion related symptoms. The current study assessed concussion symptom knowledge in collegiate level student athletes. Method: Data from 122 collegiate athletes at a midsized Midwestern university completed a checklist of symptoms they would expect to experience following a concussion. Participants ranged in age from 18-22 (M = 19.52 ±1.21). Results: Cluster analysis revealed three groups of expected symptoms, namely high (18 of 16 possible correct symptoms; N = 21), medium (11 symptoms; N = 85), or low symptom (4 symptoms; N =16) endorsement group. Consistent with expectations, a factor analysis on expected concussion symptoms found three factors (i.e. cognitive, affective, physical), though a high number of symptoms cross loaded (5 of 16). Conclusions: The current results indicate that student athletes may have different knowledge and/or conceptualizations of concussions. This pattern encourages the development and empirical testing of interventions to increase knowledge of concussion symptoms in this population with the goal of increasing accurate reporting during clinical evaluation.

B-30

Relationships between Performance on a Computerized Meal Simulation Task and Self-Report and Observational Measures of Instrumental Activities of Daily Living (IADLS) in Individuals with Acquired Brain Injury

Ferland M, Guerrero Nunez K, Davidson P, Collins B, Marshall S

Objective: To determine if a computerized meal simulation task predicts instrumental activities of daily living (IADL) in individuals with acquired brain injury. Method: Twenty-two adults participated in a Transitional Brain Injury Program. Self-ratings of cooking and everyday cognitive activities were collected on the Rehabilitation Activities of Daily Living Survey- II (RADLS). RADLS variables were: perceived ability for meal planning/organization, meal preparation/cooking, and a Composite Score of the ability in 12 everyday cognitive tasks. An in-vivo meal preparation rating system examined compensatory strategy use (CSU), efficiency (E), and overall independence (OI). The meal simulation task incorporated 1, 2, and 6-screen complexity levels. Performance variables were the ability to have all foods finished simultaneously while completing a distracter task of simulated table setting. Results: Inter-rater reliability for in-vivo meal ratings for all three dimensions were high, (ICC = .904, (CSU) ICC = .797, (E) ICC = .874 (OI)). Ability to have foods ready simultaneously on the simulation task was significantly positively correlated with everyday IADL cognitive task ability (r = .47 , p < .05) and approached significance for meal preparation/cooking ratings (r = .427, p = .05). Significant decline in table setting across complexity levels (level 1 to 2 - t (21) = 5.47, p = .000; level 1 to 6 - t (21) = 5.15, p = .000) suggested a strategy change from dual-task (cooking/table setting) to more cooking focused. Conclusion: Simulation meal preparation was associated with clients' perceptions of meal preparation and broader IADL skills.

B-31
Neuropsychological Symptoms and Signs in Hispanic Patients with Mild Traumatic Brain Injury
Herrera-Pino J, Samper G

Objective: The aim of the present study was to determine the relationship among subjective symptoms reported by patients status post mild traumatic brain injury (MTBI) and signs obtained through the use of neuropsychological instruments. Method: The sample consisted of 60 consecutive Hispanic patients who reported cognitive complaints following MTBI who were referred to an outpatient neuropsychological service. The average age of the sample was 37.88 years, average level of education was 12.16 years, and average time since the injury was 11.16 months. All the participants were administered a formal battery of neuropsychological instruments including the Neurobehavioral Rating Scale, as a measure of reported symptoms, and the following tests: Non Verbal Intelligence-2, Stroop Word and Color, Grooved Pegboard, Continuous Performance, Visual Reproduction (WMS), Logical Memory (WMS), and Wisconsin Card Sorting, as measures of signs of impairment of higher cerebral functions. Results: The results of this study were obtained through multiple regression analyses and indicate that there is a strong and significant relationship (p<0.001) between the type and extent of complaint of cognitive impairment reported by the patients and the results obtained in the different neuropsychological instruments as measures of different types of impairments of higher cerebral functions. Conclusions: The subjective complaints (symptoms) presented by Hispanic patients with MTBI are reflective of the impairments of higher cerebral functions they show in the neuropsychological instruments used in their evaluation (signs). This type of finding lends additional credence to the existence of a post concussion syndrome, meeting the criteria of abundant symptoms and signs.

B-32
Neurobehavioral Functioning as a Mediator of Emotional Functioning and Social Problem Solving in Individuals with Brain Injury
Ibarra S, Parrott D, Steffen F, Backhaus S

Objective: To investigate the role of neurobehavioral and executive control in the relationship between emotional functioning and social problem solving schema in individuals with brain injury. Method: Eighteen individuals with brain injury (BI) and their caregivers were recruited from a Midwestern outpatient BI rehabilitation facility for participation in a larger treatment study. Data analyzed for the current study was collected as part of the baseline testing for the larger treatment study. Measures included the Social Problem Solving Inventory – Revised (SPSI-R), Brief Symptom Inventory -18 (BSI-18), and Family ratings from the Frontal Systems Behavioral Scale – Executive Dysfunctions Subscale. Results: Linear regression using emotional functioning to predict social problem solving explained 34% of the variance (F=7.86, p=.013). Adding neurobehavioral functioning to the model resulted in a mediating relationship and increased the explained variance to 64% (F=12.24, p=.001). Conclusions: An individual's approach to how they solve daily social problems can impact one's ability to work, engage in activities, and persist in close relationships. It is important to understand which factors influence one's approach to solving problems. Consistent with previous research, this study found that persons with BI who were emotionally distressed were more likely to have a negative approach to managing social problems. Additionally persons who were also rated to have poor cognitive abilities in the areas of

organization, self-monitoring, and decision-making, had a greater chance of having a negative orientation toward solving daily problems. Clinical recommendations will be offered to enhance evaluation and treatment in settings aimed at increasing community re-integration.

B-33
Intellectual Predictors of Responsiveness to an Online Problem-Solving Intervention for Adolescents with Complicated Mild to Severe Traumatic Brain Injury (TBI)
Karver C, Wade S, Taylor H, Brown T, Kirkwood M, Stancin T

Objective: This study examined the ability of verbal intelligence to predict response to intervention for adolescents with TBI. Method: Adolescents with TBI (N = 95) were randomly assigned to a 6-month web-based problem-solving intervention or to an internet resource comparison group. Prior to the intervention, the parental Behavior Rating Inventory of Executive Function (BRIEF) was administered to assess baseline behavior along with the Verbal IQ (VIQ) index of Wechsler Abbreviated Scale of Intelligence to assess verbal intellectual ability. The BRIEF was administered 6 months later to assess post-intervention behavior. Results: We predicted that adolescents with lower VIQ, reflecting greater cognitive effects of TBI, would show more behavioral deficits. As children with greater cognitive deficits would be expected to have greater potential to benefit from intervention, we expected lower VIQ to predict greater behavioral gains. Generalized linear regression was utilized with 6-month BRIEF scores as the dependent variable, VIQ and treatment group as predictors, baseline BRIEF scores as a covariate. We introduced the cross-product term group x VIQ to examine moderating effects. As hypothesized, lower VIQ was associated with more post-intervention problems as measured by the Global Executive Composite (â = .77, p = .02). There was a VIQ x group interaction for the Metacognitive Index (â = -.91, p = .01), with lower VIQ associated with more positive changes within the intervention group. Conclusions: Results suggest that verbal intelligence predicts post-intervention ratings of behavior and has an important role in responsiveness to post-TBI intervention. Understanding such predictors will aid clinicians in tailoring treatments to individuals, thus improving efficacy.

B-34
Default Mode Network Connectivity in Traumatic Brain Injury: A Longitudinal Study
Krishnan K, Culver C, Arenivas A, Bosworth C, Shokri-Kojori E, Diaz-Arrastia R, Marquez de la Plata C

Objective: This study examined the relationship between degree of compromise in functional connectivity (FC) and white matter integrity (WMI) of the default mode network (DMN) longitudinally after traumatic axonal injury (TAI). The clinical utility for these markers of compromise were also evaluated. Method: Resting-state fMRI and DTI scans were acquired for 17 controls and 25 patients with TAI acutely (2-9 days) and chronically (6-11months). Clinical outcomes were assessed at the chronic stage. The 4 nodes of the DMN yielded 6 between node edges, and as many reconstructed between node tracts. DMN nodes are: medial frontal cortex, posterior cingulate cortex, and left and right lateral parietal lobes. Results: Patients demonstrated FC compromise in 83% and 100% of DMN edges at acute and chronic stages, respectively. 67% of between node edges showed significant FC and WMI compromise at the acute stage. One functional edge demonstrated significant improvement in FC and WMI over time suggesting recovery. One edge was relatively intact at the acute stage but showed compromise in FC and WMI chronically suggesting delayed compromise to the network. Many of these markers correlated to

processing speed and executive function tasks. All statistical analyses reported at p<0.05. Conclusions: This study provides evidence of a relationship between the integrity of FC and white matter connections in the DMN. Both FC and WMI of the DMN may be sensitive to initial and secondary compromise to the network, as well as recovery related to TAI; and these markers appear to be modestly associated with clinical outcomes.

B-35

More Serious Bodily Injuries are Associated with Lower Risk for PTSD and Postconcussional Disorder in Military Service Members

Lange R, Ivins B, Marshall K, Schwab K, Parkinson G, Iverson G, Bhagwat A, French L

Objective: The purpose of this study was to examine the influence of bodily injuries on symptom reporting following complicated mild traumatic brain injury (TBI) and moderate TBI. Method: Participants were 69 US military service members (Age: M=28.3 years; 100% Male) medically evacuated from combat theatre. All participants had sustained a complicated mild TBI or moderate TBI with concurrent bodily injuries. Severity of bodily injuries was quantified using a modified version of the Injury Severity Score that excluded intracranial injuries (ISSmod): Moderate (n=15), Serious (n=21), Severe/Critical (n=33). All participants completed the Neurobehavioral Symptom Inventory (NBSI) and the PTSD Checklist (PCL-C) within 12 months of injury (M=43.3 days, SD=69.8). Results: There was a significant negative association between ISSmod scores and the NBSI (r=-.284, p=.018) and PCL-C (r=-.295, p=.014) total scores. There were significant main effects across the three groups for the NBSI (p=.008) and PCL-C (p=.048) total scores. The lowest NBSI and PCL-C scores were found in the Severe/Critical group (i.e., Moderate & Serious > Severe/Critical). Service members with more severe bodily injuries were significantly less likely to meet research criteria for PTSD or Postconcussional Disorder. Conclusions: There was an inverse linear relationship between the severity of bodily injuries and the reporting of traumatic stress and post-concussion symptoms. Those with more severe bodily injuries reported fewer symptoms. Hypothesized explanations include: underreporting of symptoms; increased peer support; disruption of fear conditioning due to acute morphine use; or delayed expression of symptoms.

B-36

History of Concussion and Validity of ImPACT Baseline Scores in College Athletes

Lichtenstein J, Adams-Deutsch Z, Fleischer J, Goldberg K

Objective: To investigate the effect of previous concussions upon questionable validity scores ("sandbagging") on baseline neurocognitive testing among college athletes. Method: A chi-square analysis was conducted to examine the relation between the number of previous concussions reported and baseline neurocognitive test scores that were below suggested validity cutoffs. Subjects included 973 college athletes at a NCAA Division III university who received baseline testing as part of their university's concussion management program. The Immediate Postconcussion Assessment and Cognitive Testing neurocognitive battery (ImPACT) was used, and baseline testing was administered during an athlete's pre-season. Results: The relation between the number of previous concussions reported and "sandbagging" scores was not significant on either the Verbal Memory Composite, $X2 (1, N = 973) = .003$, p = .998, or Visual Memory Composite, $X2 (1, N = 973) = 5.214$, p = .074. Conclusions: There is not a significant

relationship between the number of previous concussions reported and questionably valid performance on neurocognitive baseline testing. This suggests to practitioners that the number of concussions reported by college athletes at the time of their baseline testing may not be a meaningful indicator of a "sandbagging" profile. Additionally, these measures of validity appear to be insensitive to the effects of previous concussions.

B-37
Sex Differences in Validity of ImPACT Baseline Scores in College Athletes
Lichtenstein J, Adams-Deutsch Z, Fleischer J, Goldberg K

Objective: To investigate sex differences, as well as the influence of sex upon questionable validity scores ("sandbagging") on baseline neurocognitive testing among college athletes. Method: A chi-square analysis was conducted to examine the relation between sex and baseline neurocognitive test scores that were below suggested validity cutoffs. Subjects included 680 male and 293 female college athletes at a NCAA Division III university who received baseline testing as part of their university's concussion management program. The Immediate Postconcussion Assessment and Cognitive Testing neurocognitive battery (ImPACT) was used, and baseline testing was administered during an athlete's pre-season. Results: The relation between sex and "sandbagging" scores on the Verbal Memory Composite was significant, $X2$ (1, N = 973) = 7.850, p = .005. Specifically, on average, men scored below validity cutoffs more frequently than women (12% vs. 5%). The relation between gender and Visual Memory Composite "sandbagging" scores was not significant, $X2$ (1, N = 973) = .461, p = .497. Conclusion: A significant relationship exists between sex and questionably valid performance on neurocognitive baseline testing, with males being more likely to "sandbag" than women.

B-38
Validity of ImPACT Baseline Scores in College Athletes
Lichtenstein J, Fleischer J, Goldberg K

Objective: To investigate the prevalence of questionable validity scores ("sandbagging") on baseline neurocognitive testing among college athletes. Method: A frequency analysis was conducted to examine baseline neurocognitive test scores. Subjects included 974 college athletes at a NCAA Division III university who received baseline testing as part of their university's concussion management program. The Immediate Postconcussion Assessment and Cognitive Testing neurocognitive battery (ImPACT) was used, and baseline testing was administered during an athlete's pre-season. Results: 206 (21.2%) of the athletes scored below the test producers' suggested validity cutoff on the Visual Memory Composite. 88 (9.0%) of the athletes scored below the suggested validity cutoff on the Verbal Memory Composite. Conclusions: More than 1/5th of college athlete performances on baseline neurocognitive testing is questionably valid. This has major implications for concussion management programs that use ImPACT, as accurate baseline scores are essential for the usefulness of serial testing post-concussion.

B-39
Facial Affect Recognition and Emotional Distress in a VA Polytrauma Population
Lockwood C, Ehrler M, Hull A, Bradley E, Sullivan C, Poole J

Objective: This study aims to explore the relationship between facial affect recognition and levels of emotional distressed in a VA polytrauma population. Method: Participants: 124 veterans, ages 21-58, mean education 13 years, with positive standard VA screen for possible mild to moderate TBI. Measures: PTSD Checklist (PCL), Beck Depression Inventory- Primary Care Version (BDI-PC), Beck Anxiety Inventory (BAI), and a shortened version of Ekman's Facial Affect Recognition measure (FAR). All measures violated assumptions of normality; thus, data were analyzed using Spearman's rho correlation analyses. Results: A strong negative correlation was found for the FAR and BDI-PC ($r= -.25$, $p < .01$), the BAI ($r= -.18$, $p < .05$), and the PCL ($r= -.202$, $p < .05$). Conclusions: Veteran polytrauma patients with higher levels of depression, anxiety, and PTSD (as measured by the BDI-PC, BAI, and PCL, respectively) perform worse on a measure of facial affect recognition. To date, no research literature examines the relationship of emotional factors on facial affect recognition within the polytrauma population. This finding represents an important addition to the research literature in that an increasing number of OIF/OEF veterans and service members return from war zones with this signature injury, and clinicians must aim to better understand the complex neuropsychological sequelae following TBI.

B-40
Facial Affect Recognition Errors in a VA Polytrauma Population
Lockwood C, Sullivan C, Hull A, Bradley E, Ehrler M, Poole J

Objective: This study aims to describe error types on a measure of facial affect within a VA polytrauma population. Method: Participants: 124 veterans, ages 21-58, mean education 13 years, with positive standard VA screen for possible mild to moderate TBI. Measure: a shortened version of Ekman's Facial Affect Recognition measure (FAR). On this measure, seven universal expressions of facial affect were presented across 42 items. Emotions were classified by Positive (Happy), Negative (Angry, Disgusted, Afraid, and Sad), or Neutral (Neutral and Surprised). Error types were examined between these three groups of affect recognition errors. Results: On the FAR measure, 20 of the participants (16%) scored within the impaired range on this measure. Mean total correct was 25.93 (sd= 4.96, range= 7-36). Out of a possible 24 errors on negative affect items, the mean error was 10.98 (sd= 3.67; range 4-22). Out of a possible 6 errors on positive affect items, the mean error was 1.96 (sd= 1.08; range 0-6). And, out of a possible 12 errors on neutral affect items, the mean error was 2.99 (sd= 1.87, range= 0-12). The most commonly missed affect was afraid, while the least commonly missed was surprised. Conclusions: To date, no research literature has described facial affect recognition error types within the polytrauma population. These initial descriptive findings represent an important addition to the literature, particularly due to the fact that an increasing number of OIF/OEF veterans and service members return with TBI and polytrauma with complex neuropsychological sequelae. Further studies should explore the relationship of these specific error types with performance on other neuropsychological measures.

B-41

History of Concussion and Baseline Differences Between Men and Women on the CRI

Marcinak J, Schuster D, Al-Khalil K, Webbe F

Objective: We investigated the effect of pre-morbid concussion history on baseline Concussion Resolution Index (CRI) composite scores. This study contributes to the growing literature on the role of pre-morbid conditions on baseline performance on computerized instruments, and provides some insight into decision making for initial medical eligibility. Method: The CRI was administered to 271 (50% female) NCAA Division II student athletes, aged 18-27 years (M = 20.28, SD = 1.457) as part of the University's concussion management program. The effects of history of concussion and gender on the composite CRI indices were examined. Results: A two factor MANOVA revealed no interaction of gender with concussion. A significant main effect for gender was observed (lambda = .952, F(3,263)=4.425, p= .005) but not for concussion history. The gender outcome was controlled by a significant difference in the complex reaction time index, F(1,265) = 11.037, p=.001, with females (M=.671) responding faster than males (M=.743). Although the multivariate interaction was not significant, a small difference was found in the univariate interaction test for simple reaction time, F(12,265)=3.161, p=.044, with females (M=.361) who reported one concussion responding faster than males (M=.408) with one concussion. Conclusions: Premorbid concussion history did not predict baseline CRI performance. To the extent that the CRI adequately measures cognitive status, the reporting of multiple concussions prior to initial medical clearance should not, in and of itself, represent a red flag for beginning practice and competition. Finding that females demonstrated quicker reaction times than males supports previous research.

B-42

WAIS-4 Findings in Mildly to Severely Traumatic Brain Injured Patients and Investigation of Demographically Corrected Norms

Myers A, Ireland S, Simco E, Carroll C, Mittenberg W

Objective: The sensitivity of the WAIS-4 to head trauma severity and the diagnostic validity of demographically corrected WAIS-4 norms were investigated among head injured adults. Method: Forty-seven ethnically diverse patients between the ages of 18-89 were selected from admissions at a major trauma center. Participants who had sustained a closed-head injury were tested 1 to 36 months post-injury. Patients had sustained mild to severe TBI, and scored 75 or greater on the Galveston Orientation and Amnesia Test (GOAT) at the time of testing. Neuroimaging and admission Glasgow Coma Scale (GCS) scores were used to confirm the injury and corresponding severity. Patients were administered core subtests of the WAIS-4 and the standard and Advanced Clinical Solutions (ACS) Demographically Adjusted T-scores were calculated. Results: Patients with lower GCS scores showed more impaired Processing Speed (r= .34). Length of PTA (r=-.36) and length of coma (r=-.29) were associated with lower PSI scores. Demographic adjusted PSI was associated only with PTA (r = -.35). VCI (M = 91.62, SD = 15.67) was significantly higher than PSI (M = 78.28, SD = 17.89) for age corrected norms and for demographic adjusted Index T-scores. Conclusions: Results were consistent with prior literature indicating that the WAIS-IV IQ and Indexes are reduced significantly by traumatic brain injury, and that more severe injuries are likely to show the most pronounced effect on the PSI. There was no evidence that corrections for

educational level, ethnicity, and gender improved the sensitivity of the WAIS-IV to injury severity beyond that obtained by corrections for age.

B-43
Cognitive Reserve Theory: Do Premorbid and Post-TBI Functioning Moderate Vulnerability to Posttraumatic Stress?
Palmer E, Poole J, Bradley E, Dinishak D

Objective: Prior research suggests that cognitive reserve may be an important moderator of risk for several psychiatric disorders, including Posttraumatic Stress Disorder (PTSD). The present study tested whether premorbid intelligence and acute cognitive effects of traumatic brain injury (TBI) can account for PTSD symptoms in military veterans. Method: 223 military personnel and veterans who screened positive for mild to moderate TBI were referred for neuropsychological assessment in a VA outpatient polytrauma clinic, months to years post-injury. Subjects' premorbid IQ was estimated by the Shipley Vocabulary test. Acute effects of TBI were indexed by reported Loss of Consciousness (LOC) and Posttraumatic Amnesia (PTA) duration. Posttraumatic symptoms were measured using the PTSD Check List (PCL). Potential predictors of PCL score were tested by hierarchical regression, entering Premorbid IQ first, followed by LOC and PTA. Results: Most subjects reported posttraumatic stress tied to multiple traumatic events throughout their deployment. Premorbid IQ was marginally significant in predicting PTSD symptoms (p< .06). PTA was highly significant in accounting for PTSD symptoms (p< .01), while LOC was not (p> .23). The overall effect size of Premorbid IQ and PTA was moderate (R= .33), with PTA accounting for most of this effect. Conclusions: Consistent with cognitive reserve theory, these findings indicate that lower cognitive functioning may increase vulnerability to PTSD. In this military and veteran sample, acute alteration of cognition after TBI accounted for posttraumatic stress symptoms more strongly than premorbid IQ. This suggests that reduction of key neurocognitive functions may interfere with the normal processing and resolution of traumatic experiences.

B-44
Fatigue Effects on Baseline Concussion Testing
Piecora K, Marcinak J, Al-Khalil K, Mroczek N, Schuster D, Snyder A

Objective: The Standardized Assessment of Concussion (SAC) and Balance Error Scoring System (BESS) are common sideline measures for assessing concussion. As intentionally simple instruments, even small deviations from baseline are considered significant. This study investigated whether fatigue due to sport-specific exertion impacts scores on these measures. Method: The SAC and BESS (hard surface only) were administered to 26 (61.5% female) NCAA Division II student athletes, aged 18-23 (M = 19.88, SD = 1.31), following completion of practices including game-style scrimmages for soccer and event length distances in rowing. Athletes had been active for a minimum of 60 minutes at the time of testing. Athletes rated their level of exertion on the Borg Scale of Perceived Exertion. The post-exertion SAC and BESS scores were then compared to their respective baseline scores. Motivational instructions similar to those given in baseline testing were employed. Results: Paired-samples t-tests revealed no significant differences between baseline and post-exertion for total SAC and SAC domains. Fifty-seven per cent of the sample decreased on total SAC by at least one point. Total BESS errors increased significantly post-exertion [t(26)=-2.471, p=.021] as did BESS single leg stance, [t(26)= -3.127, p=

.004]. Conclusion: Significant changes in BESS scores, post exertion, and the fact that the majority of subjects declined by clinically significant levels on SAC, suggest that fatigue present at sideline testing may complicate immediate concussion assessment and produce false positive outcomes.

B-45
The Influence of Suspect Motivation at Baseline on Post-Concussion Clinical Decision Making
Rabinowitz A, Arnett P

Objective: Athletes post-concussion are often highly motivated to return-to-play, and eager to demonstrate to the assessor that they are functioning well. However, at baseline, it is sometimes the case that athletes are less engaged in cognitive testing. The aim of the present study is to evaluate the extent to which differences in motivation across assessments may influence athletes' test performance and complicate test interpretation. Method: As part of a sports-concussion management program, 638 college athletes were administered a battery of neuropsychological tests at baseline. Forty-eight of these athletes went on to sustain a concussion, and were re-administered alternate forms of the same battery post-injury. Examiners rated athletes' motivation at baseline on a 1 to 7 scale. Results: Athletes were divided into three groups based on motivation ratings: low motivation (n=67), adequate motivation (n=381), and high motivation (n=165). MANOVA results revealed a multivariate effect of motivation group on baseline neuropsychological test performance (Pilai's Trace F = 6.7, p < .001). Baseline motivation also improved prediction of post-concussion cognitive decline, above and beyond post-concussion symptoms ($\chi^2(1) = 4.3$; p < .05). Reporting post-concussive symptoms increased the odds of being classified as impaired (odds ratio, OR = 22, p < .01) and being rated as adequately or highly motivated at baseline decreased the odds of being classified as impaired (OR = .1, p < .1). Conclusions: Suspect motivation at baseline was related to poorer pre-morbid neuropsychological test performance. However low baseline motivation did not decrease the likelihood of exhibiting cognitive decline post-concussion. Rather, those athletes who received lower motivation ratings were more likely to demonstrate neuropsychological decline in response to injury.

B-46
The Effects of Technology-Related and Software-Related Factors on Neurocognitive Baseline Test Performance Using ImPACT.
Schatz P, Cameron N

Objective: Computer-based tests are commonly used to document pre-season neurocognitive status. Given that testing is widely conducted in school computer laboratories, we sought to identify effects of technology-related (e.g., screen resolution, available memory) and software-related (e.g., test version) factors on neurocognitive baseline test performance using ImPACT. Method: The sample was comprised of 536 high school and college athletes who completed pre-season baseline testing using the desktop versions of ImPACT. Participants were assigned to independent groups on the basis of screen resolution (600x800, 768x1024, 1024x1288), user memory (<1000, 1000-2000, 2000+), and ImPACT Version (1.2-2.3, 3.4-3.6, 5.6-6.7). Participants scoring >30 on the Impulse Control composite were excluded. Results: ANOVAs revealed: 1) significant effects of screen resolution on verbal (p=.022) and visual memory (p=.039) composite scores; 2) significant effects of ImPACT version on verbal and visual memory (p=.001) and motor processing speed (p=.016) scores; 3) significant effects of user memory on visual memory

composite scores (p=.001). Conclusions: It appears that baseline neurocognitive testing using the desktop versions of ImPACT is being conducted on a wide variety of computers, with a variety of versions. In addition, tests are being administered on monitors set at a variety of screen resolutions. All of these factors appear to contribute to variability on test scores. While the newer version of ImPACT is web-based, and may be less affected by these factors, establishing recommended settings for users of the desktop version is warranted along with empirical testing of these factors on the online version.

B-47
Associations between Executive Functions and Academic Achievement in Children with Traumatic Brain Injury (TBI)
Stolberg P, Hart J, Jones W, Mayfield J, Allen D

Objective: Academic achievement and executive functions (EF) are commonly assessed following TBI to examine the extent these areas have been impacted by injury. However, few studies have explored whether EF deficits impact academic abilities. The purpose of this study is to compare performance in EF and academic skills in children with TBI, in order to determine whether associations between these two abilities are present in TBI. Method: Participants included 40 children referred for neuropsychological evaluation following TBI. Each participant was administered the Woodcock Johnson Test of Achievement 3rd edition (WJ-III:Ach) and the Delis-Kaplan Executive Functioning System (DKEFS) as part of a comprehensive battery. Correlations between the WJ-III:Ach and DKEFS index scores were calculated, and clinical variables were examined. Results: The participants scored within the low average to mildly impaired range on most measures. Correlational analysis indicated several significant associations. Measures of reading, math and writing abilities exhibited moderate to large correlations with information generation, inhibition, and problem solving. Conclusions: Results suggest executive functioning following TBI may play an important role in academic abilities in children. Not surprisingly, children's math and reading abilities seem to be mediated by all three EF domains that were measured. However, the extent to which EF deficits caused poor academic performance could not be examined. Nonetheless, EF deficits may be important to consider in educational planning for children with TBI.

B-48
Can Depression, Anxiety and Stress Predict Postconcussion Symptom Reporting in a Non-Clinical Sample?
Sullivan K, Edmed S

Objective: To examine the relationship between negative emotional states (specifically, depression, anxiety, and stress) and the report of postconcussion syndrome (PCS) symptoms in a non-clinical population. Method: Seventy-one university students (75.3% female; Mage = 24.27, SD = 8.93) with no history of brain injury or neurological disease reported the frequency and severity of symptoms experienced over the previous two weeks using the British Columbia Postconcussion Symptom Inventory (BC-PSI). Participants also completed the Depression Anxiety Stress Scales (DASS). A multiple regression was conducted to investigate the relative influence of depression, anxiety, and stress, to BC-PSI scores. Results: The variables depression, anxiety and stress had a statistically significant positive relationship to PCS symptom report at the bivariate

level (all p's < .001). In the multiple regression, 72.9% of the variance in BC-PSI symptom endorsement rates was explained when depression, anxiety, and stress were considered together. However, anxiety was not a significant multivariate predictor. Stress was the strongest predictor (Beta = .59, p < .001), followed by depression (Beta = .22, p < .05), explaining 14.8% and 2.6% of the variance in BC-PSI symptom endorsement rates, respectively. Conclusions: If replicated, results suggest that stress may be a particularly important predictor of PCS symptom report. Further, the presentation of PCS symptoms could be explained by stress, even in the absence of a mTBI. Therefore, in those clinical cases where the injury history is ambiguous or unclear, this study suggests that clinicians should carefully consider the role of stress in relation to PCS symptom report.

B-49
Post-Acute Neuropsychological Functioning in a Veteran with Kernohan's Notch Phenomenon following a Boxing-Related Traumatic Brain Injury
Vanderploeg R, Silva M

Objective: Case study presentation of the neuropsychological functioning of a 21-year-old veteran with a severe TBI secondary to a boxing injury. He underwent an emergent decompressive craniectomy due to a right subdural hematoma and malignant cerebral edema resulting in transtentorial herniation. His neurologic course is significant for bilateral posterior cerebral artery infarcts and diffuse axonal injury as well as right hemiparesis secondary to Kernohan's notch phenomenon. Method: Review of records, CT imaging, and serial assessment of cognitive functioning. Neuropsychological assessment included: Memory, Orientation and Amnesia Test (MOAT); Wechsler Adult Intelligence Scale – Fourth Edition (WAIS-IV); California Verbal Learning Test – Second Edition, Short Form (CVLT-II); Brief Visuospatial Memory Test – Revised (BVMT-R); Benton Visual For Discrimination Test; Visual Field Exam; Trail Making Test. Results: The veteran has right hemiparesis secondary to ipsilateral Kernohan's notch phenomenon, and a left upper quadrantanopia with double vision. Neuropsychologically, the patient displayed a dense amnestic disorder for both verbal and visual material following emergence from posttraumatic amnesia approximately two months after his injury. He also demonstrated generalized slowing of information processing speed and efficiency. Basic visual perceptual, visuospatial, language, and attention/working memory abilities were intact. Thinking was somewhat concrete, but gross executive problems were not present. Conclusions: This case study illustrates neuropsychological impairments of a veteran in post-acute recovery from a severe TBI remarkable for Kernohan's notch phenomenon. The prominent neuropsychological finding was a dense amnesia in the context of other abilities being generally spared. Findings are consistent with damage to both medial temporal lobes, secondary to right transtentorial herniation and bilateral posterior cerebral artery infarcts.

B-50
Association of Neurometabolites and Symptom Reporting following Concussion
Vaughan C, McGuire E, Gerst E, Fricke S, VanMeter J, Newman J, Gioia G

Objective: Concussions are understood to predominately affect the function of the brain but not cause structural injury. Newer neuroimaging techniques such as proton magnetic resonance spectroscopy (1H-MRS) may provide an objective tool to examine suspected changes in brain

metabolism. An association between these objective markers of brain changes and self-reported symptoms in adults has recently been examined, but this is the first study to date to associate these biomarkers with symptoms in youth following concussion. Method: 5 participants (ages 11 to 16; 3 male) who sustained concussion (4 with no loss of consciousness; all 5 sports-related injuries) completed single voxel spectroscopy at 3 days, 7 days and recovery (mean = 46 days; min-max = 22-83) using a 3-T MRI machine. Data was analyzed using LC-Model. Voxel placement (2x2x2 cm) was located in the splenium of the corpus callosum. Post-injury symptom report was gathered from parent and child on the post-concussion symptom inventory (PCSI) which assesses number and severity of 22 known post-concussion symptoms. Results: Pearson product moment correlation coefficients (Pearson r) supported significant (p <.10) negative associations between child symptom report and biomarkers of neurometabolic function (Creatine/phosphocreatine (Cre) and N-acetylaspartate (NAA)) and positive associations with glucose (Glc). Parent symptom report was negatively associated with GABA concentration. Conclusion: This study identifies a relation between commonly used subjective measures of injury severity (e.g., symptom reporting) with objective biomarkers of brain functioning in youth with concussion.

B-51
Neurometabolic Change over the Course of Recovery from Concussion
Vaughan C, VanMeter J, McGuire E, Gioia G, Newman J, Gerst E, Fricke S

Objective: Sophisticated neuroimaging techniques such as proton magnetic resonance spectroscopy (1H-MRS) are now becoming utilized to understand neurometabolic changes in brain function following concussion in adults. This study aims to assess serial change in biomarkers of neurometabolic function in youth with concussion. Method: 5 participants (ages 11 to 16; 3 male) who sustained concussion (4 with no loss of consciousness; all 5 sports-related injuries) completed single voxel spectroscopy at 3 days, 7 days, and recovery (mean = 46 days; min-max = 22-83) using a 3-T MRI machine. Data was analyzed using LC-Model. Voxel placement (2x2x2 cm) was located in the splenium of the corpus callosum. Results: Statistical power was limited by small sample sizes, but significant increases were seen in GABA and glutamate plus glutamine (Glu+Gln) from visit 1 to 3 (p<.05). Trends over time also showed increasing levels of N-acetylaspartate (NAA) over the course of recovery although these changes were not statistically significant. Conclusions: Results are consistent with the emerging body of 1H-MRS literature in adult samples. Biomarkers such as NAA are believed to be markers of neuronal integrity and changes in NAA following concussive injury are thought to reflect the early post-injury dysfunction of neurometabolism which characterizes this injury. Understanding early post-injury change in brain function, and particularly brain energy state, in youth concussion is important for gathering a greater understanding of this injury.

B-52
Visuospatial Neglect on the Line Bisection Task in Young Children Following Brain Injury
Wahlberg A, Zelonis S, Chatterjee A, Smith S

Objective: To determine if visuospatial neglect is present on the line bisection task in young children following brain injury. We hypothesized that individuals with right hemisphere injury (RHI) will display significant rightward deviation, and individuals with left hemisphere injury (LHI) will display significant leftward deviation when compared with controls. Neglect will be

present among individuals with brain injury, and its frequency will not differ between RHI and LHI groups. Method: Children ages 2-6 years with a history of unilateral stroke, hemorrhage, or brain resection (> 6 months prior) were recruited from the child neurology division at our institution (n = 17). Healthy age-matched controls were recruited (n = 56). Participants bisected 20 lines, and mean deviation from center was calculated. T-tests were used to examine mean differences between groups; Z scores were calculated to determine if individuals with brain injury displayed neglect (Z> -1.96); and Fisher's exact test was used to determine if the frequency of neglect differed between RHI and LHI groups. Results: Mean deviation from the midpoint differed between RHI and controls (t = -1.774, p = .081) and between LHI and controls (t = 4.591, p < .001). In the RHI group 3/6 individuals demonstrated neglect, and in the LHI group 6/11 individuals demonstrated neglect. There was no difference in the frequency of neglect between RHI and LHI groups (Fisher's exact, p = 1). Conclusion: Neglect on line bisection was present in more than half of subjects, and frequency was not different following RHI or LHI.

B-53
Are Brain-Injured Individuals at Higher Risk for Simulation Sickness in Virtual Reality?
Whipple E, Mace L, Manning K, Ang J, Schultheis M

Objective: The use of virtual reality (VR) simulation in rehabilitation populations continues to grow. A significant side effect of VR is simulation sickness (SS). Little is known about the combined effect of SS with neurological sequalae. The current study addresses this need by examining the incidence of SS among individuals with acquired brain injury (ABI) during the use of a Virtual Reality Driving Simulator (VRDS). Method: 28 individuals with ABI and 28 matched age, education and gender healthy controls (HC) were administered the Simulator Sickness Questionnaire (SSQ) (Kennedy et al., 1993) in conjunction with administration of VRDS. The SSQ consists of a symptom checklist administered both pre and post-VR exposure. For each participant a Pre-SSQ score and a Post-SSQ score were calculated using Kennedy' documented procedures. Results: Results indicated that 17.9% of individuals with ABI and 3.6% of the HC experienced SS. Between group comparisons indicated that individuals with ABI reported a significantly higher level of symptom presentation prior to the VR exposure (M = 18.43, SE = 23.52) than HCs (M = 7.35, SE = 9.63), t (54) = -2.31, p < .05. Similarly, the ABI group endorsed a higher level of symptoms post-VR exposure (M = 34.86, SE = 33.68) than HCs (M = 25.51, SE = 30.11), but this difference did not reach significance. Conclusion: The findings indicate that while individuals with ABI may experience SS during exposure to virtual reality simulation, they may not be at greater risk than healthy individuals, as symptoms endorsed prior to VR exposure are not indicative of SS.

B-54
Mild Traumatic Brain Injury (Concussion), Post-Traumatic Stress Disorder, and Depression in U.S. Soldiers Involved in Combat Deployments: Association with Post-Deployment Symptoms
Wilk J, Herrell R, Hoge C

Objective: To examine the associations of deployment-related mild traumatic brain injuries (mTBIs), and the effects of multiple mTBIs on post-deployment health in a sample of U.S. Army soldiers. Method: 1,502 soldiers were administered anonymous surveys 4-6 months after returning from deployment to Iraq or Afghanistan containing validated clinical scales for posttraumatic stress disorder (PTSD) (PCL-17) and depression (PHQ-9) and concussion-related

questions widely used in post-deployment screening. Results: 17% of soldiers reported an mTBI during their previous deployment. Of soldiers reporting an mTBI during their previous deployment, 59% reported having more than one. After adjustment for PTSD, depression, and other factors, loss of consciousness was significantly associated with three post-concussive symptoms, including headaches (OR =1.5; 95% CI, 1.1-2.3). However, these symptoms were more strongly associated with PTSD and depression than with a history of mTBI. Multiple mTBIs with loss of consciousness increased the risk of headache (OR=4.0, 95% CI, 2.4-6.8) compared to a single occurrence, although depression (OR=4.2, 95% CI, 2.6-6.8) remained as strong a predictor of headaches as multiple mTBIs. Conclusions: These data indicate that current screening tools for mTBI being used by the Department of Defense and Veterans Affairs are of questionable utility in distinguishing persistent post-deployment symptoms attributed to mTBI from other causes. Accumulating evidence strongly supports the need for multidisciplinary collaborative care models of treatment in primary care to collectively address the full spectrum of post-war physical and neurocognitive health concerns.

B-55
The Ecological Validity of Executive Type Neuropsychological Test Measures In Traumatic Brain Injury
Zakzanis K, Yu S, Jeffay E

Objective: Neuropsychological tests play a figural role in characterizing the breadth and severity of cognitive impairment that may disable a patient in terms of their ability to engage in various activities of daily living in the real world. As such, it is of paramount importance that these tests accurately predict disability in the real world. The present study examined the sensitivity of various neuropsychological tests, including those with high-purported ecological validity, in distinguishing between those who were symptomatic and suffered from a Traumatic Brain Injury (TBI) with complaints of activities of daily living (ADL) or without complaints of ADL. Method: Patients (n = 71) with TBI who were symptomatic or asymptomatic were assessed on the Behavioral Assessment of Dysexecutive Syndrome (BADS), Wisconsin Card Sorting test, Trail Making Test, Wechsler Abbreviated Scale of Intelligence (third edition) and the Tower of London an average of 2.61 yrs (± 1.91 yrs) post-injury. Results: Those who reported ADL disability did not differ significantly from those who did not report ADL disability across all measures except for the Modified Six-Elements (MSE) and Rule Shift Cards (RSC) subtests of the BADS. Conclusions: The results suggest that, except for the MSE and RSC, traditional neuropsychological tests may not be sensitive to real world disability in this patient population. These findings demonstrate limitations of neuropsychological testing, yet suggest that measures with better ecological validity may be more predictive of real world functioning.

B-56
Baseline Performance on the Concussion Resolution Index Differs by Team and Sport
Zimmer A, Webbe F, Piecora K, Schuster D

Objective: Baseline results from student athlete's performance on the Concussion Resolution Index (CRI) were analyzed to determine if there were differences across sport (i.e. Soccer) and team (i.e. Men's Soccer; Women's Soccer). Analysis of such differences may help to enhance knowledge of normative performance and facilitate interpretation of post-trauma results allowing

institution of the most effective return-to-play strategy. Method: Baseline concussion assessments were conducted on 271 (50% female) student athletes from nine different varsity sports. Participants completed the CRI and a demographic survey. The dependent variables consisted of the three composite indices of the CRI: Simple Reaction Time, Complex Reaction Time, and Processing Speed. Results: The CRI differed significantly across sport (lambda=.82, $F(24,754)=2.25$, p=<.01) and team (lambda=.73, $F(45,752)=1.88$, p=<.01). For sport, both Simple [$F(8, 262)=4.50$, p <.01] and Complex [$F(8, 262)=.38$, p=.02] Reaction Times differed, but not Processing Speed. Results between teams again yielded differences on Complex Reaction Time [$F(15, 255)=2.09$, p=.01] and Simple Reaction Time [$F(8, 255)=2.50$, p=.02] but not on Processing Speed. Notably, basketball players, particularly the men, performed worse on most tasks compared to the other sports and teams. Conclusions: Differences in pre-morbid performance on the CRI indicate the need for use of baseline measures of concussion over the normative values on these tasks as the norms may not account for team differences in performance. The team differences may also have consequences on the return-to-play assessment post-trauma.

B-57
Baseline Performance on Common Sideline Measures of Concussion (SAC and BESS) Differs by Team and Sport
Zimmer A, Piecora K, Schuster D, Webbe F

Objective: College student athletes' performance on the Standardized Assessment of Concussion (SAC) and Balance Error Scoring System (BESS) were analyzed to assess differences across sport (i.e., soccer) and team (i.e., Men's Soccer; Women's Soccer). Any reliable team or sport differences could impact post-trauma sideline and return-to-play evaluation when using general group norms. Method: Baseline SAC and BESS assessments were conducted on 271 (50% female) college athletes from nine varsity sports. Dependent variables included the four domain (orientation, immediate memory, concentration, delayed memory) and total SAC scores, and the hard surface and pad scores from the BESS. Results: BESS performance differed significantly across sport (ʄ¼=.90, $F(16,522)=1.69$, p=.045), but not team (ʄ¼=.85, $F(30,508)=1.46$, p=.56). Both sport and team differed significantly on hard surface but not pad performance. For both sport and team, soccer players generally performed better than athletes from other sports and teams. No significant differences were found on the total score of the SAC either by sport or team. SAC domain performance differed significantly between teams (ʄ¼=.73, $F(60,982)=1.40$, p=.03), but not between sports (ʄ¼=.86, $F(32,953)=1.23$, p=.18), with only the immediate memory domain significant. Men's Basketball performed worse than 7 of the 16 teams. Conclusions: Lack of differences on the SAC suggests team and sport variables did not contribute significant variance to this measure. Differences on the ground performance on the BESS suggest a mediating factor for baseline BESS performance, which could impact return-to-play strategies, particularly if normative rather than baseline comparisons are employed.

Neuropsychological Domains: Executive Function

B-58
Does Executive Functioning Influence Verbal Learning?
Adler M, Holster J, Golden C

Objective: Performance on verbal memory tasks has been associated with executive functioning (EF). The purpose of this study was to further examine this relationship using the WMS-IV and CVLT-II as measures of verbal memory. Method: Participants consisted of 44 adults, aged 18 to 61, from a non-clinical population. The sample was 60.0% Caucasian and 51.1% male, with a mean education level of 16.09 years (SD = 2.11). EF measures included Number of Errors on the Category Test and Total Number of Perseverative Errors, Total Categories Completed, Total Number of Trials, and Total Number of Errors on the WCST. Verbal memory tasks included Verbal Paired Associates I (VPA I) and Logical Memory I (LM I) on the WMS-IV and Trials 1-5 Free Recall Correct on the CVLT-II. Results: Results were considered significant at the p < 0.05 level. Weak positive linear associations were found between WMS-IV VPA I and Number of Errors on the Category Test, r = 0.366, and Total Number of Perseverative Errors on the WCST, r = 0.303. Conclusions: Results indicate that flexibility, abstraction, and concept formation is more integral to performance on a task of verbal paired associations than story memory or word list learning. The authors attribute this association to the need to apply rules and alternate between semantically-associated and non-associated word pairs now required on the updated WMS-IV VPA I subtest. Such may place increased demands on EF not present on the WMS-IV LM I or CVLT-II tasks.

B-59
Differences in Working Memory Performance on the Category Test and the WCST
Andrews A, Schleicher-Dilks S, Golden C

Objective: Executive functioning often requires individuals to learn visual information and manipulate it to accomplish tasks. The purpose of this study was to examine the relationship between working memory across two commonly used measures of executive functioning. Method: Participants consisted of 579 individuals from a clinical population, aged 16-81 (M=32.88, SD=13.57). The sample was 65.8% Caucasian, 54.7% female, and 85.9% right-handed, with a mean education level of 13.52 years (SD = 2.66). Tests included were the Working Memory Index (WMI) from the Wechsler Memory Scale-III (WMS-III), Category Test (CT), and the Wisconsin Card Sorting Task (WCST). Results: Results were significant at the p < .05 level. Negative linear correlations were found between WMI and number of errors on the CT, r = -0.49 and for WMI and number of errors on the WCST, r = -.354. Fisher's z' transformation was used to compare the correlations for significant differences. Results confirmed that the two correlations were significantly different, z = 2.67. Conclusions: The results of this study suggest that the CT may tax visual and auditory memory more than the WCST. For individuals with memory impairment, a test of executive functioning that does not overly rely on memory performance may be desirable to avoid confounding executive functioning performance with memory performance. Thus, the WCST may be a better choice for examining executive functioning in patients with suspected memory impairment than the CT.

B-60
The Executive Control Battery in Normal Children: A Normative Study
Arffa S, Thornton J

Objective: The Executive Control Battery (ECB) is a measure with an emphasis on positive symptoms such as perseveration and stereotypes which promises clinical utility in the evaluation of brain injured and developmental involved children. Method: The ECB is a neuropsychological battery with 4 subtests used to measure Executive Functions (EFs). For Graphical Sequences the subject is asked to draw graphical representations following verbal commands under time constraints. The test is designed to elicit four types of perseveration. Competing Programs consists of executing various responses following commands whose physical characteristics are 'in conflict' with desired responses. Motor Sequencing requires rapid alteration of both simple unimanual and bimanual motor sequences. Manual Postures involves imitations by the subject of manual postures (both unimanual and bimanual) produced by the examiner. 158 normal subjects with equal numbers of male and females were sampled in each age range from 6-16. Children with central nervous system disease, emotional or education problems, physical disability, or IQs below 80 were not included. Results: Participants are divided between sex with 48.1% male, and 51.9% female participants. The sample is 97% Caucasian. The age range for the sample is 5 to 16 years. Descriptive statistics by age and gender are reported for 14 error types on Graphical Sequences, 3 error types on competing programs and manual postures, and 19 error types on manual postures. Reliability data are presented. Conclusion: The potential for using the ECB in clinical populations was discussed.

B-61
The Executive Control Battery in Normal Children: Developmental Trends
Arffa, S, Thornton, J

Objective: There are challenges to assessing Executive function (EF) development in children as the functions are emerging and developmental trajectories differ by task. The Executive Control Battery (ECB) is a unique measure, with an emphasis on productive symptoms such as perseveration and stereotypes, which promises to offer a rich source of developmentally appropriate manifestations of EF. Method: The ECB was administered to 158 normal subjects with equal numbers of male and females in each age range from 6-16. Children with central nervous system disease, emotional or education problems, physical disability, or IQs below 80 were not included. Results: Graphical Sequences, Competing Programs, and Manual Postures were negatively correlated with age, while Motor Sequences was not correlated with age. This suggests that as age increased, perseverative and echopraxic errors decrease in three of the four subtests. A survey of the results of healthy adults was reviewed and suggests that adult level performance may bit be achieved by age 15 age sample in either competing programs or Graphical Sequences. There was, however, no relationship to intellectual function. Conclusion: The perseverative and stereotypic behaviors elicited by Competing Programs and Graphical Sequences and echopraxic errors by Manual Postures of the ECB appear to have developmental trajectories, and skills appear to emerge throughout childhood and adolescence, although IQ does not appear to be factor.

B-62
The Executive Control Battery in Normal Children: Relationship to Intelligence
Arffa S, Thornton J

Objective: The relationship between Executive Function and IQ is unclear. The cognitive impairment associated with some frontal lobe lesions involve cognitive abilities that are not measured by IQ while others may be significantly correlated. This study explores the relationship between intelligence and measures of the Executive control Battery in children and adolescence. The Executive Control Battery (ECB) is a unique measure, with an emphasis on positive symptoms such as perseveration and stereotypes. Method: 158 normal subjects with equal numbers of male and females were sampled in each age range from 6-16 were given the ECB and Wechsler Intelligence Scale for Children-III. Children with central nervous system disease, emotional or education problems, physical disability, or IQs below 80 were not included. Results: Hierarchical multiple regression results suggest that there is no significant relationship between IQ and Manual Postures total errors, Competing Programs Errors, Motor Sequencing Total Errors or Motor Sequencing Errors. Conclusions: These findings suggest that the ECB's unique system of eliciting perseverations is independent of IQ. Studies have found that measures of EF correlate with concept formation and fluid reasoning (Salthouse, 2006; Carmichael, Ris, Weber, Schefft, 1999; Chelune & Baer, 1986; Heaton, 1981). The study results suggest that the ECB does not measure fluid reasoning or concept formation and therefore remains an independent measure of EF. Moreover, higher IQ scores do not significantly predict lower perseverative errors on the ECB subtests.

B-63
The Executive Control Battery in Normal Children: Relationship to Other Executive Function Measures
Arffa S, Thornton J

Objective: Currently, executive function (EF) are described as multidimensional constructs consisting of several subfunctions. The Executive Control Battery (ECB) is a unique measure, with an emphasis on positive symptoms such as perseveration and stereotypies. This study explores the relationship between known measures of EF and measures of the ECB in children and adolescence. Method: 158 normal subjects with equal numbers of male and females were sampled in each age range from 6-16 were given the ECB , Wisconsin Card Sort and Stroop color Word Test (WCST perseverative errors, scaled score, WCST failure to maintain set, Stroop Color Word Test Word standard score, Stroop Color Word Test Color standard score, and Stroop Color Word Test Color Word standard score). Children with central nervous system disease, emotional or education problems, physical disability, or IQs below 80 were not included. Results: Hierarchical multiple regression indicate an overall model of one predictor (Stroop Color Word Standard Score) that significantly explains Graphical Sequence Errors, accounting for 28.5% of variance in Graphical Sequence Total Errors. Regression results do not indicate a predictor that significantly explains Competing Program Errors or Manual Postures Echopraxia. A hierarchical multiple regression suggest that WCST Perseverative Errors moderately explains Motor Sequences Errors accounted for 20% of variance in Motor Sequencing Errors. Conclusions: These findings suggest while the ECB shares some variance with known executive function measures, these correlations are modest and at least two subtests appear unique.

B-64
Exploratory Factor Analysis of the Delis-Kaplan Executive Function System (D-KEFS) for Pediatric Samples (ages 8-19) of a Mixed Clinical Group and a Comparable Age Group from the Standardization Sample
Canas A, Sevadjian C, Fournier A, Miller D, Maricle D

Objective: The purpose of this study is to compare the D-KEFS factor structure between a pediatric sample comprised of a mixed clinical group and the pediatric standardization sample. Method: Clinical data used in the study were archival and culled from a national database. Normative data are archival and were provided by Pearson, Inc. The samples consisted of 518 cases of a mixed clinical group and 875 cases from the D-KEFS normative sample of children between the ages of 8 to 19. An Exploratory Factor Analysis using a Principle Component s method with a Varimax rotation was conducted to extract factor solutions for both samples. In addition, a Coefficient of Factor Congruence was utilized to compare factor loadings between the samples. Results: The normative sample yielded a seven factor solution, while the mixed clinical sample yielded a nine factor solution, reflecting two additional factors, which tapped into visual-motor and shifting attention abilities. Conclusion: The exploratory factor analysis indicated that the clinical and normative groups shared several factors, which is consistent with the test developer's factor structure. However, the clinical group had two unique factors, visual-motor and shifting attention. In addition, the variance distribution across factors differed between the samples. These findings suggest that the two additional factors have increased diagnostic sensitivity in a clinical group and should be taken into account when interpreting test results.

B-65
Tower of London Performance after Adolescent Traumatic Brain Injury
Donders J, Larsen T

Objective: The goal of this study was to examine the criterion validity of the Tower of London – Drexel University (TOL) in adolescents with traumatic brain injury (TBI). Method: The TOL was administered to 43 adolescents with TBI (age 11–15 years, 67% male, 79% Caucasian) within 1–12 months after injury, with exclusion of cases with prior complicating history (e.g., LD, ADHD). About half of the sample had uncomplicated mild TBI (LOC < 30 min and negative neuroimaging), whereas the remainder had intracranial lesions on neuroimaging and/or duration of coma > 1 day. The findings from the TBI group were compared to those of 43 demographically matched controls, selected from the TOL standardization sample. Results: Logistic regression analysis revealed that TOL Moves, Initiation Time, and Execution Time standard scores had a 70% classification accuracy (sensitivity 72%, specificity 68%, area under the curve 82%). Hierarchical regression analyses in the clinical group revealed that longer duration of coma and the presence of a diffuse lesion on neuroimaging accounted for statistically significant proportions of the variance in these TOL scores (R-squared ranging 0.23 – 0.29). These same TOL scores did not correlate statistically significantly with the Perseverative Responses standard score from the Wisconsin Card Sorting Test (WCST), even though the latter variable did covary negatively with length of coma (r = –0.35, p = .02), suggesting that the TOL and the WCST measure different and non-redundant aspects of executive functioning. Conclusion: The findings support the criterion validity of the TOL in the assessment of sequelae of adolescent TBI.

B-66
The Effect of Language on Motor Control
Gidley Larson J, Sheehan J, Suchy Y

Objective: The current study examined under what conditions verbalization facilitates M-CNT, measured by the smoothness of a double-tap movement, in a computerized motor sequence learning task. Method: 40 healthy participants, ages 18-27, were pre-trained in an eight-movement motor sequence. 20 participants were pre-trained in the sequence using verbalization and 20 participants were pre-trained without verbalization. Once trained, all participants completed three Performance Blocks: Block-1—participants performed the sequence as they had been trained; Block-2—verbal prompts of the actions in the motor sequence appeared on the screen and all participants were required to vocalize the action as they made their movement; and Block-3—verbal prompts disappeared and participants were instructed to continue to perform the motor sequence and were free to choose whether to use verbalization. Results: MANOVA revealed a significant Block X Group interaction (F(2,37) =3.53, p =.039), such that the verbal prompts presented in Block-2 facilitated M-CNT in the no-verbalization group, but interfered with M-CNT in the verbalization group. Follow-up analyses revealed significant differences between groups on Blocks-1 and 3, but not Block-2. Conclusions: M-CNT was facilitated by verbalization only when the motor sequence was learned motorically, without access to language. It is likely that for those participants without language the verbal prompts decreased the load in working memory allowing for smooth and rapid execution of discreet movements. Conversely, for those participants who had access to language, working memory may have been taxed by reading the prompts aloud resulting in slowed execution of the discreet movements.

B-67
Relationship between Executive Functioning and Verbal Memory in Pediatric TBI
Gonzalez S, Jordan L, Heaton S

Objective: Pediatric traumatic brain injury (TBI) often impacts memory and executive functioning. Previous research in our lab demonstrated a correlation between executive functioning and delayed verbal memory within a pediatric TBI sample. The current study extends these findings to examine the relationship between executive functioning and verbal memory impairments in more detail and within a larger pediatric TBI sample. We predicted that moderate/severe TBI specifically impacts the encoding (i.e. learning) stages of memory, and executive dysfunction is significantly related to these encoding deficits. Method: Twenty-four orthopedic injury, 11 mild TBI, and 48 moderate-to-severe TBI patients aged 6-16 completed core verbal memory subtests from the CMS and Trails B within one year post-injury. Results: A between-group ANOVA revealed that the moderate-to-severe TBI group performed significantly worse than the orthopedic controls on all norm-referenced verbal learning, immediate, and delayed recall subtests. Of interest, no group differences in percent retention of information were identified. Pearson correlations indicated that within the moderate/severe TBI group, performance on Trails B scores significantly correlated with Word Pairs learning, immediate, and delayed recall. Conclusions: Taken together, these results suggest that moderate/severe TBI is related to decreased verbal memory performance. Moreover, reduced memory for abstract verbal memory (i.e. word pairs) in a moderate/severe TBI sample is significantly related to executive dysfunction. These findings highlight the importance of examining memory difficulties subsequent to TBI for more specific

encoding deficits and to explore whether they may be stemming in part from executive dysfunction. Such clinical analysis is critical for effective and targeted cognitive interventions.

B-68
Utility of Executive Functioning Tests in Differentiating Traumatic Brain Injury
Higgins K, Rolin S, Dunham K, Akeson S

Objective: The current study examined the utility of tests of executive functioning, including the Booklet Category Test, and Trails Making Test A & B, in differentiating individuals with and without TBI, as well as differentiating mild from moderate/severe TBI in a community sample. Method: Participants for the study sample were taken from an archival database from a community neuropsychological assessment private practice. The sample included 94 participants. Approximately 55% were referred for testing by an attorney and a 91% had a comorbid psychological diagnosis. Participants were placed in "No Injury", "Mild TBI", and "Moderate/Severe TBI" categories based on World Health Organization criteria. Participants' results on various tests of executive functioning (Booklet Category Test and Trails Making Test A & B) were compared. Results: The current study did not find significant differences between participants on tests of executive functioning (Booklet Category Test, $F(2, 123)= 1.40$, $p>.05$; Trails Making Test B, $F(2,91)=1.76$, $p>.05$. A significant difference was found between TBI groups on Trails Making Test A, $F(2, 92)= 5.69$, $p=.005$. Conclusions: Our study offers dissimilar conclusions from previous research that has demonstrated utility in tests of executive functioning for differentiating individuals with no TBI from those with mild and moderate/severe TBI. The conclusions from this study suggest tests of executive functions do not offer the same utility with clinical samples as they do with controlled research samples. Further research is needed to determine if these differences generalize to other community or clinical samples.

B-69
Concurrent Validation of a New Measure of Executive Functioning
Horton A, Reynolds C

Objective: Executive functioning is an important variable in neuropsychology. This poster examines the relationships between traditional measures of executive functioning (Category Test [CT], Trail Making Test-Part B [TMT-B] and Stroop Color Word Test-Color Word [CW]) and a new measure of executive functioning, the Test of Verbal Conceptualization and Fluency (TVCF) in order to provide evidence for concurrent validation. Method: Thirty adult patients referred by neurologists and psychiatrists for outpatient neuropsychological evaluation at a private practice office were administered full neuropsychological batteries that included the CT, TMT-B, CW and TVCF and Symptom Validity Tests such as the Word Memory Test (WMT) and Test of Malingered Memory (TOMM). The TVCF includes subtests such as Category Fluency (CF), Number Correct (NC), Perseverative Errors (PE), Number of Categories (CN), Letter Naming (LN) and Trails C (TC). The patients included 18 females, 29 Caucasians and 1 African-American, and 27 patients were right handed. Diagnoses include head trauma-13, stroke-8, brain tumor-3, Multiple Sclerosis (MS)-3, Attention Deficit Hyperactivity Disorder (ADHD)-2 and Electroshock-1. Ages ranged from 22-73 (Mean-48.8, Standard Deviation-12.7) and education ranged from 12-20 years (Mean-15.1, Standard deviation-2.4). All subjects signed informed consent documents and passed SVTs. Results: Correlations were mostly moderate and ranged from .56 (TMT-B/TC) to .04 (CT/LN).

Conclusion: Correlations between traditional and new measures of executive functioning were mostly moderate supporting the concurrent validity of the TVCF and the theoretical construct of executive functioning.

B-70
Executive Functioning and Intelligence in Children
Horton A, Reynolds C

Objective: Intelligence is related to many neuropsychological tasks but the relationship may vary by developmental age. This poster examines the relationships between two new measures of intelligence and executive functioning in children. Method: Twenty-seven children referred by neurologists and psychiatrists for outpatient neuropsychological evaluation at a private practice office were administered full neuropsychological batteries that included the Reynolds Intellectual Assessment Scale (RIAS), a measure of intelligence and the Test of Verbal Conceptualization and Fluency (TVCF) a measure of executive functioning and Symptom Validity Tests (SVT) such as the Word Memory Test (WMT), Amsterdam Short-Term Memory Test(ASTMT) and Test of Malingered Memory(TOMM). The RIAS is composed of indices that assess Verbal Intelligence (VIX), Nonverbal Intelligence (NIX) and Composite Intelligence (CIX). The TVCF includes measures of verbal fluency, card sorting and trail making. The patients included 11 females, 14 Caucasians, 5 African-Americans, 2 Hispanics, 2 Asian-Americans and 4 Multi-Cultural children and 23 children were right handed. Diagnoses include head trauma-19, Aspergers-3, Epilepsy-2, Attention Deficit Hyperactivity Disorder (ADHD)-2 and Autism -1. Ages ranged from 8-18 (Mean-12.7, Standard Deviation-3.0) and education ranged from 2-12 years (Mean-7.3, Standard deviation-2.9). All subjects signed inform consent documents and passed SVTs. Results: Correlations ranged from .50 (NIX /Trails C) to .02 (VIX/Number Correct) and were moderate to low. Conclusions: Executive functioning subtests variances in children has moderately to low correlations with intelligence tests. As executive functioning subtests had unexplained variances this supports the construct of executive functioning in children.

B-71
An Ecologically Valid Assessment of Executive Function in Healthy Older Adults: The Day Out Task
McAlister C, Tam J, Schmitter-Edgecombe M

Objective: Normal aging often leads to executive function deficits which may result in a decline of "real world" functioning. Questions remain regarding the sensitivity and ecological validity of neuropsychological tests of executive function (EF). The aim of this study was to compare performances of younger and older adults on the "Day Out Task" (DOT), a novel, ecological task with a strong multitasking component aimed at assessing EF in a real-life setting. Method: Forty-nine healthy older adults (M= 66.78) and 47 younger adults (M =22.32) were given a list of everyday tasks to prepare for a day out (e.g., gathering ingredients for a recipe, collecting change for a bus ride, taking motion sickness medication) and asked to complete the tasks in whatever order they wished while multitasking and interweaving the tasks. Efficiency of multitasking was measured by number of initiated and completed tasks, quality of completed tasks (i.e., efficient vs. inefficient), and accuracy of sequencing. Results: Older adults differed on number of tasks completed, t(94) = 2.53, p < .01, but not on number of tasks initiated. Although older adults overlapped a similar number of tasks, their task completion quality, t(94) = 4.96, p < .0001, and

sequencing, t(94) = 5.01, p < .0001, was poorer. Conclusions: Results revealed substantial age-related decrements in EF and support the recent trend in neuropsychological assessment toward more ecologically valid procedures of assessments. This study further highlights the role of multitasking in the maintenance of every-day functional ability. Psychometric data and further research with additional populations are recommended.

B-72
Does Working Memory and Processing Speed Predict Executive Functioning Declines in ADHD Youths?
Olivier T, West S, Golden C

Objective: Executive functioning (EF) relies on intact working memory and processing speed systems, which are often impaired in youths with ADHD. This study examined whether impairment in working memory and processing speed predicted declines in EF in ADHD youths. Method: Participants were 214 youths diagnosed with ADHD, ages 4 to 17 (M=9.10, SD= 2.82); 57% identified as Caucasian. In this group, 72% were male, and 86% were right-handed. EF measures included Trails B, Stroop Color Word Test, WCST, and CPT. Processing speed measures included WISC-IV Coding, Symbol Span, and Processing Speed Index (PSI). Working Memory measures included WISC-IV Digit Span, Letter Number Sequencing (LNS), and Working Memory Index (WMI). Results: Pearson correlations assessed the abilities of processing speed and working memory measures to predict EF in ADHD youths. The WMI significantly correlated with the Stroop Color/Word score (r= .95, p<.05), WCST Total Number of Perseverative Responses (r= -.38, p<.01), and WCST Total Perseverative Errors (r= -.31, p<.05). The LNS subtest was significantly correlated with WCST Total Number of Perseverative Responses (r= -.38, p<.01), and WCST Total Perseverative Errors (r= -.32, p<.05). Neither the processing speed measures nor the Digit Span subtest were significantly correlated to EF measures. Conclusion: Working memory alone predicted declines in EF in youths with ADHD. Specifically, working memory predicted perseveration and impaired inhibition. Interventions for youths with ADHD should target improving working memory skills in order to increase EF in youths with ADHD.

B-73
The Relationship between an Individual's Performance on Trails A and Trails B and the Halstead Category Test
Prinzi L, Martin P, Robbins J, Bruzinski B, Golden C

Objective: The Trail Making Test (TMT) measures visual conceptual abilities, cognitive flexibility, set shifting, visual-motor tracking, visual-spatial functioning and has a large attentional component. TMT contains two parts: Trails A (TMT-A) and Trails B (TMT-B). The Category Test (Category) requires abstract concept formation, cognitive flexibility and entails components of visual-spatial functioning and memory. Method: The sample included 609 clinically impaired individuals (males = 37.5%). The participants mean age was 32.99 (SD = 13.29) with an average education of 13.52 years (SD = 2.67). Participant ethnicity was Caucasian (54.8%).The participants' performance on TMT-A and TMT-B was divided into six groups: TMT-A Good (T=0-28), TMT-A Average (T =29-56), TMT-A Impaired (T =57-84), TMT-B Good (T = 0-32), TMT-B Average (T = 33-64), TMT-B Good (T = 65-96). The interaction was non-significant. Results: A two factor between-subject ANOVA yielded a statistically significant relationship between TMT-A and

performance on Category, F (2, 609)= 5.09, and between TMT-B and performance Category, F (2, 609) = 5.04. Conclusions: On both tests, the Impaired group scored significantly worse than the Average group. Because the interaction was not significant, TMT-A and TMT-B are independent from each other regarding performance on Category. The study's findings suggest that TMT-A and TMT-B assess different abilities in relation to those required for performance on Category.

B-74
Two-Factor Structure of the Comprehensive Trail Making Test in Adults
Riccio C, Blakely A, Yoon M, Reynolds C

Objective: Previous evaluation of the Comprehensive Trail Making Test (CTMT) using a confirmatory factor analysis (CFA) revealed that for children, a two-factor model provided a better fit than a one-factor model. The purpose of this study was to explore whether these findings suggested a developmental factor structure or if the two-factor structure also would be supported for adults. Method: A CFA was conducted using MPlus to examine the factor structure for adults in the standardization sample. Participants: The sample for this study included 695 adults, aged 18-74 (Mean=40.48, SD=15.65). The participants were predominantly female (67.77%) and white (88.35%). Selection. Data were collected across 16 states with all regions of the US represented using stratified random sampling. Measures. All five trails tasks from the Comprehensive Trail Making Test (Reynolds, 2002) were considered. Results: The findings of the CFA indicated an excellent fit for the two-factor model: $\div 2(4)=1.976$,p=.741; CFI=1.000; RMSEA=.000; SRMR=.005. A one-factor structure was not supported: $\div 2(5)=63.636$,p=.000; CFI=.965; RMSEA=.129; SRMR=.034. Results were the same when younger (under 50) and older (50+) were considered separately. Conclusions: These data suggest that a single score, the CTMT Composite Index, may not be a valid representation of executive functioning. Instead, the results support a two-factor structure, that represents attention/sequencing and set switching/inhibition, to identify an individual's deficits in functioning.

B-75
Executive Function's Mediating Role Between Neuropsychological and Psychological Conditions and Reading Skills
Robbins J, Prinzi L, Martin P, Golden C

Objective: The current study aims to evaluate whether executive functions (EF) mediate reading comprehension (RC) in neuropsychological and psychological diagnostic groups. Method: Eighty-four adults (neuropsychological: Alzheimer's, Vascular Dementia, Learning Disabilities, Attention Deficit/Hyperactivity Disorder, Amnestic Disorder, and Cognitive Disorder Not Otherwise Specified (NOS), n =45, and psychological: Major Depressive, Adjustment, and Anxiety Disorders, Dysthymia, and Mood Disorder NOS, n =39) participated in the study. The sample consisted of 43% males aged 16-81 (M =31.37, SD =14.48). Sixty percent were Caucasian. EF was assessed with Wisconsin Card Sort (WCST), Conners' (CPT) Omission and Comission, Stroop, and Trails B. The Nelson Denny Reading Test assessed RC. Results: A multiple mediation analysis was revealed EF did not mediate RC for the groups (CPT Omission, t = -.831, p =.408; CPT Comission t =.802, p =.425; Trails B, t =1.655, p =.101; WCST, t =.852, p =.397; Stroop, t =.577, p =.565). With a bootstrapped 95% CI, bootstrap results confirmed a non-significant relationship. Conclusions: The current study investigated the indirect relationship between diagnostic groups, EF, and RC. The

presence of EF does not impact speeded RC in neuropsychological and psychological diagnoses. While previous research has examined the direct relationship between diagnoses and EF and RC and concluded that individuals with these conditions show EF and RC difficulties, research has not examined the indirect relationship examined in this study. The current study shows that RC deficits in individuals with these diagnoses are not the result of deficits with EF. These observed RC deficits are due to other factors.

B-76
Relationship of WAIS-IV Intellectual Factors to Performance on the Category Test
Schleicher-Dilks S, Andrews A, Adler M, Pearlson J, Golden C

Objective: The purpose of this study was to identify which WAIS-IV scores contribute to performance on the Category Test (CT). Method: Participants consisted of 73 individuals from a clinical sample, aged 18 to 64 (M=34.23, SD=13.23). Participants were 64.4% female, 74% right-handed, and 57.5% Caucasian, with a mean education of 13.18 (SD=2.05). A stepwise regression analysis was used to identify which scores predicted performance on the CT. Measures included Number of Errors on the CT, and the core subtests from the WAIS-IV. Results: A stepwise regression identified Matrix Reasoning (MR), Visual Puzzles (VP), and Coding as explaining 44.3% of the variance in CT errors (F(1,69)=4.34, p<.001). MR significantly predicted CT scores (â=-.564, p<.001) and explained a significant portion of variance in CT scores (R2=.318). Conclusions: Results suggested the CT is partly a measure of perceptual reasoning abilities and may therefore misidentify individuals with poor perceptual reasoning as having poor executive functioning. MR was the strongest predictor of CT performance likely because MR assesses knowledge of part-whole relationships as well as classification and spatial ability. The small but unique contribution of VP to CT performance may indicate that the ability to mentally manipulate visual stimuli is related to CT performance. The relationship between Coding, a task of processing speed, and CT performance may be accounted for by the fact that both tasks are sensitive to brain damage. Since verbal intelligence is unrelated to CT performance, the CT may be used to assess executive functioning in individuals with communication and reading disorders and language deficits.

B-77
Multivariate Analyses of Variance between a Mixed Clinical Sample of Children Ages 8-19 and a Comparable Age Group from the Standardization Sample of the Delis-Kaplan Executive Function System (D-KEFS)
Sevadjian C, Canas A, Fournier A, Miller D, Maricle D

Objective: The purpose of this study was to ascertain whether there were significant D-KEFS mean score differences in a pediatric population (ages 8-19) based on several independent variables (IVs): group (mixed clinical sample: n = 512 versus the standardization sample; n = 875), student's age, ethnicity, primary language spoken at home, sex, and diagnostic group classification (specific learning disability, ADHD, neurologically impaired , emotionally disturbed, speech/language impaired , autistic, or other health impaired). Method: Clinical data used in the study were archival and culled from a national database. Normative data were also archival and were provided by Pearson, Inc. Multivariate Analyses of Variance for comparison between the clinical and normative samples were computed to test for main effects by student's age group, ethnicity, sex, primary language, and diagnostic group. Univariate tests were then computed to determine which

specific D-KEFS subtests were significant for each of the statistically significant independent variables. Post-hoc Tukey comparisons were computed for IVs with two or more levels. Results: Utilizing the Wilks' Lambda criteria, there was found to be a significant main effect for age group, ethnicity, sex, diagnostic group classification, and group type (clinical versus standardization). Conclusion: The analyses indicated the presence of various main effects. The effects of these variables have implications for clinical practice, which will be highlighted.

B-78
The Effect of Contextual Novelty versus Task Novelty on Motor-Planning
Sheehan J, Gidley Larson JC, Suchy Y

Objective: Prior research found task novelty deleteriously affects motor planning (M-PLN). However, it is unknown whether contextual novelty also affects M-PLN. This study sought to evaluate the role of context on the length of M-PLN latencies. Method: 37 healthy participants, ages 18-27, performed either a five-movement (n =18) or an eight-movement (n=19) motor sequence. Participants learned the sequence using rote nonverbal procedural learning, then completed three Performance Blocks: Block 1--performing the movements as they had been trained; Block 2 (new context)--performing the sequence while reciting task-congruent prompts presented on a computer screen; Block 3--performing the sequence as they wish (with or without verbalization). M-PLN was recorded electronically and operationalized as the latency between sequences. Results: Repeated measures ANOVA yielded a significant Block X Complexity interaction (F(2,35)=9.57,p<.001). Follow-up analyses indicated that contextual novelty of Block 2 interfered with M-PLN when the sequence was simple (t(1,20)=5.34,p<.001), but not when it was complex(t(1,20)=-1.12,p=.275). Conclusions: Results show that contextual novelty can have deleterious effects on M-PLN latencies, even after a task has been fully learned and automatized. Interestingly, M-PLN was deleteriously affected only when the task was simple. The failure to show novelty effect on the complex task may relate to the specific nature of our manipulations: i.e., verbal cues may have facilitated planning of longer sequences, thereby offsetting the effect of novelty.

B-79
Executive Functioning, DTI, and Cortical Thickness in Pediatric Epilepsy
Sherman E, Carlson H, Gaxiola-Valdez I, Wei X, Beaulieu C, Hrabok M, Hader W, Brooks B, Kirton A, Barlow K, Hrabok M, Mohamed I, Wiebe S

Objective: Epilepsy is associated with executive functioning problems, but structure-function relationships are not well established. Using diffusion tensor imaging (DTI) and cortical thickness analyses, relationships between executive functioning, frontal white matter, and cortical thickness were investigated to determine whether executive functioning is related to integrity of frontal structures in children with epilepsy. Method: DTI data from 27 children with focal epilepsy from Alberta Children's Hospital (mean age = 11.8 [4.0] years) were acquired in the axial plane [(6 gradient directions, voxel size = 2x2x3mm3, 4 min; FA, mean diffusivity (MD), radial diffusivity (RD) and volume (mm3)]. Cortical thickness was measured using Freesurfer on 3D T1-weighted MP-RAGE images (TR=2400 msec, TE=4.5 msec, voxel size = 1x1x1 mm3). Partial correlations adjusted for age were used to relate imaging data to parent-rated executive functioning (Behavior Rating Inventory of Executive Function; BRIEF). Results: Executive functioning was inversely

related to orbito-frontal cortical thickness (r = .47, p < .05), but not related to superior or middle frontal cortical thickness. Executive functioning was positively correlated with bilateral anterior forceps white matter volume and radial diffusivity (r = -.50, p = .01; r = -.49, p < .05), but not with other measures of frontal white matter integrity (FA, MD). Conclusions: Executive functioning in pediatric epilepsy is related to aspects of white and grey matter integrity of frontal circuits. Neuroimaging techniques show promise as useful tools to understand relations between structure and cognition in pediatric epilepsy.

B-80
Frontal Systems Behavior Scale in Long-term Survivors of Childhood Brain Tumors
Smith K, Ailion A, Ivanisevic M, King T

Objective: This study examined self and informant ratings of executive functioning adult survivors of childhood brain tumors and typical controls. Previous research comparing self and informant ratings of executive function in neurological populations indicates that self and informant report often differ. However, the direction of this difference is mixed; in one study participants with MS reported more dysfunction, attributed to hyperawareness, while in another study participants with TBI reported less dysfunction, potentially due to poorer insight. Method: Forty-four undergraduate students served as typical controls. Twenty-nine survivors were on average 19 years (SD=4.18) post diagnosis. Participants were on average 24 years of age (SD=3.37) and were matched on age, education, sex, ethnicity, and socioeconomic status. The Frontal Systems Behavior Scale (FrSBe) was used to measure executive function based on self and informant reports. Informants were chosen by the participants and were typically family, spouses, or close friends. Results: Bivariate correlations were conducted to compare self and informant ratings on the FrSBe Total Score. Control participants' self and informant reports were significantly correlated (r=.57, p<.001). Survivor's self report was also significantly correlated with the informant report (r=.64, p<.001). Survivor self report and informant report were within normal limits as was control informant report but control self report on average suggested elevated problems. Conclusions: The significant relationship between self and informant report in survivors suggests that the survivors are aware of their functioning in these areas. Relationship between ratings on subscales will be presented. Hypotheses about the relationship between self and informant reports will be discussed.

B-81
The Relationship between Ratings of Executive Function and Neuropsychological Measures of Executive Function in Typical Young Adults
Smith K, King T

Objective: The purpose of this study was to investigate the relationship between ratings scales of executive function and neuropsychological measures of executive function in typical young adults. Method: Forty-nine undergraduates participated; average of 23 years of age (SD=8.26) and 13 years of education (SD=1.23). The sample was 74% female, 44% Caucasian, 29% African American, 9% Hispanic, and 18% Asian. This study used the following performance-based tasks of executive function from the Delis-Kaplan Executive Function System: Color Word Inhibition (CWI), Color Word Inhibition-Switching (CWIS), Trail Making Letter Number Sequencing (LNS) and Verbal Fluency Switching (VFS). The disinhibition and dysexecutive subscales of the Frontal

Systems Behavior Scale (FrSBe)- self and informant report was used to measure executive function ratings in daily life. Results: Means and standard deviations for each measure were as follows: FrSBe Self Disinhibition: T=70.37 (12.90); FrSBe Informant Disinhibition: T=59.75 (14.17); FrSBe Self Dysexecutive: T=70.47 (9.33); FrSBe Informant Dysexecutive: T=59.37 (10.98); CWI: SS=9.96 (2.62); CWIS: SS=9.90 (2.85); LNS: SS=10.63 (1.54); VFS: SS=12.41 (2.69). Bivariate correlations were conducted among the executive function tasks and ratings. Color Word Inhibition-Switching correlated significantly with self report Dishinibition (r=-.39, p<.01). No other variables correlated significantly. Conclusions: This moderate correlation suggests that the FrSBe self-report ratings and neuropsychological tasks, specifically Color Word Inhibition-Switching, are tapping into a similar construct. The complementary data from performance based and self and informant report will be discussed.

B-82
Detection of Subclinical Executive Weakness Using Simple Choice Reaction Time
Thorgusen S, Bowman D, Suchy Y

Objective: Latencies on choice reaction time (CRT) tasks increase as complexity of responses increases. We sought to achieve similar results by manipulating stimulus complexity comparing emotional vs. neutral distracters, while holding response complexity constant. Because performances on CRT tasks correlate with executive functioning (EF), we also investigated whether the cost of increased stimulus complexity would be related to subtle subclinical symptoms known to be associated with EF weaknesses. Method: Sixty-two college-age students were recruited based on self-reported symptoms of ADHD and anxiety (known to be related to EF weaknesses), or absence of symptoms (controls). Participants completed three CRT tasks with varying stimulus complexity (abstract neutral distracters, pictorial emotional distracters, and verbal emotional distracters). Results: Emotional distracter costs were calculated by subtracting abstract task decision times (DT) from emotional tasks DT. A repeated measures analysis of variance using distracter costs as the dependent variables, distracter type (pictorial vs. word) as a within-subjects factor, and group (ADHD vs. anxiety vs. control) as a between-subjects factor yielded a significant interaction between distracter type and group (F[2,59]=3.97, p<.05). ADHD and anxiety showed greater distracter costs for the pictorial relative to the verbal emotional task (t(27)=4.475 p=<.001, and t(15)=-2.92, p<.05, respectively). Conversely, distracter costs for the control group did not differ between tasks (t(17)=1.15, p=.267). Conclusions: Relative to controls, participants with subclinical symptoms of ADHD and anxiety demonstrate different response patterns for pictorial versus verbal distracters. Varying stimulus properties in CRT tasks may be a promising method for detecting subclinical EF weaknesses.

B-83
Effects of Cognitive Load in Child Brain Tumor Survivors and Unaffected Controls on the Tasks of Executive Control
Walsh K, Mitchell F, Jill G, Iris P, Ross K, Madan-Swain A, Gioia G, Isquith P

Objective: Deficits in executive functions, particularly attention, processing speed, and working memory, have been noted in children treated for brain tumors (BT). We compared performances of children with BT to normal controls on a new computer administered measure of response to working memory and inhibitory control demands. Method: A sample of 24 brain tumor survivors

aged 8-18 years was matched by age and gender to controls. Participants underwent a brief neurocognitive evaluation including the Tasks of Executive Control (TEC) and parent ratings on the Behavior Rating Inventory of Executive Function (BRIEF). The TEC crosses an n-back paradigm with three increments of working memory load (0, 1, 2-back) with a go/no-go task that manipulates inhibitory control demand. Alpha was set at .05 for all analyses. General Linear Models and repeated measures analysis was applied to evaluate between (BT vs. control) and within group (task load) differences. Results: Preliminary results revealed significant differences in response accuracy between the BT and control groups when an inhibitory demand was added (F=3.85; p=.03; Eta squared=.14). When an inhibitory cue was added, the BT group focused more on the unique target stimuli but sacrificed attention to the frequent standard pictures (F=4.12; p=.048; Eta squared=.08). Conclusions: These preliminary results suggest subtle differences in fundamental aspects of executive function in childhood brain tumor survivors. The BT survivor group had greater difficulty allocating resources between background and unique target information as overall cognitive load increased. Future analyses will consider known factors in outcome, including age at treatment, time since treatment, treatment and tumor types.

B-84
Reliability of the Clinical Dementia Rating with a Traumatic Brain Injury Population
Webber D, DeFilippis N, Collins M, Hill F

Objective: This study examined the inter-rater reliability (IRR) of the Clinical Dementia Rating (CDR) Scale for brain-injured patients. The CDR is a central aspect and commonly used rating of impairment in worker compensation cases. It was hypothesized that the CDR would have good IRR when used with TBI patients. Method: 250 neuropsychologists from across the US were randomly selected from the National Academy of Neuropsychology's membership list and mailed packets of information (e.g., introductory letter, CDR, patient vignette, mental status, neuropsychological test information, and history, which included mild to moderate TBI). These professionals were asked to complete the CDR for the described patient and return this information. Inter-rater reliability was calculated for the global CDR score and each of the six CDR domains. Results: Of those mailed, 53 packets were returned completed as instructed (21.2% response rate). Clinician experience varied from 0-31 years. IRR on the global CDR score was 73.6%. Domain IRR were as follows: Orientation 79.2%; Home and Hobbies 71.7%; Personal Care 71.2%; Memory 56.6%; Judgment and Problem-Solving 49.1%, and Community Affairs 54.7%. Conclusions: Results suggest the CDR global score has acceptable IRR (>.70), indicating adequate consistency among multiple neuropsychologists. This was not the case among several individual domains. Further research to improve the utility of this instrument is discussed.

B-85
Bilingual Advantages in Parent Reports of Executive Functioning
Weber R, Johnson A, Wiley C

Objective: The purpose of this study is to examine potential differences between monolingual and bilingual children on parent reports of executive functioning (EF) on the Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 2000). Previous research comparing monolingual and bilingual children has established potential bilingual advantages in inhibition and working memory on performance-based measures only (Bialystok & Martin, 2004; Bialystok,

2010). Method: A total of 59 participants (children, ages 4-7, and their families) were recruited through the distribution of materials at elementary schools and community centers. Data were collected in 1-2 sessions. Parents completed a demographic questionnaire, the BRIEF, and a measure of economic stress, along with several other measures not examined in this study. Results: A MANCOVA model was utilized to examine multivariate differences in BRIEF raw scores on all subscales. Age and economic stress were included as covariates, due to significant group differences in these areas. A significant multivariate effect was observed for language group, using Wilk's statistic (λ=.701; F (8, 48) = 2.565; p < .05; η^2= .30). Follow-up univariate analyses found significant group differences in working memory, organization of materials, and the metacognition index. Conclusion: These results add to the current literature by examining potential bilingual advantages on parental report measures of EF and may assist in understanding the behavioral implications of bilingual advantages in EF.

B-86
Proposed Score Adjustment for Executive Functioning Constructs on the California Verbal Learning Test-Children's Version with Pediatric Traumatic Brain Injury Population
Zimmerman E, Burns T, DeFilippis N

Objective: The current study examined an adjustment score for the executive functioning (EF) constructs on the California Verbal Learning Test-Children's Version (CVLT-C) with a pediatric traumatic brain injury (TBI) population. The CVLT-C is sensitive to effects on learning in TBIs (Mottram & Donders, 2005); however, the EF constructs have not been sufficiently validated (Vanderploeg, Schinka, & Retzalff, 1994). The goal of applying the adjustment score is to increase the correlation between CVLT-C performance, provided EF scores, and additional measures of EF. Method: Forty-one participants (63% male) diagnosed with a TBI were included. Participants ranged in ages 7-16, were referred for a neuropsychological evaluation at a children's hospital, and received the CVLT-C, as well as the Drexel Tower of London (TOL-DX) and the Behavioral Rating Inventory of Executive Functioning (BRIEF) for convergent validity. Bivariate correlations were used to analyze the degree of correlation before and after the application of the adjustment formula. Results: Using SPSS statistical package-18.0, there was increased correlation with perseverations (r=-.725), p<.01, in comparison to the absence of the adjustment formula (r=.402). Similarly, significance was found when applying the formula to the total number of intrusions (r=-.775), p<.05, than without (r=-.356). Although stronger correlations were observed, convergent validity with the TOL-DX and the BRIEF indices did not show statistical significance. Conclusions: The application of the adjustment formula when applied to the specified EF constructs on the CVLT-C is more useful and valid; thus, yielding a more independent and meaningful measure of EF constructs within one testing measure.

Professional Issues: Ethics

B-87
Selection Criteria for Clinical Neuropsychology Internships
Ritchie D, Odland A, Stevens A, Mittenberg W

Objective: Internship in clinical neuropsychology is an essential part of specialty training. This paper reports a survey of the applicant evaluation and selection criteria currently used at clinical

neuropsychology internships. Method: Training sites were identified from listings published by INS, AITCN, APA Division 40, and APPIC. Internship information was reviewed for concordance with the Houston Conference and INS/APA Division 40 guidelines. Utilizing these criteria, 103 internships that offered a minimum of 50% of training devoted to clinical neuropsychology were identified. Supervising neuropsychologists were contacted and asked to complete a 10-item survey of candidate selection criteria used in a prior similar study. Results: 72.8% of sites ((n=75) responded to the survey. Clinical experience in neuropsychological assessment, specialization in neuropsychology during graduate school, the interpersonal skills of the applicant during the interview, and letters of recommendation from clinical neuropsychologists were reported as the most salient selection criteria. Applicants that had completed graduate school curricula that provided specialty education in neuropsychology, with clinical neuropsychologist faculty and supervisors were preferred. Internship supervisors valued prior practicum experience with neurological cases at university affiliated or V.A. medical centers, flexible assessment approaches, and supervision by neuropsychologists. Research experience was also viewed important by most internship sites. Conclusions: Results indicate continued endorsement of the vertically integrated model of education and training outlined by the Houston Conference and INS/APA Division 40 guidelines for the didactic and experiential components of specialization in clinical neuropsychology. The number of neuropsychology internship sites has more than doubled during the past 10 years.

Professional Issues: Forensic Practice

B-88
Study of Incidence of Malingering in Litigated Cases
Hartlage L, Williams B

Objective: Over the past decade there has been a sharp increase of studies concerning the detection of malingering in litigated cases, with a proliferation of techniques proposed for detection, and an Academy position paper addressing the issue. Unfortunately, there is no clear procedure for determining exactly who is malingering, with such inference often being based on responses of individuals instructed to simulate malingering, or on congruence among tests designed to detect malingering. Method: This project compared 35 individuals at risk for malingering (i.e. litigated cases) with 35 roughly matched individuals with an interest in minimizing brain impairments (individuals seeking VRD assistance for educational pursuits). All had history and presenting complaints suggestive of brain impairment. Comprehensive neuropsychological assessments were conducted, along with six different procedures described in research literature as sensitive to malingering or suboptimal effort. Results: All individuals demonstrated evidence of brain impairment, of at least mild severity, with majority at moderate to severe level. None in 'control' group demonstrated signs of malingering on any measure. At-risk group showed signs of malingering involving two measures in 31 cases, and on one measure in 29 cases. There was no consistent sign of malingering on three or more measures. Conclusions: Findings suggest possibility of potential contamination of test data by malingering in 17% of at-risk cases, with greater potential in 9% of at-risk cases, with 9% in control group. Research that suggests higher incidence of malingering may reflect criterion contamination based on agreement between measures without independent confirmation of validity.

B-89
Using the Independent Living Scale in Competency Evaluations
Weidemann E, Demakis G

Objective: The Independent Living Scale (ILS) is a measure of functional abilities in various domains. Although the ILS is used to aid in assessing competency in forensic settings, research has not addressed the ILS in this population. Method: Data from 66 individuals who completed a competency evaluation in North Carolina was assessed. The sample ranged in age from 18 to 93 (M=57.18, SD=23.41), was predominantly female (58%), Caucasian (49%), and judged by the examiner as incompetent (87%). Subjects were administered the Mini-Mental State Examination (MMSE), the Health and Safety (HS) and Managing Money (MM) subscales of the ILS, and Trail-Making Test Part B. Correlations between measures assessed how the ILS relates to other measures and independent-samples t-tests determined if there were differences in performance by examiner judgment of competence. Results: The HS subscale of the ILS was significantly correlated with the MM subscale of the ILS (r=0.64, p<.001), and the MMSE (r=0.45, p=.007). The MM subscale was significantly correlated with the MMSE (r=0.51, p=.004) and Trail-Making Test B (r=0.54, p=.021). There was a significant difference between those who were judged competent versus incompetent on the MM subscale, t(37)=2.77, p=.009, and the MMSE, t(23)=3.60, p=.002. The HS subscale was nearly significant, t(41)=2.00, p=.052. In each comparison, those deemed competent performed better. Conclusions: The ILS relates to other measures commonly used in competency evaluations. More research needs to be conducted on the validity of this measure in forensic populations.

Poster Session C

Aging and Dementia: Alzheimer's Disease

C-1
The Advantage of Using Daily Functional Tasks to Differentiate Patients from Controls
Avila J, Razani J

Objective: The purpose of this study was to examine how well a performance-based functional task differentiates Alzheimer's disease (AD) and mild cognitively impaired (MCI) patients from healthy adults. Method: Participants were 49 AD patients, 6 MCI patients, and 60 healthy elderly controls. Diagnoses were made at the medical centers by qualified physicians and neurologists. All participants were administered the Direct Assessment of Functional Status (DAFS) which assesses the following 14 domains: the ability to 1) tell time using a clock. 2) orientation to person, place, and date, 3) use a telephone; 4) prepare and mail a letter, 5) identify road signs, 6) knowing driving rules, 7) identify currency, 8) count currency, 9) write a check, 10) balance a checkbook, 11) "shop" from a mock grocery store by freely recalling shopping items, 12) "shop" by recognizing items, 13) "shop" with a list, and 14) make correct change. Results: Discriminant function analyses revealed that all DAFS subscales, with the exception of identifying currency, were statistically significant (p values > .01) in classifying the 3 groups. However, the shopping subscales demonstrated the best sensitivity and specificity with 65.8%-72.8% of AD, MCI and control cases being correctly classified. Additionally, a majority of the scales classified normal

controls at accuracy rates of 90%-100%, but misclassified patient groups. Conclusions: These findings suggest that some functional tasks, particularly those which rely on memory skills, are better at delineating patients from controls than others. These findings may be helpful to clinicians and will be further discussed.

C-2
Using Short-Term Memory Measures to Assess Long-Term Memory in Early Alzheimer's Disease
Burkhart S, Adams W

Objective: Alzheimer's disease (AD) impairs long-term memory of both verbal and visual information. While these impairments have been studied extensively at traditional short-term delays of 20-35 minutes, they have not been explored at long-term delays. In the current study, long-term delays of 1-day and 7-days were introduced to traditional short-term memory measures. Method: 60 Participants were recruited for the study including; 20 individuals with Early AD, 20 individuals at risk for AD, and 20 age matched healthy controls. During an initial visit Participants were administered a self-evaluation questionnaire, the Mini Mental Status Exam (MMSE), the Alzheimer's disease Caregiver Questionnaire (ADCQ), 2 subtests from the Wide Range Assessment of Memory Learning, 2nd Edition (WRAML2: Story Memory and Verbal Learning subtests), the Wechsler Adult Intelligence Scale, 4th Edition (WAIS-IV: Information subtest), and Rey-Osterrieth Complex Figure Test (ROCFT). 1-day and 1-week later, Participants were administered the WRAML2 subtests and ROCFT as an assessment of long-term memory. Results: Early AD Participants performed significantly poorer at the 1-day interval than both the healthy control group and at-risk group, while performance at the 7-day interval showed less variation across groups. This pattern was evident across all measures administered, except the self-evaluation questionnaire. Conclusions: Results indicate adding a 1-day interval for assessment of long-term memory using a word list task (WRAML2 Verbal Learning subtest) to a clinical AD screening provides increased diagnostic sensitivity to detect impairment of Early AD individuals.

C-3
Regional Groundwater Arsenic Levels are Associated with Poorer Neuropsychological Functioning among Those with Cognitive Impairment
Edwards M, O'Bryant S, Hall J, Johnson L, Grammas P, Gong G, Hargrave K, Mattevada S, Barber R

Objective: Few studies to date have examined the impact of current low arsenic levels in the United States with regards to cognitive impairment. The aim of this study was to examine the potential link between GIS-estimated regional groundwater arsenic levels and neuropsychological functioning. Method: Data were analyzed from 1390 participants (733 AD cases, 127 MCI cases, and 530 controls) enrolled in the Texas Alzheimer's Research & Care Consortium longitudinal study. Results: The study showed that among control participants, GIS-estimated regional groundwater arsenic exposure levels was actually associated with better scores on global cognition (B (SE)=0.08(0.03), t=2.9, p=0.004) and language (B(SE)=0.29(0.10), t=2.83, p=0.005). However, among those with mild cognitive impairment (MCI), there was shown to be a significantly association with poorer scores on global cognition (B(SE)=-0.34(0.13), t=-2.7, p=0.009), visuospatial (B(SE)=-0.43(0.18), t=-2.5, p=0.015), executive functioning (B(SE)=-0.44(0.18), t=-2.4, p=0.017), delayed verbal recall (B(SE)=-0.43(0.19), t=-2.2, p=0.028) and delayed visual recall (B(SE)=-0.36(0.17), t=-2.2, p=0.034). Additionally, among Alzheimer's

disease (AD) cases GIS-estimated regional groundwater arsenic levels were associated with significantly poorer scores on delayed memory (B(SE)=-0.37(0.10), t=-3.6, p<0.001). Conclusions: These findings indicate that estimated regional groundwater arsenic levels are negatively associated with neuropsychological performance among those with MCI and AD.

C-4
Boston Naming Test: Gender Differences in Older Adults with and without Alzheimer's Dementia
Hall J, Vo H, Johnson L, Barber RC, O'Bryant S

Objective: The study clarifies the relationship between gender and performance on the BNT by controlling for the effects of demographic and health risk factors. Method: Participants were 468 outpatient individuals (272 diagnosed with probable AD and 180 cognitively intact) enrolled in the TARCC program. Participants undergo annual evaluations that include medical examination, interview, neuropsychological testing, and blood draw. The neuropsychological assessment consists of the Wechsler Digit Span, Logical Memory, and Visual Reproduction, along with the Trail Making Test, Boston Naming Test (60-item version), verbal fluency (FAS), and the Geriatric Depression Scale (GDS-30) and the Clinical Rating scale (CDR). AD patients met consensus based diagnosis for probable AD based on NINCDS-ADRDA criteria (McKhann, et al, 1984). Only mild AD as shown by a CDR global score of 0.5 or 1.0 were used.   Results: Control males outperformed females (F = 10.81, p < .000, ES = .20). AD males also performed significantly better than AD females (F = 17.13, p < .000, ES = .25). Gender differences remain after covarying for estimated IQ, age, education, and presence of hyperlipidemia and hypertension. Secondarily, after controlling for level of decline (using CDR scores) and mentioned covariates, gender differences remain significant with robust naming abilities among AD males compared to females for both groups. Conclusions: Overall, within-group and between-group comparisons support prior findings that males perform significantly better compared to females on the BNT even after controlling for health and level of decline. Findings have implications for clinical practice and prospective test norm considerations.

C-5
Does the FrSBe Index Frontal Hypoperfusion? A SPECT Study Utilizing MCI and Dementia Groups
Hill B, Davis J, O'Connor K, Musso M, Rehm-Hamilton T, Ploetz D, Rohling M

Objective: To examine whether the Frontal Systems Behavior Scale (FrSBe) indexes frontal hypoperfusion in patients diagnosed with mild cognitive impairment (MCI) or dementia. Method: Data from 76 individuals were obtained via record review from a hospital-based Memory Disorders Clinic. Mean descriptive values: 75 (SD 8) years of age, 13 (SD 3) years of education, MMSE score 26 (SD 6), and DRS-2 raw score 124 (SD 11). 66% female, 99% Caucasian, 54% MCI, 46% dementia. All individuals had the FrSBe (apathy, disinhibition, executive dysfunction, and total scales were used in this study) completed by a caregiver and also completed a SPECT study. SPECT data were quantified as radioactive counts per pixel normalized to average cerebellum counts per pixel. SPECT regions of interest (ROI) were right and left high frontal and right and left lateral frontal. Results: None of the "before" FrSBe scales were significantly correlated with SPECT frontal ROIs. For the "after" FrSBe scales, only the apathy scale was significantly (p<.05) correlated with right high frontal (r = -.24) and right lateral frontal (r = -.26) SPECT. ANOVA revealed no significant differences between MCI and dementia groups on any of the frontal SPECT data or

FrSBe scales. Conclusion: The current results suggest that of the FrSBe scales, only the apathy scale may be related to frontal hypoperfusion as measured by SPECT in older individuals diagnosed with cognitive disorders.

C-6
Relationship between Brain Atrophy and Performance on Memory Measures in AD
Rodriguez M, Potter E, Loewenstein D, Duara R, Golden C

Objective: The purpose of this study was to examine relationships between memory measures and brain atrophy in a sample with early stage Alzheimer's Disease (AD). Methods: Logical Memory II, Visual Reproduction II, Hopkins Verbal Learning, and the Fuld Object Memory Evaluation (OME) were examined. MRI volumetric analysis of 16 brain structures was examined. The sample consisted of 121 early staged AD subjects. The subjects' age range was from 59-92 (M= 75.56, SD= 7.5), education range 6-20 (M=13.14, SD=3.35), and was 53% female. Results: Significant Pearson Correlations were found between the Fuld OME and the left r (119) = .40, p<.001, and right r (119) = .28, p<.01 hippocampus, right parahippocampus r (119) = .35, p<.001, left superior temporal gyrus r (119) = .32, p<.01, left r (119) = .29, p<.01, and right r (119) = .28, p<.01 superior parietal lobule, and left inferior parietal lobule r (119) = .33, p<.01. Hopkins verbal learning test was correlated to the left hippocampus r (119) = .39, p<.001, and right parahippocampus r (119) = .33, p<.01. Visual Reproduction II was correlated with the left hippocampus r (119) = .40, p<.01, left parahippocampus, r (119) = .31, p<.01, and right parahippocampus r (119) = .30, p<.01. Conclusions: These results suggest that performance on memory measures in an early stage AD sample are highly related to atrophy in the hippocampus and parahippocampus. This is consistent with previous studies that have shown early AD to show deficits in memory and hippocampal areas and contributes to understanding the development of the disease.

C-7
Differences in RBANS Scores between Multi Domain Amnestic Mild Cognitive Impairment and Alzheimer's Disease Patients
Velamuri S, Rinehardt E, Schoenberg M, Mattingly M, Kaufman R, Rosado Y

Objective: Alzheimer's disease (AD) is characterized by progressive decline in cognitive function. Mild Cognitive Impairment (MCI) is considered a transitional phase to AD. Multiple-domain amnestic MCI (mdaMCI), due to more severe and widespread cognitive disorders, is a better predictor of AD. The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) has been used to clinically diagnose AD, and percent retention scores on delayed memory tasks have been used to differentiate MCI and AD diagnoses. The study's purpose is to examine whether mdaMCI patients or AD patients differ significantly on RBANS index or subtest scores. It was hypothesized that there would not significant differences between mdaMCI patients and AD patients. Method: A sample of mdaMCI patients (n = 18) and AD patients (n = 19) similar in age and years of education was used in the current analysis. One-Way ANOVA's assessed differences between groups. Results: Results indicate significant differences on the RBANS Total Score (F(1,35) = 40.405, p =.00), the Delayed Memory Index score (F(1,35) = 38.315, p = .00), the Attention Index Score (F(1,35) = 11.659, p=.002), the Language Index Score (F(1,35) = 4.856, p = .034), the Visuospatial/Construction Index score (F(1,35) = 15.358, p =.00), and the Immediate Memory Index (F(1,35) = 19.498, p = .00). Significant differences between groups were also

present for RBANS subtest scores except for semantic fluency. Conclusion: The results of this study can be used to further evaluate the diagnostic accuracy of the RBANS in diagnosing both AD and MCI patients based on their index or subtest scores.

Developmental and Pediatric: Attention Deficit (Hyperactivity) Disorder

C-8
Gender Differences in Personality Features for Children with Attention-Deficit/Hyperactivity Disorder
Boseck J, Tiberi N, McCormick C, Davis A, Hernandez Finch M, Gelder B

Objective: Salient gender differences in prevalence of ADHD have been identified with boys being diagnosed at a much higher frequency, especially for children with severe inattention, hyperactivity, and impulsivity. What is less well explored are gender differences in personality. The purpose of the current study was to investigate ADHD symptomatology between genders using the Personality Inventory for Children – Second Edition (PIC-2). Method: The sample consisted of 150 males (mean age = 10.37, SD = 3.3) and 81 females (mean age = 9.80, SD = 3.0) diagnosed with ADHD-Combined Type by a neuropsychologist and physician specializing in neurodevelopmental disorders. All participants were administered the PIC-2 as part of a neuropsychological evaluation. Results: MANOVA results indicated that there was a significant overall gender difference on the PIC-2 [$F (1, 219) = 2.84$; $p < .01$] with significant differences in Cognitive Impairment ($p < .01$), Inadequate Abilities ($p < .05$), Poor Achievement ($p < .01$), Disruptive Behavior ($p < .05$), Antisocial Behavior ($p < .05$), Noncompliance ($p < .05$), Reality Distortion ($p = .05$), Developmental Deviation ($p = .01$), and Limited Peer Status ($p = .05$) with males displaying significantly more symptomatology in all of these areas. Follow-up Descriptive Discriminant Analysis indicated that the best predictors of gender differences included Poor Achievement (.531*) and Cognitive Impairment (.396*). Conclusions: Results comparing males and females with ADHD indicated males display significantly more overall behavioral symptoms. The most characteristic symptoms of gender differences include poor academic achievement and cognitive impairment with males having greater impairment in both of these areas.

C-9
An Ecologically Valid Method for Determining Stimulant Medication Effects in the Context of Outpatient Psychoeducational Assessment
Cannon M, McGregor S, Reitman D, Rey J, Scarisbrick D

Objective: Due to the large number of children diagnosed and prescribed stimulant medication (SM) it is important to understand the effects of these medications in the context of psychoeducational assessment (PA). The present case study illustrates a method of detecting medication response using a readily available psychoeducational battery. Method: Examined an 8-year-old Caucasian male presented for an ADHD re-evaluation and medication evaluation. Initial testing was conducted while on medication (Focalin™, 15 mg) to ensure his performance reflected the best estimate of his ability. Adam completed the core subtests of the Wechsler Intelligence Scale for Children-IV (WISC-IV) and first 12 subtests of the Woodcock Johnson Test of Achievement-III, Form A (WCJ-ACH). During the re-administration while off medication, selected subtests from the WISC-IV and WCJ-ACH Form B were re-administered to test for medication

response. Behavioral observations of Adam's test behavior were also obtained. Results: Adam's performance on and off medication revealed that SM was associated with significantly better performance on seven of the eight re-administered subtests. For instance, Adam's performance while "off-medication" on the Math Calculation Skills substest decreased from the 72nd percentile to the 38th percentile. Overall, Adam's academic performance generally improved from the low average to average range while taking medication. Behavioral observations were consistent with this assessment, revealing that Adam was more distractible and active during the off-medication administration. Conclusion: Use of a selective re-administration of substests from a psychoeducational battery consisting of subscales from both the WISC-IV and WCJ-ACH-III appears to offer a sensitive test of medication response during clinic-based psychoeducational assessments.

C-10
Identifying Cognitive Deficits in Adults with ADHD Using the WAIS-IV/WMS-IV
Holdnack J, Iverson G

Objective: The purpose of this study is to compare adults with ADHD to demographically similar healthy control subjects on the Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV) and the Wechsler Adult Memory Scale-Fourth Edition. Method: Participants were 47 adults with ADHD (mean age=23.0, SD=3.8 years) and 47 demographically matched healthy control subjects (mean age 23.0, SD=3.9). Results: For the WAIS-IV, MANOVA revealed an overall multivariate effect $(F(4,89)=4.64, p<.01)$ with univariate effects for the Working Memory $(F(1,92)=12.80, p<.01,$ Cohen's d=.74) and Processing Speed Indexes $(F(1,92)=5.88, p<.05, d=.50)$. Univariate ANOVAs revealed significant differences, in favor of control subjects, on Digit Span Forward $(p < .05, d=.43)$, Digit Span total $(p<.05, d=.49)$, Arithmetic $(p<.001, d=.79)$, and Coding $(p<.05, d=.53)$. On the WMS-IV, adults with ADHD showed significantly lower performance on the Immediate $(p<.05, d=.59)$ and Auditory Memory Indexes $(p<.05, d=.61)$. The groups differed on Verbal Paired Associates Learning $(p<.01, d=.76)$, Delayed Cued Recall $(p<.01, d=.76)$, and Delayed Free Recall $(p<.01, d=.77)$. No other significant differences were observed on the WMS-IV. Conclusion: Adults with ADHD performed more poorly on tests of auditory short-term memory, mental arithmetic, multi-trial verbal learning, and processing speed.

C-11
WISC-IV Cluster Subtypes Predict Diagnoses, Symptom Ratings, and Outcome in Children with ADHD
Thaler N, Bello D, Whoolery H, Etcoff L

Objective: In this study we aimed to identify subgroups representing different levels of symptom severity, socioemotional functioning, and academic achievement in a sample of children with attention deficit/hyperactivity disorder (ADHD). Prior cluster studies have identified subtypes using symptom and personality profiles but fewer have attempted to cluster IQ profiles and associate such clusters with outcomes. The present study addresses this by examining WISC-IV cluster profiles in a heterogeneous sample of children with ADHD. Method: Participants included 207 children (70.5% boys; mean age = 9.93 years) who were referred for neuropsychological evaluation and diagnosed with ADHD (56.5% inattentive; 43.5% combined) by a pediatric neuropsychologist. Hierarchical and partitional clustering methods were used specifying WISC-IV

indexes as abstracts. The most optimal cluster solution was compared across diagnosis, symptom and parent rating scales, and academic achievement. Results: A five-cluster solution was identified as the best fit for the data. There was a significant difference among clusters for diagnosis, $\chi^2 = 23.29$, p < .05, as the cluster with impaired PSI had more children diagnosed with the inattentive subtype. Parent ratings confirm that this cluster had higher symptoms of inattention, while a low IQ cluster had more impaired functional communication, and a high IQ cluster had better academic achievement. Conclusions: Results confirm that cognitive functioning can predict outcome in children with ADHD and provide support for an inattentive subtype characterized by impaired processing speed. The analysis also suggests that WISC-IV profiles may be useful in predicting emotional and academic outcomes within this population.

C-12
Lecture Note-Taking in Postsecondary Students with Self-Reported Attention-Deficit/Hyperactivity Disorder
Vekaria P

Objective: Taking and reviewing lecture notes is a prevalent activity that is related to higher test performance in postsecondary education. This was the first study to examine underlying cognitive factors in lecture note-taking in postsecondary students with self-reported ADHD. Method: Participants included 22 students with self-reported ADHD and 50 students who served as controls from multiple universities. The mean age for the sample was 22.62 years (SD = 3.68) and 68% of participants were female. Students took notes on a videotaped lecture, reviewed their notes, and took a written recall test. The independent variables included disability status (i.e., self-reported ADHD and non-ADHD), attention, transcription fluency, verbal working memory, and listening comprehension. The dependent variables were quality of notes and essay performance. Results: Multiple regression analyses revealed that attention (p < .05) and listening comprehension (p < .05) were the only significant predictors of quality of notes, and notes' quality (p < .001), disability status (p < .01), and listening comprehension (p < .05) all significantly predicted essay quality. Post hoc ANOVAs revealed students with self-reported ADHD obtained lower scores on a written recall test and a measure of transcription fluency compared to non-ADHD peers, but did not differ in terms of quality of notes, attention, verbal working memory, or listening comprehension. Conclusions: Based on the current findings, it seems postsecondary students with self-reported ADHD do not experience significant difficulties encoding information from lectures, but rather have trouble reviewing and/or retrieving information. More studies are needed to replicate these findings in students with confirmed ADHD.

C-13
Attention Deficit Hyperactivity Disorder: The Heritability Gender Factor
Whittington L, Nemeth D, Gremillion A, Olivier T

Objective: Olivier, Nemeth, & Whittington (2009) concluded that early evaluation and intervention were crucial in the management of familial attentional difficulties. Faraone, et al. (1995), as cited in Mash (2003), found that male siblings from families with one affected child were more likely to have ADHD than were female siblings from these families. The five children, ages 6 to 16, used in the Olivier, et al., heritability study were male siblings. To further explore the gender heritability factor, the two female siblings from this family were evaluated. Method: The two female siblings,

ages 14 and 15, were evaluated in 2010. Measures used in this evaluation included the following: Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), Test of Variables of Attention (TOVA), Behavior Rating Inventory of Executive Function (BRIEF) – Teacher and Parent Form, Behavior Assessment System for Children – Second Edition (BASC-2) – Parent and Teacher Form, and Brown ADD Scales. Results: Results were not suggestive of attentional difficulties. Intellectual assessment reveals Average to High Average functioning in all areas. Attentional assessment was within normal limits, as were Executive and Behavioral rating scales. Both girls' school histories were normal. Conclusions: In this intrafamilial study, results were positive for Attention Deficit Hyperactivity Disorder (ADHD) for the five boys, but not for the two girls. Both girls continue to excel in their academic programs. The four younger boys, all of whom are on psychostimulant medication, are now thriving academically and are enjoying their school placements and peer relationships. In this single family case study, the girls were spared the ADHD heritability factor.

Neurological and Neuropsychiatric Disorders: Psychiatric Illness

C-14
Neuroanatomical Fingerprint of Borderline Personality Disorder
Amirthavasagam S, Jeffay E, Zakzanis K

Objective: As individuals with borderline personality disorder (BPD) exhibit deficits in affect regulation and impulse control, research in the past decade has proposed temporolimbic volume decrease as a biological substrate for these symptoms. The current meta-analysis set out to synthesize findings from magnetic resonance imaging (MRI) studies that observed hippocampal/amygdalar volumes in BPD-control comparisons. Method: Ten publications were included for calculations of mean effect size (M) totaling 176 patients with BPD and 192 healthy controls. Results: The analysis found a moderate to substantial disparity between BPD-control for hippocampal (left M=-0.54; right M=-0.74) and amygdalar (left M= -0.90; right M= -0.44) volumes. Moreover, major depressive disorder (MDD) and age were found to have a moderating role for right hippocampal volume, as well as anxiety disorders on left hippocampal volume. Conclusions: Overall, though our findings demonstrate structural changes in the temporolimbic regions of the borderline brain, they are too modest to represent a biological marker.

C-15
Using Feedback to Guide Behavior: Impairments on the WCST Predict Psychosis
Barney S, Umuhoza D, Strauss G, Knatz-Bello D, Allen D

Objective: Schizophrenia (SZ) and bipolar disorder (BP) share a number of common features. For example, dopamine has been found to be dysregulated in both disorders. Furthermore, dopamine plays a role in reward learning, and individuals with SZ exhibit deficits in this area. The current study sought to extend these findings to BP with and without psychotic features, with the hypothesis that participants with psychotic symptoms would exhibit more severe deficits in reward learning. Method: The sample included 146 individuals with BP and a history of psychosis (BP+), BP and no history of psychosis (BP-), SZ, or normal controls (NC). Participants were administered the Wisconsin Card Sorting Test (WCST). Analyses focused on responses to the first four WCST cards. Mixed-model ANOVA that included one within-subjects factor (WCST trials 1-4) and one between-subjects factor (group) examined group differences in learning across trials.

Post hoc analyses examined trial-by-trial differences among the groups. Results: Results indicated significant main effects for group and for WCST trial, as well as a significant group by trial interaction effect. Post hoc comparisons indicated significant between group differences on WCST trials 2, 3, and 4. Examination of the raw scores indicated the expected pattern of performance was present among the groups (NC>BP->BP+>SZ). Conclusions: Results demonstrate an incremental impairment in SZ and BP patients' ability to use feedback to guide behavior, such that SZ exhibit the greatest impairment, followed by BP+ and BP-. Determining whether these deficits in bipolar disorder are due to dopamine dysregulations, as has been suggested in schizophrenia, requires further investigation.

C-16
Do Working Memory Tasks Suitably Differentiate Between ADHD and Anxiety Cases?
Bolanos J, Bell J, Restrepo L, Frisch D, Golden C

Objective: Studies have shown that anxiety and Attention Deficit/Hyperactivity Disorder cause similar, but respective decreases on working memory (WM). Likenesses in diagnostic presentation (e.g. restlessness, difficulty concentrating) and frequent comorbidity causes difficulties in differential diagnosis. The purpose of this study was to find whether several measures of WM are useful in differentiating ADHD and Anxiety Disorders when comparing group performances of an adult sample. Method: This study compared adults diagnosed with anxiety (n = 47) and ADHD (n = 24) and their performances on working memory tasks of the WMS III and WAIS III (WMIQ of the WAIS III, and the digit span scaled score (SS), letter-number sequencing SS, and arithmetic SS of the WAIS III, WMI of WMS III, and the letter-number sequencing, symbol span of the WMS III). The total sample included 78.9% Caucasian, 53.5% male, and 84.5% right-handed. Mean age and education were 30.04 (SD = 11.83) and 14.13 (SD = 2.63). Results: No significant differences were found at the .05 level between anxiety and ADHD groups across all dependent variables. Conclusions: Results showed that while the groups did not differ in their performance on WM tasks, the ADHD group consistently performed slightly lower. Previous research has shown that these groups showcase significantly poorer WM performance when individually compared to normals. The results of this study indicate that solely using WM tasks to accurately diagnose and differentiate between ADHD and Anxiety is not realistic due to these groups' similar performances. Other assessments and factors should be considered when diagnosing.

C-17
Base Rates of PTSD in TBI
Hartlage L, Williams B

Objective: Interest in post-traumatic stress disorder among traumatic brain injury victims has sharply increased with the recognition that these disorders have become recognized as the 'signature injuries' among personnel exposed to improvised explosive devices (Department of Defense, 2007). Recognition and proper diagnosis is hampered by the fact that these conditions may coexist; and that in many cases there may be overlap. Method: Records were reviewed of 38 individuals referred for evaluation of possible TBI, ranging in age from 21 to 50 years of age and with 13 years of education. Patterns of impairment that can be helpful for differentiation of TBI and PTSD were revealed. Results: Examinees presented with clear and consistent evidence of traumatic brain injury, with Halstead-Reitan Impairment Indices in moderate to severe range.

Whereas almost all reported symptoms reflective of possible PTSD, criteria for the diagnosis of PTSD were noted in only 12 cases. Among factors differentiating between patients with and without PTSD were loss of consciousness vs. alteration of consciousness and damage to brain areas involving ventromedial brain areas and amygdala. The latter indicators appeared to be neuroprotective for PTSD. Although data were not available for all patients, a number of mitigating factors also associated with lowered likelihood of PTSD involved sociopersonal support. Conclusion: Findings may provide a preliminary basis for a taxonomy for the prediction of factors associated with PTSD among TBI victims.

C-18
Measuring Change in Cognitive Functioning in Outpatients with Depression Using Computerized Cognitive Screening
Iverson G, McIntosh D, Kjernisted K, Young A

Objective: Some patients with depression have measurable cognitive impairment. Computerized cognitive screening is an efficient method for monitoring change in cognitive functioning during treatment or as part of a clinical trial. The purpose of this study is to examine the test-retest reliability of a computerized cognitive screening battery in outpatients with depression. Method: Participants were 44 outpatients with depression who were enrolled in a treatment study. Their average age was 44.2 years (SD=12.4), average education was 14.2 years (SD=2.3), 53.5% were men, 77% were Caucasian, and 62.8% were employed. They were administered the CNS Vital Signs battery twice with an average test-retest interval of 6.4 days (SD=3.0, range=2-16). Patients were also administered the 17-item Hamilton Depression Rating Scale (HDRS), Montgomery-Asberg Depression Rating Scale (MADRS), and the Hamilton Anxiety Rating Scale (HARS) twice. Results: Statistically significant practice effects were present for all index scores except Memory, Verbal Memory, and Visual Memory. Most of the CNS Vital Signs index scores were not normally distributed. The Spearman test-retest coefficients were as follows: Psychomotor Speed=.92, Reaction Time=.67, Complex Attention=.78, Cognitive Flexibility=.79, Processing Speed=.88, Executive Function=.77, Memory=.44, Verbal Memory=.35, Visual Memory=.30, and Neurocognition Index=.70. The Pearson test-retest coefficients for the rating scales were: HDRS=.70, MADRS=.72, and HARS=.78. Tables for interpreting reliable change on CNS Vital Signs are provided. Conclusion: This study provides important data for clinicians and researchers on how to interpret change in cognitive functioning, as measured by computerized testing, in outpatients with depression.

C-19
The Effects of Personality Characteristics and Depression Severity on Cognitive Functioning
Kiely T, Tai C, Gomez R, Schatzberg A, Keller J

Objective: This study investigated the relationships among personality characteristics and depression severity on cognitive function in patients with Major Depression. Method: Sixty-five participants (ages 21 to 75), were recruited at Stanford University. Participants were administered the Structured Clinical Interview to determine whether they met criteria for Major Depression. Those recruited were administered the Millon Clinical Mulitaxial Inventory–III and a battery of cognitive measures, including the California Verbal Learning Task-II (CVLT-II). Regression analyses examined the relative contribution of personality traits and depression

severity on cognition. Specifically, we examined the effects of dependent and borderline personality traits on processing speed, and verbal and visual memory measures. Results: On the CVLT, the regression model significantly explained 22.1% of the variance, $F(4,61) = 3.34$, $p< .004$ for the total learning over the 5 trials. Age (Beta = -2.88, $p<.015$), borderline personality traits (Beta = -.242 , $p<.038$), and dependent personality traits (Beta = -2.42, $p<.041$) were all found to be unique predictors in this model. On the long-delay cued and free recall, the regression model accounted for 16.8% ($p<.03$) and 19% ($p<.02$) of the variance respectively. However, this same regression model did not predict a significant amount of variance in processing speed or visual memory tests (p values between .38 and .50). Conclusions: Age and personality characteristics predicted verbal working memory as measured by various scores on the CVLT-II. Borderline and dependent features had independent contributions on some aspects of verbal memory. Our findings suggest different personality traits may have unique contributions to verbal memory performance.

C-20
Cognitive Implications for Orbitofrontal Volume Loss in Late Life Depression
Rhodes E, Ajilore O, Zhang A, Kumar A, Lamar M

Objective: Volumetric measures of the orbitofrontal and anterior cingulate cortices are reduced in individuals with late-life depression (LLD) when compared to age-matched healthy controls (HC). The cognitive implications of reduced anterior cingulate in LLD include impaired cognitive interference inhibition while the functional implications of orbitofrontal reductions are not as well delineated. Method: We administered a computerized Object Alternation (OA) task – shown to measure perseveration and orbitofrontal functioning in human and non-human primate lesion studies – to 56 community-dwelling individuals: 30 HC (mean age=66.3+4.4; MMSE=29.1+1.1) and 26 unmedicated LLD (mean age=65.9+7.7; MMSE=29.1+1.0). Participants had 50 trials to achieve 10 consecutive correct alternations before task discontinuation. Structural MRI was also conducted on a subset of participants (n=17). Results: There were no between-group differences in participant characteristics. There were, however, between-group difference in OA reaction time (OA-rt) and total trials to completion (OA-ttc) such that the LLD group had longer OA-rt measures and took more trials to either learn the task or reach discontinuation criteria (all p-values<0.02). Results did not change after controlling for gross motor speed or stroke risk. Preliminary analyses of structural imaging data suggest equivalent orbitofrontal volumes between-groups. Conclusions: Within the context of similar orbitofrontal volumes, individuals with LLD still performed worse on a measure known to require this prefrontal region when compared to HC. This may point toward the use of OA as a possible marker for subtle alterations in structure/function relationships even before detectable volume loss had occurred in LLD.

C-21
Simple Auditory Processing Deficits in Schizophrenia
Ringdahl E, Sutton G, Turner A, Snyder J, Allen D

Objective: Individuals with schizophrenia exhibit deficits on neuropsychological tests requiring auditory and language processing (e.g., digit spans, verbal learning tests). While these deficits arise from dysfunction of multiple brain regions, the left superior temporal gyrus (STG) plays critical roles in auditory and language processing, and also is a key region in schizophrenia. In

schizophrenia, the extent to which simple auditory processing deficits contribute to deficits on more complex neuropsychological tasks and symptoms is unclear, as is the association between auditory processing deficits and STG volumes. This study investigated these matters by examining left and right STG volumes, simple tone discrimination, and auditory hallucinations in schizophrenia. Method: Seventeen outpatients with schizophrenia were evaluated using a standardized tone discrimination task. Additionally, STG volumes were acquired from T1-weighted magnetic resonance images and auditory hallucinations were assessed using the Scale for Assessment of Positive Symptoms. Results: Correlations indicated a large effect between left STG and tone discrimination, although no such effect was present for right STG. A large effect between tone discrimination and severity of auditory hallucinations was also present. Conclusions: Results indicate that decreased STG volume was associated with poorer tone discrimination, and poorer tone discrimination was associated with increased auditory hallucinations. The extent to which these more basic deficits in auditory processing impact performance on neuropsychological tests requiring more complex auditory and language processing abilities requires further investigation, although it is apparent that these basic auditory perception deficits are associated with more complex disease phenomenology as reflected by their association with auditory hallucinations.

C-22

Slowed Processing Speed Influences Neurocognitive Impairments in Patients with Deficit Syndrome Schizophrenia

Verbiest R, Thaler N, Strauss G, Allen D

Objective: Deficit syndrome schizophrenia (DS-SZ) is a schizophrenia subtype characterized by distinct clinical symptomatology including primary and enduring negative symptoms, poorer prognosis, and greater neurocognitive impairments than patients with non-deficit schizophrenia (ND). Prior studies have implicated slowed processing speed as a central characteristic of schizophrenia, particularly among patients with prominent negative symptoms. The current study further examined this issue by investigating the relationship between processing speed and neurocognition in a sample of DS and ND-SZ patients and controls (CN). Method: Participants included 15 DS, 40 ND, and 30 CN adults (49.5% male; mean age = 42.5) who completed a comprehensive neuropsychological battery. Raw scores on standardized neuropsychological tests were used to derive z-scores for 7 neuropsychological functioning domains, including a global cognition score that did not include processing speed. Results: Significant differences were found for all composites, such that the DS group had poorer neuropsychological performance on all domains except working memory. Regression analyses indicated that processing speed predicted global neuropsychological impairment for all groups; however, processing speed predicted global cognitive impairment to the greatest extent in DS patients. Conclusions: Results confirm that patients with DS-SZ exhibit the greatest impairment in verbal and visual memory, executive functions, and motor performance suggesting that the negative symptom subtype is associated with the poorest neuropsychological functioning among individuals with schizophrenia. Findings also suggest that slowed processing speed may have a stronger role in contributing to neurocognitive impairment in DS relative to ND patients.

C-23
The Role of Working Memory in the Evolution of Pathological Worry
Walkenhorst E, Crowe S

Objective: This project examined the role of working memory in the transformation of non-pathological worry into the pathological worry noted in individuals with Generalized Anxiety Disorder (GAD). Method: There were 50 participants. The clinical sample had been diagnosed with GAD by their treating practitioner. The diagnosis was confirmed using the Anxiety Disorders Interview Schedule (ADIS), the State Trait Anxiety Inventory (STAI) and the Generalised Anxiety Disorder Questionnaire (GAD-Q-IV). Participants were randomly allocated to a low state worry (control) or a high state worry (worry induction) conditions. Participants took part in three 5 minute control or worry-induction sessions. Between these sessions, participants completed each of the verbal, spatial and visual nback working memory tasks. Results: There were no significant differences for the verbal and spatial nback tasks across conditions. However, between-subjects 2 (participant sample: clinical vs. non-clinical) X 2 (state worry: low vs. high) ANCOVAs revealed that clinical GAD individuals induced into a high state of worry were the least accurate on the visual nback task, $F(1,46) = 7.09$, $p = .011$, $h2 = .14$, and had longer decision latencies than non-clinical individuals on the visual nback task, $F(1,46) = 7.32$, $p = .01$, $h2 = .14$. Conclusions: These results indicate that visual working memory is intimately involved in the processing of worry. Pathological worry may act to overload the capacity of the working memory system. This may be particularly detrimental when the visual working memory is overloaded, as complete emotional processing of events may also be disrupted.

Neurological and Neuropsychiatric Disorders: Treatment and Rehabilitation

C-24
Motivation for Treatment following Traumatic Brain Injury: Patient and Family Predictions
August-Fedio A, Sexton J, Cummings S, Brown K, Fedio P

Objective: Following traumatic brain injury (TBI), patients and their families have benefited from structured cognitive-behavioral and family interventions. The study was designed to investigate the importance of family perceptions in encouraging the patient to seek treatment. Method: Twelve moderate-severe TBI patients (7 males, 5 females; M=36 years of age, 4 years post injury) and family completed the Neurobehavioral Functioning Inventory (NFI) rating post TBI functioning in somatization, motor skills, attention/memory, communication, depression, and aggression. Each dyad also rated the level of satisfaction regarding the patient's current and future recovery. Finally, each patient completed the Motivation for TBI Rehabilitation Questionnaire (MOT-Q). Results: Patients' and families' ratings on the NFI placed within the average range and in close agreement. Patients' dissatisfaction with recovery was significantly related to their impairment, especially for depression (r=.80) and memory/attention (r=.75). Family members overestimated how much improvement the patients anticipated in the future. While patients generally endorsed being interested in treatment, only their current satisfaction regarding attention and depression correlated with motivation to seek treatment (r=-.51, -.48). However, the families' current and future satisfaction regarding the patients' recovery predicted the patients' motivation for treatment (current=-.56; future=-.57). Conclusions: These results suggest that family satisfaction with the patient's recovery may be the strongest motivator for the patient

seeking treatment and speak to the need to include family members in the therapeutic process. In order to maximize rehabilitation outcomes and recovery from TBI, the focus of early treatment should address discrepancies between the patient's and family's judgments regarding the effects and expectations following injury.

C-25
Differential Impact of types of PTSD symptoms on Visual Memory in Electrical Injury Patients
Grigorovich A, Fish J, Gomez M, Leach L

Objective: To investigate the effect of re-experiencing (RE), avoidance (AV) and hyperarousal (HA) post traumatic stress disorder (PTSD) symptoms on visual memory performance in electrical injury (EI) patients. Method: Data was obtained from an ongoing study of adult EI patients in a rehabilitation hospital. 30 patients (28 males) were studied, with a mean (±SD) age of 43.0±10.0 years. Posttraumatic Stress Disorder Checklist (Civilian Version) scores were used to obtain RE, AV and HA. Immediate (IVM) and delayed (DVM) visual memory was assessed using the Rey-O Figure Test. Pearson correlations were done to assess the relationship between injury, demographic factors, PTSD symptoms and IVM and DVM. A linear regression analysis was conducted to see whether RE, AV or HA best predicted IVM and DVM. Results: Injury and demographic factors were not significantly associated with RE, AV, HA, IVM or DVM. RE and AV were significantly correlated with IVM (r= -0.425, -0.466) and RE, AV and HA with DVM (r= -0.605, -0.428, -0.348), respectively (p<0.05) level. AV strongly predicted IVM score (R=0.466, p=0.014) and RE strongly predicted DVM score (R=0.605, p=0.001). Conclusion: RE and AV symptoms in EI patients are significant predictors of visual memory performance. Given that studies have suggested that initial poor memory performance may be associated with an increase in PTSD symptom severity over time (e.g. Morgan et al, 2006; Parslow et al., 2007), neuropsychological evaluation should be a standard component of the clinical evaluation of EI. A longitudinal intervention study is required to further explore these results.

C-26
Predictors of Recommended Level of Supervision following Acute Inpatient Rehabilitation
Lloyd H, Nichols M, Goldberg M

Objective: Rehabilitation treatment teams routinely make recommendations concerning the level of supervision needed by patients. No published studies were found that examined how teams decide on recommended supervision level. This study examined whether data routinely collected in inpatient rehabilitation (e.g. Functional Independence Measure [FIM], neuropsychological test results) predicts level of supervision (i.e. 24 hour versus no 24 hour supervision) recommended by treatment teams at discharge. Method: Data from 36 consecutive inpatients (22 cerebrovascular accident; 10 traumatic and non-traumatic brain injury; 4 neurologic) seen for neuropsychological evaluation were included. Data collected included: 1) FIM total motor and cognitive scores at admission, 2) total motor and cognitive FIM gain at discharge, 3) level of neuropsychological impairment as indexed by scores on the Trail Making Test, Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Neuropsychological Assessment Battery (NAB) Screening Module, and Digit Span Test (DST). A binary logistic regression was used to measure the predictive value of the aforementioned assessments. Results: Neither neuropsychological impairment level nor admission FIM scores predicted the recommended level

of supervision. Follow-up Pearson correlations revealed that RBANS List Recall and Figure Recall were the only measures that significantly correlated with recommended supervision. Conclusions: These findings raise questions about how data routinely collected in inpatient rehabilitation settings is used by treatment teams in guiding decisions regarding discharge recommendations. A better understanding of how rehabilitation professionals use available data in making discharge recommendations will become increasingly important in the age of evidence based medicine.

C-27
Assessing Effectiveness of Training in Attention Regulation Applied to Individually Defined Goals in Veterans with Chronic TBI
Novakovic-Agopian T, Chen A, Abrams G, Rossi A, Binder D, Muir J, Carlin G, Murphy M, McKim R, Fitsimmons R, D'Esposito M

Objective: Goal-Oriented Attentional Self-Regulation (GOALS) is a novel intervention designed to target deficits in executive control processes with training in attention regulation applied to participant-defined goals. In a pilot study individuals with chronic ABI significantly improved post GOALS but not brief control intervention on attention/executive function and memory measures, functional task performance, and goal-directed control over neural processing on fMRI (Novakovic-Agopian et al 2010; Chen et al 2011). The objective of current ongoing study is to assess the applicability and effectiveness of GOALS training in veterans with chronic TBI, compared to control Brain Health training (BHW) matched in intensity and duration. Method: Eleven veterans with chronic (6+months) TBI and mild-moderate executive dysfunction participated in this ongoing study. Seven completed GOALS intervention and four completed Brain-Health (BHW) control training during first 5 weeks. Participants that started with BHW switched to GOALS during second 5 weeks. Measurements at baseline, weeks 5 and 10 included neuropsychological and functional performance assessments, and self-report. Results: At week 5 participants who completed GOALS training significantly improved from baseline on measures of attention/executive function, complex functional task performance, and self-report measures, while participants who completed BHW training did not show any significant changes. Conclusions: The preliminary results suggest that GOALS training may be promising in veterans with chronic TBI and executive dysfunction. Participants found the protocol engaging, improved in targeted cognitive and functional domains, and incorporated some of the trained strategies to their daily life. The limitations of the current study and future directions are discussed.

C-28
Disconnection Syndrome: A Rare Case of Bilateral ACA Embolic Stroke
Shevchik K, McCaw W, Schrock B

Objective: Disconnection syndromes are rare and result from disruption in communication between the hemispheres of the brain. Disruption at the genu of the corpus callosum can cause sympathetic apraxia on the left upper-extremity and intermanual conflict. The purpose of this presentation is to illustrate this rare syndrome, its concomitant neuropsychological impairments, and its resolution. Method: This 36-year-old right-handed Thai male with 12 years of education and a history of cardiomyopathy, atrial fibrillation and medication non-compliance presented to the ER with dyspnea , atrial fibrillation and confusion. An MRI revealed embolic infarcts in the ACA territories bilaterally in the frontal region. The first neuropsychological assessment occurred after

admission to an acute rehabilitation unit. The second assessment occurred after admission to a post-acute rehabilitation program. Results: The first assessment revealed impaired bimanual coordination and sympathetic apraxia, particularly with limb gestures. The patient expressed surprise that his "left hand was not cooperating". The patient had difficulty crossing midline with visual, proprioceptive, kinaesthetic and auditory input. Consistent with medial involvement, the patient demonstrated long response latencies, impaired initiation and maintenance of motor programs and motor perseveration and slowed processing speed. Other evidence of frontal involvement included anosagnosia, poor self-monitoring ,ideational perseveration and verbal stereotypies. Memory was impaired. Language performance was not interpreted due to ESL. Intermanual conflict was observed in buttoning and closing doors. Repeat testing 6 weeks later revealed some improvement but not total resolution. Conclusion: This is a classic presentation of this rare syndrome and provides some evidence of pattern of resolution. Video will presented.

C-29
Paying Attention to Values Instead of Pain: Chronic Pain and Neuropsychological Functioning, as Potentially Mediated by Acceptance of Pain
Vernon A, Frank R, Zurita Ona P, Freitag E

Objective: To examine whether or not acceptance of pain mediates the association between chronic pain and neuropsychological functioning. Method: Ten community-dwelling individuals with chronic pain (lasting at least 1 year) were recruited on a voluntary basis in the Bay Area, California (7 females, mean age = 56 years). Participants' chronic pain had variable etiology, including fibromyalgia, arthritis, migraine headaches, sciatica, and neuropathy secondary to diabetes. Before and after treatment, participants completed a series of measures of acceptance of pain, experiential avoidance, coping profile, depression and anxiety, and somatization. Participants also completed a computer-based neuropsychological test of attention, memory, and processing speed (Immediate Post-Concussive Assessment and Cognitive Testing; ImPACT). Comparisons of hierarchical linear regressions were made to examine whether or not acceptance of pain mediates the association between chronic pain and neuropsychological functioning. Results: Acceptance of pain mediated the association between chronic pain and verbal memory (Adjusted $R2$ Change = .34, t = -1.23, ns), but not with visual memory (Adjusted $R2$ Change = .39, t = -2.58, p < .05). Conclusions: After participants underwent an acceptance-based treatment, increased pain severity was associated with decreased verbal and visual memory. Post-treatment, acceptance of pain mediated the association between chronic pain and verbal memory, but not with visual memory. The present study demonstrated the importance of acceptance-based treatment for individuals with chronic pain and subsequent deficits in neuropsychological functioning.

C-30
Self-Generation Enhances Verbal Recall in Individuals Infected with HIV
Weber E, Woods S, Kellogg E, Grant I, Basso M, The HNRP Group

Objective: Self-generation is theorized to enhance new learning because it involves elaborated and deeper encoding. The present study explored this approach in HIV infection, in which moderate encoding deficits are commonly observed. Method: Participants included 56 HIV-infected and 46 seronegative individuals, who learned paired word associates through either self-generated or

didactic encoding. In the didactic condition, participants received completed word pairs that they were instructed to read aloud. In the self-generation condition, participants received the first word, but the second word was self-generated based on its first letter and the given relationship between the words (e.g., "synonym"). The primary dependent variables of interest were the 20-minute delayed free recall scores from the self-generation and didactic conditions. Results: A mixed-factor ANOVA revealed main effects of HIV status ($p<0.05$) and encoding condition ($p<0.001$), but no interaction between HIV status and encoding condition ($p>0.10$). Planned comparisons showed that HIV+ individuals recalled fewer words overall compared to their seronegative counterparts ($p<0.05$), and that both groups recalled significantly more words learned in the self-generation condition ($p<0.001$). Although the interaction term was non-significant, HIV-infected individuals recalled significantly fewer words versus the seronegative group in the didactic condition ($p<0.05$; d=0.58), but performed comparably in the self-generation condition ($p>0.10$; d=0.26). Conclusion: Findings suggest that self-generation strategies may improve verbal recall in individuals with HIV infection and may therefore be an appropriate and potentially effective cognitive rehabilitation tool in this population.

Neuropsychological Domains: Memory and Amnesia

C-31
The Relationship between Intelligence and Memory Measures in a Clinical Sample
Dyer B, Daniel M, Michael P

Objective: Discrepancy analysis is a method of indentifying memory impairment which involves comparing the patient's current memory test scores with an expected level of performance, frequently an IQ score. If the memory score is significantly below the intelligence score, this discrepancy is taken as indication of a memory deficit. However, there are differing views of the relationship between intelligence and memory and accurate understanding of this relationship is critical for discrepancy analysis. Method: One hundred sixty seven adult patients [Mean (sd): age = 29.76 (10.84); education = 13.83 (2.32)] referred for neuropsychological assessment to a university doctoral training and research center were divided into three groups based on Full Scale IQ (FSIQ) and General Ability Index (GAI): below average (< 89), average (90-109), and above average (> 110). The groups' memory performance was compared on: California Verbal Learning Test- 2nd Edition (CVLT-II), Rey-Osterrieth Complex Figure Test (RCFT), WMS-III Logical Memory (LM), and WMS-III Visual Reproduction (VR). Results: The memory test differences between the below average (M: FSIQ = 86.54; GAI = 86.52) and average groups (M: FSIQ = 99.37; GAI = 98.59) were twice as great as the memory test differences between the average and above average (M: FSIQ = 107.28: GAI = 105.20) groups. Conclusions: Mean memory scores were very similar for FSIQ and GAI, suggesting discrepancy analysis is likely to result in the same findings. Memory tended to be lower than intellectual ability in individuals with above average intelligence, while the opposite pattern held true for individuals with below average intelligence.

C-32

Verbal Performance in Individuals with Deficits in Auditory Memory

Fontanetta R, Martin P, Golden C

Objective: The present study examines differences between semantic and rote memory capabilities as compared to verbal performance. Method: Participants included 511 clinical outpatient adults given a neuropsychological evaluation. Participants were 54% female, 69% Caucasian, 12% African American, and 14% Hispanic. Participants were grouped according to their scores on Logical Memory I (LMI; semantic memory) and Verbal Paired Associates I (VPAI; rote memory) from the WMS-III; below average in LM1, but average or higher in VPA1 (n=101); Below average in VPA1, but average or higher in LM1 (n=84); and Average or higher on both tests (n=326). Individuals obtaining a scaled score of 7 or lower were considered Below Average group and individuals obtaining a scaled score of 8 or higher were considered Average. These scores were compared the verbal subtests of the WAIS-III. Results: Significant differences (p<.01) were found across all WAIS subtests. Post-hoc comparisons indicated that both the Below Average LM group and the Below Average VPA group scored significantly worse than the Average group on all subtests. The Below Average LM group scored significantly worse than the Below Average VPA group on Comprehension and not the other subtests. Conclusions: These results revealed a relationship between auditory memory skills and verbal performance. It is possible that a deficit in semantic memory is related to a deficit in comprehension ability. Those who performed poorly on a logical memory test were also shown to perform poorly on a test of comprehension. This was not the case for those who performed poorly on a test of rote memory.

C-33

Influences on Cognitive Complaint Severity in a Neuropsychological Referral Sample

Gass C, Stripling A, Odland A

Objective: Investigated relative influence of psychological factors and acquired deficits in severity of cognitive complaints. Also the association between cognitive complaints, emotional complaints, and self-reported physical difficulties. Method: 100 VA patients underwent comprehensive neuropsychological examination, screened for incomplete effort (Green's MSVT) and symptom exaggeration (MMPI-2 F/Fb, T>110). Mean age: 57.9 (SD=12.7), education: 13.3 (SD=2.5), WAIS-IV FSIQ: 91.8 (SD=13.1). Diagnostically diverse sample, 40% had neurodiagnostic test findings suggestive of brain dysfunction. Tests included Cognitive Difficulties Scale (CDS), a 39-item 5-point scale self-report measure of frequency of specific problems in past week in attention and memory. Tests included WMS-IV, the WAIS-IV, and MMPI-2. Results: CDS scores were related to MMPI-2 level of self-report disclosure (scale L, r=-.38, F, r=.39, and K, r=-.46, all ps<.001), multiple R=.52. Physical complaint severity (Health Concerns Scale) was associated with disclosure level of emotional difficulties (scale L, r=-.15, F, r=.50, K, r=-.54), multiple R=.61 (p<.001). Cognitive complaints correlated with Anxiety (.50), Depression (.53), and Work Interference (.47). CDS was associated with auditory-verbal retentive memory for narrative material on the Logical Memory-II subtest of the WMS-IV (r=.30, p<.005). CDS scores were not related to WAIS-IV Working Memory Index scores (r=.00) or to WMS-IV Visual Reproduction-II scores, (r=.03). Conclusion: In a fairly typical neuropsychological referral setting, severity of cognitive complaints is substantially based on level of depression and anxiety, much less on actual memory ability as established in formal testing.

C-34

An Evaluation of the CVLT-II Substitution on the WMS-IV amongst a Mixed Clinical and Nonclinical Population

Holster J, Corsun-Ascher C, Olivier T, Golden C

Objective: The WMS-IV manual introduced a novel substitution rule in which scores from the CVLT-II may replace WMS-IV scores for Verbal Paired Associates I and II subtests; the validity of this substitution remains unclear. The purpose of the paper was to determine if this substitution significantly alters WMS-IV index scores, thus affecting subsequent analyses and diagnostic decision making. Method: Participants consisted of 70 adults aged 18 to 64 from a mixed normal (N=46) and clinical (N=24) population. The sample was 54.3% female, 64.3% Caucasian, and 85.7% right-handed, with a mean education level of 15.26 years (SD=2.39). Variables from the CVLT-II and WMS-IV were used in analyses. Results: Results were considered significant at the p < 0.05 level. When comparing WMS-IV index scores with and without CVLT-II score substitutions, paired t-tests indicated a significant difference regarding the DMI Index Score, t (69) = -2.024, in which participants generally performed better without the CVLT substitution (M=109.46, SD=13.60) than with the CVLT substitution (M=108.43, SD=14.65). No significant differences were found regarding the Auditory Memory Index or Immediate Memory Index Scores. Conclusions: CVLT-II Delayed Free Recall does not appear to be interchangeable with WMS-IV Verbal Paired Associates II. Examinees appear to demonstrate superior retention and retrieval on Verbal Paired Associates II, which could be attributed to the corrective feedback given on Verbal Paired Associates I and mandated visual interference tasks between immediate and delayed recall trials. The authors suggest that caution should be taken when utilizing this score substitution.

C-35

Pattern Recognition on the Ruff-Light Trail Learning Test (RULIT)

Legaretta M, Vik P, Van Ness E, Fowler B

Objective: To create a means to aid retrieval on the Ruff-Light Trail Learning Test (RULIT), the authors developed a Pattern Recognition procedure. Performance on this recognition component was hypothesized to correspond with measures of executive functioning (EF) and verbal memory recall. Method: Ninety-nine incarcerated women and 83 undergraduate students completed a test battery that included the RULIT, the new RULIT Pattern Recognition, California Verbal Learning Test (CVLT-SF), and a variety of EF tests. RULIT Pattern recognition included 72 RULIT images with between 3 and 6 line segments highlighted. Subjects had 2 seconds to view the card and then decide if the highlighted lines were or were not part of the trail they had learned. Results: Patterns were compared for item-corrected total correlations and percent who correctly identified the pattern. Thirty patterns were selected that varied in difficulty and complexity and were related to total score. Cronbach's Alpha was >.09 for these 30 items. Recognition correlated with verbal learning (r=.273, p<.001) and long-delay recall (r=.295, p<.001). Recognition also correlated with Matrix Reasoning (r=.304, p<.001), Trails B (r=-.270, p<.001), cancellation test speed (r=.219, p<.05), and figural fluency strategies (r=.204, p<.05). Conclusions: Pattern Recognition is a viable supplement to the RULIT. It is quick to administer and may tap working memory. Subjects must retain the brief visual image while simultaneously retrieving and comparing memory of the trail. Correlations indicate it is related to learning, recall, and processing speed.

C-36

Comparison of Short and Standard Form CVLT-II Performances in a Demyelinating Disease Population

Noll K, Denney D, Wiechman A, Stephanie T, Greenberg B, Lacritz L

Objective: Memory deficits are common in patients with demyelinating disease, though fatigue can make comprehensive cognitive testing burdensome for these patients. The utility of the CVLT-II Short Form compared to the Standard Form was examined in a demyelinating disease population. Method: The CVLT-II Short and Standard Forms were administered to 50 demyelinating disease patients as part of a larger study of cognition (M age=42.9, SD=12.1; M Edu=15.7, SD=2.4; Caucasian=90%, Female=82%). The 2 forms were administered at separate testing sessions within a 6-week test-retest interval. Comparisons were made using Pearson correlations and Chi-square tests. Results: Significant associations between forms were seen for Total Learning (Total; r=.71), Short-delay Free Recall (SDFR; r=.67), Long-delay Free Recall (LDFR; r=.80), Long-delay Cued Recall (LDCR; r=.72), Recognition Hits (Hits; r=.46), and Recognition Discriminability (d'; r=.54). Frequency of impairment (1 SD below M) did not significantly differ between forms (Total, 16% vs. 12%; SDFR, 24% vs. 32%; LDFR, 24% vs. 28%; d', 16% vs. 10%), but agreement between tests (i.e., which patients were impaired) was limited (Total, 40%; SDFR, 47%; LDFR, 37%; d', 30%). Conclusions: These results support the validity of the CVLT-II Short Form in demyelinating disease patients. Variability in impairment across tests may relate to differences in test formats, such as fewer items and shorter delays, in addition to ceiling effects on the recognition portion of the Short Form. Accordingly, the Short Form is an adequate screening tool for memory impairment, but may not be able to capture nuances of memory performance as well as the Standard Form.

C-37

The Benton Visual Retention Test Distinguishing Verbal and Non-Verbal Learning Strategies

Padua M, Sandhu K, Moses, Jr. J

Objective: The purpose of the study is to elucidate the role of the Wechsler Adult Intelligence Scale-III Digit Span (WAIS-III DS) Forward and Backwards, and Wechsler Memory Scale-III Spatial Span (WMS-III SpS) Forward and Backwards on the Benton Visual Retention Test (BVRT), particularly in defining verbal and non-verbal learning strategies. Age and years of education will be included in the analyses to understand their contributions to memory processes. Method: U.S. Veterans within the Palo Alto VA Healthcare System were randomly and consecutively referred for neuropsychological assessment. No exclusion criteria were used. These Veteran patients exhibited mixed medical and neuropsychiatric diagnoses. They were administered the BVRT, WAIS-III DS, and the WMS-III SpS; factor analyses were composed. Results: Analyses in this sample, found that the early BVRT items factored with WMS-III SpS, and these tests factored with education. The late BVRT items factored with the WAIS-III DS, and these tests factored with education. The late items of the BVRT, WMS-III SpS, WAIS-III DS were negatively correlated with age. Conclusions: This study suggests that early items on the BVRT may be related to a visuo-spatially mediated attention and concentration memory learning strategy, while the late BVRT items are better related to a verbal strategy. Years of education contributed to memory processes across tests, while age decreased memory performance on increased BVRT demand tasks. Findings support the importance of education and its impact on memory processes, and when coupled with a verbal

and/or a non-verbal learning strategy can serve as a mediator to memory performance with increased age.

C-38
The Relationship among Common Working Memory Measures
Sordahl J

Objective: The purpose of this research was to look at the construct of Working Memory and the relationship between the various psychological tests that measure it. Currently, two prominent memory measures (Wechsler Memory Scale 4th Edition (WMS-IV) and the Wide Range Assessment of Memory and Learning-2nd Edition (WRAML-2)) include their own unique methods for assessing Working Memory. Specifically, the WRAML-2 includes Verbal Working Memory and the WMS-IV Visual Working Memory. This study intended to determine whether working memory is a unitary construct (as proposed by the Wechsler Adult Intelligence Scale 4th Edition (WAIS-IV)) or in fact may be divided into verbal and visual domains. Method: Twenty-one students enrolled in undergraduate psychology courses at a private university were recruited as participants. Selected subtests from the Behavior Rating Inventory of Executive Function – Adult Version (BRIEF), WAIS-IV, WRAML2, and WMS-IV were administered to all participants for the purpose of measuring working memory constructs. Pearson correlations were used to compare normative data from each of the selected subtests. Results: Analysis indicated a significant correlation between Verbal Working Memory (WRAML-2) and Digit Span Forward (WAIS-IV) (r = .491). No other significant correlations between working memory measures were found, including the Working Memory index of the BRIEF. Conclusions: The current research findings support the dichotomy of two unique working memory constructs, Verbal Working Memory and Visual Working Memory. This was shown by the non-significant correlations between WRAML-2 and WMS-IV working memory measures. These findings suggest that working memory may not be a unitary construct.

Neuropsychological Domains: Other

C-39
Stability of an Intellectual Screening Tool before and during Antiviral Therapy for Hepatitis C
Anderson J, Wheaton V, Anderson J, Berggren K, Cheung D, Luber H, Loftis J, Huckans M

Objective: The Reynolds Intellectual Screening Test (RIST), a brief estimate of general intelligence, is comprised of two subtests measuring crystallized and fluid intelligence. The authors report a test-retest reliability of .84. However, there is little data on the degree to which illness, injury, or interventions impact performance on the RIST or if it can inform estimates of pre-morbid function in specific populations. Previous studies have shown that individuals undergoing antiviral therapy for the hepatitis C virus (HCV) experience decline in several cognitive domains. The purpose of this longitudinal study was to determine whether individuals receiving antiviral therapy would evidence decline on the RIST. Method: 25 HCV+ individuals (age = 53.24 ±7.88 years; 68% male; 44% veterans; 92% Caucasian; average length of infection = 26.25 ±12 years) were recruited through hepatology clinics in Oregon and completed the RIST before and 3 months after initiating treatment (average days between visits = 136 ±51). Results: Paired samples t-tests revealed that, compared with baseline (average Index Score = 102.8±8.4), participants demonstrated significant

improvement (p = .03) on the RIST Index at visit two (average Index Score = 106.2 ±9.3). No significant differences between visits were found on either subtest scores. Conclusions: Although conclusions would be strengthened by repeating this study in larger samples, improvement on the RIST Index score is likely consistent with practice effects. Overall, these data suggest performance on the RIST is not adversely impacted by antiviral therapy for HCV, and it may serve as a valid estimate of current and pre-treatment cognitive function in this population.

C-40
Neuropsychological Analysis of the Visual Organization Test
Bennett T, Dawson C, Soper H

Objective: Preliminary work suggested that the item percept often can be determined by only one of the two to four elements in each stimulus array, and "Visual Organization" is not needed. Those with weakness on the right side of the brain might well tend to look at individual items to determine the target, and, hence, with poor visual organization skills would still get several answers correct. Method: The 100 individual items composing the 30 stimuli for the VOT were presented individually to 191 adults, including 44 college students, all with no known neurological impairments. This was followed by the standard administration of the 30-item VOT, on which most performed well (mean = 25.4, SD = 2.92). The 100-item presentation was administered through a booklet form. 3. Results: The prior results were confirmed. For 16 of the 30 stimuli there was at least one element that alone sufficed for correct identification of the stimulus at least 90% the time, rendering "visual organization" not necessary. Also, for 24 of the items one element results in a correct score of at least half the time. Conclusions: The VOT has proven to be an excellent test to determine brain damage. Just because identification can be made from a single item, our patients do not necessarily do it, but these results do call into question the "Visual Organization" aspect of the VOT. On the other hand, other gestaltic principals may be called into use when using only a single element for making a response.

C-41
Differential Effects of Intellectual Level on Age Related Declines in Intelligence
Bennett T, Soper H

Objectives: Though intellectual declines with age have long been acknowledged, the question of interest here is the differential loss of functioning over the years among those of superior and low average intelligence. Method: We decided to compare the performances of the different age groups to those just entering adulthood at age 16. We used a current adult intellectual assessment scale, the Wechsler Adult Intelligence Scale-IV. Scores which would result in average (index = 100), superior (120) and low average (80) for each age were compared using the normative data for 16-year-olds. Results: Full Scale scores for the lower two groups start to drop after age 45, and by age 80 average functioning is equivalent to the borderline or lower range for 16-year-olds. The Full Scale IQ (FSIQ) scores for the superior group actually rise on the order of 10 points and remain above the initial score to about age 55, whence a slow decline begins. Vocabulary score held well for all groups, and verbal comprehension held almost as well. Perceptual reasoning showed declines after mid-adulthood. Working memory, surprisingly, held well into the 70s for each group, but the expected drop in processing speed after age 45 was observed. Conclusion: This study showed the expected and previously observed intellectual decline of those of average and

below intelligence, but the results indicate that those who start in the superior range hold overall ability and actually improve in FSIQ scores over the working years.

C-42
Gulf War Illness 10 Years Later: Longitudinal Neuropsychological Evaluation
Carter K, Hester A, Ringe W, Spence J, Posamentier M, Hart J, Haley R

Objective: Many veterans of the 1991 Persian Gulf War complain of multi-domain cognitive difficulties, although little is known about the stability of neuropsychological deficits over time. This longitudinal study of neuropsychological functioning investigated the course of cognitive deficits in a group of healthy veterans and those with Gulf War Illness. Method: Control (n=15, mean age 60.5 + 6.9 yrs, 12.9 + 2.3 yrs educ) and Ill veterans (GWI; n=17, mean age 59.7 + 7.6 yrs, 11.9 + 2.2 yrs educ) served in a U.S. Naval construction battalion (i.e., "Seabees") during the first Gulf War. Standard measures of intellectual functioning, visuospatial ability, language, attention/concentration, episodic memory and psychomotor speed were administered initially in 1998 (T1) and again in 2008-2009 (T2). T-test analyses compared standard score changes in Control and GWI groups between two time points. Results: Controls scored in the average range across measures at T1 with no change or slight improvement at T2. Compared to controls, over time GWI demonstrated differences (GWS<Control) on certain measures of attention/processing speed (WAIS-3 Digit Span [t(24)=2.24, p=.035], Trails A [t(24)=2.89, p=.008] & Trails B [t(24)=2.68, p=.013]), visuospatial functioning (WAIS-3 Matrix Reasoning [t(23)=2.02, p=.055]) and memory (WMS-3Auditory Immed [t(22)=2.04, p=.054], WMS-3 Auditory Delay [t(22)=2.71, p=.013], WMS-3 Visual Reproduction I [t(23)=2.37, p=.027]). Conclusion: While many aspects of neurocognition were stable over time for both groups, GWS veterans demonstrated mild declines in several domains over a 10 year test-retest period.

C-43
Utility of the WAIS-IV in a Mixed Clinical Sample
Fallows R, Pella R, McCoy K, O'Rourke J, Hilsabeck R

Objective: The Fourth Edition of the Wechsler Adult Intelligence Scale (WAIS-IV) is a significant revision of its predecessor. However, unlike the vast research on the WAIS-III, little is known about the utility of the WAIS-IV in differentiating diagnostically diverse patients in a clinical setting. Method: A mixed clinical sample of 76 veterans [86% men, age=58.1 years (SD=12.3)] displaying adequate effort were administered the WAIS-IV as part of a neuropsychological evaluation. Participants were placed into three diagnostic groups: Cognitive Disorder, Dementia, and Psychiatric Disorder. Univariate and multivariate analyses of variance were conducted to examine differences among groups on index and subtest scores. Results: Post-hoc analyses revealed the Dementia group obtained significantly lower scores on Full Scale Intelligence Quotient (FSIQ) and all indices than the other two groups, which did not differ significantly from each other. The Dementia group also obtained significantly lower scores on all subtests than the other two groups, with the exception of Matrix Reasoning. The Cognitive Disorder and Psychiatric groups did not differ significantly on any subtest. Conclusions: In a mixed clinical sample of veterans, the WAIS-IV demonstrated good overall ability to differentiate Dementia from Cognitive Disorder and Psychiatric groups. It is noteworthy that Information and Vocabulary were significantly lower in the dementia patients, calling into question their utility as "hold" subtests.

Findings from this sample suggest that Matrix Reasoning may be a better indicator of premorbid intellectual functioning.

C-44
What Does WAIS-IV Visual Puzzles Measure?
Fallows R, Pella R, McCoy K, O'Rourke J, Hilsabeck R

Objective: Little is known about what cognitive functions underlie the new Visual Puzzles (VP) subtest of the Wechsler Adult Intelligence Scale – Fourth Edition (WAIS-IV). The purpose of this study was to investigate the underlying cognitive processes involved in VP. Method: Seventy-six veterans (86% men) displaying adequate effort were administered the WAIS-IV as part of a neuropsychological evaluation. Average age of the sample was 57.6 years (SD = 12.5), and average education was 13.4 years (SD = 2.8). Correlations were conducted to examine relationships between VP raw scores and commonly used neuropsychological measures. Multiple regression analyses were conducted to determine which measures contributed the most variance to VP. Results: VP correlated significantly with Wisconsin Card Sorting Test (WCST) total categories (r=.63), Trail Making Test-B (TMT-B; r=-.51), Boston Naming Test (BNT; r=.41), FAS (r=.41), and Stroop Color-Word (r=.31). On the RBANS, VP correlated significantly with Story Memory (r=.52), Coding (r=.51), and Semantic Fluency (r=.44). A stepwise multiple regression including WCST, TMT-B, BNT, FAS, and Stroop was significant and showed that WCST total categories entered first, accounting for 40% of the variance, and BNT entered second, accounting for an additional 9%. A second stepwise regression including RBANS Story Memory, Coding, and Semantic Fluency also was significant and showed that Story Memory entered first, accounting for 27% of the variance, and Coding entered second, accounting for an additional 10%. Conclusions: Results confirmed that a strong nonverbal problem solving component underlies VP performance, as asserted in the manual. However, VP performance may also measure verbal skills, learning, and processing speed.

C-45
Test Anxiety in Relation to Measures of Cognitive and Intellectual Functioning
Gass C, Curiel R

Objective: We explored the potential impact of test anxiety on performance on the four indexes of the WAIS-III and WAIS-IV. In addition, we examined its impact on a global measure of neuropsychological test performance (Average Impairment Scale; AIS) based on a validated and comprehensive standardized test battery. We hypothesized that high test anxiety would show a significant effect on the WMI and PSI of the WAIS-III. Method: The sample consisted of 300 patients in a VA medical center. Fourteen patients were excluded due to incomplete effort, therefore, 274 men and 12 women with an average age of 59.3 (SD = 15.3), and 12.7 years of education (SD = 2.6) were included. It was 66% Caucasian/Anglo, 19% African American, 14% Hispanic, and 1% Other. The examinees were administered the WAIS-III, a comprehensive neuropsychological battery (HRNES-R; Russell & Starkey, 1993), and the Test Anxiety Profile (TAP; Oetting & Deffenbacher, 1980). Results: Level of test anxiety was significantly related to performance on the WAIS-III WMI (r = -.343, p < .001). Test anxiety was not related to overall performance on the HRNES-R (AIS). However, level of education had a collinear relationship with test anxiety in predicting working memory performance. Consistent with a body of previous research, the results of stepwise regression suggest that test anxiety is more likely a reaction to,

than a cause of, deficient working memory performance. Conclusion: These results suggest that clinicians should be reluctant to attribute poor working memory and global neuropsychological test performance to examinee-reported anxiety that occurs during the testing process.

C-46
Emotional and Personality (MMPI-2) Factors in WAIS-IV Performance
Gass C, Stripling A, Odland A

Objective: We examined the potential effects of psychological factors (MMPI-2) on WAIS-IV performance after controlling for incomplete effort and distorted symptom reporting. Method: Consecutive neuropsychological referrals (veterans, N=125) with diverse diagnoses were administered a comprehensive battery including the WAIS-IV and MMPI-2. Referrals were screened for incomplete effort (Medical Symptom Validity Test) and symptom exaggeration (F, Fb, Fp). Factor analysis (PCA/Varimax) of MMPI-2 content scales was performed. Scores on these factors were examined in relation to WAIS-IV Index scores on Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed. Potential effects of age and education were examined. Results: Factor analysis revealed three major MMPI-2 content scale factors that accounted for 71% of the total variance: Social Withdrawal/Depression, Acting Out/Anger, and Fears/Bizarre Ideation. Correlations revealed a robust relationship between Fear/Bizarre Ideation and Verbal Comprehension (r = -.33, p<.001), with marginal relations between Withdrawal/Depression and Working Memory (r=-.18), and Processing Speed (r=-.20, ps<.05). Acting Out/Anger was marginally related to Working Memory (r=-.20, p<.05). Age and education were not mediating factors. Conclusions: The MMPI-2 content scales appear to represent three broader dimensions of behavior, all of which have a mild association with working memory performance on the WAIS-IV. Processing speed was marginally related to Withdrawal/Depression. The most robust finding was an inverse relation between verbal-intellectual performance and Fears/Bizarre Ideation. In general, these results are consistent with previous investigations that suggest that clinicians should be cautious in attributing lower WAIS scores to psychological factors reflected in the MMPI-2.

C-47
Interrelationships of WAIS-IV Perceptual Reasoning Subtests in a Clinical Sample
Goldberg M, Lloyd H

Objective: The Perceptual Reasoning Index (PRI) of the WAIS-IV is comprised of three subtests, Block Design (BD), Matrix Reasoning (MR), and Visual Puzzles (VP). In the WAIS-IV normative sample correlations among these subtests were as follows: BD-MR = 0.54; BD-VP = 0.64; MR-VP = 0.64. The current study sought to determine if the strength of the relationships between the subtests held in a mixed clinical sample. Method: Data from 63 consecutive patients seen for an outpatient neuropsychological evaluation were included. The sample had a mean age of 50 ± 14 years, mean education of 14 ± 2 years, and a mean WAIS-IV FSIQ of 96 ± 14. Correlational analyses and paired t-tests were used to compare scores from the three subtests. Results: Significant correlations in this clinical sample were obtained for each comparison and were as follows: BD-MR = 0.51; BD-VP = 0.65; MR-VP = 0.31. T-tests showed significant differences between scaled scores on Block Design and Matrix Reasoning as well as Block Design and Visual Puzzles, but not Matrix Reasoning and Visual Puzzles. Notably, slightly over a third of cases (35 to 39 percent) had

scaled scores that differed by 3 or more points for a given subtest comparison. Conclusions: The normative correlations for BD-MR and BD-VP held in this clinical sample. However, the MR-VP correlation in our sample was substantially lower. Additionally, a good proportion of patients had scaled scores on these scales that differed by 3 or more points, which would complicate impressions regarding the status of complex visuospatial functioning.

C-48
A Case of Severe Dysgraphia in an Otherwise Normal Profile
Gremillion A, Nemeth D, Whittington L

Objective: According to the INS Dictionary of Neuropsychology, Apraxic Agraphia is defined as, "A writing impairment characterized by poor letter formation. While copying is slavishly produced, oral spelling may be spared. It results from impaired ability to program the necessary motor movements for writing" (Loring, 1999). "This difficulty in forming letters despite being able to spell the words orally is a form of apraxic agraphia" (Lezak, 2004). Intervention is often unsuccessful. When individuals exhibit extreme cases of dysgraphia, they often have a history of negative educational experiences. Method: Results of an evaluation of a 17 year old white male, who received occupational therapy services since elementary school, will be presented. The purpose of this assessment was to quantify his severe dysgraphia for 504 college accommodations. Results: This individual's intellectual data reveals superior verbal abilities and average performance abilities. An educational screening is consistent with his 12th grade placement. Psycholinguistically, this individual's spelling skills, although average, represent his weakest areas, with all other composite scores being within expectancy. Attentional and affective difficulties are noncontributory. Both parent and self-report measures of Executive Functions reveal difficulties with Organization of Materials. Behavioral Assessment suggests conduct and relational difficulties. Personality data suggest a positive and stable self-evaluation. In spite of this adolescent's severe dysgraphic status, the only contributing medical factor is chronic migraine headaches. Conclusions: 504 accommodations and adaptations at the college level will be needed to assist this adolescent male with successful college performance. This evaluation confirms the need for these accommodations. Examples of this adolescent's dysgraphia will be highlighted.

C-49
Social Inference, History of Conduct Disorder, & the OFC
Hu E, Vik P, Dasher N, Fowler B

Objective: Neuroimaging and neuropsychological research has linked diminished orbitofrontal cortex (OFC) activity with delinquent or psychopathic behavior. This same region is implicated in accurate social information processing and emotion recognition. Given these OFC functions, we hypothesized that history of childhood conduct disorder (CD) behavior would predict poorer inference of subtle social information cues (e.g., sarcasm and white-lies). Method: Twenty-five incarcerated men and women completed a diagnostic interview that assessed CD symptoms prior to age 15. Subjects then completed The Awareness of Social Inference Test (TASIT) and the Iowa Gambling Task (IGT). Results: CD behaviors involving violent confrontation, animal cruelty, and property destruction were counted. TASIT Sarcasm correlated in the predicted direction with CD (r=-.47, p=.02). Surprisingly, CD domains did not correlate with IGT (r=.15, p=.53) or TASIT White Lie scores (r=.21, p=.33). Results suggest that number of head injuries mediates the relationship

between CD and TASIT scores. Conclusions: Incarcerated men and women who report a history of violent and destructive behavior in their youth struggle to infer accurate meaning from social interactions. These finding offer theoretical insight into the behavioral and social implications of impaired OFC that has been documented among behaviorally delinquent youth.

C-50
Is It Possible to be Highly Intelligent yet Neuropsychologically Impaired?
Jeffay E, Zakzanis K

Objective: Literature on the neuropsychological performance of normal, healthy individuals is abundant but test performance of individuals with high educational achievement is scarce. Thus, the current study was interested if individuals with particularly high levels of educational achievement demonstrate variability in neuropsychological test performance, which cognitive domains are most variable in these persons, if the Best Performance Method proposed by Lezak is an appropriate method to estimate pre-morbid intelligence in this sample and if any of their test scores would be considered to be in the abnormal range. Method: Participants (n = 25) with a high-level of education (M = 19.6 yrs of education, SD = 3.24 yrs) were evaluated on 13 popular neuropsychological tests which spanned multiple neurocognitive domains. Results: Based on the mean Full-Scale IQ (122.4 ± 10.4), it was seemingly reasonable to assert that the participants were a uniform and unique sample of highly educated individuals. The analyses revealed that the mean maximum discrepancy score (difference between the highest and the lowest z-score) was 4.14 ± 1.25, the most variable cognitive domains were construction and verbal memory and that 44% of the participants had a least one score less than a z-score of -2.0. Conclusions: The data from this study suggest that individuals with high levels of educational achievement exhibit marked variability in test score performance, do not have cognitive abilities which are equally distributed, can be highly intelligent yet neuropsychologically impaired and that the Best Performance Method is an invalid and unreliable method of estimating pre-morbid levels of intelligence.

C-51
The Effect of Location of Brain Injury on Booklet Category Test Performance
Jordan S, DeFilippis N, Collins M, Goetsch V, Small S

Objective: Part I of this study examined whether frontal lobe injury was related to Booklet Category Test (BCT) performance. Part II investigated the BCT's multidimensionality, examining injury location and categorization scores (e.g., set loss, perseveration, spatial positional reasoning, and proportional reasoning). It was hypothesized that the mean error score and special scores would be significantly associated with injury location. Method: Archival data from a private, southeast hospital which specializes in spinal cord and brain injury treatment was used. Fifty two, 42 male and 10 female, hospitalized patients between ages 18-53 were included. All sustained a traumatic brain injury and underwent inpatient neuropsychological testing, which included the BCT. Participants were divided into frontal lobe and non-frontal lobe-injured groups. An experimental computer scoring program calculated category BCT scales. Independent samples t-tests were conducted. Results: No significant differences were found among mean BCT error score for the frontal lobe injured (N = 28, M = 76.93, SD = 26.04) and non-frontal lobe injured (N = 13, M = 66.92, SD = 24.51) groups; t(39) = 1.17, p = .251. There were significant differences among the two injury location groups for the scales of Attentional Set Loss, t(39)= 2.39, p= 0.22; and

Conceptual Set Loss, t(39)= -2.16, p= 0.37. Conclusions: Results suggest that the BCT is capable of describe underlying cognitive processes such as set loss. These additional scales may be able to offer a greater illustration of cognitive functioning beyond a single error score. Future research should include BCT performance in patients with more focal brain injuries (e.g., stroke).

C-52
Understanding the Dimensionalization of the Bention Visual Retention Test
Mansoor Y, Homer-Smith E, Lockwood C, Moses J

Objective: A previous study by the authors revealed that the Benton Visual Retention Test (BVRT) dimensionalizes into two components: the earlier easier items and the later more difficult items. The present analyses used a series of hierarchical regressions to understand the different cognitive abilities elicited by each component. Method: The sample (N=261) is from an archival database of US veterans with mixed neuropsychiatric diagnoses. The sample is 97% male (N= 253) and predominantly Caucasian (N= 198; mean age= 50, mean education= 13). Results: A series of analyses used Benton's visual perception tests, Benton's memory tests, and the WAIS-R subtests to predict the two BVRT components. When the significant variables from each model were combined, results revealed the early BVRT item component score was best predicted by BVRT-Copy format (B-weight= .24, p<.001), WAIS-R Vocabulary (B-weight= .25, p<.001) and WAIS-R Picture Completion (B-weight= .15, p<.01; R2=.23, p<.001). The late BVRT item component score was predicted by the WAIS-R Block Design (B-weight= .41, p<.001) and Serial Digit Learning Test (B-weight= .18, p<.01; R2=.27, p<.001). Conclusions: Findings strengthen the theory that the BVRT is comprised of two separate factors, and reveal which neuropsychological capacities are tapped by each. The results suggest visual attention to details (Picture Completion), graphomotor construction skills (BVRT-C) and verbal skills (Vocabulary)--assumed to represent verbal mediation--are an important aspect of performance on the early BVRT item component. Performance on the more complex late BVRT items is best predicted by abstract visual perception and reasoning (Block Design) as well as learning and memory (SDL9).

C-53
Assessing the construct validity of the Conners' Parent and Teacher Rating Scales
Martin P, Odland A, Fontanetta R, Sharma V, Golden C

Objective: The present study seeks to analyze the convergent and discriminant validity of subscales of the Conners' Rating Scales-Revised (CRS-R) between the parent and teacher forms. Method: Participants included 103 children aged 6-16 (M=10.02, SD=2.9) given a neuropsychological evaluation. Participants were 40% female, 68%, Caucasian, 11% Black, and 16% Hispanic. The CRS-R was used to assess parent and teacher ratings of observed symptoms. Results: On the CRS-R parent form, significant correlations were found between the Oppositional and Hyperactivity (.732), Anxiety (.448), Perfectionism (.454), and Social Problems (.430) subscales, between the Hyperactivity and Anxiety (.418), Perfectionism (.378) and Cognitive Problems (.418) subscales and between the Anxiety and Perfectionism (.509) and Social Problems (.492) subscales. On the CRS-R teacher form, significant correlations were found between the Social Problems and Cognitive Problems (.412), Hyperactivity (.401), and Anxiety (.471) subscales, and between the Hyperactivity and Oppositional (.674) and Cognitive Problems (.458) subscales. Significant correlations were found between parent and teacher forms on the Cognitive Problems

(.411) and Social Problems (.489) subscales. Conclusions: The parent and teacher forms were significantly correlated on only two of the six subscales. The subscales were intercorrelated within either of the parent or teacher forms better than between sources. Such a pattern brings into question the discriminant and convergent validity of subscales of the CRS-R, suggesting a greater source than trait effect when comparing parent and teacher forms. Implications for use and interpretation of the tests must be examined in future research to determine whether one or a combination of both is most clinically useful.

C-54
A Monte Carlo Study: Frequency of Normal Healthy Adults with Abnormal MMPI-2 Scores
Odland A, Martin P, Perle J, Gass C, Simco E, Mittenberg W

Objective: Previous research suggests as more scores are interpreted there is a coinciding increase in the likelihood that abnormal scores will be obtained. Interpretation of the MMPI-2 can involve the analysis of as many as 98 or more separate scores, which suggests potential for a high frequency of seemingly abnormal scores amongst normal healthy adults. Method: The incidence of elevated MMPI-2 scores was calculated for the normal population using Monte Carlo simulations. Correlations amongst scales from the restandardization sample were used to determine the percentage of the population with seemingly abnormal scores. Simulations were conducted for all scales combined, and for the Clinical, Harris-Lingoes, Content, Content Component, and Supplementary scales separately at varying T-score cutoffs. Results: 36.8% of normal adults are likely to obtain a score that would otherwise be considered clinically significant at 65T on one or more of the 10 Clinical scales. The normal incidence of at least one apparently abnormal score was 38.3% on the Content, 55.1% on the Supplementary, and 71.3% on the Harris-Lingoes scales. When all scale groups are interpreted together, at least five seemingly meaningful scores will be found for about a third of normal persons, and seven or more scales that appear to be clinically significant can be expected in 25% of perfectly normal individuals. Conclusion: These results imply that interpretation of a large number of MMPI-2 scales should be conducted with caution, and that high T-scores may be necessary for an adequate level of confidence in the absence of corroborative test scores and extra test data.

C-55
Spatial Span Assessment: Beyond Target Number
Patt V, Minassian A, Perry W

Objective: Working memory is a cognitive system that allows temporary storage of verbal, visual, or spatial information, and keeps it available for immediate processing. To assess spatial working memory, researchers typically use tests of simple span – e.g., the Corsi Block Tapping Task, where examinees are asked to remember a series of blocks tapped in a specific order, and number of blocks recalled is the sole parameter of performance. However, the short-term maintenance of spatial information involves factors beyond simple span length, for example the relative positions of target locations. The neglect of such factors, added to different procedural standards between studies, has led to marked discrepancies in the literature. The present study examines the effect of path intersection on performance in spatial span tasks– where "path" refers to the invisible line linking all consecutive target locations. Method: Normal adult volunteers, recruited to participate in a larger neuropsychological study, were administered a computerized paradigm based on the

Corsi Block Tapping Task. Stimuli were varied in both number of targets and path intersections. Results: Preliminary results reveal a significant interaction between the effects of path geometry and target number (p<0.001), such that as target number increases, stimuli with intersections become significantly more difficult to recall than those without intersections. Conclusions: These results underscore the importance of considering parameters beyond simple target number in spatial span assessment. Specifically, path intersections must be taken into account to improve assessment accuracy and reliability and better understand the mechanisms underlying spatial working memory.

C-56
Application of the RBANS Effort Index with a Mixed Clinical Population
Shaneyfelt K, Wall J, Thompson J

Objective: This study examined classification accuracy of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) Effort Index (EI; Silverberg, Wertheimer, & Fichtenberg, 2007) in a mixed clinical sample using scores obtained on the Word Memory Test (WMT; Green, 2003) as criteria. Method: Chart review of comprehensive neuropsychological evaluations administered at a Midwestern hospital between 2006 and 2011 occurred. Individuals (n = 139) were diagnosed with a neurological disorder associated with brain dysfunction (e.g. stroke, TBI, dementia, memory loss), an Axis I psychiatric disorder based on DSM-IV-TR (APA, 2000) criteria, or both. No cases were involved in active litigation proceedings or pursuing/receiving worker's compensation. The sample was 60.1% female and 93.3% right-handed. Ethnic composition was 77.5% Caucasian, 19.7% African American, 2.2% Hispanic, and 0.6% other. Mean age was 49.3 years (SD = 14.4); mean educational level was 13.5 years completed (SD = 2.4). The Effort Index (EI) was calculated in accordance with published directions (M = 1.7, SD=2.0). On the WMT, mean Immediate Recognition (IR) was 94.1% (SD=13.2), Delayed Recognition (DR) was 84.6% (SD=14.3), and Consistency (C), 78.7% (SD=16.5). Results: Using recommended cut scores (Green, 2002), failure rates were 40.3% for IR, 35.8% for DR, and 50.4% for C. With recommended cut scores, EI sensitivity rates ranged from .687 to .706, and specificity ranged between .623 and .755. Adjustment of the EI score yielded higher sensitivity and lower specificity. Conclusion: Recommendations including additional examination of the EI in clinical samples is warranted.

C-57
The Contribution of Age, Affect, Positive and Negative Symptoms, and Cortisol Level to Processing Speed in Psychotic Major Depression
Tai C, Kiely T, Compono V, Trettin L, Gomez R, Schatzberg A, Keller J

Objective: This study examined the contributions of age, affect, positive and negative symptoms, and cortisol level on two measures of processing speed in patients with psychotic major depression (PMDs). Method: Participants (age 21- 75) with different ethnicities and levels of education were recruited at Stanford University. Structured Clinical Interview for the DSM-IV was conducted to determine if the participants met criteria for PMD. Affective scale, positive symptom scale, and negative symptom scale from the Brief Psychiatric Rating Scale (BPRS) were used. Forty-three PMD participants were administered a complete neuropsychological assessment, including Trails A (TMT-A) and Stroop Word. Blood samples of cortisol were drawn hourly from 6

pm to 1 am. Using multiple regressions, the dependent variables were raw scores of the processing speed measures, and the predictors were age, affect, positive symptoms, negative symptoms, and evening mean cortisol. Results: On the TMT-A, the regression model significantly explained 32.1% of the variance, $F(5,39)=3.22$, $p<.017$. Only the affect scale of the BPRS (Beta= -.37, $p<.04$) and cortisol mean (Beta= .44, $p<.02$) were significantly unique predictors in this model. However, the regression model did not significantly predict processing speed based on the Stroop Word Test ($p<.52$). Conclusions: Cortisol level and affective factors predicted processing speed as measured by TMT-A but not Stroop Word for PMD patients. The TMT-A and the Stroop Word test often are collapsed together to measure processing speed. Our findings suggest that different aspects of processing speed (e.g., psychomotor speed vs. recognition output speed) were being measured and are influenced by different factors in PMD.

C-58
Impact of Reading Ability on the MMPI-2 Variable Response Inconsistency Scale
Tsou J, Pearlson J, Sharma V, Tourgeman I, Golden C

Objective: This study proposes to identify whether lower reading levels contribute to higher Variable Response Inconsistency (VRIN) scores. Method: Measures included the MMPI-2 and the Nelson Denny Reading Test (NDRT). The sample of 393 participants were 43.4% male, ages 16-73 (M= 31.684, SD= 12.320), with average education 13.771 years (SD= 2.424). Of the participants, 149 had at or below 8th grade NDRT Comprehension Grade Equivalent (GE), and 244 had reading ability above 8th grade GE. Results: There was a significant association between GE and a VRIN score of at least 70, $\div 2(1, 393)= 13.023$, $p< .001$. Amongst individuals with a VRIN of at least 70, 20.8% had GE at or below 8 and 8.2% had GE above 8. Participants with a GE at or below 8 were 2.94 times more likely to obtain a VRIN of at least 70. There was a significant association between GE and a VRIN of 80+, $\div 2(1, 393)= 6.551$, $p= .020$. Of individuals with a VRIN of at 80+, 9.4% had GE at or below 8 compared to 3.3% with a GE above 8. Participants with a GE at or below 8 were 3.06 times more likely to obtain a VRIN of at least 80. Conclusions: A larger percentage of those with GE at or below 8 exceeded the acceptable range of response inconsistency. Individuals with reading ability at or below eighth grade level are more likely to have higher inconsistent patterns of responses implicating that reading level must be looked at closely before the MMPI-2 protocol is interpreted.

C-59
Associations between Psychiatric Symptomatology and Neuropsychological Functioning in a VA Polytrauma/TBI Clinic
Waldron-Perrine B, Tree H, Spencer R, McGuire A, Na S, Pangilinan P, Bieliauskas L

Objective: Psychiatric symptoms influence performance on cognitive tasks. However, findings have been mixed. The purpose of the present study was to establish the influence of psychiatric symptoms on cognitive test performance within a VA polytrauma/traumatic brain injury (TBI) clinic. Method: Veterans completing level 2 screens for TBI (n= 55, 97% male; age= 38.3 [15.1]) underwent neuropsychological testing as a part of a comprehensive evaluation. Participants also completed the Posttraumatic Stress Disorder Checklist- Military Version and the Hospital Anxiety and Depression Scale. Participants were excluded if they failed a well-validated measure of effort, the TOMM. Correlational analyses were used to establish the relationships between psychiatric

variables (anxiety, depression and PTSD) and cognitive variables (memory, processing speed, attention and executive functioning). Results: Associations among measures of anxiety, depression and PTSD were large (rs= .64 - .68). Depression was significantly negatively associated with initial registration of information (CVLT-T1; r=.34, p<.01) but no other cognitive variables. PTSD symptoms were significantly negatively associated with processing speed and cognitive flexibility (Trails B; rs=.29-.41, p<.05), whereas general anxiety was positively associated with response inhibition (Stroop Interference) and verbal memory recall (CVLT-delay; rs=.30-.37, p<.05). Conclusions: Despite strong associates among them, psychiatric symptom presentations demonstrate differential patterns of relationships with cognitive variables. Whereas depression is associated with decreased attention, PTSD is associated with reduced processing speed and flexibility. Interestingly, anxiety symptoms were positively associated with memory and performance on a task of mental control (inhibition of an overlearned response). This suggests that anxiety may be somewhat adaptive in terms of cognitive task performance.

C-60
A Domain Analysis of Clock Drawing Errors in a Memory Clinic Sample
Webbe F, Polott S, Mulligan K

Objective: The present study aimed to characterize clock-drawing errors within cognitive domains through exploring correlations among errors and neuropsychological measures. It was hypothesized that placing hands to the incorrect time would correlate negatively with measures of memory, and major spacing errors would correlate negatively with measures of executive functioning. More broadly, the current study proposes the analysis of qualitative clock features as opposed to an overall score to enhance our understanding of the deficits seen in abnormal aging. Method: The sample was 140 most recent patients (aged over 59; 60% female) from the East Central Florida Memory Disorder Clinic who had completed comprehensive memory evaluations including a brief neuropsychological assessment. A clock-drawing test using a pre-drawn circle with a maximum score of 10 points was given to each participant. Errors were categorized and tallied for each participant, and correlated with the neuropsychological measures. Results: The most common error types were failure to differentiate hands (37%), and minor spacing (26%). 22% of participants made incorrect time errors, and 17% made major spacing errors. Verbal retention scores were significantly correlated with an incorrect time error (r= -.234, p<.005). Trails B scores were significantly correlated with major spacing errors (r= -.223, p<.035), and Stroop color-word scores (r= -.261, p<.004). Conclusion: Although limited in strength, these significant correlations demonstrate that clock drawing errors and patterns of errors may be related systematically to specific cognitive domains, which adds a component to diagnostic characterization over and above a total error score.

C-61
Factorial Components of WAIS-IV Indices, Visual Assessments, and Demographic Variables
You S, Moses J

Objective: Factorial components of the Wechsler Adult Intelligence Scale-Revised (WAIS-R), Visual Naming subtest of the Multilingual Aphasia Examination (MAE), Benton Visual Retention Test (BVRT), Visual Form Discrimination Test (VFDT), age and education were factored as a group of variables to assess their common verbal, visual, and memorial components. Method: Archival

clinical test data for all participants who had completed each of the test variables in the analysis were included in the sample. There were no exclusion criteria. Results: The first orthogonal component included the WAIS-R Verbal Comprehension [VC] factor (loading = 0.866), MAE Visual Naming [VN] (loading = 0.700), years of education (loading = 0.598), and the first factor (items 1 – 4) of the BVRT loading = 0.425). The second orthogonal principal component included the WAIS-R Perceptual Organization [PO] factor (loading = 0.864), age (loading = - 0.758), the second BVRT factor [items 5 – 10] (loading = 0.513) and VFDT (loading = 0.376). The third orthogonal component consisted of the WAIS-R Freedom From Distractibility [FFD] factor (loading = 0.897), the VFDT total score (loading = 0.561), and the second factor of the BVRT (loading = 0.488). Conclusions: The combination of VC and years of education in the first component models crystallized intelligence, while VN also is a verbal mediation measure that plays a role in the initial four BVRT items that are readily named. The second and third components show selective relationships of the BVRT items 6 – 10 to both visual feature analysis (PO) and working memory (FFD).

Professional Issues: Effort and Motivation

C-62
On the Nature of Effort and Neuropsychological Science
An K, Jeffay E, Zakzanis K

Objective: The use of undergraduate participants as baseline controls in neuropsychological research studies has been an increasingly popular practice, but concerns about participant effort of this population have not been previously investigated. The purpose of the present study was to examine whether undergraduate introductory psychology students exercise variable effort in neuropsychological testing and how effort might moderate neuropsychological experimental results. To this end, we hypothesized that a substantial portion of participants that we employ in our neuropsychology studies exert suboptimal effort. Furthermore, we examined the temporal stability of effort and the variables that might mediate or predict poor effort. Method: Participants (n = 36) were administered 3 Symptom Validity Tests (SVT) (Test of Memory Malingering, Dot Counting Test, Victoria Symptom Validity Test) and various neuropsychological tests during 2 separate testing sessions at least 4 weeks apart. Results: The analyses revealed 55.6% of participants in Part 1 and 38.5% of participants in Part 2 exerted poor effort on at least one SVT. Poor effort on the SVTs was significantly correlated with poor performance on various neuropsychological tests. Moreover, there was support for the temporal stability of effort and age as a significant mediator of effort. Conclusions: These preliminary results suggest that the base rate of suboptimal effort in a healthy undergraduate population is quite high, and thus question the validity of scientific findings in neuropsychology where such research samples are utilized as baseline controls. Accordingly, effort may serve as a source of variance in neuropsychological research when using undergraduate students.

C-63

Motor dysfunction profiles in a simulated chronic pain sample

Biddle C, Fazio R, Willett K, Rolin S, O'Grady M, Denney R

Objective: To establish a motor dysfunction profile for those who exaggerate or malinger chronic pain such as established by Greiffenstein, Baker, and Gola (1996) for postconcussion syndrome. Method: Participants were 36 graduate students. All were administered the finger tapping test, grip strength, and grooved pegboard during a first administration. Tests were re-administered several months later after reading a script instructing them to exaggerate chronic pain for a compensation case (adapted from McGuire, Harvey, & Shores, 2001). Results: Participants significantly suppressed their performance across all tests, with both dominant and non-dominant hands (Wilcoxon signed ranks tests due to skewed distribution of pain data, all z > 4, all p <.001). Subjects suppressed finger tapping most strongly (29.8 difference in t-score), followed by grip strength (24.2 difference in t-score), and grooved pegboard (16.9 difference in t-score). Conclusions: These results are both similar and different from the Greiffenstein, et al. (1996) study of motor dysfunction profiles. While they are similar in that these simulators also showed a counter-intuitive pattern of motor dysfunction, they are different in the specific pattern. Those with post-concussive syndrome showed a progressive increase in performance from grip strength to finger tapping to grooved pegboard. The chronic pain simulators showed a "v"-shaped pattern with finger tapping relatively more suppressed. Future research should compare motor dysfunction profiles in a known-groups sample of chronic pain patients to further evaluate the use of motor dysfunction profiles as an embedded validity index for those presenting with chronic pain.

C-64

Use of the Cognitive Stability Index to Measure Level of Motivation Among Military Service Members Undergoing Disability Evaluations

Bresnan K, Erlanger D, Seegmiller R, Kaushik T

Objective: This study is a preliminary investigation to develop an embedded effort measure for the Headminder Cognitive Stability Index (CSI), a 30 minute computer-based neuropsychological screening battery that has been validated for assessment of TBI in both civilian and military populations. Method: Military members undergoing disability evaluations who were referred for neuropsychological testing, and who had completed at least two established "stand alone" or "embedded" symptom validity measures were included in the study. Forty-eight subjects passed all symptom validity measures (the "optimal effort" group) while 32 subjects failed two or more symptom validity measures (the "suboptimal effort" group). An experimental Effort Index was developed for the CSI based on suspected suboptimal effort scores on seven embedded measures. Classification agreement between the CSI Effort Index and established symptom validity measures was investigated. Results: For a specificity of 94.5%, the CSI Effort Index was able to detect suboptimal effort with a sensitivity of 53%, a positive predictive value of 85%, and negative predictive value of 75%. Overall accuracy was 77.5%. Conclusions: These findings demonstrate that the CSI Effort Index has the ability to accurately detect suboptimal effort on cognitive testing by persons undergoing disability evaluations. A unique advantage to this study was the use of real patients undergoing disability evaluations rather than poor effort simulators. However, this study may be limited in its generalizability since the subject population consisted solely of military

service members. Validation studies are needed to determine the generalizability of these findings across different populations, and optimal CSI Effort Index cutoff scores.

C-65
TOMM Trial 1 Performance as an Indicator of Effort in Children and Adolescents with Neurological Disorders
Brooks B, Krol A, Carlson H, Sherman E

Objective: Measurement of effort is an important component of neuropsychological evaluations, including pediatric assessments. However, given the increasing demands on clinicians' time and the need for efficiency during assessments, brevity of effort testing is optimal. Recently, there has been evidence that performance on Trial 1 of the Test of Malingering of Memory (TOMM) can be used as a stand-alone indicator of effort in adults. The purpose of the present study is to examine whether performance on Trial 1 of the TOMM is predictive of overall performance (i.e., passing Trials 2 and/or 3) in children and adolescents with neurological disorders. Method: Participants included 53 children and adolescents between the ages of 6 and 19 years (mean = 12.4, SD = 4.1) who were referred for a neuropsychological assessment through a neurology clinic at a tertiary care hospital. Results: All of the children (n=33/33) who obtained a Trial 1 score of 45 or higher also passed Trial 2/3. Of those scoring below 45 on Trial 1, only 15% (n=3/20) were unsuccessful in passing the TOMM. Conclusion: In pediatric neurology patients, adequate performance on Trial 1 of the TOMM is indicative of test-taking compliance and can be used reliably as a quick screening measure.

C-66
Phonemic Word Generation Effort Cut Scores in a Civil Forensic Sample
Davis J, McHugh T, Axelrod B, Hanks R

Objective: Phonemic word generation (PWG) has shown promise as an effort measure. This retrospective study examined demographic corrected T-scores on PWG (letters: FAS) in a sample seen for independent medical examination at a private neuropsychology practice. Method: Inclusion criteria were history of mild traumatic brain injury, age 18-65 years, and completion of a neuropsychological evaluation with at least two separate effort measures. Cases involving English as a second language or special education were excluded. The sample (N = 167) was 46% female, 70% Caucasian, 90% right-handed, and averaged 43 years of age and 13 years of education. Performance on effort measures yielded groups that passed all (Pass; n = 69), failed one (Fail-1; n = 33), and failed two or more (Fail-2; n = 65) measures. The three groups did not differ in gender, ethnicity, or handedness. Because groups differed in average age (Pass = 40; Fail-2 = 47) and education (Pass = 13.7; Fail-2 = 12.5), demographic corrected T-scores were used. Results: The Pass group scored higher than the other groups on PWG raw and demographic corrected T-scores. Receiver operating characteristic analysis was used to determine a PWG demographic corrected cut score to differentiate Pass and Fail-2 groups. The PWG cut score (T-score <=30) correctly classified 97% of Pass and 33% of Fail-2 cases; 3% of Fail-1 cases were below cut off. Conclusions: A PWG cut score showed good specificity with low sensitivity for independent use as an effort measure. It may be useful in combination with other performance validity indicators.

C-67

Does Consideration of Response Latency Improve Classification with the Word Memory Test?
Davis J, Wall J

Objective: This study examined the classification accuracy of previously identified response latency (RL) cut scores on the Word Memory Test (WMT) in a cross-validation sample using a simulated malingering design. Method: These data were collected in a posttest-only experimental study conducted at a Midwestern university during 2009-2011. Undergraduates without reported neurologic history were randomized to control (n=34), naïve simulator (n=34), and coached simulator (n=33) groups. The sample was 87% female, 70% Caucasian, and 94% right-handed; average age was 23 years; average education was 13 years. Outcome measures included the WMT and a protocol adherence questionnaire. Results: Groups were not different in demographic variables or protocol adherence. Groups differed on WMT effort indices and RL. Control participants showed higher WMT scores and lower RL than simulators. WMT effort indices correctly classified 94% of control participants, 59% of naïve simulators, and 39% of coached simulators. Previously identified Immediate Recognition RL cut offs classified 97% of control participants and 21-38% of simulators; Delayed Recognition RL cut offs classified 94% of control participants and 32-39% of simulators. When RL cut offs were combined with standard WMT effort indices, classification accuracy was 85% for control participants, 62% for naïve simulators, and 49% for coached simulators. Conclusions: On cross validation, previously identified RL variables showed adequate specificity but low sensitivity. Combining RL and standard WMT effort indices resulted in improved sensitivity, but the false positive rate (15%) exceeded conservative limits. Further examination of the utility of these cut scores is necessary prior to their clinical use.

C-68

The Effects of Feedback, State Anxiety, and Gender on Neuropsychological Test Performance
DeRight J, Jorgensen R, Lewandowski L, Ortigue S

Objective: The main objective of this study was to explore how feedback and expectations for test performance are related to worsened neuropsychological test performance. It was predicted that negative feedback would have a more salient effect on test performance than positive feedback, particularly in more complex tests. In addition, the roles of state anxiety and gender were analyzed in exploratory analyses. Method: Sixty-five healthy undergraduate participants (33 males and 32 females) completed two sessions of the CNS Vital Signs (CNSVS) battery. To feign an evaluative scenario, participants completed an arithmetic 1-back test that appeared to them as the "postgraduate aptitude test." Participants were given feedback after this difficult task and subsequently completed CNSVS again. Results: Repeated measures ANOVA was used to examine the relationship among feedback and neuropsychological test performance. Results from these analyses showed a significant interaction for feedback group in the complex trials of the Stroop test. Exploratory analyses showed significant gender differences reaction time, right hand finger taps, and verbal memory. Linear regressions showed significant relationships between combinations of state anxiety, feedback, gender, and cognitive test performance, such that the effect of state anxiety on test performance varied with gender and feedback type. Conclusions: Results from this study support the notion that feedback and state anxiety can lead to changes in test performance and that gender may be an important factor in interpreting test results.

Additional research is needed in this area, however these results present potentially important results for the role of external variables in neuropsychological testing.

C-69
Do Administration Instructions Alter Optimal Neuropsychological Test Performance? Data from Healthy Volunteers
Etherton J, Axelrod B

Objective: The objective was to examine whether performance during testing may be optimized by differing types of instructions to test-takers, including informing participants that poor effort could be detected. Method: Healthy undergraduate volunteers (total n = 59) were randomly assigned to 3 different instructional sets prior to completing several neuropsychological instruments. The instructions provided different levels of motivation to perform optimally: Condition 1 was informed that task difficulty would vary; Condition 2 was also instructed, "... try your best on all of the items"; Condition 3 received the above instructions plus, "...and we have a number of methods to determine if you are actually trying your best on these tasks". All three instructional set conditions completed the California Verbal Learning Test-2, WRAT-3, Trail Making Test, Controlled Oral Word Association Test, WAIS-III Digit Span and Letter-Number Sequencing, Symbol Digit Modalities Test, and Finger Tapping Test. Results: No significant group differences were observed across embedded measures or effort or nearly all neuropsychological measures. The only exception being poorer performance on Finger-Tapping Test by Condition 3, attributable to four outliers in that group. Conclusions. These results suggest that the nature of instructions provided does not have an appreciable difference on performance of effort or cognition. Concerns about the precise wording of pre-assessment instructions to examinees may be misplaced, and effort should be explicitly evaluated in clinical settings.

C-70
Utility of Symptom Validity Testing (SVT) in the Case of an 8-Year-Old Girl Reporting New Onset of Post-Concussive Symptoms 18 Months after a Mild Traumatic Brain Injury (TBI)
Green C, Snead H, Kirk J, Connery A, Kirkwood M

Objective: Recent research has shown that many SVTs developed for adults are useful for identifying suboptimal effort in children and adolescents. The current case highlights the utility of incorporating SVTs into child neuropsychological evaluations, particularly in the context of mild TBI. Method: A female initially presented for clinical neuropsychological consultation at age 7 after sustaining a mild TBI. No loss of consciousness or neuroimaging abnormalities were identified, and the patient fully recovered within 6 months. However, she reported a resurgence of suspected post-concussive symptoms (e.g., emotional lability, academic difficulties, headaches) approximately 18 months post-injury without a clear mechanism of re-injury or other neurological explanation. The onset of concerns coincided with academic stressors. Neurological exam at this time was unremarkable. Results: During the first evaluation at age 7, the patient demonstrated adequate effort on the Test of Memory Malingering (TOMM; Trial 1=45, Trial 2=50, Retention=50). Neurocognitive performance was intact aside from low average processing speed. Upon re-evaluation at age 8, performance on the TOMM was significantly worse than chance (Trial 1=18, Trial 2=16, Retention=11). Green's Medical Symptom Validity Test (MSVT) scores were also suboptimal (IR=45%, DR=45%, CNS=50%, PA=30%, FR=5%). Performance on objective cognitive

testing was significantly lower than previous testing on many measures. Conclusions: Given these findings of below-chance performance, we believe the patient did not likely sustain a second mild TBI. Motivation for suboptimal effort was determined to be school-related stress and anxiety, which guided treatment recommendations.

C-71
Efficacy of Embedded Validity Indices of the Booklet Category Test in a Criminal Forensic Population
Hanson Misialek L, Fazio R, Denney R, Myers W

Objective: To examine the efficacy of six commonly used embedded validity indices in the Booklet Category Test (BCT) in a criminal forensic population. Method: Participants were 154 inmates from within the Federal Bureau of Prisons referred for neuropsychological assessment. Participants were a mixed diagnostic group. All participants were administered the BCT and at least two other validity indices. The Slick, et al. (1999) criteria were used to classify participants into malingered neurocognitive dysfunction (MND) and presumed valid (PV) groups. BCT indices examined were Total Errors, Errors on Subtest I & II, Errors on Subtest VII, Bolter Items, Easy Items, and Total Positive Indices. Results: Forced entry binary logistic regression demonstrated significant results (χ^2 (4, N = 128) = 37.88, p < .001). The regression suggested only Subtest I & II made a significant contribution to the model (OR = 27.74). Indices were compared using receiver operating characteristic (ROC) curves. Subtest I & II was the most effective index with an AUC of .72 and a classification rate of 71%. AUCs for the other indices ranged from .61-.66. ROC comparisons showed no significant differences as the p < .05 level, but there were several trends for Subtest I & II compared to other indices (p = .06-.08). Conclusions: Only errors or Subtest I & II showed adequate sensitivity and specificity at the currently accepted cut score within a criminal forensic population. Adjustment of the cut scores for other indices would result in acceptable specificity, but with low (less than 35%) sensitivity.

C-72
The Influence of Mood and Anxiety Symptoms on Effort Test Performance in a VA Polytrauma TBI Clinic
McGuire A, Tree H, Waldron-Perrine B, Spencer R, Pangilinan P, Bieliauskas L

Objective: Veterans returning from military duty frequently experience psychiatric symptoms. When evaluating cognitive functioning, it is important to understand the potential influence of those symptoms on neuropsychological test performance. This study examined the degree to which anxiety and depression symptoms influence effort on neuropsychological testing. Method: Combat veterans [n= 249; 97% male; age= 37.6 (14.5)] reporting possible traumatic brain injury (TBI) completed a neuropsychological screen as part of a medical evaluation in a Polytrauma/TBI Clinic. Instruments included the Hospital Anxiety and Depression Scale, and tests of cognitive abilities. Poor effort was defined as failure on the Test of Memory Malingering (TOMM). Independent samples t-tests were used to look at the difference in psychiatric symptoms in those who passed or failed the TOMM. Results: Independent samples t-tests revealed that those who fail a test of effort report a higher prevalence of symptoms of depression [t(249)= 3.50, p= <.01] and anxiety [t(249)= 1.96, p= <.05]. Conclusions: Failure of effort measures is relatively common in a Polytrauma/TBI clinic, though, the reason for this is not always clear. Although independent

validity of the psychiatric presentation was not established, the findings of this study suggest that poor effort is related to higher rates of reporting of psychiatric symptomatology. Thus, psychiatric symptoms should be routinely measured during a neuropsychological evaluation, and effort test performance should be interpreted in the context of this information.

C-73
The Influence of PTSD Symptoms on Effort Test Performance in a VA Polytrauma/TBI Clinic
Na S, Waldron-Perrine B, Tree H, Spencer R, Pangilinan P, Bieliauskas L

Objective: Veterans assessed for possible traumatic brain injury (TBI) in a VA polytrauma clinic often report symptoms of post-traumatic stress disorder (PTSD). Additionally, within this population, failure of measures of effort is relatively common, although the reason for this is as yet unclear. This study was conducted to evaluate the influence of PTSD symptoms on effort test performance. Method: Veterans (n = 249; 97% male; mean age = 37.6, SD = 14.5) completing a level 2 screen for TBI were given a neuropsychological battery as a part of a comprehensive diagnostic evaluation. The Test of Memory Malingering (TOMM) was used as a measure of effort. Participants also completed the Posttraumatic Stress Disorder Checklist-Military Version (PCL-M), a self-report of PTSD symptoms. Based on published standard cutoffs, patients either passed or failed the TOMM and were diagnosable as having PTSD or not. Results: Chi-square analysis revealed that veterans with PTSD failed effort testing at higher rates than would be expected (χ^2 = 21.15, p<.001). Conclusions: Veterans who report greater PTSD symptoms are more likely to fail effort tests than those reporting fewer symptoms. Although we did not establish the validity of the psychiatric (PTSD) symptom presentation, previous research indicates validity of psychiatric symptoms and validity of cognitive presentation are separate entities. Thus, we would not necessarily expect invalid psychiatric symptom reporting to affect effort. The finding of effort test failure among veterans reporting PTSD may represent inattention secondary to psychiatric dysfunction that results in poor sustained effort toward cognitive tasks.

C-74
The Difference Between Block Design and Tower as an Assessment of Response Bias
Peck C, Schroeder R, Boatwright B, Heinrichs R, Baade L

Objective: In 1995, Mittenberg, Theroux-Fichera, Zielinski, and Heilbronner proposed an embedded measure of response bias that examined the difference between Vocabulary and Digit Span (V-DS). To date, no additional studies have examined the utility of subtest differences across neuropsychological domains. The purpose of the current study was to examine sensitivity and specificity of the difference between the WAIS Block Design and DKEFS Tower subtests within a diverse group of outpatient referrals. Method: This is an archival study that utilized patients (N=91) referred for outpatient neuropsychological evaluations. Patient diagnostic groups were the following: TBI=23, Psychiatric=18, Dementia=16, Other Neurological = 11, and Non-Credible = 20. Utilizing Slick et al. criteria, 71 neuropsychological profiles were deemed valid, while 20 were considered invalid. Following this classification, the authors calculated sensitivity and specificity rates to establish a cutoff score that provided at least 90% specificity. Results: A subtest difference cutoff score of >4 misclassified four valid profiles, resulting a specificity rate of 94% across clinical subgroups. The >4 cutoff accurately classified six of the 20 invalid profiles resulting in a 30% sensitivity. Conclusions: The >4 cutoff recommended by this study provides adequate specificity

rates within a mixed clinical group, including patients with dementia. Future research is recommended to further establish the utility of this study's recommended cutoff in a diversity of clinical settings.

C-75
Embedded Validity Measures for a Computerized Cognitive Test Battery
Rohling M, Hill B, Ploetz D, Womble M, Shenesey J

Objective: This study focused on validating embedded symptom validity tests (SVTs) for a computerized cognitive test battery. Method: 40 undergraduates participated. Subjects were randomly assigned to be either malingering simulators or controls. They completed the Word Memory Test (WMT) and CNS-Vital Signs (CNSVS) computerized cognitive test battery. Additionally, data from 23 clinical cases who also completed the WMT and CNS-VS were included in either the simulator or control group based on their WMT performance. The following measures from the CNS-VS were examined as embedded SVTs based on their ability to correctly classify an individual as either in the malingering simulator or control group: Finger Tapping (Avg. for both hands < 30), Verbal Memory Immediate Correct Hits (< 10 correctly recognized), Visual Memory Immediate Correct Hits (< 10 correctly recognized), & Reliable Digit Span (< 7). Results: The CNS-VS embedded SVTs correctly classified individuals to their known group 75% of the time (Sensitivity = 0.70; Specificity = 0.78; PPV = 0.82; NPV = 0.64). An ANOVA was conducted to examine the CNS-VS Neurocognitive Index (NCI) score between the known groups. A significant main effect was obtained; those in the genuine condition performed significantly better on the NCI than those in the malingering simulator condition (p < .0001). Conclusions: The embedded SVTs proposed in this study for the CNS-VS were able to accurately classify feigned versus genuine performance on this computerized test battery. These findings have particular relevance given the increasing use of computerized test batteries for baseline cognitive testing and return to play decisions after concussion.

C-76
MMPI-2-RF Restructured Clinical Scale Analysis in a Known Groups Litigating Traumatic Brain Injury Sample
Schroeder R, Baade L, VonDran E, Webster B, Brockman C, Burgess A, Heinrichs R

Objective: The Minnesota Multiphasic Personality Inventory – 2 (MMPI-2) is the most widely used measure of psychopathology in neuropsychological assessment. With the advent of the MMPI-2 Restructured Form (MMPI-2-RF), the original scales have been replaced with new 'restructured' scales, and it is relatively unknown how these new scales function within neuropsychological populations. Additional research on this measure is needed, especially with forensic neuropsychological populations. Method: Archival data from 44 litigating traumatic brain injury patients were examined. Of these patients, 17 met Slick et al. criteria for probable neurocognitive malingering while 27 did not. MMPI-2-RF RC Scales were examined for both groups. Results: Mean scores on the D, 1, 2, 7, 8, and 9 scales were significantly higher for the probable malingering group. The credible group did not score significantly higher than the probable malingering group on any scale. Mean scores on the D, 1, 2, 3, 4, 6, 7, 8, and 9 scales were 62, 83, 65, 51, 49, 59, 53, 63, and 45, respectively, for the probable malingering group. Mean scores were 56, 68, 56, 50, 48, 54, 49, 54, and 45, respectively, for the credible group. Conclusions: The credible group achieved

mean scores at or above a T-score of 65 on only Scale 1 (T=68). Though the probable malingering group scored significantly higher on multiple scales; it achieved mean scores at or above a T-score of 65 on only Scales 1 (T=83) and 2 (T=65).

C-77
Ability of the MMPI-2-RF FBS-r to Differentiate a Known Groups Litigating Traumatic Brain Injury Sample
Schroeder R, Baade L, VonDran E, Webster B, Brockman C, Heinrichs R

Objective: Much research has been conducted on the FBS from the Minnesota Multiphasic Personality Inventory – 2 (MMPI-2). However, the FBS has been revised for the newer MMPI-2 Restructured Form. To date, only one study has reported sensitivity and specificity rates for FBS-r scores in known group samples (Wygant et al., 2009). That study indicated that a T-Score cutoff of 90 might be useful in differentiating groups of patients who pass and fail SVTs. The current study further examines the FBS-r. Method: Archival data from 44 litigating traumatic brain injury (TBI) patients were examined. Of the patients, 17 met Slick et al. criteria for probable neurocognitive malingering while 27 did not. The FBS-r scores were examined. Results: For both males and females to achieve a specificity rate of at least 90%, a T-Score cutoff >89 had to be utilized. This resulted in a specificity rate of 100% for males and 95% for females. Additionally, it resulted in sensitivity rates of 55% for males and 57% for females. Because the same cutoff score resulted in specificity rates above 90%, a combined non-gendered group was formed. The T-Score cutoff of >89 resulted in a specificity rate of 96% and a sensitivity rate of 56% in this group. Conclusions: The results of the study are consistent with the only other study to validate the FBS-r in a known group litigating TBI sample. Specifically, a T-Score cutoff of >89 produced adequate sensitivity and specificity rates for both male and female patients.

C-78
Ability of the MMPI-2-RF Fs, F-r, and Fp-r Validity Scales to Differentiate a Known Groups Litigating Traumatic Brain Injury Sample
Schroeder R, Baade L, VonDran E, Webster B, Brockman C, Heinrichs R

Objective: The Minnesota Multiphasic Personality Inventory – 2 (MMPI-2) is widely utilized during neuropsychological evaluations. With the advent of the MMPI-2 Restructured Form (MMPI-2-RF), there are new and updated validity scales, though very little research has been conducted with these scales. This study sought to validate the Fs, F-r, and Fp-r in known groups litigating traumatic brain injury (TBI) samples. Method: Archival data from 44 litigating traumatic brain injury patients were examined. Of these patients, 17 met Slick et al. criteria for probable neurocognitive malingering while 27 did not. MMPI-2-RF Fs, F-r, and Fp-r Scales were examined for both groups. Results: On the Fs Scale, a T-Score cutoff of >83 resulted in 96% specificity and 50% sensitivity. On the F-r Scale, a T-Score cutoff of >88 resulted in 93% specificity and 39% sensitivity. On the Fp-r Scale, a T-Score cutoff of >68 resulted in 93% specificity and 17% sensitivity. Conclusion: Of the three validity scales examined, the Fs Scale produced the best results in discriminating between litigating TBI patients who met Slick et al. criteria and those who did not.

C-79

Can the MMPI-2-RF RC Scales 1 and 3 Differentiate Litigating TBI Patients Who Pass and Fail Slick et al. Criteria?

Schroeder R, Baade L, VonDran E, Webster B, Brockman C, Heinrichs R

Objective: Larrabee (1998) has indicated that Scales 1 and 3 from the Minnesota Multiphasic Personality Inventory – 2 (MMPI-2) can differentiate malingering and non-malingering patients. It is unknown, however, if the new restructured clinical scales (RC scales) of the MMPI-2-RF can differentiate between malingering and non-malingering patients. This study was conducted to determine if either or both scales can differentiate known groups litigating traumatic brain injury (TBI) samples. Method: Archival data from 44 litigating TBI patients were examined. Of these patients, 17 met Slick et al. criteria for probable neurocognitive malingering while 27 did not. RC Scales 1 and 3 were examined for both groups. Results: A t-test indicated that patients who met Slick et al. criteria scored significantly higher on RC Scale 1 (p < .001) than patients who did not meet Slick et al. criteria. There were no significant differences between the two groups on RC Scale 3 (p = .662). Consequently, only RC Scale 1 was further examined. On this scale, only one patient scored a T-Score above 85 in the credible group, whereas eight patients scored above this cutoff in the malingering group. Overall, the T-Score cutoff of >85 resulted in a specificity rate of 96% and a sensitivity rate of 47%. Conclusion: This study found that RC Scale 1 discriminated between litigating TBI patients who met Slick et al. criteria for probable neurocognitive malingering and those who did not meet the criteria.

C-80

MMPI-2-RF Somatic/Cognitive Scales in a Known Group Litigating TBI Sample

Schroeder R, Baade L, VonDran E, Webster B, Brockman C, Heinrichs R

Objective: The Minnesota Multiphasic Personality Inventory – 2 Restructured Form (MMPI-2-RF) includes new and restructured sets of scales. One of the new sets of scales that is of potential interest to neuropsychologists is the Somatic/Cognitive set. This set includes the Malaise (MLS), Gastrointestinal Complaints (GIC), Head Pain Complaints (HPC), Neurological Complaints (NUC), and Cognitive Complaints (COG) scales. Because there is very little information on how these scales function in a traumatic brain injury (TBI) sample, these scales were examined in a known groups litigating TBI sample. Method: Archival data from 44 litigating TBI patients were examined. Of these patients, 17 met Slick et al. criteria for probable neurocognitive malingering while 27 did not. The Somatic/Cognitive Scales were examined for both groups. Results: An ANOVA indicated that there were significant differences at the .05 level between the two groups on all of the scales. Mean T-Scores on the MLS, GIC, HPC, NUC, and COG scales were 75, 74, 74, 80, and 84, respectively, for the probable neurocognitive malingering group. Mean T-Scores on the same scales for those who did not meet Slick et al. criteria were 64, 57, 63, 65, and 65, respectively. Conclusions: Non-malingering TBI patients did not produce mean T-Scores above 65 on any of the Somatic/Cognitive scales. However, the group of TBI patients that was classified as meeting Slick et al. criteria produced mean T-Scores above 65 on all scales, and these scores were significantly higher than the non-malingering group.

C-81
Effort and Neuropsychological Test Performance in Schizophrenia
Strauss G, White T, Gold J

Objective: Clinicians and researchers have long wondered whether individuals with schizophrenia display poor neuropsychological test performance in part due to low effort. Poor effort might be expected to occur in only a minority of individuals with schizophrenia. In the current study we administered the Victoria Symptom Validity Test (VSVT) to determine whether a sub-set of patients exist who are characterized by low effort, and examined whether patients displaying low effort have greater severity of cognitive deficits and psychiatric symptoms. Method: Participants included 73 individuals with schizophrenia and 51 controls matched for age, gender, and ethnicity who completed the VSVT, MATRICS neuropsychological test battery, Chapman Anhedonia Scales, and symptom interviews. Results: Results indicated that 1/73 patients and 0 controls met the VSVT cut-off for malingering. However, when a statistically determined cut-off of "low effort" was applied 100% of controls and 81% of patients were characterized by normal effort, whereas 19% of patients displayed low effort. In comparison to normal effort patients and controls, low effort patients evidenced significantly greater impairment on the MATRICS battery, had greater physical anhedonia on the Chapman scale, and greater endorsement of Infrequency items. Conclusions: These findings are consistent with the notion that the vast majority of individuals with schizophrenia put forth adequate effort on cognitive tests; however, a small percentage of patients display sub-optimal effort, and these individuals tend to exhibit the poorest cognitive performance and higher levels of anhedonia. It is possible that these low effort patients are less intrinsically motivated to put forward greater effort.

C-82
The Influence of Sleep on Effort Test Performance in a VA Polytrauma/TBI Clinic
Tree H, Waldron-Perrine B, Spencer R, McGuire A, Na S, Pangilinan P, Bieliauskas L

Objective: Veterans assessed for mild traumatic brain injury (mTBI) often report chronic problems with sleep. A considerable amount of research has examined the effects of sleep deprivation on cognitive performance. However, little is known of the effects of sleep on effort. This study was conducted to evaluate the influence of sleep on effort test performance. Method: Data were collected from 249 veterans [97% male; age= 37.6 (14.5)] undergoing a cognitive evaluation. All participants completed a measure of sleep satisfaction (the Insomnia Severity Index), and estimated the number of hours they slept the night prior to the assessment. Poor effort was defined as failure on the Test of Memory Malingering. Results: An independent samples t-test revealed that individuals who pass or fail effort measures report significantly different total sleep satisfaction $t(248) = 2.68$, $p <.01$, average number of hours slept per night $t(233) = -3.56$, $p =.001$, and hours slept the previous night $t(234) = -4.19$, $p <.001$. Conclusions: Veterans who fail measures of effort reported fewer hours of sleep the night before the screen and fewer average hours of sleep, as well as greater levels of dissatisfaction with their current sleep patterns. The report of sleep patterns is subject to self-report bias, and the findings of this study suggest that description of sleep quality and quantity are related to measures of effort on cognitive tasks. Thus, sleep is an additional variable to consider in interpretation of effort test failure.

C-83

Sensitivity and Specificity of the ANAM Effort Index Using Cut-points Derived from a Clinical Sample
Vincent A, Roebuck-Spencer T, Cooper D, Bowles A, Gilliland K

Objective: Measurement of effort is essential for computerized testing where less direct supervision of the test-taker is required. The Automated Neuropsychological Assessment Metrics (ANAM) is a computer-based cognitive battery. Early work with an ANAM Effort Index (AEI) demonstrated excellent concordance with established effort measures. This study examines cut-points for the AEI using healthy and clinical reference groups. Method: The AEI was calculated by converting ANAM test scores into a common metric (ranging from 0 to 6) based on relative infrequency of these scores in healthy college students (n=27) and outpatient neuropsychology clinic referrals (n=64) who passed standard effort measures. Infrequency scores were summed over 8 variables for a maximum AEI of 48. Sensitivity/specificity were examined for the reference samples and a simulator sample feigning impairment. AEI cut-points were derived to maximize specificity in the reference samples. A sample of neurorehabilitation patients was examined to determine misclassification of severe cognitive impairment. Results: Cut-points derived from the college sample resulted in very good sensitivity for simulators (89%) and specificity for individuals with known good effort (college = 96%; outpatient = 92%) but misclassified almost all individuals with severe impairment. Cut-points derived from the outpatient sample improved specificity (college = 100%; outpatient = 94%; severe impairment = 76%) but lowered sensitivity (simulators = 47%). Conclusions: Results support the AEI as a measure of embedded effort with sensitivity/specificity similar to that of other traditional embedded measures. Sensitivity/specificity varied based on cut-points derived from different reference groups. Results demonstrate the value and trade-offs of using sample-specific cut-points.

C-84

An Examination of Effort among an Undergraduate Population
Watts A, Ahmed F, Miller L

Objective: Due to the overwhelming reliance on undergraduate populations as participants in psychological research, it is imperative that all participants exert sufficient effort during experimentation. Valid cognitive test results are heavily contingent on full effort by participants. The current study examined effort test scores among an undergraduate population. Method: One hundred and forty one undergraduates from the University of Georgia research pool participated in a study examining cognitive functioning, from which effort data were then extracted. Participants were administered the Medical Symptom Validity Test (MSVT), a forced-choice recognition task aimed at assessing adequate effort. Scores indicative of sufficient effort lie above 90 percent. Results: All participants obtained scores at or above 90 percent. Mean scores on the MSVT Immediate Recognition and Delayed Recognition subscales were 99.75% and 98.58%, respectively. Conclusion: This study aimed to quantitatively examine effort in an undergraduate population. Results of the current study suggest that this population put forth a sufficient amount of effort as characterized by the MSVT. In order to strengthen to current line of research, the time of administration of the MSVT to participants could be varied in order to avoid fatigue effects, and would allow for group analysis of possible effort failures. Considering the relative paucity of

research available on this population, it cannot be conclusively determined that effort testing is not necessary among undergraduate populations.

C-85
Base Rates and Comparison of Symptom Validity Measures in U.S. Veterans: The Medical Symptom Validity Test and Personality Assessment Inventory
Yon A, Gordon B, Bennett T

Objective: The purpose of this study was to identify the base rates of poor performance on symptom validity measures among a sample of U.S. Veterans. The relationship between cognitive effort and psychological symptoms also was evaluated. Method: The sample for this file drawer study included 364 Veterans referred to a VA Medical Center's neuropsychology clinic. Fifty-seven percent were Caucasian and 92% male. Mean age was 46.37 years (SD = 14.82). Chi-square analyses and t-tests were used to examine overall performance on the Medical Symptom Validity Test (MSVT) and the relationship between MSVT performance and validity scale scores of the Personality Assessment Inventory (PAI). Results: Forty-four percent of participants failed the MSVT. Of these participants, roughly 32% passed the PAI. Age, education, or percent of total service connection could not account for this failure rate. Participants that failed the MSVT were more likely to have a higher score on the PAI Negative Impression Management scale. Approximately 50% of the sample passed both the MSVT and produced a valid PAI. Conclusions: Like other symptom validity studies in veteran populations, the rate of MSVT failure in this study indicated that nearly 50% of veterans referred for a neuropsychological evaluation do not demonstrate sufficient effort during their cognitive assessment. The failure rate also was significantly related to the validity of symptom item-endorsement on the PAI (p = 0.00). Further research is necessary to clarify ways in which participant effort may be enhanced, particularly in the veteran population.

C-86
The Medical Symptom Validity Test and Non-Verbal Medical Symptom Validity Test in a Veteran Sample: Patterns of Poor Performance and Concurrent Validity
Yon A, Gordon B, Bennett T

Objective: The goals of this study were to identify the patterns of performance on two symptom validity measures among a sample of U.S. veterans and to determine whether the Non-Verbal Medical Symptom Validity Test (NV-MSVT) demonstrated concurrent validity with the Medical Symptom Validity Test (MSVT). Method: The sample for this file drawer study included 112 veterans referred to a VA Medical Center's neuropsychological clinic. Fifty-five percent were Caucasian and 97% male. Mean age was 41.79 years (SD = 12.46).   Chi-square and t-tests were used to examine performances on the MSVT and NV-MSVT, and the relationship between performances on both measures was evaluated. Results: Forty-two percent of participants failed the MSVT and 57% failed the NV-MSVT. Only 33% of participants passed both. The performances of participants failing the MSVT were worse than the performances of those with possible dementia on both the Immediate Recall and Delayed Recall subscales. The correlation between MSVT and NV-MSVT performance was ô = 0.464, p < 0.00. Conclusions: A third of participants passed both validity measures. Performances on both measures were significantly correlated. Veterans passing effort tests performed similarly (i.e., had similar subscale scores) compared to

other groups of individuals known to be providing good effort. Consistent with prior research, the MSVT and NV-MSVT appear to measure different aspects of effort. Clinicians should be aware that poor performance on more effort indicators increases the likelihood of invalid data. The failure rate in this sample of the veterans was higher than has been demonstrated in other studied populations.