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Abstracts

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Convention Abstracts Accepted under the Guest Editorship of Mike R. Schoenberg [a,b] and Steven Paul Woods [c]

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ADULT GRAND ROUNDS

Moderator: Richard Naugle

Discussants: Neil Pliskin, Julie Keaveney, Laurie Ryan

AGR1

Multiple white matter lesions in the corpus callosum and cerebellar vermis affecting cognitive functions in a 21-year-old woman with Susac syndrome

Hoffnung DS

Objective: Discuss role of the cerebellum in cognition and introduce Susac syndrome. Susac syndrome is a rare disorder consisting of microangiopathy of the brain, retina, and inner ear; usually affects young women. Method: Twenty-one-year-old woman with new onset of hearing loss, ataxia, and confusion in February 2007. Hospitalized and improved with IV steroids; discharged on oral steroids; readmitted 18 days later with confusion, lethargy, decreased vision on the right side, diplopia, and worsening gait. Received IV steroids and dose of IVIG during second hospitalization. MRI February'07: scattered high signal change in the white matter, especially in corpus callosum and the cerebellar vermis. MRI March'07: scattered high signal change throughout cerebral hemispheres, pons, splenium of right corpus callosum, and left genu of the internal capsule. Results: Seen 3 days apart during March hospitalization to assess for improvement on IV steroids. Again in March as an outpatient to further evaluate cognition and establish a baseline. Bedside testing: perseverative, deficits in naming, verbal fluency, design copy, judgment of angles, attention, learning and memory, fine motor coordination, and motor sequencing. After course of steroids and IVIG, relative improvements in verbal category and letter fluency. Outpatient testing 18 days after discharge: deficits in verbal fluency, verbal reasoning, planning and organization on figure copy, attention, speed of mentation, problem solving and mental flexibility, and fine motor coordination with dominant right hand. Conclusion: Deficits in this young woman highlight role of cerebellum and its cortical connections in cognitive functioning.

AGR2

Pre- and post-surgical neurobehavioral functioning in hypothalamic hamartoma

Wethe J, Prigatano G

Objective: Hypothalamic hamartomas (HH) are congenital malformations of the tuber cinereum. HH are associated with refractory epilepsy, cognitive and behavioral disturbances, and precocious puberty. Advances in neurosurgical resection of HH have led to improved seizure control, but little is known about cognitive and behavioral outcome. We present the case of a woman whose pre- and post-surgical functioning is well documented. Her case illustrates the cognitive and behavioral disturbances often associated with HH and the remarkable changes in functioning that can be observed post-surgery. Methods: Patient is a 21-year-old, left-handed woman. She was healthy until 5 year old when she began having complex partial and gelastic seizures, which were refractory to medications. MRI revealed a right-sided HH. Results: Pre-surgery, intellectual functioning was largely normal, but she demonstrated deficits in nonverbal memory, mental flexibility, abstract reasoning, and academic achievement. She had a long history of psychiatric disturbance, including rage attacks, depression, eating disorder, anxiety, and borderline traits. Three-year post-surgery, she is free of seizures and major psychiatric disturbance. Information processing speed, interpersonal skills, and some aspects of intellectual and executive functioning are improved. Verbal and nonverbal memory are significantly impaired. Social interactions and quality of life are improved. Conclusions: This case illustrates the dramatic improvement in neurobehavioral functioning and seizure control that can be seen following resective surgery for HH and the risks to structures important for memory. Questions are raised about seizure-related psychiatric disorder, the role of the hypothalamus in neurobehavioral functioning, and psychosurgery.

AGR3

A case of refractory Tourette's Syndrome in adulthood: Neuropsychological pre-and post-operative outcome from Deep Brain Stimulation (DBS) surgical treatment

Schoenberg MR, Ogrocki P, Maciunas RJ, Maddux B, Riley D, Gould D

Objective: To investigate the neuropsychological functioning of an adult male suffering from severe Tourette's Syndrome (TS) before and after thalamic DBS surgery. Method: A 29-year-old male with a history of motor tics since age 5 and sonic (phonic) tics since age 11. Tics have been severe since his teens, adversely affected his health, and were med-

ication refractory. Psychiatric history is positive for obsessive compulsive disorder (OCD) and depression. A question of attention deficit hyperactivity disorder was raised in childhood. He completed 7 years of formal schooling, and had trouble reading and writing due to tics. Presurgical neurological exam was nonfocal. He was having >150 tics/min based on video analysis. MRI was normal. Psychiatric evaluation identified mild to moderate OCD and depression. Results: Pre-surgical neuropsychological test scores across measures of general cognitive ability, attention, memory, language, visuoconstructional, and executive functioning were generally WNL, except he was unable to complete the CPT-2 and had difficulty with written SDMT (12th %ile) due to tics. Psychological testing found mild OCD with depression. Post-operatively, tics markedly decreased. Neuropsychological testing was completed 3-months, 12-months, and 2-years post-DBS. Phonemic verbal fluency and verbal memory declined from baseline at 3-months and 12-months post-op. At 2 years post-op, verbal memory scores remained below baseline, but phonemic verbal fluency improved. Anxiety and depression symptoms have decreased. Conclusions: Neuropsychological data of adults suffering from severe TS is rare, and this case illustrates the application of thalamic DBS to treat adults with refractory TS. Initial data suggest general cognitive safety with reduction in psychiatric symptoms; however, some concerns are raised.

FORENSIC GRAND ROUNDS

Moderator: Robert L. Denny

Discussants: Kyle Boone, Robert McCaffrey, James Sullivan

FGR1

Improved effort on neuropsychological testing without knowledge that previously invalid performance had been detected: a case of spontaneous redemption?

Suffield B, Jason G

Objective: There is a lack of consensus as to whether and when an individual should be retested after failing measures of effort, and no published data on the subject. Claimants, aware that previously invalid performance was detected, may alter their test behaviour, but still perform suboptimally, confounding test interpretation. This case study involves a claimant with unequivocal brain damage, who changed her approach to neuropsychological assessment, without knowing her previously invalid performance had been detected. Method: GK was 18 when she had a massive right hemisphere ischemic stroke as a complication of a carotid artery puncture. She showed some functional improvement, and subsequently attended post-secondary school. She underwent assessment for disability benefits 32 months post-stroke. Results: GK performed at chance on measures of effort, and very poorly on cognitive, academic, and vocational tests. Her MMPI-2 profile was also elevated. Results were inconsistent with her functional performance in the school and community, and considered invalid. Unaware that this assessment had occurred, her lawyer referred her for assessment in the context of medical malpractice litigation. Testing was conducted three months after the first assessment, at which time results of the first assessment were known to the second assessor, but not to the claimant, her family, or her counsel. She completed specialized and embedded effort measures nearly perfectly, generated improved clinical results consistent with her known brain injury, and produced a normal MMPI-2 profile. Conclusions: We discuss factors that contribute to performance variability, including secondary gain, coaching, introduction to the assessment, and examiner effects.

FGR2

Neuropsychological evaluation of return to work following mild traumatic brain injury

Schoenberg MR

Objective: To investigate the neuropsychological functioning of an adult female complaining of cognitive, somatic, and mood problems following a motor vehicle accident (MVA) in 11/2005 to evaluate for return to work. Method: A 43 YO female complaining of dizziness, neck pain, headache, blurred vision, tremor and numbness in her hands, as well as attention, memory and speech problems. Past medical and psychiatric history was reportedly noncontributory. She completed high school and has an associate's degree. She worked as an engineer technician. MVA resulted in loss of consciousness estimated to be less than one minute. CT studies have been normal. Results: The individual was assessed twice for IME's over a 6 month period. With the initial IME, symptom validity test scores were normal. Performances across measures of general cognitive ability, attention, memory, language, visuoconstructional, and executive functioning were average or better. With the second IME, symptom validity performance declined. Scores

on measures of general cognitive ability, attention, memory, language, visuoconstructional, and executive functioning remained generally above average. Psychological data indicated pronounced symptoms of depression and anxiety. A primary question was the presence of cognitive dysfunction that would limit the individual's ability to return to work. Conclusions: IME based evaluations are increasingly utilizing neuropsychology data in making return to work decisions. The presentation will review ability of neuropsychological data to make determinations of return to work.

FGR3

The Neuropsychological Evaluation as Part of the Examination for Competency and Criminal Responsibility in a Schizophrenic Woman Accused of Murder

Walter MS

Objective: To determine competency to stand trial and state of mind at the time of the offense in a woman with a history of schizophrenia, currently controlled on medication. Method: The client is a 44 year old woman with 11 years of education and a GED. She is charged with murder and kidnaping. She has a history of at least several TBIs due to spousal abuse. Her psychiatric problems date back to her childhood. She is on court-ordered antipsychotic medication. Results: She described some residual symptoms of psychosis, including *looking at pictures and they seem alive.* Neuropsychological testing found her to have a low average IQ (80) in contrast to average performance on the WTAR (103). Her performance in attention testing was borderline impaired, while her learning and memory were low average to impaired. She showed relative strengths in visuospatial versus verbal areas. Executive functioning was variable. Competency test performance (CAI) was adequate. Interview and review of background material suggested that she was delusional at the time of the offenses, however. Conclusions: Neuropsychological evaluation can be useful in determining the level of cognitive impairment in individuals with severe mental illness (and brain injury) and to help with determinations of competency.

PEDIATRIC GRAND ROUNDS

Moderator: Phillip Fastenau

Discussants: Jacobus Donders, Renee Lajiness-O'Neill

PGR1

Is the following neuropsychological profile a result of late effects from chemotherapy or the indication of CNS relapse?

Tagliareni L, Farrar-Anton A

Objective: Acute Lymphoblastic Leukemia (ALL) is the most commonly diagnosed cancer among children. This case will discuss the findings of a patient who was referred due to recent changes in her academic functioning. Her initial presentation was similar to children with a late effects profile; however, on the day she completed testing, her routine blood work demonstrated that she met criteria for ALL with CNS involvement. This case examines the complexity involved with understanding cause of symptomatology. Method: The patient is a 9-year-old female who was originally diagnosed with ALL at age five. While in remission, she was referred for an evaluation due to recent changes in her attention, memory, and ability to follow and complete complex tasks. Results: Patient is cognitively and academically performing equal to higher than her same-age peers with strengths noted with her verbal skills. However, her profile demonstrated executive function weaknesses in planning, organization, sustained attention, and working memory. She struggled with the organization and integration of complex abstract information. Further, she demonstrated difficulty learning new verbal information immediately following similar verbal material suggesting that the initial information was interfering with her learning of new information. Conclusions: This case presents the dilemma involved in delineating between determining whether or not this patient presented originally with symptoms related to late effects, to new CNS disease, or a combination of both. Therefore, this case provides a unique opportunity for neuropsychologists to be able to possibly assist in early identification of relapsed disease and similarities to late effects.

PGR2

Pediatric neuropsychological presentation of Glycogen Storage Disease Type IX: phosphorylase B kinase deficiency

Goldin Y, McGinley JJ, Facchini R, Masur DM

Objective: Glycogen Storage Disease Type IX is said to be a rare, relatively mild disorder that involves growth retardation and slight motor development delays. The disease is associated with metabolic elevations of serum glutamate-pyruvate transaminase (SGPT) and glutamate-oxaloacetate transaminase (GOT), in addition to hypercholesterolemia, hypertriglyceridemia, hepatomegaly and fasting hyperketosis (Willems et al., 1990). As the child ages, significant improvements are said to occur in most patients (Weinstein et al., 2002), however information about the intellectual and cognitive functioning of children with this disease is limited. Method: The patient is a six-year-old, left-handed, Caucasian male, who receives special education and additional services in his first grade setting. The patient was diagnosed with glycogen storage disease Type IX at 15 months of age, which was accompanied by hypoglycemia and metabolic acidosis. He was subsequently diagnosed with "brain damage" due to "failure to thrive" between 9 and 15 months of age. MRI and video EEG monitoring performed at age 3 revealed no significant findings. Delays in language and motor milestones were evident. Results: Extremely low verbal comprehension abilities (VCI = 59) consistent with significant language delays were noted. In contrast, the patient evidenced average non-verbal perceptual skills (PRI = 96). There were also significant attention difficulties, which interfered with his ability to follow task instructions. Preliminary attempts at assessment of memory indicated extremely low performance. Conclusions: This case contributes to the limited store of information on the neuropsychological effects of this rare pediatric disorder, and suggests multi-focal rather than diffuse deficits.

PGR3

The utility of neuropsychological assessment the diagnosis of Langerhans Cell Histiocytosis

Ferro J, Gorman P

Objective: There is a growing body of research on neuropsychological problems observed in individuals with Langerhans Cell Histiocytosis (LCH). Cognitive testing of these individuals has shown lower-than average scores on measures of intelligence, memory, learning, language problems, and academic attainments. The following case presentation illustrates the multi-focal impact of LCH lesions. Method: The patient is a 13-year-old boy who presented for an evaluation 2 years post-resection of a LCH lesion. Reportedly, his symptoms began 1 year prior to discovery of the tumor and included academic difficulties and declines in organizational ability. He received midline frontal and occipital autologous cranioplasties for gross total resection of a frontal eosinophilic granuloma and closure of the posterior skull defect in the left occipital/parietal region. He was post-operatively evaluated via bone scan, skeletal survey, and head MRI, all of which returned negative, excluding the known skull lesions. Results: The patient evidenced impairment with cognitive flexibility and set-shifting on multiple tasks. Within the realm of memory functioning, he displayed significantly below expectation performance on measures of verbal memory, whereas his performance on measures of visual memory was commensurate with his IQ. He demonstrated lateralized right-hand impairment on fine motor speed. Conclusions: He exhibited a variety of executive dysfunctions consistent neuroanatomically with the location of his resected mid-frontal eosinophilic granuloma. Furthermore, his deficits in verbal memory substantiate lateralized impairment of functioning with impairments in the left posterior hemisphere. This case demonstrates the efficacy of neuropsychological testing in assisting detection of Langerhans Cells.

Poster Session A

DEVELOPMENTAL AND PEDIATRIC: ATTENTION DEFICIT (HYPERACTIVITY) DISORDER

A1

Using the NEPSY to understand and subtype children with learning disorders

Martinez JM, Crews K, D'Amato RC

Objective: This study offered an understanding of participants with learning disorders using the NEPSY, a developmental neuropsychological measure. Participants were empirically placed into subtypes based on NEPSY subtests. Method: A total of 80 participants, 65% male, 35% female, ages 7–11 years, were evaluated from a school located in the West. The sample had 74 participants who were Caucasian (92.5%), 3 who were Hispanic (3%), 1 who was African

American (1.3), 1 who was Asian American (1.3%), and 1 who was American Indian (1.3%). The sample had been identified as having a learning disorder in reading and/or reading comprehension. Children with other disabilities were ruled out. Participants were evaluated using the NEPSY Language Domain and the NEPSY Memory and Learning Domains. A Cluster Analysis was used to subtype reading disabilities. Results: Three subtypes of participants with Learning Disorders were identified. These included (1) a No Language or Memory Deficit Subtype, (2) a Global Language and Memory Deficit Subtype, and (3) a Global Memory Deficit Subtype. It seems that cognitive processes outside phonological processing and language comprehension appear to be necessary to guarantee normal reading, namely working memory capacity and attention. Conclusion: This study suggested that memory related processes, not exclusively phonologically related processes, may contribute to reading difficulties. These data support the utility of a neuropsychological approach when serving children with reading disorders. The NEPSY appears to offer significant information for the subtyping process. Future studies need to delineate the impact of working memory processes on reading.

A2

Frontal lobe functioning in children with Attention Deficit Hyperactivity Disorder

Shearer C, Morrow J, Golden C

Objective: The purpose of this study was to evaluate whether or not children with Attention Deficit Hyperactivity Disorder (ADHD) performed differently than normal children on neuropsychological tests presumed to measure frontal lobe functioning. Method: The experimental group – 208 children with a diagnosis of ADHD (including all types) – was predominantly male (73%), had a mean age of 9.19 years (S.D. = 2.77), and a mean education level of 3.54 (S.D. = 2.58). The control group – 228 children with PTSD or an Adjustment Disorder – was also predominantly male (71.1%), had a mean age of 9.54 years (S.D. = 3.04), and a mean education level of 4.12 (S.D. = 4.93). Of the total population, 56.2% of participants were Caucasian, 18.6% African American, 17.9% Hispanic and 6.2% were classified as other. Results: There was no indicated correlation between the WCST Percent Conceptual Level Responses, Stroop Color, and Stroop Interference. An analysis of variance (ANOVA) between the samples revealed a significant difference between children with ADHD and the control group on Stroop Color performance $F(1, 80) = 8.04$, $p = .006$ at a .05 level of significance. Conclusion: Results suggested that children with ADHD demonstrated deficits on Stroop Color. These findings are consistent with previous research which found that the control group performed significantly better than children with ADHD on the Stroop Color. Previous research also suggested a significant difference between ADHD performance and control group performance on the WCST Percent Conceptual Level and Stroop Interference, which was not confirmed.

A3

Executive functioning differences in childhood ADHD subtypes by age group

Hines L, Heyanka D, Avon T, Golden C

Objective: The present study aims to determine whether significant differences in measures of executive functioning exist between ADHD subtypes and age groups. Methods: Participants consisted of previously diagnosed ADHD-Hyperactive and ADHD-Inattentive children. Age was partitioned into three groups. Group 1, aged 6–8 years ($M = 7.11$, S.D. = .79), group 2, aged 9–12 years ($M = 10.49$, S.D. = 1.05) and group 3, aged 13–17 years ($M = 14.33$, S.D. = 1.37). Executive functioning was assessed with the Stroop, Trail Making B, and the Perseverative Errors score of the WCST. Results: 2 (Subtype) × 3 (Age) ANOVAs revealed significant main effects for age on the Stroop Word subtest and the Perseverative Errors score, for subtype on the Color subtest, and an interaction effect between age and subtype for the Color subtest and Perseverative Errors Group 3 Stroop Word was superior to the other groups. Group 3 was superior to group 1 on Perseverative Errors. The ADHD-I group was superior to ADHD-H on Stroop Color. Interaction effects were demonstrated for Color subtest, with group 3 ADHD-I performing better than ADHD-H in age group 2, and ADHD-I individuals in groups 2 and 3 performed better than ADHD-I in group 1. The ADHD-I group 3 performed better than ADHD-H individuals in groups 2 and 1. Conclusions: This study supports previous research suggesting deficits of executive functioning are less evident in ADHD-I than in ADHD-H, and deficits decrease significantly in both subtypes with age.

A4

Relationship between the Conner's Rating Scale and the TOVA in ADHD

Silk E, Tireman E, Jakovljevic S, Buddin H, Golden C

Objective: The purpose of the present study was to determine whether the self report constructs related to ADHD on the CRS-R correlate significantly with the objective measure of sustained attention on the TOVA in both and ADHD and Adjustment Disorder diagnosed population. Method: The clinical group consisted of 81 children and adolescents diagnosed with Attention Deficit Hyperactivity Disorder (Hyperactive/Impulsive, Inattentive, and Combined Types) and 100 diagnosed with Adjustment Disorder. All participants completed a standardized and comprehensive neuropsychological battery. Only the Test of Variables of Attention (visual and auditory) and the Conner's Parent Rating Scale were used in the analysis. For the Adjustment Disorder group, the mean age was 9.46 (S.D. = 3.00), education was 4.08 (S.D. = 5.19), 71.0% were male, and Caucasians represented 51.3% of the sample. For the ADHD group, the mean age was 9.20 (S.D. = 2.79), education was 3.56 (S.D. = 2.59), 73.4% were male, and 58.9% were Caucasian. Results: Pearson correlations yielded very few significant correlations between the TOVA visual and auditory scores and the Conner's Rating Scales in both the ADHD group and the Adjustment Disorder groups. Of the total 49 correlations between the tests, only 3 significant correlations were found, essentially at chance levels. Conclusion: Results suggested that the self report measures of hyperactivity/impulsivity and inattention on the Conner's Rating Scales in the ADHD group do not correlate significantly with objective measures of sustained attention on the TOVA.

A5

Neuropsychological assessment in the military aviation community: Attention Deficit Hyperactivity Disorder (ADHD) waivers

Kennedy CH

Objective: One impact of the childhood diagnosis of ADHD is a significantly increasing number of now adult recruits and officer candidates presenting for military service. The military classifies ADHD as a disqualifying condition, with the caveat that if no medications have been required for a year and there are no active symptoms, an individual qualifies for active duty. In specialized communities, particularly aviation, the waiver process is challenging, given the extreme cognitive demands required by these occupations. The current research aims to quantify this issue in the Navy and Marine Corps aviation community (i.e., air crew, air traffic controllers and aviators) and examine the waiver decision process. Data selection: The Naval Aerospace Medical Institute database of 36,428 waiver applications was reviewed for waiver applicants presenting with a diagnosis of ADHD between the years 1992–2006. Data synthesis: Between 1992 and 1996 five waivers were requested and none were granted. The first waiver for ADHD was granted in 1997 with a doubling of waiver requests annually between the years 1996 and 2004. Between the years 2004 and 2006, waiver requests have remained steady at approximately 34 per year. In cases in which a waiver was approved, a comprehensive neuropsychological evaluation, which verified resolution or adaptation to ADHD symptoms, was the determining factor to grant the waiver. Conclusions: This presentation discusses the challenges to the military aviation community presented by ADHD, the aviation waiver decision making process, the necessary components of the neuropsychological evaluation, and the inherent difficulties in the assessment of aviators.

A6

Discrimination of ADHD and Bipolar based on neurocognitive performance

Myers-Pagoria M, Steiner AR, Noggle CA, Dean RS

Objectives: The DSM-IV-TR clearly indicates, when discussing ADHD, Bipolar Disorder constitutes a primary differential diagnosis consideration. Truly, difficulty comes from the nature to which many of the behavioral manifestations of each of these disorders overlap. As a result, many times it makes accurate diagnosis difficult for the neuropsychologist. However, with research implicating differing neuroanatomical regions for each disorder it was hypothesized that performance across cognitive domains may render a way to more accurately differentiate one group from the other. This study investigated the utility of the cognitive measures of the Dean–Woodcock Neuropsychological System to differentiate ADHD from Bipolar. Methods: The current sample consisted of 60 patients with ADHD, 56 Bipolar, and 48 normals. Each participant was administered the first seven subtests of the Woodcock–Johnson III-Tests of Cognitive Abilities (WJ-III, Woodcock, McGrew, & Mather, 2001). Results: Preliminary statistical analyses revealed that in comparison, Bipolar was related to far greater neurocognitive impairment than ADHD. Specifically, the Bipolar group

performed significantly ($p < .01$) worse than the ADHD group in numbers reversed, sound blending, concept formation and visual–auditory learning. No significant difference was found between groups in regards to verbal comprehension and spatial relations. Conclusions: Results demonstrate the utility of neuropsychological assessment and, more specifically, the Dean–Woodcock Neuropsychological Assessment System in differentiating ADHD and Bipolar. Clearly, in comparison, data reveal the increasing severity of impact Bipolar may have on cognitive functioning compared to ADHD. Differences found between groups represents powerful information for practitioners who are involved in treatment planning, accommodations, and interventions.

A7

The factor invariance of the Dean–Woodcock Sensory Motor Battery for patients with ADHD

Davis AS, Finch WH, Dean RS, Hiller TR, Hall JJ

Objective: The objective of this study was to test the factorial invariance of the three factor model (Davis, Finch, Dean, & Woodcock, 2006) of the Dean–Woodcock Sensory Motor Battery (DWSMB) for individuals diagnosed with ADHD and a normal sample. Factorial invariance refers to situations in which the underlying latent structure of an instrument is the same for different groups. A lack of invariance is informative from a clinical perspective because it signals potential difficulties with interpreting factors and/or scale scores equivalently for patients various groups. Data selection: Factorial invariance was assessed using a sample of 118 patients diagnosed with ADHD and 949 normal participants who were administered the DWSMB. Model invariance was tested using multiple groups confirmatory factor analysis (MCFA). Data synthesis: The three factor model proposed in Davis et al. (2006) fit appropriately for both the ADHD and normal groups. However, the results of the MCFA indicated that there were significant differences between the normal and ADHD participants on factors comprising simple sensory and cortical motor/complex sensory tasks. Conclusions: The finding of latent structure differences suggests that the meaning of these factors may be fundamentally different for the ADHD and normal groups. This result should serve to encourage clinicians employing the DWSMB to use care when interpreting findings for individuals with ADHD. Patients with ADHD may present with false positive findings on simple sensory and motor tasks secondary to deficits such as impulsivity and inattention. The implications of these results will be reviewed for practitioners and researchers.

A8

ADHD status as a mediator of soccer heading behavior in young children

Salinas C, Webbe FM

Objective: Investigation of possible adverse effects of soccer heading in children has not kept pace with similar studies in older adolescents and adults. The present study aimed to explore the epidemiology of ADHD and heading in youth soccer players and the possible role of ADHD in mediating neuropsychological functioning and soccer heading behavior. Method: Forty-nine youth soccer players (aged 9–14) including 11 with ADHD were selected from premier competitive teams in Central Florida. Tests administered included the Children's Concussion Resolution Index (Headminder, Inc.), Trailmaking Test Parts A & B, RAVLT, Tower of London, Vocabulary and Block Design subtests from the WISC-IV. Parents completed the Child Behavioral Checklist; both parents and children completed a demographic questionnaire. Results: An average of 1.6 headings per game was observed, and frequency correlated positively with age. Although only a few instances of intense heading were observed over several hundred games, heading frequency correlated significantly with report of headache. ADHD children performed at significantly lower levels on 7 of the 33 dependent measures of neurocognitive functioning, particularly those measuring visual and spatial processing, response inhibition, and planning. No significant difference in heading by ADHD status was found, nor were any significant neurocognitive weaknesses correlated with heading. Conclusions: Heading frequency was small compared to adults and older adolescents. The 22% incidence of ADHD in this sample and the executive function differences were consistent with expectations. No indication that this pre-morbid factor might interact with soccer heading in further depressing congitive weaknesses was observed in this small sample.

A9

Working memory and processing speed in children and adults with ADHD

Miller BI, Huerkamp J, Carpentier MY, O'Jile JR

Objective: The relationship between IQ and ADHD has historically not been useful in discriminating ADHD patients from health controls. However, the domain specific indices of the WAIS-III have been purported to have clinical utility

for diagnostic clarification; specifically the Working Memory and Processing Speed indices in identifying ADHD from non-ADHD patients (Murphy et al., 2001; Wechsler, 1997). The objective of this study was to compare the performance of adults and children with ADHD via the indices of the WAIS-III and WISC-III, respectively. Method: Forty-nine adults and 55 children with a diagnosis of ADHD completed the WAIS-III or WISC-III as part of a larger neuropsychological battery. Neuropsychological functioning was assessed via a comparison of scores on the three global indices and the four shared subscales from the WAIS-III and WISC-III (verbal comprehension—VCI, perceptual organization—POI, working memory/freedom from distractibility—WMI/FDI, and processing speed—PSI). Results: Results of a series of independent *t*-tests revealed that the adults with ADHD obtained significantly greater FSIQ than the children ($t(102) = 5.27$, $p < .001$). A similar trend was observed for VIQ, PIQ, VCI, and POI. No significant differences emerged between the children and adults on the PSI and WMI/FDI [($t(102) = .03$, $p > .05$) and ($t(101) = 1.36$, $p > .05$)], respectively. Conclusion: The results of this study lend further support for the utility of the WMI and PSI indices as neuropsychological markers to confirm the diagnosis of ADHD, at least in adults.

A10

Relationship of emotional functioning, intelligence, and attentional control

Pella R, Hill B, Gouvier WD

Objective: The authors examined the relationship of depression and anxiety with tests of attention and concentration performance in individuals referred to a university psychological services clinic for a psychoeducational evaluation. Method: Psychological functioning was measured with the Personality Assessment Inventory. Attention, concentration, and fluency functioning were measured with the d2 test of attention, Trail Making Tests parts A and B, and Conner's Continuous Performance Test, and Woodcock Johnson Test of Achievement academic fluency measures. We measured intellectual functioning with the Wechsler Adult Intelligence Scale—Third Edition. Results: Multivariate analyses showed no significant relationship of depression or anxiety on measures with any measure. The results of this study did not confirm our hypothesis that there would be and effect of anxiety or depression on intellectual and memory performance in this group. In fact, no measure of emotional distress significantly predicted performance on indexes of attentional errors or concentrated cognitive speed. However, intellectual functioning was consistently related to attention/concentration skill. Conclusions: Based on current findings, intellectual performance likely accounts for likely significantly more variance in the attentional domain for college level students than emotional status. Thus, attentional functioning in this population may be particularly robust to reported detrimental effects of emotional distress on cognitive testing in other individuals.

DEVELOPMENTAL AND PEDIATRIC: LEARNING DISABILITY

A11

Language and social competence difficulties in adolescents with behavior problems

O'Connell P

Objective: Language skills have been consistently identified as an area of weakness in children and adolescents who display disruptive and aggressive behavior. Verbal deficits, particularly as these skills relate to social competence, have been hypothesized to play a role in the development and maintenance of disruptive behavior. Method: Subjects included 11 adolescent males who were court-ordered to an inpatient state psychiatric hospital for an evaluation, with judges in each case seeking recommendations regarding disposition of the case. Questions from the WISC-IV Similarities and Comprehension subtests were evaluated with respect to content. Selected questions were divided into those with social/emotional content and questions with no social/emotional content. Subjects' performance was compared across eight questions of relative equivalent difficulty, four with social/emotional content and four without social/emotional content. Results: Subjects' WISC-IV Verbal Comprehension Index scores ranged from 50 to 89 with a mean of 70. WISC-IV Perceptual Reasoning Index scores ranged from 77 to 106 with a mean of 86. There was a significant difference between VCI and PRI in favor of the PRI ($t = -3.36$, $p = 0.003$). Regarding the study's hypothesis, results revealed subjects demonstrated significantly weaker performance on questions with social/emotional content ($t = -2.18$, $p = 0.03$). Conclusions: These results suggest that not only language skills, but also verbal abilities as they relate to social–emotional functioning and social interactions may have an important relationship to the development and/or maintenance of disruptive behavior in adolescent males.

A12

Relative risk of varying degrees of learning difficulties following head injury within a pediatric population

Noggle CA, Steiner AR, Myers-Pagoria M, Dean RS

Objectives: Head injury, including TBI, remains one of the leading causes of disabilities within pediatric (<21 years) populations. Rates of occurrence are inconsistent in that they fail to include milder forms of trauma. Approximately 85% of head injuries are considered mild (Luerssen et al., 1988) thus deficits may be more subtle. Still, these children tend to have more prevalent difficulties in academics (Levin et al., 1995). Although this relationship of learning difficulties following head injury has been established, data regarding the relative risk of specific learning difficulties following head injury has not been well discussed. This study investigated this relationship in hopes of identifying recommendations for clinical practice. Method: Relative risk of specific learning difficulties following head injury was calculated. Participants ($n = 78$) included children with a documented head injury and no resulting learning difficulties and children who had sustained a head injury and experienced resulting learning difficulties. The control group ($n = 19{,}640$), was derived from Robins and Reiger's (1991) Epidemiological Catchment Area Study (ECA). Results: Results indicated children who had suffered a head injury were 2.890 times more likely to have learning difficulties. More specifically, difficulties in the area of reading was the most prominently identified followed by mathematics and written expression. Additional results will be offered. Conclusions: Results demonstrate differences in the susceptibility of domains of academic performance to head injury. These are likely secondary to the cognitive functions afflicted and proportionately related to the extent to which those functions load within that academic domain. Still, findings may guide clinical practice.

A13

Differential impairment of passage comprehension and lower-based reading tasks secondary to childhood mood disorders

Myers-Pagoria M, Steiner AR, Noggle CA, Dean RS

Objectives: Mood disturbances are known to not only impact emotional functioning but also cognitive. Noggle et al. (2006) found a significant overlap in the cognitive functioning of children with depression, anxiety and bipolar. These authors suggested that in fact results were dependant upon the extent of executive and attentional control required to perform each subtest, yet no investigation of this was done. The current study looked to do this through comparison of performance of children with mood disorders on letter-word identification and reading fluency to passage comprehension on the Woodcock–Johnson III—Tests of Achievement. It was hypothesized that due to the latter requiring greater attentional and executive control, greater impairment within this area would be noted in the mood disturbance group. Method: The current sample consisted of 60 children diagnosed with mood disturbance and 52 normals. Each participant was administered the letter-word identification, reading fluency and passage comprehension subtests of the Woodcock–Johnson III—Tests of Achievement. Results: Although subtle differences approaching significance were noted between group in letter-word identification and reading fluency, significantly ($p < .01$) greater decline in performance during reading comprehension was noted with the mood disturbance group compared to controls. Qualitatively, mood disturbance was also related to slower passage reading and more frequent re-reading. Conclusions: Results extend research in that it demonstrates that as tasks become more complex children with mood disturbances will experience greater interference. Performance observed may suggest need for modifications or primary and secondary interventions within the school for children with mood disturbances.

A14

Treatment effects of Fast ForWord® demonstrated by magnetoencephalography (MEG) may be specific to rapid auditory discrimination judgments

Lajiness-O'Neill RR, Akamine Y, Gallaway M, Bowyer S

Objective: Phonological and temporal processing deficits are hypothesized as primary mechanisms of dysfunction in dyslexia. Magnetoencephalography (MEG) was used to detect cortical activity changes in order to examine treatment effects on reading in a child with dyslexia. Method: An 8-year-old girl completed reading tests at baseline and 5 months post-an 8 week intervention with Fast ForWord®. MEG was performed at baseline, 4 and 8 weeks using four paradigms: Grapheme-to-Phoneme Discrimination (GP), Nonword Reading (NW), Verbal, and Spatial Working Memory (VWM, SWM). Results: Significant brain activation differences were seen in the GP task pre and post-intervention. Brain activity altered from right inferior frontal and temporal regions at baseline to left IFG, TTG, MTG,

and Postcentral regions at 8 weeks. NW, VWM, and SWM brain activations were not significantly altered pre and post-treatment. No changes in standardized reading scores were obtained at follow up. Conclusions: Detectable changes in neural activation to left hemispheric regions of selected cognitive processes thought to underlie reading were evident without commensurate reading changes. Lack of reading improvement suggests that Fast ForWord® may primarily alter functioning in language regions when tasks require rapid auditory discrimination judgments (e.g. GP), but not when other phonological demands are required that underlie reading. Findings are consistent with research by Agnew, Dorn, and Eden (2004).

DEVELOPMENTAL AND PEDIATRIC: OTHER

A15

Sleep functioning in children with Phenylketonuria and its association with phenylalanine levels: A pilot study

Ayala Badgley J, Chute DL, Barakat LP, Tiffany Amaro J, Melvin JJ, Kothare SV, Grant ML

Objective: The purpose of this pilot study was to evaluate the prevalence of and factors associated with sleeping problems in children with Phenylketonuria (PKU). Method: Participants included parents of children between 4 and 10 years old with PKU. Parents completed the Child Background Questionnaire, Children's Sleep Habits Questionnaire (CSHQ), Pediatric Symptoms Checklist-17, McMaster Family Assessment Device-General Functioning Scale, and Parent Background Questionnaire. IQ scores and phenylalanine levels were obtained from each child's medical chart. Results: Data for 17 children with PKU were obtained (mean age = 6.82, ±2.01). A one-sample *t*-test indicated no difference in overall sleep symptoms between the PKU group and a normative sample (Liu et al., 2005). There were no significant correlations between overall sleep symptoms and current phenylalanine levels, lifetime phenylalanine levels, psychological adjustment, intelligence, family functioning, or socioeconomic status (SES). However, there was a significant correlation between lifetime phenylalanine levels and sleep-disordered breathing symptoms ($r = .57$, $p = .018$), specifically snoring. In children with well-controlled phenylalanine levels (2–6 mg/dl), there were no significant correlations between sleeping problems and family functioning, psychological adjustment, SES, or intelligence. In children with elevated phenylalanine levels (>7 mg/dl), sleeping problems (i.e., sleep time, night wakenings, and parasomnias) were significantly correlated with SES. Conclusions: Preliminary data suggests no significant sleeping problems in children with well-controlled PKU with few risk factors. Increased incidences of sleeping problems were noted in those with elevated phenylalanine levels who were found to have other risk factors, such as lower SES.

A16

Deficits in facial emotion recognition are unrelated to aggressive, antisocial behavior in a clinical sample of children

Yeager CA, Hyer L

Objective: This study tests the argument that impaired facial emotion processing is associated with antisocial/aggressive behavior in children, and that such impairment is a marker for developmental psychopathy. Facial emotion recognition deficits have been identified in antisocial children, as well as in a variety of neuropsychiatric impairments. We examined the relationship between facial emotion recognition deficits and aggressive, antisocial behavior, using prefrontal cortical dysfunction as a moderator. We completed this study on a select clinical population, in which aggression, emotional recognition deficits, and executive dysfunction were present. Method: One hundred and eleven clinic-referred youngsters with Asperger's syndrome, high-functioning autism, bipolar disorder, or attention deficit-hyperactivity disorder were administered tests of facial emotion recognition (FACES Test) and frontal lobe functioning (Category Test, Trails B/Progressive Figures, Wisconsin Card Sorting Test, Test of Verbal Fluency, the Stroop, Conners CPT). Outcome measures were parent/teacher ratings on Achenbach's Child Behavior Checklist. Results: Neither facial emotion deficits alone nor prefrontal cortical dysfunction predicted aggressive/antisocial behavior. Nor did the interaction of these variables predict such. Rather, a diagnosis of bipolar disorder was a potent predictor of aggressive/antisocial behavior. Conclusions: Results of this study do not support the usual lore regarding emotion processing deficits or prefrontal cortical dysfunction and antisocial/aggressive behavior. Rather, early onset bipolar disorder was predictive of these behaviors. Study limitations include a complex sample of convenience and perhaps limited measures, especially FACES. Discussion addressed the need for better markers of delinquency/aggression in a population where the prevalence is increasing.

A17

Facial affect processing in Autism: A comparison to ADHD

Myers T, Coben R

Objective: Autistic children have been shown to process facial stimuli differently than children without autism. Specifically, they may have difficulty recognizing, identifying, and understanding the significance of the expressed emotions. The purpose of this study was to further elucidate facial affect processing in autism. Method: Twenty children with autism and 20 children with ADHD between the ages of 5 and 16 who were referred for neuropsychological evaluation at our private practice participated. In addition to receiving a standard neuropsychological evaluation, including parent rating scales of social skills (Social Responsiveness Scales—SRS), subjects were administered a computerized neuropsychological test battery (PennCNP-Autism Battery), the Facial Expressions of Emotion—Stimuli and Tests (FEEST), and the Comprehensive Affect Testing System (CATS)—abbreviated form. A comparison was made between the performance of autistic children and ADHD children on measures of facial affect processing. We hypothesized that in addition to performing worse, autistic children with more impaired facial affect processing would also display more severe social skills deficits, such that face processing would account for a significant amount of variability in social skills deficits. Results: We found that autistic children performed significantly worse ($p < .05$) than children with ADHD on tests of facial affect processing. We also found a significant amount of the variability in social skills deficits could be accounted for by their facial affect processing abilities ($p < .05$). Conclusions: Our results suggest that an inability to process social information communicated to them through facial expression may be a contributing factor to social skills deficits in autistic children.

A18

Disproportionate deficiency in calculations and applied problems performance in the presence of childhood mood disturbances

Myers-Pagoria M, Steiner AR, Noggle CA, Dean RS

Objectives: Attention, concentration and executive control remain to be seen as the most prominently affected domains of cognitive functioning in the presence of mood disturbance. Although, research has demonstrated varying degrees of cognitive dysfunction between types of mood disturbance, similarities are found within aforementioned areas. As a result, it has been hypothesized that higher-order tasks, which rely on greater attentional and executive control, will be disproportionately impaired in individuals with mood disturbances then compared to the same individuals performance on similar yet lower-order tasks. The current study looked to do this through comparison of performance of children with mood disorders on the calculation and applied problems subtests on the Woodcock–Johnson III—Tests of Achievement. Method: The current sample consisted of 60 children diagnosed with mood disturbance and 52 normals. Each participant was administered the calculations and applied problems subtests of the Woodcock–Johnson III—Tests of Achievement. Results: Preliminary statistical analyses revealed differences in that the group with mood disturbances demonstrated significantly ($p < .01$) greater decline in performance during applied problems than did the control. Qualitatively, patient's with mood disturbances were more likely to talk themselves through the items out loud and require repeated dictation. Conclusions: Results are similar to additional research that suggests greater academic impact of mood disturbance related to the higher-order aspects of the task. Findings are important in that they may guide treatment planning in regards to implementing primary and secondary interventions within the school.

A19

Fusiform gyral volume, intellectual ability and autism

Wu C, Cramond AC, Woon FM, Cannon PC, Bigler ED, Cleavinger HB, Johnson JL, Lainhart JE

Objective: Because of the role that the fusiform gyrus (FG) plays in social cognition and face processing it has been the topic of investigation in autism. There is a greater prevalence of intellectual impairment in autism as well. The current study examined the relationship between FG volume and intellectual ability in individuals with autism compared to demographically matched controls. It was hypothesized that FG volume would differentially relate to IQ between control subjects and those with autism. Method: A total of 91 participants (41 diagnosed with autism and 50 normal controls) with the Full Scale IQ score of 65 or above were recruited. IQ was based on either the Wechsler Adult Intelligence Scale—III or Wechsler Intelligence Scale for Children-III, with Verbal IQ (VIQ), Performance IQ (PIQ) and Full Scale IQ (FSIQ) calculated. Left, right and total FG volume was measured by magnetic resonance

imaging. Results: Right, left and total volume of the FG were significantly related to IQ in subjects with autism (R: $r = .341$, $p = .026$; L: $r = .515$, $p = .000$; and Total: $r = .456$, $p = .002$). Similar significant correlations were not observed in controls. Conclusion: The current findings demonstrate a differential relationship between the size of the FG and IQ in autism, where larger FG was positively related to IQ, with no relationship found in controls. The potential role of the FG in autism and associated intellectual impairments will be discussed.

A20

Intelligence scores and amygdala volume in individuals with Autism

Woon FM, Cramond AC, Wu C, Cannon PC, Bigler ED, Cleavinger HB, Johnson JL, Lainhart JE

Objective: This study examined the relationship between IQ and amygdala volume in non-mentally retarded individuals 7–31 years of age with autism compared to age, sex (all male) and educationally matched controls. Since the amygdala is a critical limbic structure related to emotional regulation and cognition, it was hypothesized that different patterns would be present in its relationship with IQ between subjects with autism and controls, including hemispheric differences. Method: Intellectual assessment was based on either the Wechsler Intelligence Scale for Children-III or the Wechsler Adult Intelligence Scale-III. Autism was rigorously diagnosed in 41 subjects compared to 52 control subjects. Amygdala volume was determined from thin-sliced 1.5 T magnetic resonance imaging, where correction for head size differences was done by total intracranial volume. Results: Different patterns of relationships between IQ and amygdala volume were observed. Individuals with autism exhibited significant and identical correlations between Full-Scale and Verbal IQ and left amygdala volume ($r = .31$, $p = .05$), with no significant correlation with right amygdala volume. In contrast, control subjects did not exhibit a lateralization pattern to IQ-amygdala relationships. In controls, significant correlations were found between the Full-Scale IQ and total amygdala ($r = .29$, $p = .04$), and between the Verbal IQ and total amygdala ($r = .32$, $p = .02$), but left or right amygdala volumes did not reach significance. Conclusions: These findings support that significant differences exist in the functional organization of the amygdala as it relates to intellectual ability in individuals with autism compared to controls.

A21

Behavioral profiles of WISC-III cluster subtypes in pediatric traumatic brain injury

Bello DT, Allen DN, Mayfield J

Objective: Cluster analysis was used to identify performance profiles on the WISC-III in children with traumatic brain injury (TBI). Prior studies suggest unique WISC-III profiles in children with TBI, although little is known regarding the behavioral abnormalities associated with these profiles. The current study compared WISC-III clusters on parent, teacher, and self-reported behavioral ratings from the Behavioral Assessment System for Children (BASC). Method: One hundred and twenty-three children with TBI were administered the WISC-III. Parent, teacher, and self-report ratings on the BASC were obtained. Mean age for the sample was 11.6 years (S.D. = 3.1). Cluster analysis using Ward's method and squared Euclidean distance was used to divide the sample into clusters based on the WISC-III Index scores. The external validity of cluster scores was investigated by contrasting the groups on demographic and clinical variables and BASC ratings. Results: Cluster analysis indicated four clusters similar to those previously reported for WISC-III in pediatric TBI. There was a unique fifth cluster that emerged identifying a group with a selective deficit in the Processing Speed Index in the context of otherwise preserved performance. Groups were not differentiated on age and time since injury. However, they were distinguished by behavioral disturbances. Moreover differences in the types of behavioral disturbances varied based on parent, teacher, and self-report ratings. Conclusions: The present data provide further support of meaningful WISC-III profiles in pediatric traumatic brain injury, demonstrating that these profiles are associated with unique patterns of behavioral performance.

A22

The utility of neuropsychological assessment the diagnosis of Langerhans Cell Histiocytosis

Ferro J, Gorman P

Objective: There is a growing body of research on neuropsychological problems observed in individuals with Langerhans Cell Histiocytosis (LCH). Cognitive testing of these individuals have shown lower-than average scores on measures of intelligence, memory, learning, language problems, and academic attainments. The following case presentation illustrates the multi-focal impact of LCH lesions. Method: The patient is a 13-year-old boy who presented for an evaluation 2 years post-resection of a LCH lesion. Reportedly, his symptoms began 1 year prior to discovery of the tumor and

included academic difficulties and declines in organizational ability. He received midline frontal and occipital autologous cranioplasties for gross total resection of a frontal eosinophilic granuloma and closure of the posterior skull defect in the left occipital/parietal region. He was post-operatively evaluated via bone scan, skeletal survey, and head MRI, all of which returned negative, excluding the known skull lesions. Results: The patient evidenced impairment with cognitive flexibility and set-shifting on multiple tasks. Within the realm of memory functioning, he displayed significantly below expectation performance on measures of verbal memory, whereas his performance on measures of visual memory was commensurate with his IQ. He demonstrated lateralized right-hand impairment on fine motor speed. Conclusions: He exhibited a variety of executive dysfunctions consistent neuroanatomically with the location of his resected mid-frontal eosinophilic granuloma. Furthermore, his deficits in verbal memory substantiates lateralized impairment of functioning with impairments in the left posterior hemisphere. This case demonstrates the efficacy of neuropsychological testing in assisting detection of Langerhans Cells.

A23

A neuropsychological profile comparison of children with seizure disorder and comorbid ADHD with children who have ADHD alone

Salinas CM

Objective: Examination of possible adverse effects of seizures in children has not kept tempo with research in adults. The present study aimed to explore the role of seizures with children who have co-morbid ADHD in mediating neuropsychological functioning on attention and visuo-spatial tasks in comparison to children with ADHD alone. Method: The records of 78 children (aged 3–14) including 18 with Seizure Disorder and co-morbid ADHD and 30 with ADHD alone were randomly selected from a neuropsychology private practice in Central Florida. Tests administered included the NEPSY, WISC, WJ-III and CPT-II. Results: Children with Seizure disorder and ADHD performed at significantly lower levels on 4 of the 19 dependent measures of neuro-cognitive functioning, particularly those measuring visual and spatial processing as well as working memory. On the NEPSY, there was a significant univariate difference for design copy ($F = 4.045$, $p < .05$) and comprehension of instructions ($F = 4.144$, $p < .05$). On the WISC, there was a significant univariate difference for digit span ($F = 5.306$, $p < .05$) and working memory index ($F = 5.047$, $p < .05$). No significant difference in achievement by Seizure/ADHD status was found nor on CPT-II performance. A history of seizures was correlated with reduced working memory. Conclusions: The 23% incidence of Seizure/ADHD in this sample and the attention/executive function differences were consistent with expectations. Evidence that supports that seizures might interact with ADHD in further reducing attention as well as visuo-spatial weaknesses was observed in this small sample.

A24

Neuropsychological and Neuroanatomical Differences among Autism Spectrum Disorders

Arffa S, Knapp J, Basista CE, Yarger L

Neuropsychological evaluation has potential benefits both in the diagnostic and treatment planning phases of autism spectrum disorders. The most common categories cited in the Diagnostic and Statistical Manual, Fourth Edition separate autism spectrum disorders (ASD) into Autistic Disorder, Asperger's Disorder and Pervasive Developmental Disorder, Not Otherwise Specified. None of the DSM-IV criteria rely on neuropsychological or cognitive indices, with the exception of language impairment in Autistic Disorder and the absence of cognitive deficits in Asperger's Disorder. However, there is voluminous literature emerging on the relationship of autism spectrum disorders and neuropsychological dysfunction. In the first portion of this presentation, a review of the literature on structural brain abnormalities among autism spectrum disorders will be presented. In the second portion, the popular neuropsychological theories of autism spectrum disorders will be discussed. The overlap of non-verbal learning disability and Asperger's syndrome, which is commonly ignored in the autism spectrum literature, will be explored and contrasted with theoretical positions. Finally, an analysis of over 100 children and adolescents with an autism spectrum disorder who have undergone a neuropsychological evaluation in a Northeastern outpatient developmental center will be discussed. Measures useful in neuropsychological evaluations will be discussed systematically and the usefulness of neuropsychological data in treatment planning will be offered.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: OTHER

A25

A feasibility study of comprehensive neuropsychological testing in patients with metastatic and primary brain tumors to assess sequelae of oncologic treatment

Hsu N, Kreutzer JS, Barani I, Broaddus W, Chung T

Objective: This study assessed the feasibility of administering a comprehensive neuropsychological battery to select patients with intracranial malignancies. Method: Six patients with known intracranial malignancy and history of either surgical resection or cranial irradiation were serially followed in an outpatient multidisciplinary neuro-oncology clinic. A comprehensive battery of neurocognitive measures consisting of Mini-Mental State Exam, Digit Span subtest of WAIS-III, Trail Making Test, Controlled Oral Word Association, Logical Memory I and II subtests of WMS-III, Rey-Osterrieth Complex Figure Test, Rey Auditory-Verbal Learning Test, Symbol Digit Modalities Test, and Grooved Pegboard was administered to these patients to prospectively assess global neurocognitive function following primary therapy. Patient Health Questionnaire-9 was also administered to screen for depression. Results: One patient successfully completed the entire test battery. Five patients completed at least 70% of the tests. Testing for one patient was discontinued after three tests due to fatigue. Duration of administration ranged from 15 to 70 min. Conclusion: This study demonstrates feasibility of administering an abbreviated, yet comprehensive neuropsychological test battery to patients with intracranial malignancies after primary therapy. We also show that 83% of patients can complete at least 70% of the tests administered, if the testing is directed by a trained neuropsychologist. The results of this feasibility study serve as the basis of a pilot study comparing neural stem cell preserving cranial irradiation with standard therapy in patients with lung and breast cancer. The study will also provide guidelines to clinicians and researchers in compiling a test battery for intracranial malignancies patients.

A26

Coping strategies, cognitive dysfunction, and depression in MS patients longitudinally

Rabinowitz AR, Arnett PA

Objective: Patients with cognitive deficits associated with multiple sclerosis (MS) may be at risk for depression when they also use maladaptive coping strategies. Furthermore, cognitive difficulties may directly affect an individual's ability to employ more adaptive cognitively effortful coping strategies, leading to depression (mediation). The current study tested whether coping mediated or moderated the relationship between cognitive dysfunction and depression longitudinally in MS. Method: Fifty-three MS patients were assessed at two time points 3 years apart. Cognitive function was assessed using the Symbol Digit, the PASAT, Visual Elevator, and Reading Span. Coping and depression were assessed using the COPE and the Chicago Multiscale Depression Inventory, respectively. Results: Controlling for coping at time 1 and cognitive functioning at time 1, the interaction between cognitive functioning and coping was significant ($R^2 = .07$, $p < .05$). Regarding mediation, cognitive function at time 1 significantly predicted depression ($R^2 = .22$, $p < .001$) and coping ($R^2 = .14$, $p < .01$) at time 2, and coping at time 2 significantly predicted depression at time 2, controlling for cognitive function at time 1 ($R^2 = .08$, $p < .05$). Conclusions: Our moderation tests suggest that MS patients with cognitive dysfunction are most at risk for depression over time when they use low levels of adaptive, relative to maladaptive, coping. Furthermore, we found that coping partially mediates the relationship between cognitive functioning and depression longitudinally. Cognitive dysfunction may influence MS patients' ability to employ more active, relative to avoidant, coping strategies, something that may put them at risk for depression.

A27

Neurocognitive impairments associated with adjustment disorder

Steiner AR, Myers-Pagoria M, Noggle CA, Dean RS

Objectives: The DSM-IV-TR suggests adjustment disorder may cause significant impairments in social, occupational and academic functioning, yet no specific mention is made of cognitive impairment. Research has demonstrated cognitive impairments in mood disturbances but not specifically adjustment disorder. This study investigated what cognitive impairments, if any, occur in conjunction with adjustment disorder not only when compared to normals but also to groups within the more severe mood disturbances of depression and anxiety. Methods: The sample consisted of 30 patients with adjustment disorder, 40 depression, 40 anxiety, and 48 normals. Each participant was administered the first seven subtests of the Woodcock–Johnson III-Tests of Cognitive Abilities (WJ-III, Woodcock, McGrew, &

Mather, 2001). Results: Preliminary statistics were ran with additional analyses to be conducted later. Results revealed the adjustment disorder group performed significantly ($p < .01$) worse across domains compared to normals including verbal comprehension, visual–auditory learning, sound blending, concept formations and numbers reversed. However, they tended to significantly ($p < .01$) outperform the more severe mood disturbance groups (i.e. anxiety and depression) in a majority of these domains including concept formation, sound blending and numbers reversed. Additional findings will be shared during presentation. Conclusions: Results clearly demonstrate the cognitive effects adjustment disorder may carry. Findings may provide insight into the basis for the commonly occurring occupational and educational difficulties and thus direction in treatment planning, accommodations, and interventions. Yet, findings also highlight the more mild effects of adjustment disorder in comparison to depression and anxiety. Possible explanations and future direction will be shared.

A28

Cognitive functioning in Neuro-Behçet and Neuro-Lupus

Cavaco S, Martins Silva A, Santos E, Pinto P, Pereira C, Coutinho E, Pinto C, Gonçalves A, Meneses R, Correia J, Vasconcelos C

Objectives: This study aimed to characterize the neuropsychological profile(s) in patients with multisystemic autoimmune diseases with known neurological involvement. Methods: Twenty-three Systemic Lupus Erythematosus's patients with Neuropsychiatric Lupus syndrome (NPSLE) and 14 Béhçet's disease patients with CNS involvement (NBD) recruited in the HGSA—Neurology Outpatient Clinic were compared to healthy demographically matched subjects ($N = 74$) in a series of neuropsychological tests. The applied battery included measures of attention/psychomotor speed (9-hole Peg Test, Digit Span, Attentive Matrices, Corsi Test, Sentence Repetition, TMT-A); visual-construction (CFT—copy); learning and memory (AVLT—immediate recall, delayed recall and recognition, CFT—delayed recall); and executive functions (Letter-Word Fluency, WCST and TMT-B). All patients underwent MRI scanning. The scale Age Related White Matter Changes (ARWMC) was used to analyze the scans. Exclusion criteria: (1) flare during the previous month, (2) flare within the interval between testing and MRI scanning, and (3) illiteracy. Results: The NBD group and the NPSLE group showed poorer immediate recall and visual-construction in comparison to healthy subjects. NPSLE patients had additional impairment in other cognitive domains. Nine NBD patients (64.3%) and 15 NPSLE patients (65.2%) had white matter changes (i.e., 1 or 2 ARWMC scores). The abnormality sites and the clinical variables (i.e., duration of disease and EDSS) did not differ between patient groups. Conclusion: Despite known differences in the pathophysiological mechanisms of the diseases, NBD and NPSLE patients in the inactive stages of the diseases shared common neuropsychological impairments.

A29

The impact of seizure related items on the MMPI-2 in the profiles of patients with epilepsy or psychogenic nonepileptic seizures

Russell H, Coady EL, Chaytor N, Hantke N, Holmes MD, Drane DL

Objective: The MMPI-2 is commonly used to assess psychopathology in epilepsy (ES) and psychogenic non-epileptic events (PNES). Items describing seizure experiences may overestimate psychopathology, however. We explored whether removing seizure related items (SRIs) would produce clinically significant changes in MMPI-2 scores and if this differed by diagnostic group. Method: Sixty patients (30 diagnosed with PNES and 30 with ES) were administered the MMPI-2. SRIs were those identified by Derry et al. (1997). After removing endorsed SRIs, each profile was rescored on scales 1, 2 and 3, given the diagnostic significance of these scales in PNES (Wilkus et al., 1984). Results: A repeated measures ANOVA (group by original and rescored *T*-scores) was conducted for each scale. No main effect of group was found for any scale. The change in mean *T*-scores was significant for all scales ($p < .05$, effect size = 0.67–0.72). Each scale was recoded for the presence of a clinically meaningful reduction (i.e., rescored *T*-score < 65). A chi-square analysis (group by *T*-score change) was conducted for each scale. The likelihood of a clinically significant profile change was similar across groups, ranging from 2% on scale 2 to 22% on scale 1. Conclusions: While the results indicate removing SRIs yield statistically significant changes, there is little clinical significance. The removal of SRIs did not differentially impact either diagnostic group, with both equally likely to decline in *T*-scores. Thus, the inclusion of SRIs does not appear to differentially over-pathologize patients with ES.

A30

Effects of non-neurological medical conditions on MMPI-2 profiles in patients with epilepsy or psychogenic nonepileptic seizures

Coady EL, Russell H, Chaytor N, Hantke N, Holmes MD, Drane DL

Objective: Patients with psychogenic nonepileptic seizures (PNES) often produce characteristic elevations on the MMPI-2 when compared with patients with epileptic seizures (ES). We examined whether the PNES profile (Wilkus, Dodrill, & Thompson, 1984), and elevations on Scales 1 and 3 produced by patients with PNES and ES were related to endorsement of objective non-neurological medical conditions (e.g., diabetes, cancer). Method: Thirty patients with ES and 30 patients with PNES were identified through long-term monitoring at the UW Epilepsy Center from 2006 to 2007; all completed the MMPI-2. We examined whether Scales 1 and 3 were more elevated in patients who endorsed objective non-neurological medical conditions compared to those who reported none. Results: Two univariate 2×2 ANOVAs were conducted to evaluate the effects of medical complaints and diagnosis on scales 1 and 3. Significant main effects of diagnostic group on both scales 1 and 3 were found: $F(1, 56) = 12.08$, $p < .05$ and $F(1, 56) = 8.28$, $p < .05$, respectively. There was no effect of medical complaints on either scale ($ps > .05$). Chi-square analyses found no significant relationship between presence of medical conditions and likelihood of a PNES profile for either diagnostic group. Conclusions: These results indicate endorsing objective non-neurological medical conditions does not result in higher scores on scales 1 and 3, or a greater likelihood of meeting PNES criteria. This suggests elevations on these scales is reflective of psychological symptoms, rather than being due to the presence of actual chronic medical conditions.

A31

The multiple etiological determinants of neurocognitive dysfunction in children with epilepsy

Bender HA, Zaroff CM, Borod JC, Schaffer S, Morrison C, Barr WB

Objective: This study evaluated multiple etiological determinants of neurocognitive abilities in pediatric epilepsy. Relative contributions of psychiatric symptomatology, social-skills functioning, and/or seizure-related factors on test performance were explored. We hypothesized that seizure type and age of onset, along with externalizing behavior problems will be robust predictors of neuropsychological impairment. Method: Sixty participants, ranging from 6 to 17 years, comprised the sample. All subjects had a confirmed diagnosis of epilepsy; children with FSIQ scores <70 were excluded. We administered a test battery assessing performance in six domains: general intellectual, language, visuospatial, attentional, executive, and learning and memory abilities. Two parent-report behavior rating scales (e.g., CBCL and BASC) were also completed. Covariance analysis was conducted to evaluate whether seizure-related variables mediated the effects of psychiatric and social impairment on neurocognitive testing. An alpha level of .05 was utilized. Result: Ratings on a global measure of psychiatric/behavioral symptomatology contributed significantly to diminished performance in the language domain. A linear trend was also noted in the learning and memory domain; seizure type moderated these relationships. Elevated levels of depression, anxiety, and somatization also accounted for learning and memory deficits; medication regimen and seizure type were significant moderators. Externalizing behavior problems significantly impacted performance in executive functioning; seizure type moderated this relationship. Conclusion: This investigation identified multiple subgroups of children with epilepsy at increased risk for neuropsychological dysfunction. The level of impairment was related to several behavioral and illness-related factors. Frequent assessment, parental psychoeducation, psychotherapy, and/or cognitive remediation may be warranted in such cases.

A32

The Self-Other Word Association Test: Clinical utility in a neurologically impaired and healthy control population

Levin Allen S, Irani F, Feehan J, Mamikoynan E, Swirsky-Sacchetti T

Objective: To introduce and evaluate the clinical utility of a quick, categorical fluency measure of the Self (Self/Other Word Association Test—S/O WAT) in a sample of patients with neurological impairment and healthy controls. Methods: A sample of healthy controls and outpatients (mild traumatic brain injury, dementia and other neurological conditions) referred to a private neuropsychology clinic completed the S/O WAT as part of a larger neuropsychological battery. The S/O WAT measures the quality and quantity of word production related to Self and a familiar Other within

restricted search conditions. Results: Overall, patients and controls displayed no difference in the total number of Self and Other words produced. Differences within patient groups will be discussed. However, a qualitative analysis of the type of word produced revealed that there was a significant difference between patients and controls along the dimensions of Abstractness/Concreteness and Valence (positive, negative, neutral). Participants were also most likely to report personality traits and verbal descriptors (e.g. brilliant) followed by physical descriptors of themselves or others. Conclusion: The clinical utility of including a measure of self/other word production in neuropsychological evaluations is highlighted here. Variables such as type of word, word valence and concreteness can provide additional insights about patients' metacognitive representations of self and others.

A33

Use of the Personality Assessment Inventory as a tool in the differential diagnosis of epileptic versus nonepileptic seizures

Mickley NC, Wagner MT, Pritchard, III PB, Topping KB, Halford JJ

Objective: Our aim was to replicate previous research which suggested that the Personality Assessment Inventory (PAI) may be used as a screening tool in the diagnosis of epileptic (ES) versus nonepileptic seizures (NES; Wagner et al., 2005). Method: A retrospective chart review was conducted on 85 consecutive adult patients who were seen at the Medical University of South Carolina for treatment-refractory seizures. Only patients who completed both a valid PAI and inpatient video-eeg monitoring which captured representative events were considered for this study. Of these 63 patients, 11 were excluded due to invalid PAI's, and 3 were excluded due to mixed epileptic and nonepileptic seizures during VEEG. Board-certified neurologists made the diagnosis of ES or NES based on the results of the VEEG. The PAI was administered and scored independently according to standardized protocol instructions. In addition, a "NES indicator" score was calculated for each patient by subtracting the *T*-score on the Health Concerns from the Conversion subscale score of the Somatization scale. ANOVA was used to test whether specific personality characteristic predicted NES. Results: These data replicate our prior research when tested in a separate population, showing that NES and ES patients differ significantly on the Conversion subscale of the PAI ($F[1, 47] = 15.680$, $p < 0.001$), and on the NES indicator scale ($F[1, 47] = 16.931$, $p < 0.001$). Conclusions: The clinical application of the PAI as a low cost, efficacious screening tool to identify patients with NES is supported and confirmed by this study.

A34

Impact of control beliefs on physical and emotional functioning in MS over time

Barwick F, Arnett PA

Objective: Multiple sclerosis (MS) can have an unpredictable course and an uncertain prognosis. The extent to which MS patients feel they have control over their illness may affect their physical and emotional functioning over time. The current study evaluated the extent to which control beliefs predicted functioning in these two domains longitudinally. Method: Ninety-five MS patients completed the Multiple Sclerosis Attitudes Index, a measure of illness control beliefs, along with the Sickness Impact Profile (SIP), Fatigue Severity Scale, BDI-II, and Depression Proneness Rating Scale. Fifty-one of these patients completed the same set of measures approximately three years later. Results: Control beliefs at time one significantly predicted level of fatigue and impact of symptoms on physical activity (SIP-Physical Scale) at times one and two, even after controlling for degree of physical disability (EDSS). These beliefs also significantly predicted level of depression symptoms and depression proneness at times one and two ($p < .05$ for all R^2 change values). MS patients experiencing less control over their illness reported lower levels of physical activity, higher levels of fatigue and depression symptoms, and greater proneness to depression at both times. Conclusions: How MS patients view themselves in relation to their illness is importantly associated with their physical and emotional functioning. Those patients who see themselves as less self-efficacious in managing their illness appear likelier to report higher levels of symptoms over time. Treatment might usefully target control beliefs as an additional way of helping MS patients manage their symptoms more effectively.

A35

Emotional response of injured varsity athletes: Examination of concussion and musculoskeletal injuries

Hutchison M, Mainwaring L, Richards D, Comper P

Objective: Emotional disturbances following athletic injury have been clearly identified as predominantly negative. However, the majority of research on emotional following athletic injury has been conducted on heterogeneous samples

of athletes across a wide variety of musculoskeletal injuries. Therefore, the objective of the study was to determine if concussed and musculoskeletal injured athletes experience differential emotional responses. Method: The concussed ($N = 20$) and musculoskeletal injured ($N = 14$) groups consisted of student athletes participating in intercollegiate athletes at the University of Toronto. Healthy physically active undergraduates comprised the control group ($N = 19$). The short Profile of Mood States (POMS; Grove & Prapavessis, 1992) assessed emotional functioning serially from pre-season to 2-weeks post-injury. Results: There were no significant differences in mood pre-injury. A 3 (group) × 4 (time) ANOVA revealed changes over time for Vigor [$F(3, 47) = 7.32$, $p < 0.001$], Confusion [$F(3, 48) = 3.53$, $p = 0.02$], and Total Mood Disturbance [$F(3, 47) = 4.74$, $p < 0.001$]. Significant interactions for Anger [$F(6, 96) = 6.41$, $p < 0.001$] and Fatigue [$F(6, 96) = 2.47$, $p = 0.029$] were observed. Conclusion: Athletes with musculoskeletal injuries had significantly more Anger immediately post-injury than concussed and healthy controls. Concussed athletes had increased Fatigue and lower Vigor than comparison groups. Results show that there is an emotional response to concussion that appears to be different from that related with musculoskeletal injuries and that associated with day-to-day emotional profiles of uninjured controls.

A36

Examining the cognitive demands of driving in multiple sclerosis

Sestito N, Weisser V, Elovic EP, Ang J, Fleksher C, Nead R, Millis S, Schultheis MT

Objective: This study examined the relationship between cognitive functioning and driving among persons with multiple sclerosis (MS). The current clinical "gold standard" for evaluating driving capacity, the behind the wheel evaluation (BTW) and reports from the Department of Motor Vehicles (DMV) were examined. In addition, self-reported driving frequency was measured. Method: The current study is a subcomponent of a larger prospective study that included a comprehensive cognitive assessment, a visual and physical examination and a driving evaluation. All data were collected in an outpatient research setting and an outpatient driver rehabilitation program. Participants were 66 community-dwelling, licensed individuals with clinically-defined MS between the ages of 23 and 56. Driving performance was defined by calculating a total BTW score and a composite DMV score reflecting accident and violation history. Self-report questionnaires assessing driving frequency in days per week and miles per week were administered. Results: A logistic regression showed that oral SDMT ($p = .078$) was a marginally significant predictor of driving performance on the BTW. A possion regression revealed that the 7/24 ($p = .001$) and the oral SDMT ($p < .001$) tests were significant predictors of a participant's DMV score. Multiple regressions showed that no cognitive predictors were significantly related to days per week or miles per week driven. Conclusions: Aspects of cognitive functioning particularly speed of processing and visual memory appear to influence driving performance in MS whereas driving frequency does not appear to be influenced by specific cognitive domains. Implications for basing driver recommendations on cognitive performance are discussed.

AGING AND DEMENTIA: ALZHEIMER'S DISEASE

A37

Relationships among memory control beliefs, subjective memory appraisal, and memory compensation strategies in patients with Amnestic Mild Cognitive Impairment

Seelye AM, Howieson DB, Wild KV, Hayes T, Sauceda LR, Kaye JA

Objective: The present study's objective was to assess relationships among memory control beliefs, subjective memory appraisal, and memory compensation strategy use in individuals with amnestic MCI. We hypothesized that higher memory control beliefs would be correlated with higher subjective memory appraisal and higher memory compensation strategy use. Method: Individuals with a diagnosis of MCI ($n = 14$) aged 59–90 years were recruited through two Alzheimer clinics. The study's design was correlational. Instruments included the Memory Controllability Inventory to measure perceived control over memory, the Memory Functioning Questionnaire to measure subjective memory appraisal, and the Memory Compensation Questionnaire to measure reported memory compensation strategy use. Results: Higher perceived control over memory was significantly ($p < .01$) correlated with higher subjective memory appraisal. Higher perceived control over memory and subjective memory appraisal were significantly ($p < .01$) correlated with lower use of and reliance on memory compensation strategies. Conclusion(s): Consistent with hypotheses, results suggest higher memory control beliefs may be associated with higher subjective memory appraisal in this population; however, contrary to hypotheses, higher memory control beliefs were associated with lower use of mem-

ory compensation strategies. These results may differ from our hypotheses for several reasons. First, individuals with high feelings of control over memory may feel disinclined to compensate for memory problems. Second, this study is correlational, and it is unclear whether results are influenced by unknown variables. Finally, the pilot study's sample size limits interpretation of results. Future studies with larger sample sizes will be needed to confirm our findings.

A38

Does depression impact the neuropsychological profile of patients diagnosed with Alzheimer's Disease?

Riggins JM, Humphreys J, O'Bryant SE, Sutker PB

Objective: Research suggests that depression influences cognitive abilities, particularly attention, working memory, and processing speed; however, the relation between depression and neurocognitive profile of patients presenting for Alzheimer's disease evaluation is largely unknown. The current study examined the relation between depressive symptoms and the overall neuropsychological profile of patients diagnosed with Alzheimer's disease as measured by the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Method: Participants were 51 patients (18 male and 33 female) diagnosed with Alzheimer's disease (AD); mean age and education of the sample was 76.98 (S.D. = 5.7) and 13.06 (S.D. = 3.6), respectively. Forty-three participants were classified as non-depressed and eight were classified as depressed based results of either the Beck Depression Inventory (BDI-II) or Geriatric Depression Scale (GDS). Patients were administered the RBANS as part of his/her comprehensive neuropsychological evaluation. Results: The cognitive profiles of depressed and non-depressed patients were parallel ($F = .246$, $p > .05$), suggesting that the overall neuropsychological profile of AD patients does not differ between those expressing depressive symptoms versus those who do not. Conclusion: Previous studies have shown depression to have a negative impact on cognitive functioning; however, the present results indicate that depressive symptoms do not change the overall neurocognitive profile of AD patients presenting for evaluation.

A39

A validity study of the Picture Recognition Test for adults with Mental Retardation

Pyo G, Curtis K, Curtis R

Objective: It is hypothesized that early dementia has gone undetected in people with mental retardation (MR) due to their severe cognitive deficits. Standard cognitive tests are not useful, since these tests cannot measure the cognitive skill levels of these subjects. The Picture Recognition Test (PRT) was developed for adults with moderate to severe MR as a dementia screening test. This study determines if the PRT is useful for this purpose. Method: The PRT is a recognition memory test for pencil drawings of 15 objects. After all 15 pictures were presented, immediate recognition memory was tested; the subject was asked to identify the target picture which was presented with two distracter pictures. Delayed recognition memory was tested 10 min after the immediate recognition memory. Results: Forty-one normal controls and 13 AD patients were recruited from group homes and our dementia clinic. The IQs (AD 28.85 + 9.06; normal 34.32 + 12.57) and ages (AD 56.44 + 10.94; normal 53.00 + 7.97) were not significantly different. The AD group's functional level (age-equivalent score 4.75 + 1.26) was significantly lower than the normal group (5.85 + 1.72) ($p < 0.05$). The AD group scored significantly lower than the normal group on PRT immediate memory (AD 9.85 + 3.13; normal 12.05 + 3.21), and delayed memory (AD 8.62 + 3.53; normal 12.02 + 3.21) ($p < 0.05$). Conclusions: The results demonstrated that PRT is useful to differentiate AD patients among adults with moderate to severe MR.

A 40

Capacity to consent to treatment: Age-based norms and clinical cutoffs

Marceaux J, Perkins A, Griffith H, Belue K, Lanza S, Harrell LE, Clark D, Brockington J, Marson DC

Objective: Medical decision-making capacity (MDC) is an important instrumental activity associated with functional independence and autonomy. We developed the Capacity to Consent to Treatment Instrument (CCTI), a vignette-based instrument assessing MDC. The CCTI has previously established reliability and validity in patients with AD. The two clinical vignettes of the CCTI assess five decisional standards: "evidencing choice", "making reasonable choices", "appreciating consequences", "evidencing rational reasons", and "understanding treatment". We present normative data for the CCTI and illustrate clinical applicability of these norms. Method: The CCTI was administered to 70 older controls (separated into ages <60, 60–69, 70 and above), 36 AD patients, and 82 MCI patients. Age-referenced performance cutoffs were set at −1.5 S.D. and −2.5 S.D. in reference to control means. Norms were applied to CCTI

performance of the MCI and AD patients, and sensitivity, specificity, and classification accuracy to detect cognitive impairment and dementia were calculated. ROC analysis compared patient classification outcomes based upon −1.5 S.D. and −2.5 S.D. cutoffs. Results: Both cutoffs for all standards were either highly sensitive (>.80), highly specific (>.80), or both. All areas under the curve were greater than chance (.50). Sensitivity and specificity were generally higher when using the −1.5 S.D. cutoff, with the "understanding" standard demonstrating the highest values. Conclusion: Results support the utility of the CCTI norms to detect impaired treatment consent abilities in MCI and AD patients. The CCTI thus offers a standardized and psychometrically sound means of measuring MDC in the clinical and research settings.

A41

Trails 3: Age-based norms and clinical cutoffs

Marceaux J, Perkins A, Griffith H, Belue K, Lanza S, Harrell LE, Clark D, Brockington J, Marson DC

Objective: Existing measures of visuomotor tracking and set shifting distinguish normal aging from AD. However, discriminating milder cognitive difficulties such as in MCI may require more demanding measures. Trails 3 was designed for this purpose, in that it requires an added set switch in comparison to Trails B. We herein present initial normative data and demonstrate clinical utility. Method: Trails 3 was administered to 65 older controls (separated into ages <60, 60–69, >69), 67 MCI patients, and 25 mild AD patients. Age-referenced performance cutoffs were set using the convention of −1.5 S.D. in reference to control means. Norms were applied to Trails 3 performance of the MCI and AD patients. Sensitivity, specificity, and classification accuracy to detect cognitive impairment and dementia were calculated. ROC analysis compared patient classification outcomes based upon −1.5 S.D. cutoff. Correlations between Trails 3 and Trails A and B were calculated. Results: Trails 3 had moderate sensitivity (.61) and strong specificity (.86) to detect cognitive impairment and the area under the curve (.74) was significantly greater than chance (.50). Further analysis indicated moderate sensitivity (.51) and strong specificity (.86) when applied to the MCI group alone; the area under the curve (.68) remained statistically greater than chance. Trails 3 was significantly correlated with Trails A (.55) and B (.74). Conclusion: Trails 3 appears clinically useful for detecting impairment in MCI and AD. Measures of complex processing speed are likely to help determine which MCI patients are closer to conversion to AD. Future studies should examine this question.

A42

Utility of the CERAD neuropsychological battery total score in the progression of Alzheimer's Disease

Rossetti HC, Hynan LS, Cullum CM, Lacritz LH

Objective: Annualized CERAD Total Change Scores (CTCS) were compared with other cognitive measures to establish its utility as a measure of cognitive progression in AD (max CERAD Total Score = 100). It was hypothesized that AD subjects would exhibit greater CTCS than controls, and their degree of change would fall outside the Reliable Change Index (RCI) confidence interval. Method: Subjects included 383 Normal Control (NC) and 655 AD subjects of similar age and education from the National CERAD Registry who had serial CERAD data (Baseline–Visit 4). Annualized CTCSs for AD and NC were derived and RCIs calculated to establish statistically reliable change that would occur only 10% of the time by chance. CTCSs were compared to annualized change scores from the MMSE, Clinical Dementia Rating Scale (CDR), Sum of Boxes, and Blessed Dementia Rating Scale (BDRS). Results: AD subjects showed significantly greater decline [M (S.D.) = −7.20 (6.93)] than NCs [M (S.D.) = 1.04 (3.41)] from baseline to Visit 1 [($t(894) = -17.30$, $p < .001$)], and from baseline to last visit [($t(1036) = -21.78$, $p < .001$)]. By Visit 3, the majority of AD subjects (65.2%) showed a degree of cognitive decline that fell outside the RCI. AD CTCSs significantly correlated ($p < .001$) with MMSE ($r(651) = .66$), CDR ($r(181) = -.42$), and BDRS ($r(653) = -.38$) change scores. Conclusion: Results support the utility of the CERAD Total Score as a measure of AD progression and provide comparative data for annualized change in CERAD Total Score and other summary measures.

A43

Differential diagnosis of Alzheimer's Dementia and Depression in older adults using an Abbreviated Sensory-Motor Battery

Hall J, Hiller TR, Dean RS, Davis AS, Noggle CA

Objective: Older patients with Alzheimer's Disease (AD) and depression can present with similar neurocognitive deficits which complicate both early identification of AD and differential diagnosis. Some promising research has suggested

that sensory-motor tasks may aid in the differential diagnosis of these patient groups. Since many of these patients have limited test-taking skills, it is essential to use tests or subtests which are highly pathognomic of dysfunction. The present study analyzed the ability of selected components of a measure of the Dean–Woodcock Sensory Motor Battery (DWSMB) to assist in differential diagnosis. Method: Participants were 32 patients with AD (mean age = 76.68 years; S.D. = 6.57 years) and 20 patients with Depression (mean age = 64.41; S.D. = 11.16 years). Previous factor analyses have suggested a three-factor model of the DWSMB for neurologically-impaired adults. A discriminant analysis was conducted using factor 2 which was comprised of motor tasks because one of the most distinguishing factors of AD is psychomotor slowing and patients with AD typically do poorly on complex motor tasks. Results: Wilks' Lambda was significant at the .05 level ($F = 2.47$, $p > 0.01$). Using jack-knife cross-validation, patients with AD were correctly classified 87.5% of the time and patients with depression were correctly classified 38.1% of the time. Conclusions: The abbreviated battery of motor functions of the DWSMB was effective in correctly classifying patients with AD. The implications of this study will be discussed for practitioners and researchers.

AGING AND DEMENTIA: HEALTHY AGING AND COGNITION

A44

The effect of clustering style on recall of prescription information in healthy older adults

Gillis M, Spiers MV

Objective: Does idiosyncratic clustering of prescription information result in lower recall in cognitively intact elderly individuals? Method: Independently living older adults ($n = 36$) ages 72–92 years ($M = 81.31$, S.D. = 4.60) were recruited as part of a larger study assessing medication competence in the elderly. Participants completed the Prescription Memory Task, designed to measure semantic organization of medication instructions. Participants arranged and studied 9 index cards containing prescription information. Immediate and delay free recall trials followed. Participants included in this analysis obtained a minimum score of 27 on the Mini-Mental Status Exam ($M = 28.72$, S.D. = 1.03). Analyses were performed to examine frequency and degree of idiosyncratic clustering styles. Results: Hierarchical cluster analyses yielded a dominant semantic clustering strategy for all participants. Eighteen participants used the dominant clustering strategy (cluster score = 6) and 18 participants showed various degrees of idiosyncratic organization (cluster score = 0–5) in their initial arrangement of prescription information. The dominant strategy group recalled more information at immediate recall ($F(1, 34) = 4.23$, $p = .047$) and delayed recall ($F(1, 34) = 5.80$, $p = .022$) than participants in the idiosyncratic strategy group. Secondary analyses revealed that cluster score is not related to age ($r = -.11$, $p =$ n.s.), but is associated with MMSE score ($r = .35$, $p = .04$). Conclusions: Among cognitively intact elderly individuals, the ability to use a dominant or normative clustering strategy is associated with gross level of cognitive functioning. Individuals who implement the normative clustering strategy are subsequently able to recall more prescription information.

A45

Education's impact on aging of normal and brain injured individuals

Golden C

Objective: It is recognized that aging is associated with cognitive decline. However, there is a lack of good research on the role of protective factors. This study looked at three hypotheses focusing on the role of Education as a protective factor against aging in normal and brain injured individuals as well as across fluid and crystallized tasks. Method: Data for this study was selected from a series of 1548 de-identified research files which were collected over the past decade in South Florida and each were evaluated to determine the presence of factors such as education and handedness and the presence of 17 dependent variables representing crystallized and fluid skills. One thousand one hundred and twenty-four individuals aged 50–99 were found to meet these criteria. Subjects were broken down into four age groups and five education groups as well as whether they had a known brain injury. Results: An overall MANCOVA showed significant findings for both age, education, and brain injury. The results of post hoc ANOVAs (at the .01 level for all) showed 13 of the 17 variables were significant for age, 17 for education, and 16 for brain injury. However, there were significant interactions for age and education, but not for age and brain damage or for education and brain damage or the three way interactions. Conclusions: While the highest education group was superior at all age levels, the degree of advantage declined across the age groups, suggesting that education was not a protective factor as higher education individuals showing greater decline.

A46

Effects of educational attainment on age-related decline in cognitive flexibility

Renfrow S, Marker C, Durkin M, Golden C

Objective: Cognitive flexibility is suspected to decrease with age, resulting in errors on specific tests of executive functioning. Educational attainment has been suggested to influence age-related decrements in cognitive performance. The current study predicts that age-associated errors on executive measures involving cognitive flexibility will be reduced in highly educated individuals. Method: A sample of 394 outpatient adults (mean age = 34.6, S.D. = 14.3; mean education = 13.5, S.D. = 2.7) was chosen from a database of a local university clinic (47% male, 53% female; 72% Caucasian, 13% African American, 15% Other). Cognitive flexibility was measured by the outpatients' scores on the Wisconsin Card Sort Test (WCST), a common measure of executive functions. Results: Age and education were found to significantly correlate with the total number of correct trials (for age, $r = -.25$; for education, $r = .18$; $p < .01$), total number of errors (for age, $r = .33$; for education, $r = -.25$; $p < .01$), perseverance (for age, $r = .28$; for education, $r = -.23$; $p < .01$), perseverative errors (for age, $r = .30$; for education, $r = -.29$; $p < .01$), and nonperseverative errors (for age, $r = .28$; for education, $r = -.23$; $p < .01$) of the WCST. Main effects were found for age, $F(346) = 7.675$, $p < .05$, eta-squared = .102, and education, $F(346) = 5.822$, $p < .05$, eta-squared = .079, with regards to rate of cognitive decline. Conclusions: Fewer errors and perseveration among highly educated individuals across all ages suggest education may be related to higher scores across all age groups.

A47

Relationship between IQ and neuropsychological test performance in older adults

Shaw L, Heyanka D, Golden C

Objective: Premorbid IQ estimates are useful for predicting functioning on neuropsychological tests in cases of neurological disease or injury. Within normal populations, it has been suggested that the relationship between IQ and test performance is stronger for persons with average intelligence or less. The present study sought to explore the relationship between IQ and other common neuropsychological measures among healthy older adults. Methods: Participants included 139 healthy older adults ranging from 55 to 93 years of age. Most were female (39%) and right-handed (89%). The participants had a mean education of 13.91 years (S.D. = 2.76) and a mean IQ score of 108.14 (S.D. = 15.74). Neuropsychological measures included the COWAT, the WRAT Reading and Arithmetic indices, the WMS-III Immediate, Delayed, and General Memory indices, Trails B, and the Stroop. Based on prorated WAIS-III Full Scale IQ scores, IQ was divided into four levels (70–85, 86–100, 101–115, and 116–130). Age and education were covaried. Results: The MANCOVA yielded a Wilk's Lambda of 4.620 ($p < 0.001$). Univariate tests revealed significant group differences for each neuropsychological measure ($p < 0.001$). Pairwise comparisons suggested that the lowest IQ group performed significantly worse than the other IQ groups, while the highest IQ group performed significantly better than the other groups. Conclusion: These results suggest that there are significant relationships between level of IQ and neuropsychological test performance. Clinical implications of these findings will be discussed.

A48

Effects of age and education on cognitive processes and executive function performance in older men

Shaw L, Hines L, Figueroa M, Golden C

Objective: Previous research has examined cognitive processes and age-related decline on executive tasks in older women, as well as the differential effect of education on performance. The present study was designed to assess these functions in older men. Method: Participants included 48 healthy males ranging from 55 to 86 years of age. Most were Caucasian (79%) and right-handed (90%). The total sample had a mean MMSE score of 28.20 (S.D. = 2.26), a mean GDS score of 6.56 (S.D. = 7.52), and a mean FSIQ score of 111.17 (S.D. = 16.79). Age was divided into two levels (55–71 and >72). Education was divided into two levels (7–13 and >14). Results: Trails B Time performance showed significant main effects for age [$F(1, 43) = 10.86$, $p = 0.002$] and education [$F(1, 43) = 9.01$, $p = 0.004$], but not for the interaction effect. Stroop performance showed significant main effects for age [$F(1, 41) = 16.67$, $p < 0.000$], but not for the main effect of education or the interaction effect. COWAT performance showed a significant main effect for age [$F(1, 43) = 7.37$, $p = 0.010$], but not for the main effect of age or the interaction effect. Inspection of the means indicated that the older age group performed significantly worse than the younger age group. Conclusion: These results

suggest that some forms of executive functioning are impacted by age and education level. Clinical implications of these findings will be discussed.

A49

Education as a predictive factor for executive functioning in older normal adults

DenBesten N, Durkin M, Hines L, Golden C

Objective: This study evaluated whether level of education achievement can predict executive functioning performance in older adults. Methods: One hundred and twenty-four participants aged 55 with no history of neurological or psychiatric problems were included. Each subject was administered the Controlled Oral Word Association Test (COWAT), Boston Naming Test (BNT), WAIS-III Matrix Reasoning, Trails B, and the Stroop Color Word Test in order to measure executive functioning. Education consisted of three groups: 12 or less, 13–15, and 16 years or more. The present study included. mean age, ethnic breakdown (e.g., most Caucasian, education, and gender percentage). Results: Data were analyzed by means of a discriminant analysis. The 12 years or less group varied significantly from the 13–15 years group at the .05 level on measures of executive functioning. The 12 years or less group varied significantly from the 16 or more group at the .05 level ($p < .001$) on measures of executive functioning. Matrix Reasoning appears to contribute most (15.022) and the COWAT contributed second (6.288) in discriminating differences of executive functioning between the three groups. The Boston Naming Test and Trails B contributed third. Conclusions: Results indicated that individuals who complete 16 or more years of education outperform those with less education on tasks of executive functioning later in life. Individuals who completed 13–15 years of education retained a higher level of executive functioning than those with less education. The results of this study indicated that higher education is associated with executive functioning.

A50

Executive functioning, motor programming, and functional independence

Kraybill M, Franchow E, Suchy Y

Objective: The purposes of the present study were (1) a replication of our prior findings that have shown that the Push-turn-taptap (PTT) task from the electronic version of the Behavioral Dyscontrol Scale (BDS-ev) relates to executive functioning (EF), and (2) an extension of previous research pitting the Delis–Kaplan Executive Function System (D-KEFS) against components of motor programming (MP) assessed with the PTT task in terms of their ability to predict functional independence among the elderly. Methods: 50 elderly participants were administered the following tasks: (1) D-KEFS, (2) Timed Instrumental Activities of Daily Living (TIADL), and (3) PTT. The PTT task generates three variables used in the analyses: (a) Motor Control; M-CNT, (b) Motor Learning; M-LRN, and (c) Motor Planning; M-PLN. Results: M-LRN, M-PLN, and M-CNT were found to correlate with other measures of executive abilities and were significant predictors of functional independence. The PTT task did better than the D-KEFS battery at predicting functional independence after demographic variables (R square change = 0.189, $p < .01$; R square change = 0.159, $p < .001$). Conclusions: The PTT task was shown to capture EF abilities assessed by other EF measures including the D-KEFS. These findings also suggest that the PTT task may have clinical utility as a brief but effective predictor of functional independence; it would be more cost-effective than a longer battery and may be particularly useful in the assessment of older adults who are more susceptible to fatigue.

A51

A preliminary examination of The Dementia Rating Scale-II in a college-age sample

Carmona JE, Cox DE, Holland AK, Harrison DW, Mallory T, Stratton H

Objective: The Dementia Rating Scale is commonly used in the diagnosis of Alzheimer's disease (AD) with direct implications for the elderly on competency and self-determination drawn from these test results. The scale is typically administered by specialized healthcare practitioners in the United States and has been in circulation since 1988. It consists of a number of subtests designed to assess performance according to five cognitive domains: Attention, Initiation/ Perseveration, Construction, Conceptualization, and Memory. An updated version, the DRS-II has been available since 2001. However, few studies have examined the diagnostic validity of the DRS-II. Method: A pilot study was conducted in which the DRS-II was administered to high functioning, healthy, university undergraduate students ($N = 40$) aged 18–24 with mean entrance SAT score = 1231. Students were randomly drawn from the undergraduate psychology research pool. Results: Data indicated 70% ($N = 28$) of the sample scored within an

interpretive range of "Below Average" and 10% ($N = 4$) scored in a range considered "Mildly Impaired." Conclusions: The results lend discussion to three main points: first, the economic impact of healthcare costs associated with AD and the emotional toll of AD on the elderly and on relatives necessitate accurate assessment of cognitive functioning. Furthermore independent examination of the DRS-II in a college age sample is warranted, given the potential for identification of false positive AD dementia patients. Lastly, the consequences of false diagnosis and the implications for competency, independence, and self-determination suggest that this is a critical area for research on dementia.

AGING AND DEMENTIA: OTHER

A52

Influence of sleep disordered breathing on cognitive functioning among elderly with cognitive compromise

Yamout KZ, Bliwise DL, Goldstein FC, Wood-Siverio C, Lah JJ, Levey AI

Objective: This study examined the relationship between sleep disordered breathing (SDB) and neurocognitive functioning in a sample of older adults with cognitive compromise. Method: Participants were elderly (age $M = 73.5$, S.D. = 8.5), mostly Caucasian (87%), females (54%) and males with diagnoses of Dementia ($n = 51$) or Mild Cognitive Impairment ($n = 37$). Sleep disordered breathing was assessed using ambulatory oximetry during sleep and was quantified as a Desaturation Index (DI), the number of drops in oxygen desaturation of greater than or equal to 4% per sleep hour. Neuropsychological functioning was measured using a comprehensive battery of tests that assessed global functioning and depression, as well as the neurocognitive areas of attention, verbal and nonverbal learning and memory, visuomotor processing speed, verbal fluency, visuospatial perception/visuoconstruction, naming, and executive functioning. Results: Multiple hierarchical regression analysis was conducted entering DI, age, gender, education level, depression, and MMSE scores predicting results on each neurocognitive measure independently. Regressions were conducted separately for those with versus without cardiovascular disease (CVD). Among those without CVD, DI was only significantly ($p \leq 0.05$) related to poorer attention and one measure of construction. However, among the participants with CVD, DI severity was significantly related to worse nonverbal delayed recognition memory, visuospatial perception, visuoconstruction, visuomotor speed, and fluency, and approached significance with attention. Conclusions: This study demonstrated a dose-related influence of DI on neurocognitive functioning among cognitively compromised elderly. The influence was more robust among those with severe cardiovascular disease than those without. Supported by NIA AG-025688; AG-020269.

A53

Impact of depression on memory and executive functioning in cognitively healthy older adults

Heyanka D, Reuther B, Mackelprang J, Golden C

Objective: Literature regarding the impact of depression on cognitive abilities in older adults has yielded disparate results. As deficits secondary to depression are vital differential diagnoses for dementia in this population, much of the literature has focused on a clinical population. The purpose of this study was to examine the impact of depression on memory and executive functioning within a cognitively healthy geriatric population. Methods: Participants were 152 adults aged 55–93 years ($M = 67.89$, S.D. = 9.42) with 65.4% female, 74.4% Caucasian, and 91.1% right-handed. All indices of the WMS, excluding Working Memory, were implemented to assess memory while executive functioning was assessed with the COWAT, Trail-Making Tests and four Stroop measures. Based on the Geriatric Depression Scale, participants were partitioned into three levels: Severe (20–30), Mild (10–19), and No (0–9) depression. A MANCOVA was implemented with age covaried to eliminate age-related cognitive decline. Results: The MANCOVA controlled for age [Lambda(14, 135) = 3.31, $p < .001$] and yielded significance across the design [Lambda(28, 270) = 2.05, $p < .01$]. Excluding Stroop Interference and COWAT, univariate analyses displayed significance on all measures while maintaining homogeneity of variance. Trend analysis suggested a quadratic trend and pairwise comparisons supported this trend as the Mild group performed significantly worse than the Severe and No depression group on all measures. Conclusion: These results indicate depression adversely impacts memory and executive functioning in a cognitively healthy geriatric population. Clinical implications of these findings will be discussed.

A54

Personal factors contributing to deficits in self-awareness of cognitive impairment in HIV/AIDS

Juengst SB, Pramuka M, McCue M, Becker J, Skidmore E

Objective: This study examined what personal factors were associated with poor self-awareness in individuals with cognitive disability due to HIV/AIDS. Method: Seventy-five subjects, 52 HIV+ and 23 HIV−, completed a psychosocial interview (SCID), the Patient's Assessment of Own Functioning (PAOF) questionnaire, and a battery of neuropsychological tests. They were then classified as being aware, having limited awareness, or having poor awareness based on the differences between their self-reports and performance on the neuropsychological test battery. Performance on specific neuropsychological tests, substance use, HIV/AIDS sero-status, age, and depression, were examined for possible associations with deficits in self-awareness. Results: Those with more severe cognitive impairment were less aware than those with normal or borderline cognitive functioning. A one-way ANOVA suggested that the poor awareness group differed significantly from both the aware and limited awareness groups on the Digit Symbol test and the Rey Figure Immediate and Delayed Recall. The aware and limited awareness groups were not significantly different for any factor. Overall, poor awareness was associated with poorer test performance. In those who were HIV positive, individuals with poor self-awareness were significantly younger than those with limited or good self-awareness; this was not the case for those who were HIV negative. Conclusion: The most important finding in regards to HIV/AIDS is the suggestion that there is an interaction between the disease and age, indicating that there may be a specific disease process contributing to deficits in self-awareness in HIV positive individuals.

A55

Predictors of testamentary capacity with reference to undue influence

Chafetz M

Objective: The objective of this study is to determine neuropsychological variables that predict testamentary capacity. Rules about testamentary capacity are similar in all states but have specific language that varies from state to state. Louisiana rules were revised and "modernized" in 1991, requiring that the testator "must have the ability to comprehend generally the nature and consequences of the disposition that he is making" (La. Civ. Code art. 1477). Undue influence requires testamentary capacity, for the testator must have capacity to make a will if he or she is to be fraudulently influenced. Yet there must be some weakness on the part of the testator; otherwise, the testator would be able to resist the malevolent influence. The present study seeks to determine factors that constitute weaknesses to the point of testamentary incapacity. Method: A rating scale that captures the basic components of testamentary capacity was developed. Twenty-four serial referrals for dementia workup by the author were utilized. Each subject or guardian provided informed consent. Correlation coefficients were derived for rating scale totals and neuropsychological variables. Classification accuracy was described. Results: Neuropsychological variables accounting for over 50% of variance in this rating scale include inhibition (Stroop interference), word reception (PPVT-III), immediate memory (RBANS), language (RBANS), dementia level (DRS-2), and recognition memory (MSVT). Conclusions: Testamentary capacity has a low standard, requiring basic neuropsychological integrity that would normally be considered as impairment in many cases. These findings are discussed with relation to cases of testamentary capacity and undue influence.

A56

Neuropsychological, neuroimaging, and clinical correlates of early- and late-stage Semantic Dementia

Addison-Brown K, Bosc K

Objective: The current study is a case comparison of the clinical correlates of early- and late-stage semantic dementia. Method: The study was conducted in an outpatient senior health clinic. BH, a 64-year-old Caucasian female, and BW, a 69-year-old Caucasian female, both college-educated, received diagnoses of Semantic Dementia following extensive neuropsychological testing, neuroimaging, and clinical interview. Results: Overall, BH was more severely impaired than BW. BW's neuropsychological deficits were specific to language, ranging from mild to severe impairment within this domain. There were isolated impairments in judgment and immediate memory, with the latter thought to be related to the patient's language impairment. BH's neuropsychological testing revealed severe deficits in language, attention, visuospatial/constructional abilities, and memory. Despite completion of a college degree 2 years earlier, BH displayed severe letter and number agnosia and inability to read even simple words. MRI results for both patients were consistent with mild cerebral atrophy. In addition, BW's PET scan revealed prominent hypometabolism in the left frontotemporal

region. BH was severely impaired in daily life (e.g., self-care deficits, getting lost while driving, apathy, and low motivation), while BW's complaints were limited to language deficits and increased irritability. Conclusions: Results support the prominence of language deficits in Semantic Dementia prior to the emergence of other impairments. They also reflect the clinical correspondence of results from neuropsychological, neuroimaging, and interview data.

A57

An extension of preliminary findings on the psychometric properties of the Alberta Smell Test

Ericson R, Gavett BE, McCaffrey RJ

Objective: The Alberta Smell Test (AST) is a 20-item, forced-choice odor identification test. The present study sought to provide preliminary findings of the psychometric properties of the Alberta Smell Test, both by replication and extension of previous results. Method: The Brief Smell Identification Test (BSIT) and the AST were administered to 30 community-dwelling elderly volunteers, age 50 and over. The National Adult Reading Test—Revised (NART-R) and the Finger Tapping Test were administered between the two tests to prevent carryover effects, and ordering of the tests was counterbalanced in two testing sessions. The psychometric properties of the AST were calculated and compared to those of the BSIT. Results were also compared to previous findings. Results: Test–retest reliability of the AST was high (.83), and internal consistency was high (.84 compared to BSIT's .70). Concurrent validity between the two tests was high in both administrations (.52 and .67). High correlation between the AST and the Dementia Rating Scale (.42) provide concurrent validity, while low correlation between the AST and the National Adult Reading Test—Revised (.25) provide discriminant validity, indicating good construct validity of the AST. Adding these data to previous results of the same study provide a greater sample size (60) and similar significant results. Conclusion: In the present study, the results indicate that the Alberta Smell Test is a reliable and valid measure of olfactory identification, and compared favorably to the BSIT, a widely used and well-established odor identification test. Implications will be discussed.

A58

The relationship between depression and cognitive decline in older adults

York PJ, Rogers SA

Objective: Research has suggested a relationship between depression and cognitive decline among older adults, but little has assessed how depression relates to the level of cognitive decline. This study examined the relationship between depression and the degree of cognitive decline from premorbid levels of cognitive functioning. Methods: A neuropsychological battery was administered to 17 older adults (M age = 76.12) residing in a retirement community. Participants were grouped into non-depressed and mildly depressed groups. Decline scores were calculated by first creating z-scores for each cognitive domain and then subtracting these from premorbid estimates. Results: Individuals with mild depression had significantly greater decline in verbal IQ scores than non-depressed individuals, $t(14) = -2.15$, $p = <.05$. Similarly, when controlling for age, those with mild depression had greater decline in the executive domain than those with no depression, $F(1,14) = 5.52$, $p < .05$. Subsequent post hoc analyses of the executive domain revealed significant differences in Letter-Number Sequencing, $t(15) = 3.30$, $p < .01$. Trails B was also approaching significance, $t(15) = 1.96$, $p = .07$. Conclusions: These findings suggest depression may be related to a greater degree of cognitive decline, particularly in verbal IQ and executive functioning. This bolsters previous research suggesting that the executive domain is most closely related to detriments associated with depression. Further, the degree of decline from premorbid levels is related to depression regardless of current levels of cognitive functioning. These findings may inform the treatment and detection of both depression and cognitive decline among older adults.

PROFESSIONAL ISSUES: EFFORT AND MOTIVATION

A59

The Rarely Missed Index: Measure of malingering or response bias?

Barlow A, Axelrod BN, Paradee C

Objective: The Rarely Missed Index (RMI) from the Wechsler Memory Scale—III Logical Memory Recognition (LMR) subtest was proposed as a measure of malingering based on (1) four items that are correct when answered "yes" and (2) two items that are correct when answered "no." The influence of an individual's tendency to respond positively or negatively, and that effect on RMI, was the focus of this study. Method: Thirty-one individuals were

administered LMR without prior presentation of the story material. Responses to the 30 LMR items were given a numerical value representing a tendency to respond positively by saying "yes" (+1) or negatively by saying "no" (−1) to the items. The sample was trichotomized based on Response Bias Score, separating participants into Negative ($n = 8$), Positive ($n = 15$), and Balanced ($n = 8$) Response Bias groups. The scores for total correct and for RMI were computed. Results: Groups did not differ with regard to overall performance, though RMI was significantly lower for Negative Response Bias. Because yea-saying is associated with higher RMI scores, 67% of Positive Bias Group were misclassified as malingering, while 50% of the Balanced and 0% of the Negative Response Bias groups would be considered malingering by RMI. Conclusions: Obviously, the RMI is influenced by response bias and is not solely a measure of malingering. In other words, yea-sayers are more likely to be falsely considered to be malingering than individuals with no response bias or those who are nay-sayers.

A60

Evaluation of the Rarely Missed Index relative to other neuropsychological test performance

Axelrod BN

Objective: Clinical research with the WMS-III has promoted the use of a regression-based algorithm of six Rarely Missed Items (RMI) from the 30 items included in the recognition subtest of Logical Memory. Method: A mixed clinical sample of 327 individuals (age = 56 years; education = 11.9 years) underwent neuropsychological evaluation for the purposes of clinical care. The evaluation included the Wechsler Memory Scale-III (IM = 72; GM = 76) as well as other cognitive measures, including WAIS-III (FSIQ = 83), Rey AVLT (SS = 70), WRAT-3 (Reading = 89; Spelling = 82; Arithmetic = 84), TMT-B (t-score = 41), WCST (SS = 82), and FAS (25 words). The sample was dichotomized based on RMI score, resulting in 61 of the individuals (18.6% of the sample) deemed by the algorithm as being pathologically high. An examination of the groups of patients who fell above the RMI cut-off score (i.e., poor effort) were compared to those who fell below the cut-off score (i.e., good effort). Results: The results demonstrated a nearly consistent pattern of the group with high RMI scores performing significantly worse than the other group on other cognitive tasks. This difference was noted across measures of intellectual functioning, memory, academic achievement, and executive functioning. The groups did not differ with regard to age or education level. Conclusions: Findings from the present study demonstrate the need to evaluate purported measures of incomplete effort with patient samples and relative to performance on other tasks of cognitive functioning.

A61

Using digitally modified dynamometer to assess effort

Davis JJ, Killilea C, Wall JR

Objective: This pilot examined effort in a simulated malingering design using analog and digitally modified dynamometers (DMD) in a sample without reported neurological history. Method: A post-test only experimental design was conducted at a midwestern university during the fall of 2006. Twenty-nine undergraduates participated; 75.9% were female, 93.1% Caucasian, 6.9% African-American, and 82.8% right-handed. Average age was 21.2 years (S.D. = 5.16), and average educational level, 12.6 years (S.D. = 0.87). After random assignment to naïve malingering ($n = 15$) or control ($n = 14$) conditions, malingerers read information about general effects of traumatic brain injury, while controls were given information about spinal cord injury. Outcome measures included grip strength and from a subset of the sample ($n = 6$), force curve graphs generated from applying a polynomic equation to the DMD data. Post-testing on reading material and a survey were used to assess compliance with instructions. Results: Average grip strength (kilograms) of naïve malingers for dominant hand ($M = 24.53$, S.D. = 12.82) and nondominant hand ($M = 23.43$, S.D. = 14.37) was significantly lower than that for controls (dominant hand $M = 33.96$, S.D. = 7.17, $t(22) = -2.47$, $p = .022$ (two-tailed), $d = -9.43$; and nondominant hand $M = 34.04$, S.D. = 7.29, $t(21) = -2.53$, $p = .019$ (two-tailed), $d = -10.60$). These differences were also demonstrated in force curves graphed from the DMD subset. Conclusions: The findings suggest further study using DMD to assess effort.

A62

The relationship between the TOMM and Faces as measures of motivation

Tireman E, Silk E, Jakovljevic S, Buddin H, Golden C

Objective: Tombaugh states that the Test of Malingering Memory (TOMM) is designed to, "provide a reliable, economical first step as part of a full psychological battery to help assess whether an individual is falsifying symptoms

of memory impairment". The purpose of the present study was to determine whether the TOMM Trial 1 and 2 scores correlate significantly with the WMS-III Faces I and II subtest scores in a mixed clinical population. Method: The clinical group consisted of 29 adults in a mixed clinical population. All participants completed a standardized and comprehensive neuropsychological battery. For the present study, only the Test of Malingering Memory and the Faces I and II subtests on the Wechsler Memory Scale were used. For the sample, the mean age was 35.81 (S.D. = 12.18) and the mean education was 14.82 (S.D. = 2.71) and 65.5% were male. Caucasians represented 72.4% of the sample. Results: Pearson correlations yielded no significant correlations between the TOMM and Faces. Conclusion: Results suggested that the subtest scores on the Wechsler Memory Scale, Faces I and II do not correlate significantly with Trials 1 and 2 on the Test of Malingering Memory. It was found that using the Faces I and II subtests as a measure of malingering similar to the TOMM in a general clinical population does not seem to be indicated in the current study by a lack of correlation between variables. These results require further replication of the data.

A63

The performance of the MMPI-2 reconstructed scales among personal injury litigants feigning impairment

Downing SK, Denney RL, Spray BJ, Halfaker DA

Objective: This study evaluated the relationship between the Reconstructed Scales and malingering. Method: The sample was retrieved from archival data and consisted of 74 personal injury claimants who declared traumatic brain injury, underwent outpatient neuropsychological evaluation, and for whom valid MMPI-2 results were available. Litigants were classified as displaying Probable Malingered Neuropsychological Dysfunction (MND) or Presumed Valid based on Slick, Sherman, and Iverson (1999). Logistic regression analyses were conducted to evaluate the relationship between each RC scale and subject groups. Area under the receiver operating characteristic (ROC) curves were created for each logistic regression model to determine optimal hit rates for those scales found to be susceptible to feigned symptoms. Results: Five RC scales (RCd, RC1, RC2, RC7, RC9) were found to significantly predict group membership at the $p < .05$ level. The majority of variance was accounted for by RC1 ($R^2 = 25.5$, $d = 1.3$), RC2 ($R^2 = 26.1$, $d = 1.4$), and RCD ($R^2 = 13.9$, $d = .7$). Scales RC7 ($R^2 = .07$, $d = .5$) and RC9 ($R^2 = .09$, $d = .5$) each contributed less than 10% of the variation. A ROC analysis for RC1 found a cutoff score of 80 produced an overall classification rate of 78% with a specificity of 74% and sensitivity of 83%. For RC2, a cutoff score of 72 produced an overall classification rate of 76% with a specificity of 68% and sensitivity of 83%. Conclusion: Clinicians conducting personal injury evaluations should be aware that MND affects RC scales, particularly RC1 and RC2.

A64

Performance of individuals with Somatization/Conversion Disorder on the Test of Memory Malingering (TOMM)

Zartman AL, McCoy KJ, Kurtz EL, Hilsabeck RC

Objective: While substantial research has focused on identifying frank malingering, few studies have examined the effect of somatization on symptom validity testing. It is hypothesized that individuals with somatization/conversion disorder are more likely to fail effort testing than people diagnosed with Cognitive Disorder NOS or Depression. Method: Ninety-two veterans (85% men) were evaluated for attention and memory problems at a VA hospital. Following comprehensive neuropsychological testing, including administration of the TOMM and the MMPI-2 or Personality Assessment Inventory (PAI), 53 were diagnosed with Cognitive Disorder NOS (COG), 26 were diagnosed with Depression (DEP), and 13 were diagnosed with Somatization/Conversion Disorder (SOM). Chi-square was used to determine if group differences existed in percentage of persons failing the TOMM. Results: There were no significant group differences in age, education, ethnicity, or estimated WAIS-III FSIQ. A significantly greater percentage of the SOM group failed the TOMM (38.5%) compared to both the COG and DEP groups (5.7% and 11.5%, respectively). Of the 11.5% of the DEP group failing the TOMM ($N = 3$), 66.7% received a secondary diagnosis of somatization/conversion disorder. Conclusions: Individuals with somatization/conversion disorders are more likely than persons with Cognitive Disorder NOS or Depression to produce invalid test performances on the TOMM in spite of performing within normal limits overall on other neurocognitive measures. This is likely due to their preference to manifest emotional upset in the form of physical complaints, in this case cognitive problems.

A65

Use of FP scale items to identify unusual responding in a large survey assessing male health care utilization

Kinderdietz JS

Objective: In research involving lengthy surveys it is important to include safeguards to ensure participants thoughtfully and conscientiously answering each item. Another thing that researchers must consider is participant fatigue and attempt to limit the number of items on a questionnaire in order to maximize the collection of essential data. A strategy used to try and satisfy these competing interests is the inclusion of items or entire scales designed to measure infrequent responding such as the *F* scale from the MMPI-II. The *F* scale, while ideal for this purpose, consists of 60 items that would increase the size of most research surveys noticeably. Another option, and one investigated in the current study, would be to select items from the FP (Infrequency-Psychopatholgy) Scale, developed by Arbisi and Ben-Porath (1995), that are answered infrequently by members of normative and inpatient psychiatric samples. Method: Three items were selected to identify unusual responding using the original Minnesota normative group by Hathaway and McKinley, the national survey sample from the MMPI-II, and the contemporary psychiatric sample from Minnesota and Ohio. These items were selected based on ratings of low ambiguity and desirability (Dahlstrom, Welsh, & Dahlstrom, 1975) and infrequent endorsement by normative and inpatient psychiatric samples. Results: These 3 items were able to identify 32 questionnaires from a group of 721 surveying male healthcare utilization that upon inspection appeared to be answered in a random or fixed manner. Conclusions: It is possible to use an abbreviated form of the FP scale to safeguard against random survey responding.

A66

Likelihood of suboptimal effort in a forensic sample based on Finger Tapping Test and Trail Making Test scores

Gavett BE, Lynch JK, Fisher JM, McCaffrey RJ

Objective: There is a growing body of literature investigating the detection of suboptimal effort using tests that were neither developed nor standardized for this purpose. Several studies have revealed that individuals suspected of suboptimal effort or malingering perform more poorly than those with brain injury on the Finger Tapping (FTT) and Trail Making Tests (TMT). Despite this finding, the utility of these measures in clinical decision-making is questionable, because reduced scores can also result from genuine cognitive impairment. We present likelihood ratios and probability values for identification of suboptimal effort using these measures. Method: An archival analysis was conducted of 202 patients referred for neuropsychological assessment for litigation purposes following mild traumatic brain injury. Patients administered at least two symptom validity tests (SVTs) as part of a larger forensic neuropsychological battery were included in the analysis ($n = 149$). The sample consisted of 66 women and 83 men (age: $M = 41.9$, S.D. = 13.7, range = 17–78). Twenty-three subjects failed two or more SVTs and were categorized as probable suboptimal effort. ROC analyses were used to calculate likelihood ratios and probability values for scores on the FTT and TMT. Results: The likelihood of suboptimal effort based on FTT and TMT scores was generally low for a range of scores and base rates. Conclusions: The use of FTT and TMT as indices of suboptimal effort is not recommended, as the posttest probability of correct classification, even at very low scores, is not likely to differ substantially from the prior probability (i.e., base rates).

A67

Relationship of alliance and satisfaction in neuropsychological assessment feedback

Estrada AR, Nowinski LA, Smith SR

Objective: The present study examines the relationship between patient-reported alliance and satisfaction following neuropsychological assessment feedback. Despite ample literature on neuropsychological testing, there is a dearth of research on alliance and satisfaction in this arena. In personality assessment, Ackerman, Hilsenroth, Baity, and Blagys (2000) found that pre-therapy collaborative therapeutic assessment enhanced alliance, which has important implications because alliance is acknowledged as a strong predictor of treatment outcome. Method: Participants ($N = 24$) of this study were self-referred adults ($N = 13$) and parents of adolescents ($N = 11$) assessed in a university-based neuropsychology clinic. In conjunction with neuropsychological assessment, participants completed the Combined Alliance Short Form and Client Satisfaction Questionnaire following an in-person feedback session with the clini-

cian. Results: Significant relationships were found between client satisfaction and the alliance factors of agreement on goals and patient–clinician bond ($r = .75$, $p < .001$; $r = .64$, $p < .01$). Agreement on treatment goals was significantly related to perceived relevance of clinician recommendations ($r = .47$, $p < .05$) and likelihood of following recommendations ($r = .55$, $p < .05$). Correlations between satisfaction and global patient alliance yielded moderate to large effect sizes ($r = .62$–$.75$). Conclusion: These results suggest that patient report of alliance is positively related to satisfaction with services. Patient–assessor bond, agreement on goals, and patient satisfaction were found to be positively related to perceived relevance of recommendations as well as likelihood of following through with recommendations.

A68

Endorsement of BRIEF validity items may identify low participant investment

Samek J, Spencer RJ, Rice SC, Waldstein SR

Objective: Neuropsychologists routinely use self-report data when assessing behavioral functioning. The integrity of these data, however, is dependent upon the motivation of the respondent. Here, five validity items from the Behavior Rating Inventory of Executive Function (BRIEF) were used to identify participants who might have poor motivation while taking part in a behavioral study. Method: Ninety-seven undergraduate students completed the BRIEF, a self-report questionnaire that contains 70 items pertaining to executive functioning in the everyday environment. Participants indicated whether, over the past month, they had "never", "sometimes", or "often" experienced problems with each behavior. Imbedded within the BRIEF are five validity items that were rarely endorsed as either "never" or "often" by the standardization sample. For example, few adults would indicate "often" to an item stating "I forget my name". Results: Twenty-four (25%) of the present participants endorsed at least one infrequent response to a validity item. Those participants endorsing at least one of the validity items reported significantly fewer problems with executive functioning, lower levels of state anxiety, and arrived to their testing appointment significantly later than those who did not (p's $< .05$). Conclusions: The manual for the BRIEF suggests viewing protocols containing endorsement of three or more validity items with suspicion. However, in the present sample, endorsement of even one of the five validity items may suggest poor investment on the part of respondents. Thus, the results from such protocols should be interpreted with caution.

Poster Session B

DEVELOPMENTAL AND PEDIATRIC: OTHER

B1

Significant accommodations in the evaluation of a child with Sotos Syndrome

Pelletier S

Objective: Neuropsychologists may be requested to evaluate children who present considerable challenges (i.e. performance that is well below age expectations and hesitancy to respond). While adherence to standardization procedures is preferable, at times an evaluation cannot be completed without modifications to traditional means of assessment and interpretation. Method: Evaluated 5 year old, right-handed, Hispanic male, with reported prior medical diagnosis of Sotos Syndrome. Firstname has been raised in a bilingual home. A prior evaluation suggested he was untestable. Significant modifications in the administration of measures were required, including use of a peer model to support Firstname's ability to interact with the examiner. Nonstandard methods were required to interpret his level of performance, including use of age equivalency scores, as reliance upon standard scores provided a flat profile. Results: Firstname completed all tasks presented that were within his ability level. His performance reflected delays in most spheres of functioning. Significant concerns related to his limited expressive language skills (greater expressive than receptive deficits). Firstname demonstrated generally age appropriate attentional capacities. Based on his history and results of the current assessment Firstname's present level of cognitive performance is in the range of moderate mental retardation. Firstname's profile of performance is consistent with that expected in a young child with Sotos Syndrome. Conclusions: Although perhaps not the preferred methods for assessment, this case presents one example in which nonstandard examination and interpretation practices were required in order to obtain a valid and ecologically useful assessment of a youngster's performance.

B2

Case study of a six year old with Williams Syndrome and Autistic features

Papazoglou A, Hamilton WG

Objective: Williams Syndrome (WS) is a multisystem disorder with a distinct cognitive and behavioral phenotype. Although children with WS are often used as a comparison group for children with autism spectrum disorders (ASDs), research suggests that some children may demonstrate some of the social deficits and unusual behavior typically associated with ASDs. The potential for co-occurrence has been understudied, with prevalence estimates as high as 20% for WS and ASD and at 5–10% for WS and autism. We present data on a 6-year-old male referred with a question of ASD. Method: This patient presented with a history of Type 1 Chiari Malformation and developmental delays, resulting in therapies since the age of 14 months. Recent areas of concern included inattention and behavior problems. Results: Neuropsychological testing revealed intellectual functioning in the borderline range (WISC-IV FSIQ = 71), with a relative strength on the General Language Index (SS = 89). Academic functioning was commensurate with FSIQ. Consistent with the WS cognitive profile, visual–spatial construction deficits and a short attention span/distractibility were noted. Adaptive, behavioral, and executive difficulties were evident across environments. Although WS was genetically confirmed, less consistent with this diagnosis were stereotyped behaviors, which were many. Conclusions: The results of this evaluation suggest a behavioral phenotype not entirely consistent with WS. Coupled with existing literature, this raises questions about the practice of using WS individuals as a comparison group in ASD research and highlights the need for overlapping symptomatology and its underlying neurological pathology to be further examined.

B3

Understanding and serving children with Post-Traumatic Stress Disorder (PTSD) in schools

D'Amato RC, Warnygora NR, Titley JE, Sinco SR

Objective: If we are to successfully serve children with Post-Traumatic Stress Disorder (PTSD) we must work in the public schools where children spend the majority of their time. PTSD in children refers to an acute psychological reaction that causes significant impairment in functioning and persists for longer than one month. The purpose of this poster is to develop and evaluate a teacher rating scale for identifying school children with PTSD. Method: Our instrument, the Teachers PTSD Child Rating Scale, was validated with the Behavior Assessment System for Children (BASC)-Teacher Rating Scale. The clinical group was children diagnosed with PTSD and the control group was normal children. Samples were matched according to gender, ethnicity, and parental education. We began with 90 questions, and practically and statistically (via a Bonferroni correction) reduced to 20 questions ensuring coverage of Criterion B, C, and D from the DSM-IV categorization for individuals with PTSD. Results: Five sample items with item-total correlation coefficients are presented below: (1) the child plays out the traumatic event (.61); (2) the child draws pictures related to the traumatic event (.71); (3) the child does not show developmentally appropriate affection for peers (.75); (4) the child acts out the traumatic event with other children (.61); (5) the child draws pictures displaying frightening dreams (.65); Conclusions: The neuropsychological foundation of PTSD is beginning to be understood. The Teachers PTSD Child Rating Scale is a quick and efficient measure which allows the differentiation of children who have developed PTSD from those who have not.

B4

Arithmetic and executive functioning in adults

Riccio C, Barrois L, Haws B, Wolfe ME

Objective: The purpose of this study was to examine the relation between measures of executive function (EF) and arithmetic skill, algorithmic computation, and arithmetic word problems in young adults. It was hypothesized that measures of EF would account for additional variance beyond that accounted for by cognitive ability. Method: The current study used extant data on 90 consecutive adult referrals who obtained a Full Scale IQ of 80 or higher; all participants had been part of a larger study. The participants had a mean age of 21.72 years (S.D. = 3.21). The sample was predominantly male (52.22%) and white (84.44%). Of the sample, 33.33% met criteria for ADHD (with or without comorbid disorders) and 37.78% met criteria for some other disorder. Measures included subtests from the WJ-III as reflecting arithmetic skill (math fluency), alogrithmic computation (calculation) and arithmetic word problems (applied problems), as well as various neuropsychological measures. Results: Cognitive ability (FSIQ), working memory, verbal fluency, Trails B, and Stroop were all significantly associated with arithmetic skill (math fluency) and appeared to

contribute equally to the variance explained. In contrast, overall cognitive ability accounted for the greatest variance in algorithmic computation and arithmetic word problems. Trails B also emerged as contributing to variance in algorithmic computation. Conclusions: Although cognitive ability was the strongest predictor for higher level arithmetic skills, measures of executive function emerged as important at the basic level of arithmetic skill. Thus, interventions that target impaired executive function may positively affect math fluency.

B5

Neuropsychological deficits, CNS chemotherapy, and remission in childhood leukemia—A case study

Lavach J, Hart JE

Objective: Although rare, leukemia is the most common form of childhood cancer, accounting for 30% of all cancers in children under 15. CNS chemotherapy, with or without cranial irradiation, has been associated with depressed intellectual and academic functioning, and when combined, appear to be additive. Chemotherapy alone has been linked to cognitive, psychomotor, and affective deficits. Because treatment effects appear to emerge over time, the purpose of this study was to establish baseline data prior to treatment, with periodic re-evaluation to evaluate changes due to treatment and intervention. Method: The case presented describes a three-year study of a nine-year-old third grader diagnosed with leukemia, at baseline displaying no neurological or neuropsychological deficits prior to one year of prophylactic CNS chemotherapy. Placed on a 504 Plan, during, and after one year after chemotherapy, his parents and teachers noted "increased difficulty paying attention, planning ahead, remembering, and keeping up with his friends." Results: Tests administered included the WISC-IV, QNST-R, Halstead–Reitan Neuropsychological Battery, Stroop Color and Word Test, Projective Drawings, Bender Visual Motor Gestalt Test II, and NEPSY. Analysis of test data revealed cognitive confusion, attention difficulty, concentration problems, and organizational inefficiency. Conclusion: The subject's IEP was amended to include significant curriculum modification, weekly communication between parents and school, and monthly team meetings. With the subject's leukemia in remission, a continuously monitored IEP, parental and teacher reports, and neuropsychological assessment over three years, his cognitive, psychomotor, and affective deficits improved from moderately to mildly impaired.

B6

Autosomal dominant periventricular nodular heterotopia and visual spatial deficits

McCann MV, Pongonis SJ, Golomb MR, Edwards-Brown M, Christensen CC, Sokol DK

Objective: Periventricular nodular heterotopia (PVNH) is a brain migrational anomaly associated with seizures, and recently, reading disorders. Inheritance of bilateral posterior PVNH is X-linked, autosomal recessive or sporatic. We present a father and son with bilateral frontal PVNH and similar visual spatial cognitive deficits, suggesting autosomal dominant transmission. Methods: Father and son pair underwent neurological exam, brain MRI and neuropsychologic testing. Results: The father's neurologic exam was normal. MRI showed small PVNH in the bilateral frontal horns (R > L), and fronto-parietal sulcal prominence with mildly dysmorphic gyri. WASI scores were: Verbal IQ 86 and Performance IQ 71. He performed below average on visual–spatial tests (Block Design SS 24, JLO raw = 20), nonverbal problem solving (Matrix Reasoning SS 24), concept formation (WCS total errors SS 55, Perseveration SS 74, 0 Categories completed), arithmetic (WIAT-II Num. Operation SS 83), consistent with nonverbal learning deficits. The son's neurologic exam showed mild hearing loss and dysmetria. MRI demonstrated prominent bilateral frontal PVNH. WISC-IV Indices were: Comprehension 96, Perceptual Reasoning 86, Working Memory 97, Processing Speed 75. He showed deficits in visual–spatial processing (Scaled scores: Block Design 6, Coding 6, Symbol Search 5, NEPSY Arrows 4; Beery VMI SS 77), arithmetic (WJ-III Calculation SS 82) and visual memory (WRAML-2 SS79), consistent with nonverbal learning deficits. Conclusions: We believe this is the first reported case of autosomal dominant bilateral PVNH associated with visual spatial deficits. Frontally located PVNH may interfere with white matter tracts, contributing to visual–spatial/processing speed deficits.

B7

Memory functioning in low birth weight compared to Traumatic Brain Injury: Inefficiency versus impairment

Lajiness-O'Neill RR, Barba E

Objective: The purpose of this study was to examine memory functioning in children with low birth weight (LBW), traumatic brain injury (TBI), and controls, to explore potential limits on neural plasticity and examine differential effects on memory with prenatal compared to postnatal alterations in brain functioning. Method: Participants included

65 LBW children (41 males; mean age = 9.5 years)—Low Birth Weight (LBW < 2500 g) ($n = 28$), Very Low Birth Weight (VLBW < 1500 g) ($n = 8$), Extremely Low Birth Weight (ELBW < 1000 g) ($n = 7$); 57 TBI children (34 males; mean age = 13.5)—Mild ($n = 10$), Moderate ($n = 4$), and Severe ($n = 25$); and 85 controls (males = 37; mean age = 13.1) examined with the Test of Memory and Learning (TOMAL). Results: LBW and TBI groups performed significantly poorer than controls on immediate verbal list learning ($F = 4.6$; $p = .004$) and facial memory ($F = 8.3$; $p < .001$). Following delay, only the TBI group continued to perform more poorly on both tasks of verbal list learning ($F = 8.6$; $p < .001$) and facial memory ($F = 6.0$; $p < .001$). Conclusions: Prior studies have revealed differences in delayed recall in LBW compared to control children, particularly in spatial memory. Comparing LBW, TBI, and controls, deficits are evident in retrieval in both verbal and visual domains. However, those differences are no longer apparent during delayed recall, suggesting an inefficiency that diminishes once children with LBW are given time to consolidate information.

B8

Executive dysfunction in Attention Deficit Hyperactivity Disorder and Autism Spectrum Disorders

Basista CE, Knapp J, Yarger L, Arffa S

Objective: Executive dysfunction has been implicated in the manifestation of a variety of childhood disorders, including Attention Deficit Hyperactivity Disorder and Autism Spectrum Disorders (ASD), although the specific profile often varies. The current research study compared the pattern of executive functioning in children with ADHD and ASD on the Behavior Rating Inventory of Executive Functioning (BRIEF). Method: Parents of children (ages 6–16) with a primary diagnosis of ADHD ($n = 15$, 73% male, 93% Caucasian) or ASD ($n = 33$, 88% male, 97% Caucasian) completed the BRIEF in an outpatient, mental health facility. Results: Children in the ADHD and ASD groups demonstrated significant elevations on the Global Executive Composite (mean ADHD = 79.87, mean ASD = 68.67), Behavioral Regulation (mean ADHD = 77.40, mean ASD = 67.12) and Metacognition (mean ADHD = 76.93, mean ASD = 67.56) indices. Significant differences between the groups were found on all BRIEF measures (ADHD > ASD), with the exception of the Shift and Organization of Materials subscales ($p = .174$ and .232, respectively). The greatest mean differences were found on the Global Executive Composite ($p = .000$), Behavioral Regulation Index ($p = .006$) and Inhibit ($p = .002$) subscale. Conclusions: Children with ADHD and ASD demonstrate clinically significant deficits in all domains of executive functioning. Children with ADHD demonstrated greater deficits on scales assessing inhibition and behavioral regulation, even when compared to children with ASD. This finding further supports Barkley's theory of behavioral disinhibition as a hallmark of children with ADHD, with disinhibition further affecting all other executive functions.

B9

The relationship between Asperger's Disorder and Nonverbal Learning Disability

Knapp JA, Basista CE, Yarger L, Arffa S

Objective: The clinical presentation and diagnostic criteria of Asperger's Disorder (AD) and Nonverbal Learning Disability (NLD) overlap, with common deficits in reading nonverbal cues, pragmatic language, transitions, environmental change, problem solving, and social relationships. This may lead professionals to assert that all individuals with AD have definite or probable NLD. This study investigated whether all individuals with AD also meet criteria for NLD. Method: Thirty-four children (ages 6–16, 65% male, 91% Caucasian) diagnosed with Asperger's Disorder completed a comprehensive neuropsychological examination (flexible battery) between 2004 and 2007 at an outpatient facility. Results: Twelve percent of the sample met criteria for AD and NLD. Children with AD and NLD demonstrated reliable differences among verbal and nonverbal skills on the WISC-IV (mean VCI = 112; mean PRI = 94, mean FSIQ = 102). Corresponding deficits were noted on the Beery Buktenica Developmental Test of Visual Motor Integration, Fifth Edition (VMI) and the Test of Visual Perceptual Skills, Non-Motor-Revised (TVPS-R). Children with AD who did not meet criteria for NLD demonstrated similarly developed verbal and nonverbal skills in the WISC-IV (mean VCI = 103, mean PRI = 100, mean FSIQ = 100). This group did not display significant deficits on the VMI or TVPS-R. Conclusion: All children with AD may not exhibit the core cognitive characteristics of NLD, despite similarity in clinical presentation. However, due to 12% of children in this study meeting criteria for both diagnoses, objective individual assessment of strengths and weaknesses may be necessary for adequate treatment planning.

B10

Examining young children with Verbal Apraxia and PDD, NOS

Knapp JA, Arffa S

Objective: Young children with verbal apraxia may be misdiagnosed with Pervasive Developmental Disorder, Not Otherwise Specified (PDD,NOS). Children with apraxia avoid communicating with others due to difficulty with planning and programming movement for speaking. They may display behaviors indicative of PDD, such as decreased eye contact, which may be interpreted as a social deficit. These children struggle with social interactions with peers due to language deficits. These communicative deficits and social struggles may be misinterpreted as PDD,NOS. Method: Two children (ages 2 and 5) diagnosed with verbal apraxia and PDD,NOS completed a comprehensive neuropsychological battery to determine current social and language functioning. The Autism Diagnostic Observation Schedule (ADOS) was used to determine social deficits associated with PDD,NOS. Results: The older child demonstrated clear social overtures and age-appropriate social skills, resulting in the ADOS not supporting PDD,NOS. The younger child demonstrated mild social deficits, resulting in the ADOS supporting a diagnosis of PDD,NOS. Analysis of previous evaluations indicated that the older child's social skills improved dramatically after his language improved. Conclusion: Results from the current study suggest that young children with verbal apraxia may be misdiagnosed with co-morbid PDD,NOS. This may lead to exhausting energy and time on treatment directed toward socialization, as opposed to directing treatment on language, which appears to be the underlying deficit. While longitudinal studies are needed, underlying developmental delays in speech may account for early social deficits, which may not be indicative of qualitative impairments in socialization associated with PDD,NOS.

B11

Executive function predictors of social-behavioral functioning in boys with Fragile X Syndrome

Hooper SR

Objective: The primary purpose of this study was to examine the utility of using specific executive functions as predictors of social–behavioral functioning in boys with Fragile X Syndrome (FXS). Few data exist with respect to this issue in FXS. Method: Participants include 56 boys with full mutation FXS and an average age of 10.80 years. The sample was largely Caucasian and within the middle socioeconomic stratum. Measures included tasks that assessed selected executive functions including problem solving (NEPSY Tower), planning (WJ-III Planning Subtest), and inhibition (Day/Night Task). IQ (Leiter-R Brief IQ) and the sociodemographic variables of chronological age, maternal education, and medication use also were included. Specific outcome variables included parent and teacher ratings of Total Behavior Problems on the Child Behavior Checklist (CBCL). Linear regressions were conducted to examine the relationships between the predictors and the outcome variables. Results: For the teacher-completed CBCL, the overall linear regression approached significance, $F(7, 25) = 2.27$, $p < .06$, and accounted for a 22% of the variance. Only WJ-III Planning ($p < .05$) was a significant predictor of CBCL Total Behavior Problems. For the parent completed CBCL, the overall linear regression was not significant. Conclusions: Planning abilities appear to play a significant role in the teacher ratings of social-behavioral functioning in boys with FXS; however, problem solving and inhibition appeared less important. These findings will require additional validation with a larger sample of children with FXS, perhaps with other neuropsychological variables being considered (e.g., language abilities).

B12

Efficacy of virtual reality for pediatric Cerebral Palsy

York PJ, Rogers SA, Parsons TD, Rizzo AA

Objective: Standard therapies used among children with cerebral palsy (CP) can be difficult for the child to accomplish and generally lack the necessary aspects of engagement and motivation. This study provides a qualitative review of research that has been conducted using virtual reality (VR) as an alternative method of rehabilitation among children with CP. Data selection: Articles were gathered from MEDLINE, PubMed, and PsychInfo using the search term "virtual" with "child," "pediatric," "rehabilitation," and "adolescent." Studies that exclusively assessed adults, did not examine rehabilitation, or did not include some form of outcome evaluation were excluded. The final sample was comprised of 11 studies assessing rehabilitation for pediatric cerebral palsy. Data synthesis: VR appears to be effective in elevating self-efficacy and volition, increasing playfulness, and improving motor functioning among children with CP. Children with CP also reported high levels of satisfaction with VR, as well as an elevated sense of mastery of the objectives. The efficacy of VR appears to increase with the level of immersiveness, but there is little uniformity

in the variables that have been studied, and more research is needed. Conclusions: Overall, VR has been shown to be an effective new form of rehabilitation for children with CP. It appears to be intrinsically exciting and motivating, and although research is still relatively limited, the effects are positive and promising. As the number of studies grows, we will develop a better picture about which symptoms of CP can effectively be treated through the use of VR.

B13

Intellectual function and thalamic volume in Autism

Cramond AJ, Wooon FM, Wu C, Cannon PC, Bigler ED, Cleavinger HB, Johnson JL, Lainhart JE

Objective: Because of the central role that the thalamus plays in the integration and processing of sensory information and that previous studies have observed volumetric differences in the size of the thalamus in autism, the current study investigated the relationship between IQ and thalamic volume in autism compared to age, sex and education matched typical developing control subjects. Method: This sample included 71 participants with full-scale IQ (FSIQ) scores greater than 65. Intelligence was assessed by either Wechsler Adult Intelligence Scale—III or Wechsler Intelligence Scale for Children—III. Thalamic volume was determined using a 1.5 T MRI. Density of gray matter volume at the level of the thalamus was also examined using voxel-based morphometry (VBM). Relationships between verbal (VIQ), performance (PIQ), FSIQ and thalamic volume were examined in DSM-IV diagnosed autistics and compared to matched controls. Results: IQ measures and thalamic volume were found to be differentially correlated depending on subject classification. In controls, thalamic volume was significantly correlated with VIQ ($r = .56$, $p = .002$), but was not correlated in subjects with autism. FSIQ was significantly related to thalamic volume in both control ($r = .53$, $p = .003$) as well as those subjects with autism ($r = .35$, $p = .02$). Conclusions: Thalamic volume was not related to VIQ in this sample of subjects with autism. Since a core feature of autism relates to communication, these findings raise an interesting speculation on how thalamic organization may contribute to differences in cognitive function between subjects with autism and controls.

B14

Use of summary IQ scores with children presenting complex assessment profiles: A case in point

Morere D, Metz K

Objective: The APA Ethical Guidelines emphasize that psychologists use only valid tests and in a manner that is neither misleading nor harmful to the client. However, it is not uncommon to see a composite "IQ" and categorical descriptor reported even though this masks wide variability of scores both within and between measures. This may result in a label of cognitive impairment despite advanced abilities across a range of cognitive areas. Method: A child with conditions affecting hearing, language, verbal memory, and attention will be presented to demonstrate the deleterious effects of this approach. This child has documented severe language delays despite intervention for deafness and severe ADHD. Previous cognitive assessments yielded widely divergent outcomes. Results: Multiple measures were administered to estimate cognitive functioning, both standard measures and those designed for children with language limitations. Composite score descriptors ranged from Borderline to High Average. Nonverbal portions of the batteries also generated varied categorical descriptors. Subtests within each battery ranged from severely impaired to very superior. Within test variability ranged from three to eight standard deviations. Conclusion: While it is hoped that in the field of Clinical Neuropsychology inappropriate aggregation of information is avoided, the unfortunate truth is that declarations of "global intelligence levels" are common, often without even the confidence intervals reported. The case presented here offers an extreme example of the pitfalls of such reporting. Use of any global score would both inaccurately label this child and mislead anyone reading the report.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: CEREBROVASCULAR DISEASE

B15

Amnestic disorder in anoxic encephalopathy due to cardiac arrest

Domboski K, Mittenberg W, Puentes G

Objective: Varied neurocognitive presentations have been ascribed to anoxic encephalopathy caused by cardiac arrest (CA), most notably amnesia and more generalized cognitive deficiencies. This case study reports neuropsychological findings in a patient with anoxic encephalopathy due to CA. Method: The 47-year-old, college educated patient suffered CA two months before examination. He was defibrillated twice, anoxic for 10–12 min, and had LOC for 3 days.

ECG was significant for cardiomyopathy. MRI, CT, and EEG were negative. Neuropsychological evaluation assessed effort, intellectual, memory, executive, language, motor, attention, and personality functioning. Results: Examination showed amnestic disorder with profound memory impairment (WMS-III General Memory Index = 45, RAVLT Delayed Recall Raw Score = 0, and ROCFT 5-Minute Delay $T < 20$). Intellectual functioning (WAIS-III FSIQ = 79) and attention/concentration (Working Memory Index = 99) were relatively intact. Impairments other than amnestic disorder were noted in executive functioning (WCST Perseverations $T = 31$), verbal fluency (FAS $T = 32$) and motor dexterity (Grooved Pegboard $T = 29$). Although the patient was not seeking disability compensation, four effort tests were administered. Three accurately classified him as a non-malingerer and one inaccurately classified him as malingering. Several embedded effort measures accurately classified the patient as nonmalingering (WCST, FTT, MMPI-2 FBS), but some WMS-III measures incorrectly classified him "probable malingerer." Conclusions: CA causes amnestic disorder with additional specific neurocognitive deficits. The typical pattern of post-CA cognitive impairment can be established during post-acute recovery. Some widely applied effort tests and embedded measures are inaccurate in amnestic disorder caused by anoxia.

B16

A longitudinal case study of an adolescent with multiple repaired AVMs

Borden KA, O'Toole K

Objective: Pediatric arteriovenous malformation (AVM) is a rare neurological insult that occurs in less than 1% of children and requires surgical intervention. Research has shown variable findings possibly due to the location and severity of AVM and length of time between surgery and follow-up. A longitudinal case study will be presented to illustrate the long-term neuropsychological outcome in an adolescent with multiple repaired AVMs. Method: An 18-year-old male was evaluated at three data points (post-surgical repair of first AVM, long-term post-surgical repair of first AVM, post-surgical repair of second AVM). A right mesial frontal AVM was diagnosed at 11 years of age and an incidental right tentorial dural AVM was discovered when at 18 years of age. Both AVMs were repaired shortly after diagnosis. Neuropsychological data and serial MRI scans are presented. Results: Post-surgical neuropsychological data suggest localized deficits, including difficulties with planning, organization, emotional control, pragmatic language, and nonverbal encoding/retrieval following repair of the right frontal AVM and double vision and difficulties with organization of nonverbal material following repair of the right tentorial dural AVM. Long-term data indicate resolution of most localized deficits. Parent report collected through diagnostic interview revealed residual ongoing, but intermittent executive difficulties, particularly those associated with the orbitofrontal area (e.g., impulsivity, poor decision-making,). Conclusions: This case demonstrates a need for continued long-term neuropsychological follow-up, beyond medical clearance, which should include collaborative data from parents regarding functioning across domains (cognitive, behavioral, and emotional).

B17

Psychiatric manifestations in the presence of cerebrovascular disease

Steiner AR, Myers-Pagoria M, Noggle CA, Dean RS

Objectives: Within the realm of neurological care, research has suggested the risk of psychiatric manifestations following neurological insult exceeds the rates found following other forms of health impairment (Fink et al., 2003). One of the most common forms of neurological insult is cerebrovascular disease. Although research has demonstrated the relative risk of psychiatric manifestations increase following and/or in the presence of cerebrovascular disease (e.g. Brinkman, Noggle, & Dean, 2005), differentiation between the type of psychiatric disorders was not done. Given the type of psychiatric manifestation determines the appropriate mode of treatment, determination of the risk of various psychiatric manifestations in cererbrovascular disease is crucial. Thus the current study investigated this relationship. Methods: Relative risk of specific psychiatric disorders in cerebrovascular disease was calculated. Participants ($n = 93$) included individuals diagnosed with cerebrovascular disease and no diagnosed comorbid psychiatric disorder and individuals diagnosed with both cerebrovascular disease and a psychiatric disorder. The control group ($n = 19{,}640$), was derived from Robins and Reiger's (1991) Epidemiological Catchment Area Study (ECA). Results: Results indicated patients with cerebrovascular disease are over three times more likely to present with psychiatric disorders compared to the general population. Various depressive spectrum and anxiety spectrum disorders were intermixed among the most prevalent. Additional data will be shared regarding differences in rates of specific psychiatric manifestations in the presence of cerebrovascular disease. Conclusions: Findings suggest the importance of assessing not only the

functional, but also, emotional needs of patients with cerebrovascular disease. In essence findings could indicate a change in clinical practice.

B18

Changes in mood and self-esteem across time during early admission in the acute inpatient stroke rehabilitation setting

Vickery C, Sepehri A, Evans CC

Objective: To explore how self-report of mood and self-esteem vary across day and time of day early after acute inpatient stroke rehabilitation admission. Method: Fifty consecutively-admitted patients (median age 68, median education 12 years, 56% men, 74% Caucasian; 58% right hemisphere, 38% left hemisphere, 4% bilateral stroke) received measures of state self-esteem and state mood in the morning and afternoon for four consecutive days beginning within the first week of admission. Results: Repeated measures ANOVA with Day and Time of Day indicated that self-esteem ratings were higher in the afternoon and increased over the four days. Mood ratings showed nonsignificant trends on the main effects, suggesting marginal improvement in mood over consecutive days and slightly better mood in the afternoon. Individual growth curve analysis indicated that the change rates of mood and self-esteem were not significantly correlated, suggesting that changes in mood and self-esteem do not share a one-to-one correspondence. Conclusions: Self-esteem ratings significantly improved within just a few days of rehabilitation following stroke, and were higher in the afternoon. Mood ratings did not appear to significantly change across or within days. Change rates for mood and self-esteem were not related, suggesting that these constructs are separate albeit related. This suggests that self-esteem may be a separate construct from mood that bears further investigation in the emotional adjustment and functional recovery following stroke.

B19

The relationship between self-esteem, mood, and neuropsychological functioning in the acute inpatient stroke rehabilitation setting

Evans CC, Vickery C, Sepehri A

Objective: To explore the neuropsychological correlates of self-esteem and mood in acute inpatient stroke survivors. Self-related processing and emotional regulation have been linked to right hemisphere functioning in previous research, and self-esteem is also thought to involve memory processes. It was hypothesized that lower self-esteem and greater depressive/anxiety symptoms would be associated with worse performance on memory and visuoperceptual tasks. Method: Participants ($N = 93$; 50% men, 62% Caucasian, median age 66, median education 12; stroke laterality 54% left, 42% right, and 4% bilateral) were given the Rosenberg Self-Esteem Scale, Self Concept Questionnaire, Psychiatric Diagnostic Screening Questionnaire (Major Depressive Episode and Generalized Anxiety Subscales), and the RBANS an average of 8 days post-admission. Results: There were no differences between gender or stroke laterality on any of the self-esteem and emotional functioning measures. Results of correlational analyses revealed that all measures were correlated with the Delayed Memory Index Score such that higher levels of emotional dysfunction and poorer self-esteem were associated with poorer memory performance (p values ranging from .02 to .001). Depression ($p < .03$) and self-concept ($p < .02$) scores correlated similarly with the Visuoconstruction Index. Only the two self-esteem measures significantly correlated with the RBANS Total Score (p values = .028–.004). Conclusion: Results suggest that impairments in memory and visuospatial functions may be associated with lower levels of patient self-esteem and mood in an acute inpatient stroke population, consistent with suggestions from prior research.

B20

The association of self-esteem level and self-esteem stability with depressive symptomatology in the acute inpatient stroke rehabilitation setting

Vickery C, Matheny SS, Sepehri A, Evans CC

Objective: To explore the relationship between self-esteem level, self-esteem stability, and depression in the acute inpatient stroke rehabilitation setting. Method: Fifty-two consecutively-admitted patients (mean age 67, 13 years education, 54% men, 75% Caucasian, 56% right hemisphere infarctions, 40% left hemisphere, 4% bilateral) were administered a measure of self-esteem in the morning and afternoon for four consecutive days (eight assessments) beginning four days after admission. The Geriatric Depression Scale (GDS) and Mini-Mental State Exam (MMSE)

were administered within 24 h of completion of the eight assessments. Self-esteem level was calculated by averaging the total self-esteem score across the eight assessments. Self-esteem stability was operationalized as the standard deviation of the self-esteem total scores across the eight assessments. Results: Higher self-esteem level was associated with younger age and male gender. Lower MMSE scores were associated with higher self-esteem instability. After controlling for age, education, and MMSE scores, regression analysis indicated a significant interaction of self-esteem level and stability, such that lower self-esteem level and higher self-esteem instability were associated with higher GDS scores. Conclusions: The interaction of level and stability of self-esteem in predicting self-reported depressive symptoms is consistent with previous findings with neurologically-intact samples, suggesting similar psychological processes in the prediction of depression regardless of neurological status. Both level and stability of self-esteem should be considered when evaluating emotional functioning in the stroke rehabilitation setting.

B21

Postsurgical adjustment in good-outcome neurosurgical patients following cerebral aneurysm

Fields JA, Rilling L, Lacritz LH, Saine K, Allen B, Samson D, Cullum CM

Objective: To investigate postsurgical cognitive and emotional symptoms among patients with cerebral aneurysm. Method: Thirty-nine cerebral aneurysm patients (*M* age = 52, S.D. = 13.7; 85% female) with good neurosurgical outcome completed the Cognitive Symptom Checklist (CSC) at 2 weeks and 3 months post-surgery. The CSC is a self-report survey consisting of 56 questions in 6 domains (physical well-being, emotional well-being, daily activities, and the cognitive domains of memory, language, and attention). Subjects were asked to rate post-surgery changes on a 7-point scale, and the number of subjects endorsing postsurgical symptoms at each time point was examined. Results: Cognitive, emotional, and/or physical symptoms were common across the sample as a whole, with a majority of subjects endorsing residual difficulties in one or more areas. Fewer complaints regarding energy (80% vs. 58%), depression (56% vs. 44%), and anxiety (62% vs. 50%) were noted at 3 months than 2 weeks, respectively, and similar trends were found for sleep, self-care, and worry about the future. In contrast, cognitive complaints (attention, language and memory) were slightly more common at 3 months versus 2 weeks, with up to 42% (vs. 36%) of subjects reporting symptoms at follow-up. Conclusions: Good-outcome neurosurgical cerebral aneurysm patients demonstrate residual changes in their cognitive, emotional, and physical functioning with some frequency. Whereas emotional and physical symptoms tend to decrease over time, reports or awareness of cognitive symptoms may increase. These findings highlight the need for psychoeducation, assessment and intervention to enhance postsurgical quality of life.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: PSYCHIATRIC ILLNESS

B22

Intellectual functioning and symptom severity in patients with Anorexia Nervosa

Lamskova K, Moser DJ, Beglinger LJ, Duff K, Bowers W, Espe-Pfeifer P, Bayless JD, Andersen A

Objective: Most prior research indicates that patients with Anorexia Nervosa (AN) show some degree of neuropsychological dysfunction. The goal of the research project was to evaluate the relationship between the severity of self-reported eating disorder symptoms and intellectual functioning. Method: An existing database containing data for 28 female inpatients (*M* age = 26.43 [8.70]) who underwent treatment for AN in the Eating Disorders Program at the University of Iowa Hospitals and Clinics was used. Upon admission, participants were administered a neuropsychological battery, out of which the Wechsler Adult Intelligence Scale-III (WAIS-III: 9-subtest abbreviated administration), the Wide Range Achievement Test-3 (WRAT-3: Reading subtest), and the Eating Attitudes Test (EAT-26) were used for this project. Results: Partial correlations, controlling for premorbid intellectual functioning (estimated by WRAT-3 Reading score) and education, revealed a significant inverse relationship between EAT-26 scores and Full Scale IQ (partial $r = -.47$, $p = .04$). Further analysis showed that EAT-26 was associated with Verbal IQ (partial $r = -.56$, $p = .01$) and the Similarities subtest of the WAIS-III (partial $r = -.67$, $p = .002$). Conclusions: Higher self-reported eating disorder severity was associated with lower overall and verbal intellectual functioning, and, more specifically, with lower verbal abstract reasoning scores. This relationship may be significant in psychological treatment of patients with severe self-reported eating disorder symptoms, as their ability for verbal abstraction may be relatively weak.

B23

Verbal IQ moderating the effects of depression on memory performance

Zizak V, Gomez RG, Arzola GM, Romero RA, Jahn E, Keller J, Schatzberg A

Objective: Examine if Verbal IQ moderates the effects of depression on verbal memory. We hypothesized that higher Verbal IQ would result in less detrimental effects of depression on memory performance. Method: Participants were from a larger study conducted at the Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine. Twenty-six depressed patients (mean age = 39.65, S.D. = 12.91; mean education = 14.69, S.D. = 1.76) and 27 healthy controls (mean age = 35.96, S.D. = 13.71; mean education = 15.74, S.D. = 2.05) were included in this study. Subtests from the Wechsler Adult Intelligence Scale—III were administered to assess verbal cognitive abilities, Verbal IQ (VIQ). Logical Memory (LM) from the Wechsler Memory Scale—III was given to measure verbal memory for stories. Results: General Linear Models were conducted, indicating a statistically significant interaction between patient diagnosis and VIQ for LM delayed recall, $F(1, 47) = 4.73$, $p = .03$. For LM immediate recall, there was a significant effect of VIQ, $F(1, 47) = 7.55$, $p < .01$ and depression diagnosis, $F(1, 47) = 5.86$, $p = .02$, but only a trend for the interaction, $F(1, 47) = 3.34$, $p = .07$. For LM recognition, there was a significant effect of depression diagnosis, $F(1, 47) = 6.07$, $p = .02$, but only trends for the interaction, $F(1, 47) = 3.83$, $p = .06$, and for VIQ, $F(1, 47) = 3.00$, $p = .09$. Conclusions: This suggests that higher Verbal IQ may help reduce the detrimental effects of depression on verbal memory.

B24

Sensory and motor anomalies in the presence of depression

Steiner AR, Myers-Pagoria M, Noggle CA, Dean RS

Objectives: Research has demonstrated cognitive impairments in both pediatric (e.g. Sabo et al., 2007) and adult (Noggle et al., 2007) depression populations. Although deficits in cognition have been documented, studies investigating the functional impact of depression on sensory and motor functioning are more scarce. Studies (e.g. Sobin et al., 1997) have demonstrated deficits in motor activity and speed, yet further research is needed within the areas of coordination and dynamics regarding motorically-based activity. In addition, research is needed in regards to the impact depression has on sensory performance specifically, tactile awareness. The current study utilized the Dean–Woodcock Sensory-Motor Battery in the determination of such deficits possibly occurring within a depressed population. Methods: The current sample consisted of 60 patients with depression and 48 normals. Each participant was administered the 18 subtests of the Dean–Woodcock Sensory-Motor Battery (WJ-III, Woodcock, McGrew, & Mather, 2001). Results: Statistically significant ($p < .01$) results were revealed between groups. Specifically, the depressed group demonstrated significantly worse motor performance in the realms of finger tapping, hand-to-thigh coordination, and grip strength. Furthermore, on measures of sensory functionality, the depressed group performed significantly worse on simultaneous auditory acuity and object identification. Conclusions: Results expand upon previous research in that they demonstrate not only deficits in motor activity, including speed and dynamics, but also, tactile awareness. Findings may not only suggest the importance of sensory-motor assessment in neuropsychological assessment but also speak to the extent of impact depression may have on a persons functional self.

B25

Relations between fine motor functions and personality disorder traits in patients with mild-moderate traumatic brain injury

Medaglia JD, Ruocco AC, Swirsky-Sacchetti T

Objective: Motor functions of the hands have been associated with schizotypal and avoidant personality disorder traits, although relationships with other personality traits have remained largely unexplored. The present study examines the relationship between personality disorder traits and motor functions to include fine motor speed and manual dexterity. Methods: Two hundred and four right-handed adult patients referred for neuropsychological evaluation following mild-moderate traumatic brain injury were examined. Patients completed the Millon Clinical Multiaxial Inventory-III, Finger Tapping Test, and Grooved Pegboard as part of a larger neuropsychological battery. Results: A negative association was observed between schizoid traits and bilateral motor dexterity ($p < .01$). Conversely, there was a positive correlation between histrionic traits and bilateral motor speed and dexterity ($p < .01$). Gender moderated the relationship between motor functions and personality disorder traits. For females, the association between schizoid traits and fine motor speed was maintained, while the correlation between histrionic traits and motor dexterity was no longer statistically significant. Conclusion: Schizoid and histrionic personality disorder traits diverge in their

associations with fine motor functions. More generally, personality disorder traits associated with the latent dimension of introversion correlates with relatively weak motor functioning while extraversion is associated with stronger motor functions. Gender appears to be an important moderator of the association between personality and motor functioning.

B26

Relations between depression symptom factors and verbal memory

Arzola GM, Gomez RG, Zizak V, Romero RA, Jahn E, Keller J, Schatzberg AF

Objective:The purpose of this study is to observe how severity of specific types of depressive symptoms adversely affects on verbal memory performance. Specific symptoms of depression are predicted to be as good as, or better than total depression severity, in explaining poorer memory performance. Methods: Twenty-eight depressed patients were recruited at Stanford University Depression Research Clinic. The measures included in this study were Hamilton Depression Rating Scale (HDRS) and the California Verbal Learning Test II (CVLT-II). Based on a Factor Analysis study (Pancheri et al., 2002) on the HDRS, the Factors of depressive symptoms (Somatic anxiety/somatization, Psychic anxiety symptoms, Core depressive symptoms and Anorexia) and the HDRS total score were correlated with memory performance. Results: Only short delayed cued recall was significantly correlated with the HDRS total score. In contrast, Psychic Anxiety was correlated with CVLT Trail 1–5 total score, and short delay cued recall. Core depressive symptoms were significantly correlated with CVLT Trail 1–5 total score, short delayed free recall and short delay cued recall. Multiple regression analyses were conducted only with short delayed cued recall as the dependent variable. Beta weights indicated that both Psychic Anxiety (Beta = −.26) and Core Depressive symptoms (Beta = −.33) were better predictors of detrimental effects of memory performance than the total score (Beta = −.08). Conclusion: Using the HDRS, specific depressive symptoms factors are associated with detrimental verbal memory performance. Core Depressive symptoms (depressed mood, anhedonia, and psychomotor retardation) are the key symptoms that impair verbal memory.

B27

Structural magnetic tesonance imaging findings of hippocampal volume in adults with posttraumatic stress disorder: A systematic review

Woon FM, Hedges DW

Objective: Numerous studies have evaluated hippocampal volume in adults with posttraumatic stress disorder (PTSD) with mixed results. Furthermore, differences in sex and type, age of onset, and duration of trauma limit direct comparison of findings from different studies. The purpose of this study is to evaluate published studies containing data on hippocampal volume in PTSD regarding gender, and type and duration of trauma in adults with PTSD. Methods: The PubMed database was searched using the terms “posttraumatic stress disorder”, “hippocampus”, and “magnetic resonance imaging” and reference lists from relevant articles were evaluated for additional studies. Studies were included that contained information from adult PTSD populations in which hippocampal volume were quantified using magnetic resonance imaging. Two investigators independently reviewed and extracted all data. Thirty-eight studies met inclusion criteria. Results: Hippocampal volumes were heterogeneous regarding onset of trauma exposure, type of trauma, length of trauma exposure, time since trauma exposure and imaging, and sex. Nonetheless, PTSD in adult patients is associated with hippocampal volume deficits despite differences in study methodology and trauma type and duration. Further, evidence shows that hippocampal volume deficits are related to the PTSD severity. There are laterality discrepancies with deficits in the left, the right, or both hippocampi. Conclusions: Data are consistent with hippocampal volume deficits in PTSD resulting from both genetic and environmental factors. Future studies should include two control groups: a healthy, non-trauma-exposed group and a clinically healthy but trauma-exposed group. Finally, longitudinal studies investigating the relationship between hippocampal volume and PTSD are needed.

B28

Impaired olfactory hedonic judgment in deficit syndrome schizophrenia

Strauss GP, Allen DN, Barney SJ, Timko CJ, Jetha S, Kamalani LK, Pace SA, Barnes LM, Hoyt TE, Duke LA, Ross SA, Schwartz JA

Objective: Olfactory impairment was examined in patients with schizophrenia. Previous research indicates that schizophrenia patients display impairment on measures of olfactory perception, and that these impairments may

be more severe than other neurocognitive domains. These olfactory impairments may be most severe in a sub-group of patients displaying primary negative symptoms, those with deficit syndrome schizophrenia, and due to impaired circuitry within frontal and parietal regions. Negative symptoms also appear to be associated with impaired olfactory valence judgment for pleasant smells; however, it is unclear whether this finding applies to deficit syndrome patients, and whether abnormalities in hedonic judgment are subsumed by dysfunction within frontal and parietal areas. Methods: Participants included 22 unimpaired controls and 41 patients with schizophrenia who were divided into deficit ($n = 15$) and non-deficit ($n = 26$) groups using the Schedule for the Deficit Syndrome rating scale. Olfactory perception was assessed using the Brief Smell Identification Test. Results: Consistent with previous studies, results indicated that deficit syndrome patients displayed more significant olfactory perception impairments than non-deficit patients or controls. When individual BSIT items were divided into pleasant and unpleasant categories, deficit patients displayed significantly lower accuracy on both pleasant and unpleasant items, and rated pleasant items as being significantly more neutral than non-deficit patients and controls. Patient groups did not differ with regard to hedonic judgment of unpleasant items. Conclusions: These findings suggest that deficit syndrome schizophrenia may be associated with frontal and limbic system impairment, and further elucidate the neural underpinnings of patients with negative symptoms of schizophrenia.

B29

Neuropsychological impairment in patients with deficit syndrome schizophrenia

Strauss GP, Allen DN, Barney SJ, Timko CJ, Jetha S, Kamalani LK, Pace SA, Barnes LM, Hoyt TE, Duke LA, Ross SA, Schwartz JA

Objective: The current study examined neuropsychological impairment in patients with deficit and non-deficit syndrome schizophrenia. Previous research indicates that the deficit syndrome classification represents a homogeneous subgroup of schizophrenia patients who display primary and enduring negative symptoms. Distinct pathophysiology may maintain symptoms associated with this condition, particularly frontal and parietal dysfunction. We attempted to replicate and extend previous reports indicating that the deficit syndrome is associated with a distinct neuropsychological profile using a rigorously selected test battery. Method: Participants included 70 individuals diagnosed with DSM-IV schizophrenia and 22 unimpaired controls matched for age and education. Schizophrenia patients were divided into deficit ($n = 15$) and non-deficit ($n = 26$) syndrome status using the Schedule for the Deficit Syndrome rating scale. A comprehensive neuropsychological battery was administered to assess the domains of working memory, attention, executive functioning, abstraction-flexibility, motor function, and olfactory perception, as well as frontal, temporal, and parietal lobes. Results: Results indicated that deficit syndrome patients were significantly more impaired than non-deficit patients on measures of frontal, temporal, and parietal lobe functioning. With regard to individual neurocognitive domains, performance was most impaired on measures of olfaction, long-term memory, and executive functioning. Performance was also more impaired on speeded than non-speeded tests, which is consistent with deficit patients displaying generally slower processing speed. Conclusions: These findings do not support a unified pattern of anatomical impairment, and suggest that deficit syndrome schizophrenia is associated with a generalized neuropsychological impairment.

B30

Neurocognitive effects of methamphetamine: A meta-analysis

Scott J, Woods SP, Matt GE, Meyer RA, Heaton R, Atkinson JH, Grant I

Objective: Methamphetamine (MA) use has grown increasingly prevalent and is linked to numerous psychosocial (e.g., unemployment), neuropsychiatric (e.g., depression), and medical (e.g., cardiovascular) complications. Chronic MA use is also neurotoxic, primarily affecting the structure and function of frontal and limbic systems. The aim of this meta-analysis was to evaluate the hypothesis that chronic MA use is associated with deficits in neurocognitive functioning. Method: Seventeen studies published in English prior to January 2007, assessing a total of 471 adults with MA dependence and 445 healthy comparison participants without major medical confounds were included. All studies reported data on at least one standardized neuropsychological test from which estimates of effect size were derived. Results: A two-level mixed-effects model revealed broadly medium-to-large effect sizes across several domains of neurocognitive functioning, with the largest impairments in episodic memory, executive functions, and information processing speed, which were accompanied by slightly smaller deficits in motor, language, and visuoconstructional abilities. Further analysis revealed that demographic factors (i.e., male gender and older age) might play a role in the

expression of MA-associated cognitive deficits; however, the effects of MA use characteristics (i.e., length of abstinence and duration of use) were not significant. Conclusions: Findings from this meta-analysis suggest that MA dependence is associated with generally medium-to-large adverse effects on neurocognitive functioning. Considering the neural systems most susceptible to MA and their known cognitive sequelae, the pattern of neuropsychological impairment is most consistent with a frontostriatal neuropathogenesis.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: TRAUMATIC BRAIN INJURY

B31
Cluster analysis of the WISC-III factor index for children with TBI

Shafer M, Neumann CS, Mayfield JW, Koch S

Objective: The current study evaluated unique WISC-III factor profiles among children with head injuries. The WISC-III remains an important instrument in the study of this population; however, additional research is still needed to study how cognitive processes such as executive functioning, attention, and memory contribute to group differences (i.e., High IQ, Average IQ, Low IQ) among children with head injuries. Method: The present study was conducted with a large sample of children ($N = 197$) who had a primary diagnosis of TBI ($n = 123$) or ADHD ($n = 70$). Overall sample ages ranged from 6 to 17 years old, with a significant difference in mean ages for the TBI ($m = 11.48$) and the ADHD ($m = 8.63$) samples. Results: Good fit for the four-factor WISC-III model was found with confirmatory factor analysis with both the TBI (NFI = .93, CFI = .99, RMSEA = .02) and ADHD (NFI = .82, CFI = 1.00, RMSEA = .00) samples. Bivariate correlations of the individual subtests and factor indices were consistent with previous findings. A one-way ANOVA showed factor index scores were statistically lower for the TBI group than the ADHD sample, with the exception of Freedom from Distractibility Index. Additional group subtest and factor differences are also discussed. For the TBI group, cluster analyses identified three distinct groups based on performance. Univariate analyses showed no group differences for age or gender. Multivariate analyses of group cluster differences will also be presented. Conclusions: Implications for cognitive rehabilitation, treatment planning, and school transition will also be discussed.

B32
Questionable generalizability of mild traumatic brain injury meta-analyses

James K, Pertab J, Bigler ED

Objective: The most frequently cited meta-analysis intending to clarify the effects of mild traumatic brain injury (mTBI) was conducted by Binder, Rohling, and Larrabee in 1997, and was extended by Frencham, Fox and Mayberry in 2005. Small overall effect sizes were found (combined $d = 0.11$). Clinically relevant variation may be obscured when studies are combined in meta-analyses. The current investigation was designed to test the hypothesis that within the combined studies more substantial effects of mTBI are apparent when subgroups and assessment variables are considered separately. Methods: All studies included in the two meta-analyses were systematically reviewed. Studies were clustered into subcategories based on subject selection characteristics, and methodological variables. Results: Effect sizes varied based on mechanism of injury (e.g. cognitive effects of mTBI due to motor vehicle accident overall $d = .28$), assessment modality (e.g. EEG measures overall $d = 0.70$), and cognitive assessment tool used—indicating differential sensitivity of measures (e.g. Stroop, $d = .30$; Digit-Symbol, $d = .47$; Speed of Comprehension, $d = .51$). Four studies identified subgroups of injured patients with lasting symptoms, with effect sizes on cognitive measures in symptomatic subgroups as large as $d = 1.68$. Conclusions: In light of differential effect sizes on clinically relevant dimensions of mTBI, meta-analytic results do not warrant blanket application to all subpopulations, or all areas of functioning. Subgroups of mTBI patients have different symptom profiles; these differences are more apparent in certain domains and more sensitive to certain measures. Clinical and research implications are discussed.

B33
Cognitive fatigue in patients with mild traumatic brain injury, chronic fatigue syndrome, and healthy controls: A comparison

Swan-Foster MA

Objective: The aim of the study is to evaluate cognitive fatigue, perceived mental exertion (PME), and state affect, in patients with mTBI, CFS, compared with healthy controls (HC). Methods: mTBI patients were recruited from

a private neurology practice and compared with an archived dataset of 15 CFS patients and 15 HC as a part of a larger empirical study. The three groups were matched by age, years of education, and gender. Participants completed questionnaires on state affect, perceived mental exertion post-PASAT, and the 4-trial, 60-item version of the PASAT. Results: Standard *t* tests were conducted to compare group means on PASAT total score. CFS's PASAT total score was significantly lower than the HC ($t(28) = -2.25$, $p < .05$) and HC scored significantly lower on the PME than the mTBI group ($t(23.19)$, -2.37, $p < .05$), and the CFS score was significantly higher than HC ($t(28) = 3.55$, $p < .01$). One-way within-subjects ANOVA indicate a significant positive and negative mood effect not influenced by group (positive = Wilk's $L = .57$, $F(5, 33) = 5.07$, $p < .01$; negative = Wilk's $L = .44$, $F(5, 33) = 8.31$, $p < .01$). Pairwise comparisons found mean differences (6.48, $p < .05$) between mTBI and HC regarding positive affect. Conclusions: Cognitive performance was comparable across groups, yet CFS reported more perceived mental effort and mTBI reported more negative affect. Results may indicate possible different and focal areas of assessment and rehabilitation.

B34

The effects of bilateral and unilateral TBI on children's verbal and perceptual abilities

Sowell MM, Rivera VY, Riccio C, Cohen MJ

Objective: Traumatic Brain Injury (TBI) is the most common cause of acquired disability in childhood with repercussions of the damage continuing through the life span. A clearer understanding of the impact location (left, right, bilateral) has on verbal and perceptual ability is needed to better service children. TBI puts children at-risk for future academic failure; better understanding of impacts will result in more appropriate recommendations for long-term success. Method: This is a retrospective study on 21 consecutive referrals due to traumatic brain injury, who were seen at an out-patient pediatric neuropsychology facility. The mean age of the participants was 11.58 (S.D. = 3.37); the mean Full Scale IQ was 75.81 (S.D. = 11.93). The mean difference between time of TBI and evaluation was 3.64 years (S.D. = 3.21). Location of injury was used as a grouping variable; groups did not differ by time between TBI and evaluation. Results: Based on group comparisons, Verbal Comprehension differed significantly by hemisperic location ($p < .05$, partial eta squared = .38), as did PPVT-III ($p < .01$, partial eta squared = .47). In both analyses, the group with bilateral damage obtained significantly lower mean scores than both the left and right hemisphere groups. Groups did not differ significantly on any perceptual tasks (VMI, Perceptual Organization/Reasoning). Conclusion: Results suggest that bilateral TBI is more likely to manifest in deficits to language function; however, unilateral TBI is less likely to be domain specific, regardless of the hemisphere injured. Interpretations and implications of location will be discussed.

B35

Effects of TBI location on attention/concentration and memory in children

Perez E, Davis C, Riccio C, Cohen MJ

Objective: The purpose of this study was to determine the effects of TBI location and time of injury on memory function and attention/concentration as measured by the CMS. Methods: This is a retrospective study on 21 consecutive referrals due to traumatic brain injury, who were seen at an out-patient pediatric neuropsychology facility. The mean age of the participants was 11.58 (S.D. = 3.37); the mean Full Scale IQ was 75.81 (S.D. = 11.93). The mean difference between time of TBI and evaluation was 3.64 years (S.D. = 3.21). Location of injury (hemisphere involved) was used as a grouping variable; groups did not differ in time since TBI. Results: Location of injury by hemisphere and age at time of injury significantly contributed to the variance in Attention/Concentration scores (*R* square = .43; adjusted *R* square = .37) such that age at time of injury was the more significant factor. Regression results for CMS General Memory were non-significant. Based on group comparisons, CMS Learning differed significantly by hemisperic location ($p < .05$, partial eta squared = .31), as did CMS Verbal Immediate Memory ($p < .05$, partial eta squared = .29). Specifically, the left hemisphere group evidenced relatively spared Learning and Verbal Immediate Memory; both the right hemisphere and bilateral groups evidenced significantly impaired Learning; the bilateral group evidenced significantly impaired Verbal Immediate memory. Conclusion: Location and age of injury both contribute to the effects of TBI on attention/concentration, learning, and verbal memory. Implications for practice will be presented.

B36

Relationship between neurocognitive test performance and transcranial magnetically-evoked motor potentials following concussion among collegiate athletes

Livingston SC, Ingersoll CD, Goodkin HP, Saliba EN, Hertel JN, Barth JT

Objective: Alterations in neurochemical and neurometabolic processes following cerebral concussion may explain neurocognitive test performance and motor evoked potential (MEP) abnormalities, although a relationship between these variables has not been empirically demonstrated. Method: Nine collegiate athletes (33% male, mean age $20.0 \pm .87$ years) with acute cerebral concussion (<24 h since injury) were assessed. Participants were serially administered the Concussion Resolution Index (CRI) and underwent transcranial magnetic stimulation (TMS) over the motor cortex with MEPs recorded from the upper extremities. Testing was performed 24 h, 3, 5 and 10 days post-concussion. Simple reaction time (SRT), complex reaction time (CRT), and processing speed (PS) scores derived from the CRI and MEP thresholds, latencies, amplitudes, and central motor conduction time were recorded. Results: PS scores were significantly different between days 1 (2.71 ± 0.43) and 3 (2.46 ± 0.37, $P = .05$), days 1 and 5 (2.49 ± 0.41, $P = .05$) and days 1 and 10 (2.28 ± 0.27, $P = .002$). SRT scores were significantly negatively correlated with median MEP latencies on days 1 ($R = -0.6$) and 3 ($R = -0.6$), with ulnar MEP latencies on days 1 ($R = -0.6$) and 3 ($R = -0.6$), and with MEP threshold on day 10 ($R = -0.5$) ($P < .05$). Conclusion: SRT was negatively correlated with several MEP variables, suggesting that the same physiologic mechanism(s) responsible for post-concussion neurocognitive impairments may explain the observed MEP abnormalities. Additional research examining possible cause–effect relationships between these variables following cerebral concussion is warranted.

B37

Attention and memory as predictors of behavioral functioning in pediatric traumatic brain injury

Randall C, Bello DT, Allen DN, Mayfield J

Objective: Pediatric traumatic brain injury (TBI) results in neurocognitive and behavioral abnormalities, although association between these neurocognitive and behavioral disturbances remains unclear. This study examined the ability of neuropsychological measures of attention and memory to predict behavioral functioning in children with TBI. Behavioral disturbance was assessed through self-report, teacher and parent ratings. Methods: Participants included 43 children with moderate to severe brain injury. The sample was 10.8 (S.D. = 3.4) years old, 60% male, and had Wechsler Full Scale IQ scores of 79.3 (S.D. = 14.8). They were administered the Test of Memory and Learning (TOMAL) to assess attention and concentration, verbal memory and nonverbal memory. Additionally, the Behavioral Assessment System for Children (BASC) was completed by the parent as well as by the teacher. For the present study, BASC behavioral ratings of Externalizing Problems, Internalizing Problems, Behavioral Symptoms, Adaptive Skills, and School Problems were used as dependent variables in a series of multiple regression analyses, in which the neurocognitive indexes were used as predictors. Results: Multiple regression analyses indicated that the TOMAL Nonverbal Memory Index significantly predicted BASC teacher ratings of School Problems ($R = .74$) and Adaptive Skills ($R = .62$). In contrast, TOMAL memory and attention indexes were not predictive of BASC parent ratings. Conclusions: The current study suggests that for children with TBI, substantial variability exists in ratings of problem behaviors in school versus home environments. Additionally, neuropsychological variables appear to be more predictive of behavior problems in school settings than in the home.

B38

Assessing effort using the CARB in sports-related concussion testing

Bailey CM, Arnett PA, Barwick FH, Morgan TD

Objective: The current study examined the use of the Computerized Assessment of Response Bias (CARB) mean response time (MRT) as a measure of effort on sports-related concussion baselines. Methods: Three hundred and six collegiate athletes (178 male, 62 female) were administered baseline neuropsychological batteries as a part of the Penn State Concussion Program. Tests included: BVMT-R, HVLT-R, SDMT, Comprehensive Trail Making Test (CTMT), Vigil/W CPT, Stroop, Digit Span Test (DST), Wechsler Test of Adult Reading (WTAR), and the CARB. Individuals were divided into Suspect Motivation (SM) and Acceptable Motivation (AM) groups based on whether their CARB MRT standard score fell >1 S.D. below expectation according to WTAR-estimated Full Scale IQs (FSIQ). Results: As was expected, more tests were below expectation (>1 S.D. below estimated FSIQ) in the SM group than the AM group ($t(26.03) = -3.21$, $p < .01$). Also, more SM participants (80%) versus AM participants (45%) demonstrated at least 1

test performance below expectation (chi-squared(1) = 11.38, $p < .001$). Finally, a greater number of SM participants performed below expectation on tests of complex attention and processing speed (68%) than on other tests (56%). Conclusions: These results suggest that the CARB MRT can be used to identify athletes who may not put forth optimal effort on all baseline neuropsychological measures. Also, it suggests that these athletes may be more likely to put forth less effort on measures of complex attention and processing speed (CTMT, Stroop, Vigil/W, and DST), which is consistent with previous research.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: TREATMENT AND REHABILITATION

B39

Functional gains following neurorehabilitation: The influence of age on improvement

Ablitz BW, Naidoo RB, Perna RB

Objective: A study by Katz and Alexander (1994) indicated that, beginning at age 40, patients have worse functional outcomes after 12 months of neurorehabilitation regardless of severity. However, research on this topic is sparse, utilizing mainly global measures of functioning such as the GOS and the FIM. The purpose of this study is to examine the impact of age on functional improvement as measured by the MPAI-4 (Malec & Lezak, 2003). Method: Changes in the total MPAI-4 and its three index scores were compared between two age groups (<40, $n = 36$; >40, $n = 28$) in a sample of 64 individuals (mean age = 38.64 years), with similar education and TBI severity, after participating in a multidisciplinary neurorehabilitation program. The MPAI-4 was completed by the treatment team at admission and one year after initiating treatment. Results: Results indicated that the <40 group had significantly greater improvement on MPAI-4 scores than the >40 group ($t = 2.377$, $p = 0.021$, Cohen's $d = .586$) with 55.6% of individuals showing some improvement in overall functioning compared to 28.6%. Results also indicated a significant improvement on the Participation subscale of the MPAI-4 ($t = 2.005$, $p = .049$, Cohen's $d = .502$), while scores on the other subscales approached significance. Conclusions: Findings support previous studies, indicating that age is an important factor in determining the effectiveness of neurorehabilitation. These data suggest that individuals under age 40 have greater functional gains than older adults after one year of neurorehabilitation.

B40

Effects of passive musical stimulation on rehabilitation inpatients with right hemisphere CVAs

Toth C, Sherman D

Objective: To determine if people in hospital inpatient rehabilitation program who suffered right hemisphere cardio vascular accident would show significant cognitive improvement when daily musical stimulation is utilized. Method: The Rehabcentre is a unit of a private, Catholic hospital in an urban setting that offers rehabilitation for people recovering from stroke who were released from acute care but not well enough to return home and participate in outpatient therapy. Patients asked to participate in the project had suffered a right hemisphere stroke and had no prior history of head trauma. Participants who agreed joined the music group; patients who refused but met the criteria became part of the control group. This pilot test included 11 music group participants and 6 controls. Research began with pre-test and clinical interview of all patients who met criteria for inclusion. Participants were exposed to music for a minimum of two weeks, 45 min daily, as part of a group during the week and with cassette tapes in their rooms on the weekends. The post-test took place within 48 h of discharge. The tests used were the R-BANS, Trails A and Trails B. Results: Results from the pilot study indicate there are no significant differences between groups on any of the three measures. However, patients reported enjoying the music and noticed an improvement in their mood; staff noticed mood changes as well. Conclusions: Although no significant findings, the music group was a positive experience for participants. Additional research with much larger sample should be conducted.

B41

The value of outpatient neuropsychological rehabilitation of brain injured adults

Lewis AM, Nemeth DG, Marceaux KS, Lee SR

Objective: Cognitive Rehabilitation of Brain Injured Adults is often left to Occupational and Speech Therapists. Programs are usually not individualized. Little program design, oversight, and/or intervention is actually done by the Clinical Neuropsychologist. Rather, the Neuropsychologist usually focuses on data analysis, research, and/or outcome studies. This presentation will focus on the value of individualized neuropsychological rehabilitation conducted by a Clinical Neuropsychologist. Methods: Case studies of individualized outpatient neuropsychological rehabilitation

programs will be presented. Included will be rehabilitation recovery profiles of individuals who have suffered subdural hematomas, subachranoid hemorrhages, and traumatic brain injuries. Results: Pre and post-neuropsychological rehabilitation results will be presented with emphasis on areas of improvement. Return to work and/or driving results will be highlighted. Conclusions: Although large studies of the effectiveness of neuropsychological rehabilitation have yielded mixed findings, these studies have not usually focused on the value of individualized rehabilitation by a Clinical Neuropsychologist. Results from our outpatient neuropsychological rehabilitation program will be used to demonstrate the efficacy of such interventions.

B42

Group psychotherapy and FIM goal attainment among stroke survivors

Olucha GN, Acharya A, Callison C, Juelich P, Erker GJ

Objective: To examine the association between group psychotherapy and attainment of Functional Independence Measure (FIM) goals among stroke survivors in an inpatient rehabilitation setting. Method: Using archival data, patients admitted to SSM Rehab (St. Mary's Hospital, St. Louis) between June 2005 and January 2007 with ischemic stroke or intracerebral hemorrhage with a course uncomplicated by medical issues were included in this study ($n = 325$). Mean age was 67 years (S.D. = 14.79). Patients were 54% female, 57% Caucasian, and 41% African American. Patients comprised three groups those that received no group psychotherapy (0-group), received one session (1-only group), and received two or more sessions (2+ group) during their hospital stay. The outcome of interest was attainment of FIM goal established at admission. Binary logistic regression model was utilized to determine the relationship between goal attainment and group category correcting for length of stay (LOS) and number of individual psychotherapy sessions received (IPSR). Results: Using one-way ANOVA and chi square analysis, no significant differences in demographic variables were found between the three groups except in relation to LOS and number of IPSR. Odds ratio (OR) [95% CI] for the 1-only group was not different in terms of FIM goal attainment compared to the 0-group, OR 0.748 [0.19–2.88]. However, the 2+ group was more than twice as likely to achieve their FIM goals, OR 2.65 [1.13–6.25], when compared to the 0-group. Conclusions: Stroke survivors may benefit from inpatient group psychotherapy.

B43

Processing speed and perceptual organization as predictors of vocational performance among traumatic brain injury (TBI) outpatients

DenBoer J, Zade DD, Hall S, Miller C

Objective: The purpose of this study was to examine the use of neuropsychological assessment measures as predictors of vocational performance in a sample of outpatients with TBI. Methods: Participants were 16 patients (9 males, 7 females; mean age = 41.75 years) undergoing neuropsychological assessment as part of their community re-integration. Patients had varying severity levels of TBI: mild TBI = 6, moderate = 6, severe = 4. Time elapsed since TBI varied significantly (average = 6 years). Participants completed a full-day battery of standard neuropsychological measures. Results: Standard multiple regression analysis revealed that a grouping of WAIS-III Full Scale IQ, Performance IQ, Verbal Comprehension IQ, Perceptual Organization IQ, and Processing Speed IQ were shown to significantly predict the number of hours TBI patients worked during the week ($F = 7.713$, $p < .05$, adjusted $R^2 = .79$). Performance IQ and Perceptual Organization IQ were shown to make the largest explanatory contributions ($\hat{a} = 4.65$ and -4.50, respectively) while Processing Speed IQ was shown to have the largest unique contribution (standardized $\hat{a} = -2.11$, $p = .013$). Other measures of vocational performance were examined. Measures of executive functioning and memory were not significant in predicting vocational performance. Conclusion: Although executive functioning and memory measures did not effectively predict vocational outcome, a combination of WAIS-III variables (most notably Perceptual Organization IQ and Processing Speed IQ) were effective in predicting a significant amount of the variance in number of hours worked per week among a sample of TBI patients in an outpatient rehabilitation program.

B44

The effects of DBS stimulator settings on neuropsychological functioning in patients with Parkinson's disease

Mash KM, Reese LS, Schoenberg MR, Suarez M, Scott JG

Objective: Parkinson's disease (PD) is an idiopathic progressive neurological disorder. Improvement in Parkinsonian motor function has been established with STN DBS. Recently, the relationship between DBS stimulator setting and motor function has begun to be explored; however, no study to date has investigated the relationship between DBS

settings and neuropsychological functioning. This study evaluated the extent to which DBS settings (i.e., amplitude, frequency, and pulse width) are associated with post-operative performances on the RBANS. Methods: The study was a prospective clinical trial of STN DBS for the treatment of refractory PD. Twenty patients were identified that met study criteria. All participants completed neuropsychological evaluations, including the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Results: The mean age of the DBS Parkinson's sample was 66.7 (S.D. = 9.38) with 13.4 years of education. Disease duration (years) was 9.4 (S.D. = 5.1). Correlations revealed significant relationships between amplitude and pulse width with RBANS indices of Visuospatial/Construction ($r = .55$) and Immediate Memory ($r = .45$). Also, significant relationships were found between amplitude and line orientation ($r = .45$) and pulse width and delayed figure recall ($r = .46$). Multiple regression found DBS stimulator settings to be significant predictors of RBANS scores. Conclusion: Significant correlations were found between amplitude and pulse width on measures of memory and visuospatial/construction. While DBS appears to be relatively benign from a neuropsychological standpoint, some patients experience more pronounced impairments. One variable that may account for previous variability is DBS stimulation parameters.

NEUROPSYCHOLOGICAL DOMAINS: EXECUTIVE FUNCTIONS

B45

Executive functioning deficits in disorganized attachment

Horvath J, Markman BS

Objective: Given that at least on the behavioral level, children with disorganized attachment share common characteristics with children diagnosed with attention deficit hyperactivity disorder, this study compared a Disorganized group to an ADHD group to provide answers as to how these two may overlap and could be distinguished on neuropsychological tests. The aim was to better define a specific profile that each of these groups share on tests. Methods: The total sample consisted of 66 children: a control group of securely attached, normal children, a Disorganized group (+ADHD, and without ADHD), and a "pure" ADHD group (without disorganized attachment). They were recruited from mental health clinics and pediatric offices. Results: The findings suggested that disorganized attachment is associated with executive functioning deficits in inhibition, processing, planning and organization, mental flexibility, set-maintenance, and self-monitoring. The overall prototype of relatedness in disorganized attachment, consisting of a lack of a coherent and organized strategy was found to parallel a cognitive profile that is characterized by unregulated, uneven, and disordered efforts. Conclusions: Impairments in the executive controls of filtering and self-monitoring differentiated the Disorganized group from an ADHD group, based on the excessive number of intrusion errors on a verbal memory test and the high number of perseveration errors on a test of verbal fluency. The overall findings highlighted the importance of early caregiving quality on the experience-dependent maturation of neurocognitive functioning.

B46

History of relational trauma as related to BRIEF ratings in a population of adolescent girls

Hulac D, Bernstein JD

Objective: Questions (1) Do adolescent females who have suffered relational trauma differ from a normative sample in regard to executive control? (2) Are adolescent females who have suffered relational trauma more likely to demonstrate clinically significant elevations on measures of behavior regulation than metacognition? Methods: *T*-scores from the BRIEF-PRS were tabulated for 93 adolescent females in residential treatment for the following indices: (1) a global executive scale (GEC), (2) Behavior Regulation Index (BRI), (3) and Metacognition Index (MI). Question 1: The samples that were compared included the population of adolescent females in a residential treatment facility and a control sample. *T*-tests were performed to compare *T*-scores of the clinical population and the normative population. Question 2: Only the clinical sample was utilized. A chi-square statistic compared the percentage of adolescent females in RTC who demonstrated clinically elevated scores on the BRI to the percentage who demonstrated clinically elevated scores on the MI. Results: Adolescent females in residential care demonstrated a significantly *T*-scores in the global index, behavior regulation index, and metacognition index. Also, a significantly higher percentage of adolescent females demonstrated score in the clinically elevated range on the BRI than on the MI. Conclusions: Adolescent females who have histories of relational trauma will demonstrate significantly greater decrements to their executive control functions. Individuals with histories of relational trauma will demonstrate behavioral manifestations of the problem. Cognitive deficits are more associated with genetic abnormalities or focal TBI.

B47

Necker Cube reversals as a measure of figural fluency: A comparison with the Ruff Figural Fluency Test

Cox DE, Carmona JE, Holland AK, Golkow K, Johnson B, Sucgang J, Harrison DW

Objective: The current research will investigate the Necker Cube paradigm as a measure of figural fluency. As the Necker Cube paradigm does not require motor output, this measure may be of tremendous utility in examining figural fluency using electroencephalography. It is expected that the scores on the Necker Cube reversals to criterion will show strong concurrent validity with the Ruff Figural Fluency Test. Methods: One hundred and twenty participants were selected from among undergraduate students at Virginia Polytechnic Institute and State University. All procedures were completed in the course of a single 15 to 20-min session. Participants completed three 1-min sections of the RFFT and then three 1-min reversal trials of the Necker Cube. Data were analyzed using the SPSS version 12 statistical software package. Results: Necker Cube reversals to criterion showed a strong positive correlation with scores on the RFFT ($r = .68$, $p < .05$). In addition to the main effects, significant findings regarding patterns of performance across trials and sex differences were found. Scores on the RFFT trended upward across trials, while scores on the Necker Cube trended downward. Furthermore, score differences between men and women were significantly greater on the Necker Cube reversals than the RFFT ($F = 13.29$, $p < .05$). Conclusions: These results suggest that the use of Necker Cube reversals to criterion may be an appropriate measure of figural fluency that does not require significant motor output. Furthemore, Necker Cube reversals may be more sensitive to sex differences in figural fluency.

B48

Predicting executive functioning performance in adults by variables of attention and impulsivity

Hines L, Shaw L, DenBesten N, Golden C

Objective: The purpose of the present study is to examine the relationship between the Test of Variables of Attention (TOVA) Auditory and Visual scores related to attention and impulsivity, with the Stroop Color Word Test, and specific measurements of the Wisconsin Card Sorting Test (WCST). Methods: A group of 342 adults (47% male, mean age = 34.64, S.D. = 14.29) participated in the study, receiving an extended neuropsychological examination as a result of clinical referral. Measures used included the Auditory and Visual Omission and Commission scores from the TOVA, the Color, Word, Color/Word, and Interference Stroop scores, and the Preservative Responses and Categories scales (WCST). Results: Results yielded significant correlations ($p < .05$) between the Auditory Omission and Word scores ($r = .26$) and Color scores ($r = .26$). A negative correlation was identified between the Auditory Omission and Interference ($r = -.18$). Results also indicate a significant relationship between Visual Omission and Word scores ($r = .25$; $p = .01$), and Color scores ($r = .18$). Correlations were identified between Visual Omission and scores on Trails A ($r = .15$), and Trails B ($r = .14$). A negative correlation was identified between the Visual Omission and the Perseverative score. Auditory Commission was correlated with Word ($r = .19$), and Color ($r = .18$). Visual Commission was correlated with Word scores ($r = .27$), Color scores ($r = .16$), and Color/Word scores ($r = .16$). Significant correlations were identified between Visual Commission and Trails A ($r = .17$), and Trails B ($r = .16$). Conclusions: The results indicate that the TOVA is realted to executive functioning in adults.

B49

Varieties of mental flexibility in mild cognitive impairment

van der Hulst E, Manning K, Neijstrom E, Onyike C, Brandt J

Objective: Research has identified two components of mental flexibility (MF): "spontaneous flexibility" (the capacity for generating ideas and exemplars) and "reactive flexibility" (the ability to shift cognitive and behavioral sets in response to feedback). This study examines: whether a two-component model of MF is supported among patients with mild cognitive impairment (MCI); which component(s) distinguish MCI patients from normal elders, and MCI subtypes from one another; and the relationships of MF components to other cognitive and functional measures. Methods: Fifty-two normal elderly (NC), and 25 pure amnestic MCI (AMN), 36 amnestic multiple domain (AMN+), and 25 non-amnestic MCI patients (non-AMN) were administered a cognitive battery and assessments of daily functioning. MF tests included: Trail Making; D-KEFS Stroop and Sorting; Brief Test of Attention; Brixton Spatial Anticipation; TEA Telephone Search While Counting; Letter, Category and Word Class Fluency; Random Number Generation; and Alternate Uses. Results: Principal components analysis yielded two factors, labeled "Set-Shifting" and "Generativity", accounting for 50.4% of variance. MCIs were impaired in Generativity ($p = .001$) but not Set-Shifting. Four-group ANCOVAs yielded main effects of group on both factors. NCs and AMN performed similarly, and better than AMN+,

on Set-Shifting. AMN+ and non-AMN performed worse than NCs on Generativity, whereas AMN performed as well as NCs. Correlations between Set-Shifting and Generativity and other cognitive and functional measures were of comparable magnitude. Conclusions: The findings support a two-component model of mental flexibility and suggest that the components are impaired in the MCIs.

B50

Creativity in mild cognitive impairment

van der Hulst E, Manning K, Neijstrom E, Onyike C, Brandt J

Objective: While creativity is typically lost early in neurodegenerative diseases, some patients with frontotemporal dementia (FTD) and Parkinson's disease (PD) develop new or improved creative tendencies. The neuropsychological basis for creativity is debated, but executive functions are often implicated. The Tinkertoy Test (TTT), used to assess generativity and related aspects of executive cognition, can be conceptualized as a measure of creativity. The goals of the present study were to determine: (1) whether patients with mild cognitive impairment (MCI) display increased or decreased creativity as measured by the TTT, (2) whether differences in TTT performance exist among subtypes of MCI, and (3) the relationship between TTT performance and other cognitive and functional measures. Methods: The TTT and a battery of neuropsychological and daily functioning measures were administered to 63 healthy elderly (NC), 29 pure amnestic MCI patients (AMN), 36 amnestic multiple domain NCIs (AMN+) and 28 non-amnestic MCIs (non-AMN). Results: TTT performance correlated with age, education, and measures of daily functioning. ANOVA, controlling for age, MMSE score and Clinical Dementia Rating score, revealed that TTT scores differed among the four groups ($p = .022$). AMN+s performed worse than NCs ($p = .027$); no other between-group differences reached significance. The TTT correlated highly with tests of object-use generation, planning and visual judgment, and weakly with working memory and wordlist generation. Conclusion: Results suggest that creative productivity is related to other executive measures and is diminished in amnestic MCI patients with multiple cognitive deficits.

B51

The utility of single vs. multiple indicators in predicting behavioral outcomes related to executive functioning

Stagg JW, Schneider WJ

Objective: Clinicians regularly infer likely behavioral outcomes from patterns of test scores. This study was designed to measure how well one test, the Color-Word Interference Test (CWIT; Delis, Kaplan, & Kramer, 2001), predicted behavioral outcomes. Our hypothesis was that subtest difference scores would not be reliable enough to predict self-reported behavioral outcomes, but difference scores derived from multiple indicators constructed to have features closely matching those of the CWIT would achieve sufficient reliability for clinical use. Method: A sample of 204 non-referred undergraduates was recruited from a Midwestern university. Participants were administered the CWIT as well as three highly similar interference tasks created by the authors. Scores on the CWIT and three other variations of the task were used to create latent variables of inhibition and switching. Participants also completed self-report measures of executive behaviors (e.g., academic diligence, forgetfulness in daily activities) and major life outcomes (e.g., academic achievement, employment outcomes). Results: Scores from the CWIT were highly correlated with scores on highly similar task variants. As expected, scores from a single test of executive function served as relatively poor predictors of behavioral outcomes. However, scores derived from multiple indicators also failed to predict these outcomes. Conclusions: "Executive functioning" as determined by cognitive tasks appears to be distinguishable from "executive functioning" as demonstrated by maladaptive behaviors, at least among non-referred individuals. Clinicians should be careful when making behavioral inferences from performance on cognitive tasks. This caution is warranted even when clinicians have converging data from multiple executive function measures.

B52

The differential impact of frontal lobe epilepsy and sleep disordered breathing on executive functioning in pediatric populations

Luton L, Burns TG, Hamilton WG

Objective: Frontal lobe epilepsy (FLE) and sleep-disordered breathing (SDB) are commonly assessed in pediatric populations; yet, questions concerning the associated neuropsychological sequelae remain. Although adult studies have linked FLE with executive dysfunction, maturational differences in frontal lobe development prevent the generalization of findings to FLE youth. Regarding SDB, Beebe and Gozal's (2002) theoretical model explains the differential

impact of sleepiness and hypoxia on executive function; however, it has yet to be fully investigated. The current study examines the distinctive effects of FLE and SDB on executive functioning in pediatric populations. Method: Eleven FLE children were age- and gender-matched to 11 SDB youth and 11 controls ($n = 33$). A one-way ANOVA and post hoc analysis were used to compare participants on measures of intelligence, achievement, and executive functioning. Results: Although results revealed comparable intellectual and academic abilities, FLE participants performed worse than controls on verbal measures addressing semantic fluency ($p = .006$) and cognitive flexibility ($p = .020$). Further, FLE children performed worse than both controls ($p = .002$) and SDB youth ($p = .039$) on a task assessing alphabetic sequencing. Finally, FLE and SDB participants were described as experiencing greater deficits in initiation ($p = .010$ and .000), planning/organization ($p = .000$ and .000), and working memory ($p = .001$ and .013) than controls. Conclusions: Although FLE and SDB parents reported similar executive deficits, FLE youth performed worse on objective measures; thus, the predicted deficits in executive function for SDB youth were not supported, suggesting that reported symptoms may be better explained by fatigue and other factors.

B53

Executive function predictors of theory of mind

Ahmed FS, Godsey C, Kasian A, Patel G, Miller L

Objective: This study examined Executive Function (EF) predictors of Theory of Mind (ToM). ToM refers to the ability to comprehend the mental state of another, and EF refers to higher-order cognitive processes associated with the prefrontal cortex. Previous research has linked EF to ToM, although a comprehensive EF battery has not been used in these studies. This study aimed to use a comprehensive EF battery to determine if any domain of EF predicted ToM performance. Method: Ninety students from the University of Georgia participated in this study. Participants were administered the Strange Stories Test, which assesses the general ability to infer another person's mental state through the use of vignettes. Participants were also administered the Delis–Kaplan Executive Function System (D-KEFS), a battery of executive function tests. Results: Verbal fluency and inhibition significantly predicted performance on the Strange Stories Test at a significance level of 0.030 and 0.031, respectively. Conclusions: This study explored which domains of EF were related to ToM performance out of a comprehensive battery of EF. It was found that verbal fluency and inhibition both significantly predicted ToM performance. This suggests that one's ability to infer the mental state of another (and therefore successfully socially interact) may be driven by one's ability to be verbally flexible and inhibit inappropriate responses.

B54

The impact of feedback interval on Iowa Gambling Task performance

Leininger S, Pytlak K, Hatfield M, Pilarski C, Hoskins P, Skeel R

Objective: Animal research has demonstrated dopaminergic activation during the interval before the potential delivery of rewards. An experimental design was used to investigate the impact of varying length of uncertainty periods in decision-making. It was hypothesized that longer periods of uncertainty would be associated with increased dopaminergic activation; thus, choices involving uncertainty periods would be preferred, particularly when the longer period of uncertainty was associated with choices representing greater risk. Method: Sixty-eight individuals (36 females) were recruited from an undergraduate institution. Uncertainty was manipulated using a modified version of the Iowa Gambling Task on which delays between card selection and feedback can be manipulated. Random assignment was used for four conditions in which time intervals between choice selection and outcome were systematically manipulated. Results: A mixed model (5 blocks of 20 responses × condition) ANOVA indicated that while overall performance was not different between conditions ($F = .35$, $p > .05$), there was a significant interaction indicating that groups responded differentially across the blocks of five trials that partially supported hypotheses ($F = 1.94$, $p < .05$). Post hoc analyses revealed performance by the group with the greatest delay on the riskiest deck was characterized by abnormally high selection of risky decks within the first block, followed by significantly fewer selections from the risky deck in the second block relative to other groups. Conclusions: Results were partially consistent with the animal literature concerning the reinforcing properties of uncertainty and dopamine. Future research will focus on clarifying the role of dopamine through the use of clinical populations.

B55

Attentional bias for threatening facial expressions is associated with performance on switching tasks

Rau H, Suchy Y, Williams P, Thorgusen S, Simon A

Objective: Previous research suggests that individuals with a propensity for anxiety and depression tend to orient toward negatively-valenced emotional stimuli. These patients' inability to orient away from such stimuli may be related to poor executive control (Pessoa, Kastner, & Ungerleider, 2002; Vuilleumier, 2005). This study sought to examine the relationship between attentional bias and the ability to form, switch, and maintain mental set. Method: Participants were 143 undergraduates (47% male, 53% female; age 18–30). Measures included an attentional bias task (the face probe detection task; Bradley et al., 2004) and a modified switching task that assesses forming, switching, and maintaining mental set (Suchy & Kosson, 2006). The probe detection task requires that participants orient away from either neutral or angry faces. The switching task requires that participants switch between two different tasks (latencies associated with baseline performance, switching, set maintenance, and set forming were recorded and used in analyses). Results: An independent sample *t*-test showed that participants who took longer to orient away from angry faces on the probe detection task also took longer to switch between tasks [$t(141) = -2.72$, $p = .007$], but did not differ in terms of other performances (i.e., forming and maintaining mental set, baseline performance). Conclusions: These results support the notion that attentional bias toward negative emotional stimuli is related to weaknesses in executive control. Future research examining the relationship between neurocognitive functioning and emotion regulation in a patient population may help to further delineate the cognitive mechanisms that contribute to mood and anxiety disorders.

NEUROPSYCHOLOGICAL DOMAINS: OTHER

B56

The Wide Range Achievement Test-3 as a predictor of Full-Scale IQ in a clinical population

Buddin H, Hines L, Shaw L, Golden C

Objective: The purpose of the present study is to evaluate which measurement of achievement from the Wide Range Achievement Test-3 (WRAT-3) best predicts Full Scale IQ in a neuropsychiatric population. Method: A group of 380 adults (32% male, age = 34.64, S.D. = 14.29) who were referred for a clinical evaluation completed the WRAT-3 and the WAIS-3 as part of a comprehensive neuropsychological battery. Forty-eight percent of the population was Caucasian, 8% African-American, 7% Hispanic, and 3% rated themselves in the category of "other." Results: A linear regression was utilized to predict Full Scale IQ using Arithmetic, Reading, and Spelling scaled scores. The regression identified significant differences between groups [$F(3, 273) = 93.66$, $p < .000$]. Further analysis of three components of WRAT revealed Arithmetic as a significant predictor of Full Scale IQ ($t = 7.89$, $p = .000$). Reading was also a significant predictor ($t = 2.76$, $p = .006$). Effect size estimate was computed for each of the significant variables using Cohen's *f* square. Effect size for Arithmetic was moderate (*f* square = .23), and Reading was small (*f* square = .03). Conclusion: The current research was aimed at determining whether FSIQ is most accurately predicted by the Reading subtest of the WRAT-3, as is suggested by previous research. Results suggest that the Arithmetic subtest of the WRAT is the best predictor of FSIQ in a neuropsychiatric population, though Reading can also be considered an accurate measurement. Clinical implications of these findings will be discussed.

B57

Visuospatial organization in adults with mathematical disabilities

Renfrow S, Durkin M, Golden C

Objective: Associations among mathematical and spatial ability have been recorded in both males and females throughout development. The current study hypothesizes that spatial deficits also exist throughout adulthood within this population. Method: A sample of 44 outpatients (73% Caucasian, 14% African American, 13% Other) diagnosed with a mathematical learning disability were chosen from a database of a local university clinic. The sample consisted of 26 females and 18 males (mean age = 30.0, S.D. = 12.9; mean education = 13.9, S.D. = 2.2; mean IQ = 99.8, S.D. = 10.2). Mathematical ability was measured by the outpatients' scores on the Arithmetic subtest of the WAIS-III and subsequently compared to subtest scores of the WAIS-III measuring perceptual organization involving spatial concepts (i.e., Block Design, Picture Completion, Matrix Reasoning, and Picture Arrangement). Results: The results of the current study reveal a positive correlation between Matrix Reasoning and Arithmetic scores ($r = .43$, $p < .01$). The

study also found a positive correlation between Picture Arrangement and Arithmetic scores ($r = .34$, $p < .05$). The two remaining subtests did not reveal significant correlations (Block Design and Arithmetic, $r = .22$; Picture Completion and Arithmetic, $r = .29$). Conclusion: A relationship between mathematical and visuospatial ability was found only in subtests measuring perceptual organization involving mental movement (i.e., mental rotation and mental sequencing). The results suggest that mathematical disability is associated with deficits in visuospatial organization and rotation of sequential information.

B58

Late preterm infants: A cautionary tale

Sandusky SB, Griffith KM, Weden SK, Culotta VP

Objective: The aim of this study was to examine neurocognitive outcomes of late preterm infants (32 through 36 weeks of gestation) given that existing research has not clarified to what extent late preterm birth confers risk. Method: Sixty-five participants with a history of late preterm birth were referred to an outpatient behavioral health clinic, where they underwent a comprehensive neuropsychological evaluation. The final sample (55% male) had a mean age of 9.37 (S.D. = 2.14). The racial breakdown of the sample was 88% Caucasian, 5% Asian, 4% other ethnicity, and 3% African American. Results: Analyses revealed significant differences in WISC-IV verbal comprehension, working memory, and processing speed (p's < .05), with late preterm participants performing more poorly than the normative standardization sample. Subjects with a history of late preterm birth also performed significantly more poorly on tests of visual motor integration, visuospatial constructional ability and visual memory, and verbal learning and memory (p's < .05). *T*-test comparisons revealed no significant differences between groups across broad based measures of reading, math, and written expression. Conclusions: Results of this study demonstrated significant neurocognitive, but not academic, differences between late preterm subjects and normative standardization samples. This study suggests that individuals with a history of late preterm birth are at increased risk for cognitive deficits, which may contribute to reduced academic and adaptive performance. Future research may be instrumental in establishing a gradient of neurocognitive deficits in late preterm infants. Additionally, clinicians should recognize the potential risk of preterm birth and evaluate as indicated.

B59

Linguistic and non-linguistic decoding as a function of flicker fusion

Holloway SR, DaSilva F, McBeath M

Objective: Recent studies indicate that critical flicker fusion (CFF) may be related to processing in the primary visual cortex. CFF thresholds have also been shown to be impaired in populations with reading disorders, such as dyslexia. While CFF and reading scores have been compared between normal reading and dyslexic populations, few studies, if any, have compared CFF thresholds and decoding abilities within a normal reading population. Methods: CFF thresholds were assessed with an optical chopper using the method of limits by a 1-deg diameter green (563 nm) test field. Linguistic decoding was measured using reading-word and nonsense-word decoding tests. A non-linguistic decoding measure was obtained with a computer program that consisted of Landolt C targets randomly presented in four cardinal orientations, at 3-radial distances from a focus point, for eight compass points, in a circular pattern. Participants responded by pressing the arrow key on the keyboard that matched the direction the target was facing. Results: The results show a strong correlation between CFF thresholds and scores on the reading-word, nonsense-word, and non-linguistic decoding measures. Conclusions: The data suggest that reading, specifically the ability to decode words, may be related to the speed of processing in the primary visual system. In view of recent evidence showing that CFF can be increased with exposure to a unique visual experience (Seitz, Náñez, Holloway, & Watanabe, 2007), future research should consider the possibility that those who suffer from reading disabilities may benefit from training paradigms related to visual processing.

B60

Factor analysis of the Dean–Woodcock Sensory Motor Battery for adults with neurological impairment

Hiller TR, Hall JJ, Dean RS, Davis AS

Objective: The Dean–Woodcock Sensory Motor Battery (DWSMB) is a measure of sensory-motor functioning that is norm-referenced, standardized, and based upon an information processing model. Davis et al. (2006) examined the factor structure of the D-WSMB using a sample consisting of individuals with ages ranging from 31 months to 95 year

that included both individuals with and without neurological and/or psychiatric impairment. Since research has demonstrated that sensory-motor skills have a developmental component, the current study explored the factor structure of the DWSMB with adults. Method: Participants were 594 neurologically impaired adults (mean age = 41.23, S.D. = 11.69). Participants were administered the 18 subtests of the DWSMB. An Exploratory Factor Analysis (EFA) using Unweighted Least Squares was conducted. Based upon previous research by Davis et al. (2006), a three-factor solution was chosen as optimal for the data. Results: The three-factor model accounted for 46.4% of the variance. The factor structure differed from the study by Davis et al. (2006) in that there was a clearer delineation between motor skills and sensory skills. Factor 1 consisted primarily of motor tasks. Factor 2 was comprised solely of auditory acuity tasks. Factor 3 consisted chiefly of both simple and complex sensory tasks. Conclusions: The results of this study provide further evidence of good construct validity for the DWSMB. The results also suggest that with a neurologically impaired adult sample, there is a clearer delineation between motor and sensory compared to a sample consisting of adults and children.

B61

Validity of the Developmental Test of Visual Perception-Adolescent and Adult

Staskal RE, Little JA, Smith SR

Objective: The Developmental Test of Visual Perception-Adolescent and Adult (DTVP-A; Reynolds, Pearson, & Voress, 2002) is a standardized assessment designed to measure visual perceptual ability. The six individual subtests of the DTVP include tests of visual motor abilities, figure-ground discrimination, form constancy, and object completion. No independent research to date has examined the convergent or divergent validity of the DTVP. The present study attempts to fill this void in the literature. Methods: The DTVP-A, Comprehensive Trail-Making-Test (CTMT), and Wechsler Abbreviated Scale of Intelligence (WASI) were administered to 98 undergraduates from a medium-sized public university in the southwest US (mean age = 21; 15% were male, and 85% were female). Results: We calculated correlations between the DTVP-A, Performance IQ, and the CTMT to examine convergent validity. As predicted, results indicated a significant correlation between the Visual-Motor Integration Index and the composite CTMT score. We calculated correlations between Verbal IQ, and DTVP-A indexes to examine divergent validity. None of these correlations were significant. Conclusion: The DTVP-A was designed to measure specific visual processing abilities as opposed to intelligence factors. The present study examines the convergent and divergent validity of the DTVP-A. Our results support a construct of visual processing abilities that is significantly different from global nonverbal and verbal cognitive abilities. We also found that the DTVP-A is related to another visual processing test, supporting the validity of the measure. Future research is warranted on the relationship between visual processing abilities and other neuropsychological abilities.

B62

Neuropsychological correlates of Rorschach responses

Staskal RE, Nowinski LA, Walker S, Barazani S, Smith SR

Objective: A long tradition of research has examined the relationship between cognitive development and complexity of Rorschach responses. Exner (2003) argues that the Rorschach is primarily a visual-processing measure. If the Rorschach responses are a function of visual-processing, we would expect convergent validity with other visual-processing assessments. The present study replicates research on cognitive factors and examines the relationship between visual-processing abilities and Rorschach variables related to visual perception and processing. Method: A sample of 100 undergraduates completed the Developmental Test of Visual Perception (DTVP-A), Comprehensive-Trail-Making-Test (CTMT), WASI, and the Rorschach (Exner, 2003). The mean age of participants was 21 years, 15% were male, and 85% were female. Results: Selected Rorschach variables included Developmental Quality (DQ), Form Quality (FQ), Populars (P), Organizational Activity (Z), and Perceptual Thinking Index (PTI). Results of pilot correlations indicated that CTMT scores were positively related to accuracy of perception (X+%) but negatively related to an indicator of thought disorder (PTI). In the data subset examined, WASI and DTVP scores did not correlate with examined Rorschach scores. Conclusion: The current study examines the relationship between visual-processing and quality of Rorschach responses. Our preliminary results do not indicate a strong correlation between selected Rorschach variables and visual-processing assessments. Examining this relationship sheds light on how visual-processing abilities may or may not affect cognitive and emotional responses to an ambiguous task such as the Rorschach.

B63

School psychologists' neuropsychological assessment practices

Staskal RE, Smith SR

Objective: Because school psychologists are in an ideal position to identify and provide psychological services to children with neuropsychological impairments, there is a growing interest in neuropsychology in school psychology. No research has examined how often school psychologists use various neurological-based assessments. In this study, we developed a survey to assess how often school psychologists administer neuropsychological assessments and how useful they perceive them to be. Methods: We developed an Internet-based survey that assessed demographic data, training experiences, and general assessment practices. An invitation to participate in the survey was mailed to 1000 members of the National Association of School Psychologists, to which 97 responded (response rate = 7%). The sample was 77% female and 23% male. Thirty-eight percent reported their highest degree was an M.A./M.S., and 23% were doctoral-level. Results: Results indicate that school psychologists most often use cognitive and achievement assessments regardless of the presenting issue. Additionally, behavioral ratings, motoric, and self- and parent-report personality/behavioral assessments are sometimes used. However, the majority of the sample reported never using tests of verbal memory, attention, visual memory, executive functioning, language, or performance-based personality. Conclusion: Given the large number of disabilities school psychologists are responsible for assessing, the current pattern of test use has implications for identification and subsequent treatment of children with neuropsychological impairments. Given the predominate use of cognitive and achievement tests during the assessment process, it is important to examine if some neuropsychological impairments are not being properly identified in the school setting.

B64

Estimating premorbid abilities utilizing the GAMA and BASI-Survey

Zafiris CM, Bardos AN

Objective: An increasing number of practitioners are seeking more time efficient and effective measures in evaluating cognitive ability and estimating premorbid functioning. The General Ability Measure for Adults (GAMA), a nonverbal cognitive measure, and the Basic Achievement Skills Inventory—Survey (BASI), are both nationally standardized brief self administered measures. In conjunction with demographic variables, they can be used with the Oklahoma Premorbid Intelligence Estimate-3 (OPIE-3) formula to estimate premorbid ability. Significant correlations obtained between the WAIS-III, GAMA and BASI provided evidence for the validity of the new measures as alternatives to the individually administered WAIS-III thus offering a viable substitution for the WAIS-III subtests in the OPIE-3 equation. Information from the GAMA and BASI will allow neuropsychologists more flexibility, efficiency and ease in determining premorbid ability and offer additional comprehensive information on a client's present cognitive and achievement skills. Methods: Information from current published literature on the GAMA with clinical and non-clinical samples and new data will be reported regarding the relationship between the WAIS-III, GAMA and BASI with a sample of 150 non-clinical subjects. Results: Significant correlations were obtained between the WAIS-III, GAMA and BASI across studies reviewed and with the non-clinical sample of this study. The sample performed equally well on all three measures utilized. Conclusions: Given the findings of this study and the reported evidence in the literature, a formula utilizing the GAMA and BASI was developed that can be used in estimation of premorbid abilities.

B65

Grooved Pegboard rule violations: Preliminary validity evidence

Rice S, Spencer RJ, Samek JR, Katzel LI, Seliger SL, Waldstein SR

Objective: Grooved Pegboard (GP) is a neuropsychological test for which time to insert pegs serves as the primary outcome measure. Other aspects of performance, including rule violations, are rarely interpreted quantitatively. We present evidence supporting convergent and discriminant validity of GP rule violations as indicators of neuropsychological performance among older adults. Method: Seventy-five participants [mean age = 69(8.3) years, 59% male] completed GP as a part of their participation in studies of the effect of hypertension or chronic kidney disease on the brain. We recorded rule violations, including number of times participants used both hands, and number of times participants began peg insertion on the wrong side of the board. Results: Forty-five percent of participants committed at least one rule violation (range = 0–5). Correlational analyses revealed that number of rule violations was significantly related to performance on Trails Part B ($r = .27$), Digits Backward ($r = -.23$), Stroop Trial-2 ($r = -.27$) and Trial-3 ($r = -.31$), Logical Memory Immediate-Recall (r = -.24), and Visual Reproductions Immediate-Recall ($r = -.29$) and

Delayed-Recall ($r = -.24$), all p's $< .05$. Significant correlations did not arise for Trails Part A, Digits Forward, Stroop Trial-1, Logical Memory Delayed-Recall, or Judgment of Line Orientation, all p's $> .05$. Conclusions: GP rule violations are prevalent and significantly associated with poorer performance on neuropsychological tests of executive function, mental flexibility, and memory. Rule violations may indicate impulsivity, disinhibition, and poor memory and therefore may provide supplemental evidence when assessing these domains.

PROFESSIONAL ISSUES: TEST DEVELOPMENT AND METHODS

B66

A novel, computer based assesment of non-verbal fluency

Fishman DM, Yocum AA, Poreh AM

Objective: Following the Quantified Process Approach, the goal of the study was to develop new indices for the Five Point Test (FPT, Regard 1982), a commonly used nonverbal fluency measure. Method: One hundred and twenty subjects were examined. Using a computer based scoring algorithm that takes into account the number of possible permutations on the FPT, three test taking strategies were defined. These included addition, subtraction, and rotation of the design elements. Results: Multiple regression analyses shows that the Rotation Strategy was the only strategy that correlated highly with the total number of unique designs. None of the other strategies were significantly related, although these appear to be used by extremely analytical subjects. Conclusions: The results suggests that the use of the Quantified Process Scoring System, which delineates test taking strategies has considerable promise not only for the assessment of executive function deficits, but also to what we term "hyper-frontality", the ability to screen for higher order analytical skills.

B67

One-month test–retest reliability of FNIRS during verbal fluency in a subject with discrete lesion of the left frontal lobe

Ruocco AC, Merzagora A, Allen S, Schultheis M, Tuscan L, Lake T, Irani F, Ayaz H, Onaral B, Chute DL

Objective: To examine one-month test–retest reliability of functional cerebral blood flow as measured by functional near infrared spectroscopy (fNIRS) during a verbal (phonemic) fluency task. Method: Subject was a 59-year-old right-handed male with a discrete evacuated subdural hematoma in the dorsolateral region of the left frontal lobe extending to insula and left temporal pole. The 18 cm × 6 cm × 0.8 cm probe with four light sources surrounded by 10 photo-detectors was placed over standard EEG placements F7, Fp1, Fp2, and F8. Subject completed the Controlled Oral Word Association Test over two sessions separated in time by 25 days. Results: Behavioral performances fell within the High Average range of function. For the first session, relative to a resting (cross-hair) condition, significant increases in relative concentrations of oxygenated hemoglobin (oxy-Hb) were observed in the spared left medial area of prefrontal cortex. During the second session, significant increases in oxy-Hb occurred in right frontopolar area. Time courses of signals in significantly activated voxels were strongly correlated between the first and second testing sessions ($r = +.71$ and $+.50$, respectively). Conclusions: Results suggest reasonable test–retest reliability of fNIRS time courses of hemodynamic activity in cortical areas involved in verbal fluency; however, spatial localization of activity was less reliable. No voxels were activated in lesioned areas of the left frontal lobe. Overall, the findings provide preliminary support for the test–retest reliability of the temporal course of the fNIRS signal, whereas further investigation of factors accounting for differences in spatial localization is warranted.

B68

Use of checklists in developing and defining competency in neuropsychological test administration

Koeneman S, Sherrard S, Giesbrecht B, Adams W

Objective: For graduate students as well as the seasoned neuropsychologist, acquiring and maintaining test mastery is a challenging task because of the number and sophistication of procedures often required for a neuropsychological evaluation. To help with this challenge, a set of testing checklists were developed. It was expected that the checklists should aid in the accuracy and rate of test learning by identifying all necessary components for a standardized administration, utilizing an easy format. As a first step in evaluating the value in using this method, its perceived helpfulness was examined. Method: A brief questionnaire was completed by those enrolled in two graduate-level neuropsychological assessment classes ($N = 29$) near the end of the semester. Checklists were pro-

vided for about half the test procedures taught. Areas examined included the perceived effect the checklists had on (1) accuracy, (2) efficiency, (3) helpfulness in preparing to demonstrate in vivo test competency, and (4) the desirability of additional checklists for future test learning. Results: Chi square analyses yielded strong support for all four areas examined ($p < .05$), with no less than 78% of the sample moderately or strongly agreeing that checklists aided speed and accuracy in learning new neuropsychological test procedures, and a strong desire to have checklists available for future test learning. Conclusions: Checklists are perceived by doctoral level graduate students as a beneficial aid in learning new neuropsychological tests. Interestingly, the perceived value of this approach seems to increase over time. Carefully prepared checklists may be a useful tool for operationalizing minimal competency in test administration.

B69

Considerations for computer-based testing: Comparing performance on two computers using the Automated Neuropsychological Assessment Metrics

Kadlubek RM, Jones W

Objective: The purpose of this investigation was to compare performance on selected Automated Neuropsychological Assessment Metrics (ANAM) scales to see if there were statistically significant differences associated with the different computers used. Method: Archival data were available for 77 university students completing tests in a lab setting. The computer-based testing was conducted on two computers. Six ANAM scales were administered: Simple Response Time, Mathematical Processing, Sternberg Memory Search, Matching to Sample, Two-Choice Reaction Time, and Logical Reasoning. Two Presario computers were used for data collection. Computer one was a Compaq, with 32 megabytes of Random Access Memory (RAM) and a processing speed of 133 MHz. Computer two was a Compaq Prasio with 252 megabytes of RAM and a processing speed of 366 MHz. Results: Statistically significant differences were evident in the Simple Response Time 1 efficiency ($t(73) = 3.241$, $p = .002$), Simple Response Time 2 efficiency ($t(74) = 2.392$, $p = .019$), Simple Response Time 2 response time ($t(74) = -2.325$, $p = .023$), Two-Choice Reaction Time efficiency ($t(72) = 2.310$, $p = .024$), and Two-Choice Reaction Time response time ($t(72) = -2.598$, $p = .011$). Conclusion: Results showed differences between the performances of the participants between the computers on some subtests. The subtests that resulted in statistically significant differences were either on the efficiency scores or the response time scores, but not on accuracy scores. Results suggest using caution when comparing ANAM performance between computers, particularly on subtests requiring automatic responses.

B70

Effects of parental presence on children's neuropsychological test performance

Yantz CL, McCaffrey RJ

Objective: This study was designed to determine if parents' observation of children's neuropsychological testing has similiar impairing effects as those found with neutral observers and adults. Method: Fifty-three children aged 6, 7, or 8 years were administered two alternate forms of the Test of Nonverbal Intelligence—third edition (TONI-3) and Selective Reminding Test (SRT). The child's parent observed the administration of one form of each test, while the child completed the second form of each with only the examiner present. Order of parental presence was counterbalanced between groups. Child anxiety characteristics were measured using the Behavior Assessment Scales for Children—second edition. Gender, age, and anxiety levels did not significantly differ between the two groups. Using a doubly-multivariate MANCOVA, *T*-score differences for the TONI-3 and average words remembered per trial of the SRT were compared for the observation conditions, order of parental presence, and if the child reported having frequent fear. Age was included in final analyses as a covariate. Results: There was a significant interaction between parental presence order and observation status $F(2, 47) = 6.71$, $p = .003$; stepdown analyses suggest that this significance can be mainly attributed to children showing greater improvement over time when performing tasks with their parents present initially (rather than second). Conclusions: Children's neuropsychological test performance may be impacted by parental presence, even when the parent remains for only part of testing. This suggests that, despite testing manuals recommendations, even initial parental presence during testing of children should be avoided.

B71

Components of medication management: Factor structure of the Cognitive Screen for Medication Self-management (CSMS) test in older adults

Caffery DM, Spiers MV

Objective: The CSMS was developed to assess the sensory and cognitive constructs associated with medication adherence. It consists of a number of simulated tasks which measure actual aspects of a medication regimen including bottle opening, label reading and telling time in addition to tasks which assess prospective memory, encoding, recall and retrieval, sensory skills, mental calculations, and executive/organizational strategies. This study provides evidence to support the construct validity of the instrument and outlines the specific psychomotor, sensory and cognitive constructs involved in understanding and executing a medication regimen. Method: Performance scores from 11 of the CSMS tasks were analyzed from a sample of 60 community-dwelling, independently functioning older adults, aged 72–95, to examine the discriminant and convergent construct validity. A principal components analysis using a five-factor solution and a varimax orthogonal rotation was conducted to analyze the factor structure of 11 CSMS scores. Results: A five-factor solution accounted for 78.69% of the variance. The first two components were cognitive in nature and accounted for over 50% of the explained variance. The first component involved retrospective long-term memory, calculation and organizational/planning skills while the second component involved processing speed. A third component was comprised of prospective memory and clock reading tasks, and the remaining components were identified as two distinct sensory components involving sensorimotor and visuosensory abilities. Conclusion: The factor structure of the CSMS consists of cognitive, non-cognitive, sensorimotor and visuosensory components of medication taking. Further factor analytic studies using clinical populations and younger samples are recommended.

B72

Facial Affect Learning and Memory Test—Second edition (FALMT-II)

Armstrong CM, Stolberg PC, Watrous B, Allen DN

Objective: This study aims to establish psychometric characteristics for the Facial Affect Learning and Memory Test—second edition (FALMT-II). The original version of the FALMT was developed to examine nonverbal memory for emotional information in a manner analogous to non-emotional visuospatial learning tasks (e.g. Biber Figure Learning Test). A previous study provided preliminary support for the reliability and validity of the FALMT, although certain limitations were apparent (e.g., ceiling effects). The FALMT-II was developed in order to address limitations of the original version of the test. Method: A battery of tests that assessed verbal and visual learning and memory was administered along with the FALMT-II to healthy adults. Reliability and validity of the FALMT-II were examined. Results: Internal consistency and test–retest reliability estimates indicated that like the FALMT, the FALMT-II was reliable. Significant correlations with established measures of memory functioning (e.g., California Verbal Learning Test) indicated that the FALMT-II did assess memory functioning. Correlations with measures of emotion indicated the FALMT-II was a valid measure of emotion processing. Results indicated that changes made to create the FALMT-II improved psychometric properties due to the reduction of ceiling effects found in the original version. Conclusions: Because emotion is expressed to a large extent through nonverbal means, the FALMT-II may prove to be a valuable tool for assessing this aspect of emotion processing. Additional research with clinical populations with known disturbances in emotion processing would further support the validity of this instrument.

B73

Utility of selected screening tests for distinguishing between MCI and very mild AD

Humphreys J, Riggins JM, Williams BD, O'Bryant SE, Sutker PB

Objective: The objective of the current study was to examine the utility of the RBANS and MMSE in distinguishing between Mild Cognitive Impairment (MCI) and very mild Alzheimer's disease (AD). Methods: Participants were 71 patients (27 male and 44 female) with a mean age of 74.85 (S.D. = 6.12) and mean education level of 13.41 (S.D. = 3.64). Twenty-six (36.6%) were diagnosed with AD, and 45 (63.4%) with MCI. Participants were tested using a neuropsychological battery that included the RBANS and the MMSE. Diagnostic accuracy of the RBANS total score, delayed memory index, and semantic fluency scores as well as MMSE total score were examined. Results: Diagnostic accuracy was maximized with a cut-off score of 76 (i.e., 76 or below) on the RBANS total index (SN = 0.808; SP = 0.778; 78.8% overall accuracy). For the RBANS Delayed Memory index, a cut-off score of 60 correctly classified 81.7% of cases (SN = 0.808; SP = 0.822). On the RBANS Semantic Fluency subtest, a cut-off score of 16 revealed an overall

classification rate of 63.4% (SN = 0.955; SP = 0.490). Diagnostic accuracy of the MMSE was maximized at a score of 25 (SN = 0.692; SP = 0.889; 81.7% overall accuracy). A comparison of receiver operating curves (ROC) suggests comparable accuracy across the examined tests. Conclusions: The present results suggest that the RBANS and MMSE scores are useful for distinguishing between cognitive impairment due to MCI versus very mild AD.

B74

Test–retest stability of the WISC-IV

Glass LA, Ryan JJ

Objective: The WISC-IV Technical Manual (Wechsler, 2003) reports stability coefficients for the subtests, indexes, and Full Scale IQ in a sample of 243 children with a mean retest interval of one month. Stability coefficients ranged from .71 to .89. All subtest and composite scores increased from test to retest. The present investigation extends our knowledge base by providing information on the stability of the WISC-IV in a group of children assessed over a more realistic interval of approximately 10 months. Method: Thirty-five students were administered the WISC-IV. There were 34 Caucasians and one African-American. The retest interval ranged from 276 to 369 days ($M = 310$). Stability coefficients and reliable change indices were obtained for all variables. Results: Stability coefficients ranged from .25 to .83 and effect sizes ranged from 0.00 to 0.29 (Cohen's *d*). Conclusion: The data reported by Wechsler do not generalize to the present sample. Our stability coefficients are consistently lower than those of Wechsler as are the increases on each variable from test to retest. For instance, the average Full Scale IQ increase for Wechsler's sample was 5.60 points, whereas our mean retest gain was only 0.69 points. Reduced stability may be due to the longer retest interval in the current study.

B75

A comparison of the Halstead–Reitan Neuropsychological Battery (HRNB) and the Halstead Russell Neuropsychological Evaluation System (HRNES): Diagnostic categorical differences among a sample of litigating adults

Horwitz JE, Lynch JK, McCaffrey RJ

Objective: This study was designed to investigate how test results are interpreted using the Halstead Russell Neuropsychological Evaluation System (HRNES) as compared with the Neuropsychological Deficit Scale (NDS) of Reitan and Wolfson (1993). Method: Archival data from 110 litigating adults administered the Halstead–Reitan Neuropsychological Battery (HRNB) were examined. HRNES scale scores and NDS scores were compared for the following variables: Trail Making Test (A and B), Finger Tapping Test, Tactual Performance Test (total time, memory, and localization), Category Test, Speech-Sounds Perception Test, and Seashore Rhythm Test. The Average Index Score (AIS) from the HRNES was also compared with the General NDS (GNDS) score. Results: Four composite severity scores were created in order to directly compare HRNES scale scores and NDS scores: normal (HRNES >95 and NDS 0), borderline (HRNES 90-95 and NDS 1), mild to moderate (HRNES 70-89 and NDS 2), and severe (HRNES <69 and NDS 3). Wilcoxon signed-rank tests revealed that comparisons between all 10 variables as well as between the AIS and GNDS were significantly different ($p < .001$). NDS scores suggested greater levels of impaired functioning compared to HRNES scale scores across all variables. Notably, while GNDS scores in the sample ranged from normal to severe, AIS scores only fell within the normal and mild ranges. Conclusions: Our findings suggest that interpretation of test results may differ considerably depending on whether the neuropsychologist interprets data from the HRNB using the HRNES or Reitan and Wolfson's NDS procedures. Implications of these findings will be discussed in detail.

B76

Cross-validation study of the Halstead–Reitan Screening Battery for Adults

Horwitz JE, Lynch JK, Fisher JM, McCaffrey RJ

Objective: The purpose of this study was to examine the utility of using a screening battery derived from the full Halstead–Reitan Neuropsychological Battery for Adults (HRNB) to identify cognitive impairment and the need for further diagnostic testing with the full HRNB, as well as to cross-validate findings reported by Reitan and Wolfson (2006). Method: Archival data from 69 patients administered the HRNB were examined with respect to General Neuropsychological Deficit Scale (GNDS) scores and total NDS scores for the screening battery (SBNDS), comprised of the following seven variables from the HRNB: Trail Making Test Parts A and B (time only), Tactile Form Recognition Test (total time and left-right differences), and Finger Tapping Test (dominant, nondominant, and left-right differences).

Results: Pearson correlation between GNDS and SBNDS scores was .82 ($p = .01$). An ROC curve analysis determined the area under the curve (AUC) to be .882, considered "good" according to convention. Predictive utility of the screening battery was also investigated by calculating sensitivity and specificity, as well as positive predictive power (PPP) and negative predictive power (NPP) for various base rates. While a cut score of 9 was suggested by Reitan and Wolfson (2006), a cut score of 8 yielded greater sensitivity within our sample. Conclusions: Our findings suggest that the HRNB screening battery shows promise as a useful tool for screening for cognitive impairment in a variety of settings. The implications of these findings and data relating to the utility of the screening battery from the HRNB will be presented in detail.

B77

WISC-IV validity: A clinical exploration with neuropsychological tests

Edwards JW, Smith SR

Objective: As a new measure of global cognitive functioning, the WISC-IV has yet to be subjected to substantial psychometric investigation. Kaufman et al. (2006) reported that the WISC-IV FSIQ highly correlated to the global measures of nine instruments; however, the majority were other Wechsler scales. The authors called for further reported correlations with a more diverse group of cognitive tests. The present research examined the convergent and divergent validity of the WISC-IV Index and IQ scores by exploring relationships with neuropsychological tests of attention and executive functioning (CPT, COWAT, Comprehensive Trails, ROCFT, and Stroop) and behavior (BASC-2). Method: To date, the sample includes 31 participants (mean age = 11.5, S.D. = 2.62, range = 7–16 years) referred to a university-based assessment center for neuropsychological and learning disorder evaluations. Over two-thirds of the sample were male (67.7%) with the majority being European-American (61.3%) followed by Hispanic (9.1%) and biracial (4.5%). Results: Due to the high number of correlations, a conservative alpha of $p < .01$ was set. Despite the numerous correlations calculated between the WISC-IV and neuropsychological assessments, none reached significance. Conclusions: In this small clinical sub-sample, the WISC-IV Index and FSIQ scores appear to be relatively independent from neuropsychological processes such as executive functioning. These scores were also found to be independent with behavioral dysfunction. As is the case with all measures, the WISC-IV should be used in a comprehensive battery of assessments. Additional data will be presented.

B78

A functional assessment of executive functioning: The hamburger turning task

Shugars S, McCue M, Pramuka M, Fitzgerald S

Objective: Four specific aims have been incorporated into this pilot study's design: (1) standardized administration of the hamburger turning task (HTT), determine preliminary scoring reliability, (2) determine relationship between HTT scores and scores from standardized NP tests, (3) identify errors and self corrections made (standardize the administration and scoring), and (4) determine the relationship between HTT performance and measures of real-world executive functions. Method: To address the current issues surrounding the ecological validity of psychometric tests, this pilot study introduced a hands-on assessment using a simulated real-world vocational task. Twenty-three subjects, 18–26 years old, with varying cognitive disabilities, completed a vocational simulation task, the Hamburger Turning Task (HTT), and the results were compared to their scores on a battery of commonly used neuropsychological tests (WCST, FTT, FAS, TMT, Stroop Color-Word test). A Pearson-product correlation was run to compare the relationship between the scores from the HTT and the psychometric tests, as well as the relationship between both psychometric tests and HTT scores and daily behavioral observations of executive functioning related performance over a 7 week period. Results: The Hamburger Turning Task and the behavioral data were significantly correlated (−.585**, P value = .003). A high level of interrater reliability on the scoring of the HTT (.999, Chronbach's alpha) was determined. Conclusion: These preliminary results suggest that the HTT is able to be reliably scored and has a standardized administration protocol that allows it to be a useful measure of executive functioning of everyday behavior.

Poster Session C

CULTURAL AND GENDER ISSUES

C1

Neuropsychological test scores as a function of Asian American ethnicity

Chang J, Staskal R, Tran C, Estrada AR, Edwards JW, Smith SR

Objective: We examined the effects of Asian American culture and acculturation level on neuropsychological test performance and the importance of race-matching examiners/patients in neuropsychological test settings. Test scores were predicted to differ between Asians and Caucasians. Scores of highly-enculturated Asians and those in the Asian-examiner condition were predicted to differ most from the Caucasian group's scores. Asians were also predicted to report greater self-confidence and stronger alliance in the Asian-examiner condition. Method: Participants were 40 Asian and 51 Caucasian college students, and they completed the Rey-Osterrieth CFT, Developmental Test of Visual Perception, Wisconsin CST, and measures of alliance. Additionally, Asians completed acculturation/enculturation measures and were randomly assigned to an Asian or non-Asian examiner. Results: Highly-enculturated Asians and those in the Asian-examiner condition scored higher than Caucasians, highly-acculturated Asians, and individuals in the non-Asian examiner condition on the ROCF and DTVP-A Visual-Motor Index in terms of accuracy, but scored lower on time-related variables. Asians also reported greater self-confidence and stronger alliance with Asian examiners. Conclusions: Highly-enculturated Asians and those in the Asian-examiner condition had higher accuracy scores on the ROCF and DTVP-A VMI but lower scores on timed-efficiency variables. This may be due to a greater adherence to non-Westernized test-taking techniques by these individuals. Additionally, Asians reported greater sense of self-confidence and alliance with Asian examiners. Overall, intra- and interpersonal variables should be considered when testing Asian minorities in neuropsychological settings.

C2

Development of a test battery for assessing memory malingering in Hong Kong

Chang SS

Objective: The present study attempted to incorporate several tests that had specific indices for identifying memory malingering into a test battery. Method: Two measures, a famous faces test and a subjective memory questionnaire were constructed originally by the author and pilot-tested. Three indices indicative of memory malingering in Hong Kong List Learning Test (HKLLT) were explored. The indices of the HKLLT, the two new measures and the Test of Memory Malingering were incorporated into a battery for detection of memory malingering. Using an analogue design, the battery was tested on a group of community participants ($N = 58$) who were randomized into two conditions, simulated malingering (SM) condition ($n = 25$, one was excluded because of non-compliance to experimental instructions) and true effort (TE) condition ($n = 32$). A manipulation check was also completed. Results: Significant difference was found between the two conditions on all the measures. The cut-off scores of the measures attained sensitivity from .4 to .84 and specificity of .9 to 1. Using discriminant analysis, overall hit rate was 93% and using logistic regression, the overall hit rate was 98%. Using four indictors of the battery achieved sensitivity of 68%, specificity of 97% in normal control. Conclusion: The utilization of the battery in the detection of memory malingering was presented.

C3

Validation of the Brief Visuospatial Memory Test-Revised for use with Spanish speakers employing an HIV-infected sample

Cherner M, Suarez P, Lazzaretto D, Rivera Mindt M, Marcotte T, Artiola i Fortuny L, Grant I, Heaton R

Objective: To validate use of the Brief Visuospatial Memory Test-Revised (BVMT-R) in Spanish speakers by determining its ability to detect HIV-associated deficits. Method: Raw scores and rates of impaired performances based on age, gender, and education adjusted *T*-scores were compared in HIV+ and HIV− individuals who took the BVMT-R with instructions in their preferred language. Participants were 45 Spanish speaking (SS) HIV+, 45 SS healthy HIV−, 45 English-speaking (ES) HIV+, and 45 ES HIV− men and women. The HIV+ groups had comparable health status. All groups were demographically similar. HIV effect sizes were computed for SS and ES separately. Results: HIV effect was comparable between SS and ES. There were no language effects. On Total Recall, the HIV effect size for SS was −0.70 (95% CI: −1.13, −0.28) and −0.67 (CI: −1.09, −0.24) for ES. On Delayed Recall, HIV effect size for SS = −0.76 was (CI: −1.19, −0.33) and −0.76 (CI: −1.19, −0.33) for ES. Application of population-specific norms

with demographic corrections demonstrate comparable rates of impaired performances among SS and ES: for HIV+: SS = 29%, ES = 31%; for HIV−: SS = 13%, ES = 16%. Conclusions: Lack of language effect and comparability in the magnitude of the HIV effect suggest that BVMT-R administration and demographically adjusted norms for Spanish speakers are equivalent to the English in detecting HIV-associated learning and memory problems. Results provide initial validity for the Spanish language administration and norms.

C4

Validation of Spanish language administration for the Hopkins Verbal Learning Test—Revised in an HIV-infected sample

Suarez P, Cherner M, Lazzaretto D, Rivera Mindt M, Marcotte T, Artiola i Fortuny L, Grant I, Heaton R, The HRNC Group

Objective: To determine the equivalence of Spanish and English language administration for the Hopkins Verbal Learning Test–Revised (HVLT-R) and the sensitivity of the measures to HIV related cognitive impairments. Raw test scores were compared in seropositive (HIV+) and seronegative (HIV−) individuals who took the test in their preferred language. Method: The HVLT-R was administered in the participants' native language to 45 Spanish speaking (SS) HIV+, 45 SS healthy HIV−, 45 English-speaking (ES) HIV+, and 45 ES HIV− participants. HIV+ groups were comparable with respect to CD4 count ($M = 351.9$ (S.D. = 327.6) for ES and $M = 326.9$ (S.D. = 231.2 for SS)). All groups were demographically similar. HIV effect sizes were computed for SS and ES separately. Results: HIV effect was comparable between SS and ES, and there were no language effects. On Total Recall, HIV effect size for SS was moderate at −0.60 (95% CI: −1.02, −0.18). Among ES, HIV effect size was also moderate at −0.56 (95% CI: −0.98, −0.13). On Delayed Recall, HIV effect size for SS = −0.51 (95% CI: −0.92, −0.08). In ES, the HIV effect = −0.42 (95% CI: −0.83, −0.01). Conclusions: The lack of a language effect and comparability in the magnitude of the HIV effect suggests that administration of the HVLT-R in Spanish is equivalent to the English version in detecting HIV-associated learning and memory problems. Results provide initial validity for the Spanish language administration of the HVLT-R.

C5

Late language bilinguals outperform monolinguals on the Stroop test

Harms-Gillette J, Fernandez M

Objective: The aim of this study was to investigate whether learning a second language during adulthood improved performance on non-language tasks of frontal lobe inhibition. Most of the research documenting the benefits of bilingualism has been conducted in children. Yet, in 2000, the largest age group of immigrants admitted to the United States was in the 25–34-year-old range, which constituted 27% of the total immigrants admitted (United States Census Bureau, 2000). Method: There were two groups of subjects, late-acquisition English-Spanish bilinguals ($N = 19$) and English-speaking monolinguals ($N = 32$). The bilingual group learned Spanish during adulthood ($M = 26$ years). The groups were matched by age, level of education (all participants had a Bachelor's degree or higher), and language proficiency. The Stroop test was administered to all subjects as a measure of frontal lobe inhibition. Results: Results revealed that the bilingual group outperformed the monolingual group on the interference trial of the Stroop. The groups did not differ on the word reading trial, therefore, reading speed did not account for these results. Conclusions: The findings suggest that adults who learn to speak a second language exhibit increased inhibitory control that improves performance on tasks of executive function. Thus, learning to speak a second language during adulthood not only allows individuals to communicate with a broader audience, but also enhances the ability to ignore information that is irrelevant or may interfere with the task at hand.

C6

Clinical evaluation of the Mini Mental Status Exam with culturally deaf senior citizen

Dean PM, Feldman D, Morere D, Morton D

Objective: The Mini Mental Status Exam (MMSE) is commonly used to assess dementia in a clinical setting. The MMSE assesses various areas of cognition and has been published in over 50 languages. However, the validity and reliability has yet to be assessed on the utility of the MMSE with the culturally Deaf elderly population. Methods: Participants consisted of 117 deaf senior citizens, ages 55–89 ($M = 69.44$, S.D. = 8.55). Demographic and background information was collected. A standard form of the MMSE was used with modification of test administration and stimuli including

translation of English test items into a sign based language and alteration of two items (word recall and following a command to a written sentence) in order to make them culturally and linguistically appropriate. Results: Significant correlations were observed between overall test score and education level ($r = 0.23$, $p = 0.01$) as well as test score and age ($r = -0.33$, $p < 0.001$). Patterns of responses were analyzed which indicated four problematic items including "Serial 7's," "No Ifs ands or Buts," spontaneous written sentence generation, and following a command sequence. Conclusion: These results indicate that clinicians need to be aware of cultural and linguistic factors associated with the deaf population that may impact test performance and clinical interpretation of test results. Based on this data, there is an increased risk of false positives obtained when using this measure. Further research is needed to validate the use of this measure with the culturally deaf population.

C7

Executive functions in children with serious emotional disorders

Sinco SR, D'Amato RC

Objective: This study reports on executive function in children diagnosed with and without serious emotional disorders (SED). According to the Department of Health and Human Services, SED affects 9–13% of all young people, or 6–9 million children and adolescents. It is estimated that two thirds of this population are not getting the help they need. Research regarding executive functions in this population is limited. Methods: Teachers across various regions of the United States completed the Behavior Rating Inventory of Executive Function Teacher Form on 40 children, aged 7–18. Demographic information indicated that 45% of the children in this study were diagnosed with SED, 31% received free and reduced lunch, and 55% were male. In this study, 69% of the children were Caucasian, 10% were African American, and 21% were Hispanic. Although teachers were not randomly selected, random selection was used by the teachers to identify the students in this study. Results: The Behavioral Regulation Index (BRI), Metacognition Index (MI), and Global Executive Composite (GEC) were found to be significantly elevated across children with SED ($p < .01$), relative to the normative population. Conclusions: This study adds important information regarding the neuropsychological functioning of children diagnosed with serious emotional disorders. Executive function deficits appear to be frequent among this understudied population of children. Further studies are needed in order to provide insight into particular interventions which can address such executive dysfunctions in children with SED.

C8

Ruff Figural Fluency Test: Strategy use by incarcerated adult women

Jorgensen M, Gardner E, Largarreta M, Vik P

Objective: Figural fluency tests are sensitive to Right hemispheric insults. Strategy use on the Ruff Figural Fluency Test (RFFT) may contribute to the test's sensitivity and specificity; however, strategy use by adults is unknown. To understand the potential utility of strategies, it is necessary to understand how adults approach the RFFT. The objectives of this study are to (1) describe strategy use by incarcerated adult women, and (2) explore correlations between RFFT strategy use and other neuropsychological measures. Method: 54 incarcerated women (mean age 31 years, 80% Caucasian) completed a brief neuropsychological screening battery, a diagnostic interview, and the Brief Symptom Inventory. Results: Slightly over half of the women (57.4%) used a strategy at least one time; one-third (33%) used strategies two or more times. The most common strategy was rotational (72%). Strategy use correlated strongest with the WCST Trials Attempted (−.44); other significant correlations were with Spatial Span forward (.32), letter fluency (.29) and Digit Span forward (.26). Strategy use was not correlated with DS backward, SS backward, category fluency, Block Design, Trail Making Test, or WCST Categories Completed or Failure to Maintain Set. A trend was found between strategies and Matrix Reasoning (.23). Conclusion: Findings reveal that strategy use is not universal among incarcerated women; however, this sample is notable for considerable drug use (methamphetamine) and PTSD. Strategy use was related to frontal measures of verbal fluency and immediate memory and attention. Future studies should explore strategy use among the general population in addition to special groups.

C9

Performance of Spanish-English bilinguals on memory tests

Hilsabeck RC, McCoy KJ, Zartman AL, Kurtz EL

Objective: Little is known about the performance of bilinguals on memory measures. There is preliminary evidence that bilingualism has a positive effect on memory in children and may delay the onset of symptoms of dementia. The

purpose of this study was to examine the performance of bilingual adults under age 60 years. It was hypothesized bilinguals would perform equal to or better than monolinguals on memory measures. Methods: Ninety-three veterans (81% men, 19% women) referred for neuropsychological evaluation were administered the California Verbal Learning Test—2 (CVLT-2) and Rey Complex Figure (RCF) test as part of a larger battery. Monolinguals were 51 Caucasians and 7 Hispanics reporting English as their only language. Bilinguals were 35 Hispanics who grew up speaking both English and Spanish and reported feeling equally comfortable in both languages. Results: There were no significant differences in education (13.3 years vs. 12.4 years) or gender (24.1% vs. 11.4%) between monolinguals and bilinguals, respectively, but monolinguals were significantly younger (47.3 years vs. 52.4 years) and had significantly higher estimated premorbid FSIQs (104.6 vs. 96.7) than bilinguals. After entering age and estimated premorbid FSIQ as covariates, there were no significant group differences in CVLT-2 and RCF performances. Conclusions: Monolinguals and bilinguals performed similarly on memory indices of the CVLT-2 and RCF. However, there was no trend for bilinguals to perform better than monolinguals as suggested by prior research.

C10

Use of WTAR to estimate FSIQ in Hispanic individuals

McCoy KJ, Zartman AL, Kurtz EL, Hilsabeck RC

Objective: Although the Wechsler Test of Adult Reading (WTAR) manual provides normative information for estimating premorbid IQ in Hispanic populations, the published test review suggests it is most accurate when applied to highly-educated Caucasian samples. The purpose of this study was to examine the relationship between self-identified ethnicity and accuracy of estimated premorbid intellectual functioning using the WTAR. It was hypothesized, compared to Caucasians, Hispanic individuals would show greater discrepancies between their WTAR estimated premorbid FSIQ and their current Wechsler Adult Intelligence Scale–III (WAIS-III) FSIQ. Method: Seventy-eight veterans (81% men; 45% Hispanic) with mixed neurologic complaints referred for neuropsychological evaluation were administered the WTAR and WAIS-III. Exclusion criteria included inadequate effort and dementia diagnosis. Results: There were no significant group differences in age (50.6 years vs. 51.4 years) or education (13.7 years vs. 12.8 years) between Caucasians and Hispanics, respectively. Although Caucasians had significantly higher WAIS-III FSIQ scores (105.6 vs. 92.5), the difference between WTAR and WAIS-III FSIQ scores did not differ significantly between the two groups (Caucasians = 1.5 points and Hispanics = 4.4 points). WTAR and WAIS-III FSIQ scores were highly correlated in both groups with Caucasian $r = .55$ and Hispanic $r = .72$. Conclusion: The relationship between WTAR estimated premorbid FSIQ and current WAIS-III FSIQ was similar in Hispanics compared to Caucasians. Therefore, the WTAR normative information provided in the manual appears to be as accurate at estimating premorbid WAIS-III IQ in Hispanic individuals as in Caucasian individuals.

C11

Impact of Japanese written language on spatial performance: A comparison between Japanese and Americans

Sakamoto M, Spiers MV

Objective: Only a few studies have examined both sex and cultural differences and how they interact in spatial tasks. It has been suggested that Japanese and Chinese show a smaller sex differences than Americans in spatial performance. In this study it was hypothesized that the Japanese written language, KANJI, which is a more pictorial language, may be related to overall better performance of the Japanese as well as the smaller magnitude of sex differences. Method: Twenty native Japanese (10 males and 10 females), 20 Japanese Americans (10 males and 10 females) and 40 European Americans (20 males and 20 females) were recruited in Philadelphia area. The Mental Rotation Test (MRT) and the Rey-Osterrieth Complex Figure (ROCFT) were administered. This study was a 2 (sex) × 3 (culture) between-group design. Results: As predicted, the native Japanese performed better on the MRT and the ROCFT [MRT: $F(2, 74) = 5.84$, $p = .004$]. The Japanese and the Japanese Americans performed similarly on the MRT ($p = .32$). Decreased sex differences were witnessed on the ROCFT only in the native Japanese group [ROCFT—Immediate Recall: $F(2, 74) = 12.75$, $p < .001$, Delayed Recall: $F(2, 74) = 14.45$, $p < .001$, Strategy: $F(2, 74) = 12.30$, $p < .001$]. Conclusion: Pictorial written language and culture may contribute to higher spatial performance and decreased sex differences observed in the native Japanese group.

C12

Medical decision-making capacity in patients with mild cognitive impairment: Differential effects of race and cognition

Hebert K, Triebel K, Marceaux J, Martin R, Griffith R, Marson DC

Objective: Prior work demonstrates deficits in how patients with MCI process and reason with medical information. Little is known regarding the possible influence of race on medical decision-making. This study examines differences in medical decision-making capacity (MDC) among African American (AA) and Caucasian (C) older adult controls (CTL) and patients with mild cognitive impairment (MCI). Method: Participants ($n = 58$) were divided into four groups based on race and diagnosis ($n = 16$ AA-MCI, 16 C-MCI, 13 AA-CTL, 13 C-CTL). C groups were matched to AA groups on age, gender, and years of education. Participants completed the CCTI, a psychometric measure that assesses MDC under five legal standards; evidencing a choice (LS1), making a reasonable choice (LS2), appreciating consequences (LS3), rational reasoning (LS4), and factual understanding (LS5). The CCTI has established reliability and validity in patients with AD. Groups were compared on demographic and CCTI variables using ANOVA and chi-square analysis. Results: AA-MCI and C-MCI patients performed equivalently on all legal standards, as did AA-CTL and C-CTL participants. AA-MCI and C-MCI groups performed significantly below both AA-CTL and C-CTL groups on LS4 ($p = .04$) and LS5 ($p = .006$). A trend was observed that AA-MCI patients performed below both CTL groups on LS3. Conclusion: Results suggest that race has little or no influence on MDC. Thus, current normative data for the CCTI appears to be appropriate for use with AA patients. Results further support that patients with MCI experience subtle deficits in MDC.

C13

A Comparison of TOMM performance across inpatient and outpatient severe TBI populations: Challenging effort test assumptions

Block CK, Hull CH, Sautter SW, Pence MJ, Keckler W, Edwards CB

Objective: Updated norms are suggested for the TOMM after a comparison of severe traumatic brain injury inpatient, community-dwelling TBI patients, and TBI normative data from the TOMM manual. As an indicator of injury severity between inpatient/outpatient samples, differences between reported versus actual age were compared. Method: Assessments were performed on inpatient unit TBI residents ($n = 12$), community-dwelling outpatients ($n = 13$), and TBI patient data published in the TOMM manual ($n = 45$). Results: An ANOVA indicated significant differences at the $p < .003$ level or less between inpatient and TOMM manual TBI data in terms of performance on all trials, plus Pass/Fail outcome, of the TOMM. An ANOVA indicated a significant difference between the inpatient and outpatient TBI samples on Trial 1 of the TOMM, $F(1, 22) = 4.25$, $p < .02$; a trend towards significance was noted on Trial 2 and Pass/Fail outcome. A one-way MANOVA indicated significant differences between inpatient and outpatient TBI samples from the present study and normative TBI data from the TOMM manual at the $p < .02$ level (Trial 1), and $p < .001$ level (Trial 2, Retention, Pass/Fail Outcome), with large effect sizes according to Cohen's (1988) criteria. An ANOVA showed significant differences at the $p < .004$ level in reported/actual age scores. Conclusions: Differing levels of injury severity were examined and found to have differences in TOMM performance. TOMM scores below the manual cut-off scores may suggest poor effort, but actually be within the normative range for severely brain injured persons.

C14

Rey Complex Figure Test: Process and gestalt after ABI

Naidoo RB, Ablitz BB, Perna RB

Objective: To determine the salience of visuospatial perception and organization skills on a configurational (gestalt) versus part-orientation approach on the accuracy of ROCF production following ABI. Method: Data were collected on the ROCF copy task completed by 45 adults (mean age = 40.98) with ABI (20 TBI; 19 CVA, 6 other; mean education = 12.56) prior to enrollment for multidisciplinary neurorehabilitation treatment. In addition to standardized ROCF scoring, individual process variables were scored for accuracy, placement, and location on page, and gestalt of copy. Empirical data and theory support a relationship between organizational strategy, accuracy, omissions, and total score. Strong correlations were found for gestalt with education ($rs = .465$, $p < 0.001$) and placement ($rs = .280$, $p = 0.063$). Results: Discriminant analysis was conducted to determine whether five variables: total score, accuracy, placement, omissions, and education could predict gestalt. The function .608, chi-squared ($6, N = 41$) = 16.94, $p = 0.01$ of predictors

significantly differentiated between gestalt and part-orientation strategies. Gestalt accounted for 39.2% of function variance. Accuracy, education and total score were most associated with the function score. Original classification results revealed correct classification for 90% using a gestalt and 73.7% using a part approach. Cross-validation indicated 82.1% accuracy for the total sample. Conclusions: Results suggest that individuals with higher education, accuracy and total ROCF scores utilize a configurational strategy. Individuals using a configurational approach had more intact visual perceptual organization on complex novel tasks compared to those who used a part-orientation approach, following their injury.

C15

The influence of socioeconomic status on the measurement of cognitive abilities in pediatric neuropsychological assessment

Fletcher-Janzen E, Daniel M

Objective: This study investigates the extent to which the specific characteristics of child and adolescent cognitive assessment instruments may mediate the influence of socioeconomic status on performance. Method: One hundred and seventy-four children aged 7–16 completed the WISC-IV and KABC-2 (administered in counterbalanced order within groups). There were 89 females and 85 males and 6 ethnic groups represented of approximately 30 examinees each. SES was measured by mother's years of education completed. Results: Correlations among SES and overall ability scores ($N = 174$) were .85 (FSIQ FCI), .39 (WISC-IV FSIQ), and .25 (KABC-2 FCI), mean 92.3 92.4, S.D. 13.5 11.6. Adjusted for range restriction on FCI. The high FSIQ-FCI correlation replicates previous findings. The difference between the correlations with SES is statistically significant ($p < .01$). Mean overall ability scores by SES mother's education (i.e., <12, 12, 13–15, 16+) were 86.8, 89.7, 98.8, and 99.3, respectively for the WISC-IV FSIQ and 89.8, 89.8, 96.4, and 96.6, respectively for the KABC-2 FCI. The range between average ability scores at the lowest and highest SES levels is greater for the FSIQ than for the FCI. Conclusions: The two tests in this study are used frequently in neuropsychological practice, yet may yield different scores depending on the SES level of the client/patient. A differential effect of SES on measuring instruments would also affect neuropsychological research into the cognitive abilities of population subgroups that have different SES levels.

C16

Psychiatric symptom severity and neuropsychological functioning of homeless persons upon entry to a social services facility

Carter CC, Tobias M, Kuck J, Folsom DP, Bucky S

Objective: Approximately three million individuals experience homelessness in the United States annually, of which 20–40% suffer from severe mental illness. Cognitive impairments are gaining attention for their role in the social and occupational deficits associated with homelessness. This pilot study examined the psychiatric and neuropsychological functioning of homeless individuals upon entry to a homeless shelter. Methods: Twelve participants (male = 5, mean age = 41) completed the Beck Depression Inventory (BDI-II), Beck Anxiety Inventory (BAI), Brief Symptom Inventory (BSI), Wisconsin Card Sorting Test—64 Card Version (WCST-64), and the California Verbal Learning Test (CVLT-II). Full Scale IQ (FSIQ) was estimated using the Vocabulary and Block Design subtests (Wechsler Adult Intelligence Scale). Scaled, Standard, and *T*-scores were compared against a nonpatient normative sample (NS) using single sample *t*-tests. Results: BDI and BAI scores were within the Moderate range ($M = 25$ and 21). The BSI Global Severity Index was significantly elevated compared to NS ($M = 72$, $p < .001$). Vocabulary, Block Design, and FSIQ were significantly less than NS ($M = 7.08$, 7.67, and 8.3, $p < .05$). WCST Total Categories Achieved was below the 11th percentile ($M = 1.92$). CVLT Trial-5 and Short and Long Delay Free Recall scores were significantly less than NS ($M = 42.5$, 40.83, and 35.41; $p < .05$). Conclusion: This sample of homeless persons demonstrated moderate to severe psychiatric symptoms and neuropsychological impairment across intellectual, executive functioning, and verbal learning domains. Future research will examine within group differences associated with neuropsychological functioning.

NEUROPSYCHOLOGICAL DOMAINS: ATTENTION

C17

Health literacy and neuropsychological performance in older cancer patients

Vik SM, Beglinger LJ, Ness J, Link B, Chrischilles E, Duff K, Moser DJ, Denburg NL

Objective: In older adults, MMSE scores have been associated with functional health literacy (ability to understand health-related information). To determine aspects of cognition related to functional health literacy in a sample of older cancer patients. Method: Adults 55 years of age or older with Non-Hodgkin's Lymphoma, in remission and chemotherapy-free for 6–18 months, and seen in the Holden Comprehensive Cancer Center, were invited by letter to participate. Thirteen adults (M age = 68.85 [8.0]; M education = 14.9 [2.2] years) enrolled. Participants completed the Short Test of Functional Health Literacy in Adults (STOFHLA), RBANS, MMSE, Wide Range Achievement Test-3 (WRAT-3): Reading, Wechsler Abbreviated Scale of Intelligence (WASI): Matrix Reasoning and Similarities Subtests, COWAT and Trail Making Test. Results: Similar to past research, Pearson correlations revealed that the STOFHLA was associated with MMSE total score ($r = .56$, $p = .04$). Further, RBANS list learning ($r = .72$, $p = .006$), immediate memory ($r = .66$, $p = .01$), story memory ($r = .67$, $p = .01$), Trails Part B ($r = -.64$, $p = .01$), premorbid intellect (WRAT-3, $r = .60$, $p = .02$) and education ($r = .61$, $p = .02$) were also associated. Additional tests showed trends towards significance (RBANS Digit Span, Coding, Recognition, Attention and Total, COWAT). Conclusions: Functional health literacy was associated with factors such as age, premorbid intellect, and education, but also with the neuropsychological domains of memory and attention. Thus, additional time might be required when explaining health-related options to older cancer patients with subtle deficits in attention and memory.

C18

Executive functioning differences in adults and children with attention problems

Hines L, Heyanka D, Shaw L, Golden C

Objective: The purpose of the present study is to examine differences in the relationship between the auditory and visual scores related to attention on the Test of Variables of Attention (TOVA), with measures of executive functioning, including the Stroop and the Wisconsin Card Sorting Test (WCST) in children and adults. Methods: Two groups of participants were used, each receiving an extended neuropsychological examination as a result of a clinical referral. Measures used included the Auditory and Visual Omission scores from the TOVA, the Color and Word scores of the Stroop, and the Preservative Responses scale on the WCST. A group of 342 adults (47% male, mean age = 34.64, S.D. = 14.29) participated in the study, and 261 adolescents (67% male, mean age = 13.67, S.D. = 3.91) participated. Results: All data were analyzed using Pearson correlations. In children Auditory Omission demonstrated medium correlations with Stroop Word (.47) and Color (.45) at the .01 level. In adults Auditory Omission revealed a correlation with Stroop Word (.27) and Color (.27) at the .01 level. Visual Omissions on the TOVA demonstrated a correlation between Perseverative errors score on the WCST in children ($-.29$, $p < .01$) and adults ($-.14$, $p < .01$). Conclusion: Results suggest that measures of inattention, as measured by auditory and visual measures of omission on the TOVA are more strongly correlated with measures of executive functioning in children than in adults. Attentional issues may play a larger issue in executive functioning tests in children than adults where executive skills are more developed.

C19

Attention is associated with MMPI-2 RC scales in healthy undergraduates

Benitez A, Gunstad J, Ben-Porath YS

Objective: Past studies have found inconsistent relationships between the MMPI-2 and performance on neuropsychological tests of attention and memory. No study to date has examined possible relationships for the MMPI-2 Restructured Clinical (RC) Scales, which preserve the descriptive features of the existing Clinical Scales while enhancing their distinctiveness. We hypothesized that persons with RC scale elevations would show reduced performance on tests of attention and memory in a sample of healthy undergraduates. Method: Sixty participants (64% women, mean age = 19.7) completed the MMPI-2 at one time period and measures of cognitive functioning exactly one week after. The tests of attention and memory were the Adaptive Rate Continuous Performance Task (ARCPT) and the Rey Auditory Verbal Learning Task (Rey-AVLT), respectively. Results: Correlations between MMPI-2 RC scales and subtests of attention and memory were conducted. ARCPT False Alarms was associated with RC2 (Low Positive Emotions; $r = -.31$,

$p < .05$) and RC9 (Hypomanic Activation; $r = .36$, $p < .01$). ARCPT Response Bias was associated with RC2 ($r = .42$, $p < .01$) and RC9 ($r = -.30$, $p < .05$). No significant correlations emerged between RC scales and performance on the Rey-AVLT. Conclusions: The results indicate that individuals with depressive symptoms commit fewer impulsive errors (i.e. False Alarms) and tend to respond quickly to target stimuli (i.e. Response Bias), whereas individuals exhibiting hypomanic tendencies perform worse on these abilities. Further extension of this work is needed with clinical samples, such as those with diagnosed affective disorders.

C20

Focused mental processing speed: Relationship to learning and executive functions

Bottoms JM, Wilson BJ

Objective: To examine the relationship between performance on four measures of focused mental processing speed (FMP), immediate, delayed, and recognition memory for a word list learning task, and a measure of executive functions. Method: Archival data from a rural, eastern, regional level one trauma center's department of neuropsychology were accessed. Forty-seven of 180 outpatient records in the database contained scores for the measures under investigation. Mean age was 42.11 years with 12.66 mean years of education. 36.17% were female. 36.17% of the patients were referred secondary to closed head injury. FMP measures included Digit Symbol Coding, Trails A, Trails B, and Digit Vigilance Test. Scaled scores and *T*-scores were transformed to impairment scores based on half standard deviation increments (0 = <.5 S.D., 1 = .5–<1 S.D., etc.). The impairment scores were averaged for each patient. Pearson correlations (two-tailed) were computed between the FMP average impairment rating, Hopkins Verbal Learning Test—Revised (HVLT) Recall *T*-score, Delayed Recall *T*-score, Recognition *T*-score, and Booklet Categories Test Total Errors *T*-score. Results: The FMP impairment was significantly correlated with Category Errors ($r = -.459$, $p < .01$) and HVLT Total Recall ($r = -.453$, $p < .01$). FMP impairment also correlated with HVLT Delayed Recall ($r = -.325$, $p < .05$). HVLT recognition did not correlate significantly. Conclusions: Impairments on measures of focused mental processing speed may predict decreased performance on immediate and delayed recall tasks as well as on measures of executive functions. Future research should further clarify these relationships in various patient populations.

C21

Performance on the Conners' Continuous Performance Test in a group of neurologically impaired adolescents

Nilson AK, Steed MA

Objective: Normative data for neurologically impaired adolescents is not available for the Conners' CPT-II (CCPT). We compared CCPT performance in a sample of 60 neurologically impaired (NI) adolescents from an outpatient private practice to that of an age-matched healthy comparison (HC) group and selected two measures of inattention (percent commission errors and percent omission errors) and two measures of speed of processing (reaction time and reaction time standard error). We hypothesized that the NI group would show increased rates of both omission and commission errors, slowed reaction times, and lower reaction time variability than healthy controls. Method: Sixty individuals aged 12–17 who had experienced TBI ($n = 16$), multiple concussions ($n = 14$), pre- or perinatal injury ($n = 10$), or previously diagnosed with epilepsy ($n = 10$) or other neurologic event ($n = 10$) completed the CCPT as part of comprehensive neuropsychological evaluation. Results: We found mixed support for our hypothesis. As expected, the NI group produced more commission ($p = 0.0001$) and omission ($p = 0.008$) errors than did the HC group. In contrast, reaction time variability was greater for NI participants ($p = 0.0007$). Mean reaction time was faster, although this difference did not reach statistical significance. Conclusions: While a higher rate of commission and omission errors was expected given the increased problems of inattention associated with neurologic injury, the finding of increased reaction time variability is not consistent with our hypothesis. Results suggest that pediatric patients who have sustained neurologic impairments demonstrate problems with inattention and consistency of performance on the CCPT.

C22

Reliability of the Conner's Continuous Performance Test in young adults

Samek J, Spencer RJ, Rice SC, Waldstein SR

Objective: The Conner's Continuous Performance Test (CCPT) is commonly used in the assessment of aspects of attention, yet, little is known about its reliability. In lieu of relying on clinical inference when interpreting differences in performance over time, it is necessary to establish parameters of expected variability. Accordingly, we sought to establish the test–retest reliability and practice effects of the CCPT in healthy young adults. Methods: Ninety-one

undergraduate students completed the CCPT and were retested after approximately one week. No participants took psychostimulant medication within 48 h of assessment. The CCPT is a 14-minute computerized test of sustained attention and impulsivity during which letters are displayed on the monitor one at a time. Participants monitor these stimuli and respond as quickly as possible after each letter, except the letter X. The outcome measures examined here included errors of omission (failing to respond to a target), errors of commission (responding to 'X'), and response time. Results: Repeated measures ANOVA indicated that, relative to the first testing session, participants tended to make fewer errors of commission, and more errors of omission at re-test. However, there was no significant difference in response time. Test–retest correlations for errors of omission ($r = .56$), errors of commission ($r = .79$), and response time ($r = .79$) revealed largely acceptable reliability for the CCPT. Conclusions: These findings suggest that the CCPT is fairly reliable in young adults over a one week interval, but practice effects must be considered when interpreting change over time.

C23

Order of CPT-II administration within a cognitive test battery influences ADHD indices

Erdodi L, Lajiness-O'Neill RR, Saules K

Objective: The effect of administration sequence on Conner's Continuous Performance Test (CPT-II) scores was studied in clients requesting psychological assessment. It was hypothesized that when administered at the end rather than beginning of a test battery, the test scores will show higher symptom severity. If present, order effects may cause the over- or under-diagnosing of ADHD. Method: Participants were recruited at a Midwestern university's training clinic (14 males, 7 females; mean age = 21.4, S.D. = 10.2). The CPT-II was administered twice to each client: once at the beginning of the testing session, and once at the end of their appointment. The clients completed at least a full Wechsler intelligence battery in between the CPT-II administrations. Results: Clients' ADHD Index score (interpreted as percent confidence in an ADHD diagnosis) was more impaired at Time 2 ($M = 55.0$, S.D. = 25.7) compared to Time 1 ($M = 41.5$, S.D. = 22.3): $t(19) = 4.63$, $p < .001$, Cohen's $d = 1.03$. The number of T-scores above 60 on the subscales also changed from Time 1 (mean = 1.9) to Time 2 (mean = 3.0): $t(20) = 3.98$, $p < .001$, Cohen's $d = .86$. Conclusions: The later the CPT-II is administered in the sequence of tests, the more likely it is to yield scores in the impaired range. Recommendations include the adoption of a standardized administration sequence and further research to investigate the nature of order effects.

C24

Functional near infrared spectroscopy study of the PASAT in healthy adults

Voelbel GT, Lengenfelder J, Wylie G, Barbour R, Pei Y, Smith A, DeLuca J

Objective: To investigate the pattern of cerebral activation in the frontal lobes of healthy adults with functional Near Infrared Spectroscopy (fNIRS), during the PASAT with overt vocalizations. Methods: Participants were nine right-handed, healthy adults (six females) between the ages of 20 and 51 without any history of neurological disease or psychiatric disorders. Participants were seated comfortably and 30 fNIRS source/detector optodes were placed on their foreheads. The fNIRS scan started with a 5 min baseline period, followed by the control task which consisted of the vocalization of randomly presented numbers every 3 s. The Paced Auditory Serial Addition Task (PASAT) was administered with a single digit number presented verbally every three seconds on the first series of single digit numbers and every 2 s on the second series of numbers. The participants vocalized the sum of the last two digits presented. Results: Across the nine participants there was elevated oxyhemoglobin (OxyHb) detected in the right prefrontal cortex (PFC) during both the 3-s and the 2-s PASAT when controlling for the auditory monitoring and vocalization task. Conclusions: This is the first known fNIRS study investigating the pattern of activation during the PASAT task. Unlike fMRI studies, which typically use a modified version of the PASAT, this study used the version of the PASAT typically used clinically, and demonstrates activation of the right frontal cortex.

NEUROPSYCHOLOGICAL DOMAINS: EXECUTIVE FUNCTIONS

C25
Executive functioning and types of memory in children
Horton AM Jr., Reynolds CR

Objective: Recent research has identified short-term memory as a component of executive functioning. This poster examines relationships between measures of types of memory and executive functioning in children. Methods: Two samples were utilized. In the first sample, the Wisconsin Card Sorting Test (WCST) and Children's Memory Scale (CMS) were administered to 55 children ages 5–16. In the second sample, the Test of Verbal Conceptualization and Fluency (TVCF) Classification subtest and Test of Memory and Learning (TOMAL) were administered to a sample of 35 children. The WCST is widely regarded as a measure of executive functioning. The TVCF Classification Subtest is similar to the WCST in that cards are sorted on the concepts of color and number but the WCST also uses shapes and the TVCF Classification subtest uses words that are categories. The CMS and TOMAL are widely accepted measures of memory in children. The WCST and CMS scores were correlated and the TVCF Classification subtest and TOMAL scores were correlated and the two sets of correlations were compared for patterns. Results: For the WCST percent of errors and CMS Verbal Delayed Memory the correlation was .59 and for the TVCF Classification subtest, Number Correct and TOMAL Word Selective Reminding, the correlation was .54. Conclusions: The strongest relationships among both sets of correlations were that executive functioning was most highly correlated with verbal memory and less so for visual memory and attention and concentration. The similar pattern of correlations among different measures suggests verbal memory contributes to executive functioning.

C26
Agreement between parent ratings and performance measures of executive function
Jarratt KP, Wolfe M, Riccio CA

Objective: The goal of this study was to compare the results of a parent rating scale that measures executive functioning in children with objective performance measures. The Behavior Rating Inventory of Executive Function (BRIEF) was the parent questionnaire; objective performance measures included the Tower of London, Wisconsin Card Sorting Test (WCST), and Stroop Test. Method: The current study used extant data on 92 consecutive referrals that obtained a Full Scale IQ of 80 or higher; all participants had been part of a larger study conducted in a University setting. The mean age was 11.76 years (S.D. = 2.06). The sample included predominantly males (67.39%) and was predominantly Caucasian (80.43%). Of the sample, 45.65% met criteria for ADHD and 27.17% met criteria for some other disorder, excluding ADHD. Participants were administered the Tower of London, WCST, and Stroop Test, and results of parent ratings on the BRIEF were obtained. Results: Correlations between subscales of the BRIEF with performance measures were generally low, but some significant relationships were found. Specifically, BRIEF Working Memory, Plan/Organize, and Monitor scales were negatively correlated ($p < .01$) with Stroop Word, Stroop Color, and Stroop Color Word; BRIEF Initiate was negatively correlated ($p < .05$) with these same Stroop variables; BRIEF Inhibit was negatively correlated ($p < .05$) with Stroop Color; BRIEF Plan/Organize was negatively correlated ($p < .05$) with WCST Perseverative Errors and Failure to Maintain Set. Conclusions: Implications for clinical assessment of children's executive functioning via parent report as compared to performance measures will be discussed.

C27
Differential contributions to measures of cognitive flexibility (CF)
Lloyd H, Goldberg M, Hegarty L

Objective: It is assumed that measures of CF tap a similar cognitive process. However, common tests of CF differ in speed of processing and attention/working memory requirements, which potentially alters the nature of the underlying cognitive processes assessed by these measures. The purpose of this study was to examine the relationship among commonly used indices of cognitive flexibility and underlying cognitive factors affecting performance on them. Methods: Subjects were 102 individuals referred for outpatient neuropsychological assessment with a traumatic or non-traumatic brain injury. CF was indexed by the WCST Perseverative Response score (WCST-PR score), Trail Making Test—Part B (TMT-B), and DKEFS Color-Word Switching (CW-SC). Statistical analyses: (1) correlational analyses between CF measures and (2) separate stepwise linear regression analyses using each of the CF measures as a dependent variable and scores on tests indexing processing speed (WAIS-III Digit Symbol-Coding) and attention (WAIS-III WMI) as pre-

dictor variables. Results: Significant correlations were found between TMT-B and WCST-PR and TMT-B and CW-SC, but not WCST-PR and CW-SC. Similar regression equations were obtained for TMT-B and C-W, with indices of both processing speed and attention entering into the equation significantly. In contrast, only working memory contributed significantly to WCST-PR, but accounted for only 7% of the variance. Conclusions: Different underlying cognitive processes appear to be indexed by study CF measures, with TMT-B and CW-SC possibly tapping a "mental agility" factor while WCST-PR tapping a "conceptual agility" factor.

C28

Neuropsychological sequela for pesticide exposure in agriculture

Bourassa JF, Dilks LS, Martin CA, White R, Hixson S

Objective: This project evaluated the neuropsychological consequences of exposure to farmers who had experienced prolonged low-level exposure as a consequence of regular contact with Prowl, Diuron and 2–4, D. Method: Sixteen full-time farmers (14 males and 2 females) with a mean age of 51 years and mean educational level of 13.84 years who had been farming for a mean of 28 years underwent evaluation. None had a history of impairment or drug and alcohol dependency. All were currently employed. Instruments included the Shipley Institute of Living scales and the Trails Test. Tests were administered on an individual basis at the client's home at prearranged times. Each participant read and signed consent and neuropsychological tests were completed. Tests were administered and scored according to the publishers instructions and no adverse intervening events occurred. Results: Tests were negative for both the SILS Vocabulary section ($M = 54.94$, S.D. = 10.49) and the SILS Abstract section ($M = 62.81$, S.D. = 9.13) as well as the Trails A ($M = 50.88$ s, S.D. = 36.6) and Trails B ($M = 128.47$ s, S.D. = 57.84) tests. There were no significant correlations between years worked in farming and any of the measures, indicating no negative effects related to their farming and/or pesticide use. Conclusions: The results suggest regular, low level exposure to agricultural pesticides does not have an adverse effect on executive functions. Abilities such as judgment, insight, abstraction, and attention were within normal limits.

C29

Subtest analysis of WAIS-III scores of individuals exposed to 1,2-dichloroethane

White R, Dilks LS, Marceaux J, Martin CA, Bourassa JF, Hixson S

Objective: Thirty-eight individuals exposed to 1,2-dichloroethane (ethylene dichloride [EDC]), a powerful neurotoxin, were evaluated six years post-exposure. Past research reports EDC to have long-term effects on cognitive and adaptive functioning. The current study aimed to examine long-term deficits across cognitive domains. Researchers compared WAIS-III subtest scaled scores from this sample to average test performance (based on subtest means and standard deviations). Method: Data were collected from 38 participants six years after being exposed to EDC. All were referred by their treating physicians to the evaluation. None of the participants offered a history of previous cognitive impairment or drug/alcohol dependency. Standard administration procedures were followed and no events occurred during assessment that would influence the validity of the data. Results: Wechsler Adult Intelligence Scale—Third Edition (WAIS-III) was utilized to assess current cognitive functioning. *z*-Scores were calculated for each participant based on the WAIS-III scaled scores ($M = 10$, S.D. = 3). Compared to WAIS-III published norms, this sample was below average for each subtest with mean *z*-scores ranging from $-.123$ to -1.23, with the highest deficits in Picture Completion and Digit Symbol Coding. Overall, these participants had more difficulty on performance-based subtests. Conclusions: The results of this study support past findings of long-term deficits in cognitive functioning secondary to EDC. It is evident that six years post-exposure, individuals still perform at a level that is below average. In fact, only one participant scored above the mean on any subtests.

C30

Multisystemic executive functioning intervention and the perceptions of caregivers and students

Castillo CL, Smith C, Luhrs J

Objective: It was hypothesized that multisystemic executive functioning (EF) intervention would result in a significant change in perception of students' EF skills. Method: Four seventh grade students were selected due to poor EF and school functioning. Students from another school were matched by age, gender, and intelligence. The intervention was completed during one school year and included direct intervention of EF skills, peer support, family/teacher education, and mentoring. The pre- and post-intervention evaluations included the BRIEF, among other measures.

Results: Non-parametric analyses were completed comparing the General Executive Composite (GEC) *T*-score from the BRIEF parent, teacher, and self-report obtained during pre- and post-evaluations. Although there were no statistically significant differences between groups on pre- and post-scores, median scores for all pre-intervention ratings of the experimental group were qualitatively worse than those of the control group. Experimental group ratings showed decreasing median scores for all raters at post-intervention. Similar changes in the control group parent ratings were also demonstrated by a decrease in the group median by 10 points. Although teacher ratings of the experimental group improved over time, teacher ratings of the control group worsened. Conclusion: Lack of statistical significance does not indicate lack of change in the two groups. Use of the GEC, rather than composites or individual scores, may have masked change before and after evaluation. Also, since this was a pilot study, the sample size was very small, resulting in lower power to detect differences between groups and over time.

C31

Validation of the Christensen H test for detecting executive dysfunction

Jacobs DM, Isaacs C, Lobaugh M, Cave G, Soper HV

Objective: To assess executive dysfunction, word problems were selected in which the basic operations are easy but the sequencing and organizing of information is difficult. They were drawn from a number of sources including the work of Luria and Christensen. To validate this 20-item test we compared these scores to those on other tasks, some purported to assess executive functioning and some not. Method: This Christensen H Test and up to six other tests had been administered to 38 outpatients as part of clinical assessments. Four were expected to be related to executive functioning [Concepts and Directions subtest from the Clinical Evaluation of Language Fundamentals, time to complete the first eight lines of the Rey Tangled Lines (RTL8), Trailmaking B (TMTB), and Perseverative Responses and Categories completed on the Wisconsin Card Sort (WCST)] and two were not [Trailmaking A (TMTA) and Street Completion (SC)]. Results: The Christensen H was clearly related to the Concepts and Directions ($r = .432$), Trailmaking B ($r = -.446$), Perseverative Responses on the WCST ($r = -.463$), and moderately to the RTL8 ($r = -.294$). It was not even closely correlated to the TMTA ($r = -.234$) and SC ($r = .114$), as expected, but also not to the Categories on the WCST ($r = .093$). Conclusions: The Christensen H does assess to a large extent the same functions as many other executive tasks. Surprisingly, the WCST Categories score was not related to any of the other scores but perseverative responses. The reasons for the findings are discussed.

C32

Alternating frontal and supramarginal activation during working memory differentiates dyslexia from controls as revealed by magnetoencephalography (MEG)

Lajiness-O'Neill RR, Velissaris N, Erdodi L, Dorman W, Small B, Bowyer S

Objective: Atypical right hemispheric activations in temporoparietal regions have been reported in individuals with reading disorders (Simos et al., 2002). We hypothesized similar aberrant activity would be evident during verbal and spatial working memory in individuals with dyslexia compared to controls as measured by magnetoencephalography (MEG), suggesting more global hemispheric inefficiencies. Method: Ten controls (males = 8; mean age = 31.6) and four subjects with dyslexia (males = 2; mean age = 20.3) underwent MEG to detect cortical activity during verbal and spatial working memory (VWM, SWM) (D'Esposito et al., 1998). Data were analyzed with MR-FOCUSS, a current density imaging technique (Moran et al., 2005). Results: Controls demonstrated alternating activity at ~220–270 ms during VWM in left middle and superior frontal gyri (MFG, SFG), pre-/postcentral regions, and right inferior and middle frontal gyri (IFG, MFG). Bilateral IFG and right pre-/postcentral regions were activated in dyslexia. Left supramarginal (SMG) activation was noted at an earlier latency only in controls. Controls demonstrated alternating activity at ~230–290 ms during SWM from bilateral IFG, MFG, SFG, and pre-/postcentral regions to right SMG, superior and middle temporal regions. Individuals with dyslexia activated similar areas but concurrently. Conclusions: VWM requires a volleying of neural activation at ~250–270 ms in bilateral IFG, MFG, and SFG; only IFG were activated in dyslexia. Supramaringal regions were activated in a domain specific manner, but not during VWM in dyslexia. Predominantly right frontal and temporal activation during WM in dyslexia is consistent with prior findings of atypical hemispheric specialization.

C33

Monolinguals manage tasks with high relational complexity more accurately than do bilinguals

Mallery ST, Llamas V, Alvarez A

Objective: Relational complexity theory (Halford, 1993) addresses task processing demands and individual characteristics involving complex reasoning independent of memory load. Bialystok (2004) demonstrated that bilinguals have increased capacity for cognitive control and switching. This study addresses whether bilinguals also demonstrate stronger management of complexity than monolinguals. Method: Participants were 31 college students in an introductory psychology course at a small liberal arts university. All were English fluent. Seventeen were fluent bilinguals and 14 were monolinguals (minimal to no second language proficiency). There were 14 females and 17 males, and ethnicity of the group was: 39% Hispanic, 32% Caucasian, 13% Asian/Pacific Islander, 3% mixed ethnicity, and 13% unspecified. Socioeconomic status (SES) ranged from blue collar to wealthy, with the average participant self-described as middle class. Ability to process complexity was measured using the Latin Square Task (LST), a 36-item non-verbal matrix completion task, developed by Damien Birney (2006) as an experimental measure of the impact of varying complexity on reasoning. The task includes items that require binary, ternary, and quaternary processing. Results: Two-tailed ANOVA revealed no difference in monolinguals' and bilinguals' ability to manage binary or ternary processing. Monolinguals, however, were significantly more accurate in processing quaternary relations; $F(1, 27) = 4.37$, $p = .045$, eta = .36. Neither gender nor SES was related to performance on the LST. Conclusions: Monolinguals outperformed bilinguals in ability to process the most complex problems. Similar effects have been seen previously primarily on verbal tasks. Possible explanations and suggestions for further research are offered.

NEUROPSYCHOLOGICAL DOMAINS: MEMORY AND AMNESIA

C34

Autobiographical memory of the recent past following frontal cortex or medial temporal lobe excisions

Thaiss L, Petrides M

Objective: Autobiographical episodic memory was studied in patients with unilateral excisions restricted to the frontal cortex (FC = 11) or to the limbic medial temporal lobe region of the brain (TL = 18) and in control subjects (NC = 16) using an event sampling method. Method: Subjects kept structured diaries of their personal experiences over two days. After a delay, subjects' memories for the events were assessed using free recall and their spontaneous use of temporal order as a retrieval strategy was examined. Memory for temporal order of the events and for event details was also tested, and the quality of the memory trace assessed. Results: Results showed that FC patients failed to spontaneously use temporal order to organize retrieval of autobiographical events in free recall. Nevertheless, they exhibited normal autobiographical recall accuracy. TL patients were impaired in autobiographical recall. Instructing subjects to retrieve events in their temporal order failed to improve recall in TL patients and increased the incidence of intrusion errors for left temporal patients. The retrieval accuracy of FC patients, however, now surpassed that of controls. Left temporal, but not FC patients were impaired in their accurate recall of the temporal order of events. Conclusions: Based on these findings, we conclude that a basic impairment in autobiographical memory (including memory for temporal context) results from damage to the medial temporal lobe and not the frontal cortex, as has often been claimed. Frontal cortex patients fail to use spontaneously organizational strategies to aid retrieval, but can use these effectively if instructed to do so.

C35

Are immediate memory measures psychometrically viable as long-term memory measures?

Woodhouse J, Russell A, Giesbrecht B, Adams W

Objective: Long-term memory is an important cognitive domain to evaluate, however, due to practical limitations and unpredictable cultural confounds, few well standardized clinical measures exist to evaluate memory decay occurring more than 30 min. This investigation evaluated the psychometric feasibility of using commonly administered immediate memory tasks also as possible long-term memory estimates; it was hypothesized they would be. Method: Nineteen adult participants, with a mean age of 39.4 years and no neurological deficits, volunteered. Participants were administered several common verbal immediate memory subtests (WRAML-2 and WMS-3) in standardized fashion, but participants were also unexpectedly re-evaluated 7 and 30 days later. The latter two follow-ups were done by telephone. Results: As expected, using a repeated measures ANOVA, statistically significant declines in memory performance were noted in

all measures at 30-min, 7- and 30-day re-evaluations ($p < .05$). Interestingly, some memory tasks such as story memory continued to demonstrate adequate psychometric integrity throughout to serve as a viable long-term memory measure. However, another measure, a list learning task, showed declines so large among this study's non-clinical sample that the subtest's psychometric viability as a long-term memory measure is doubtful. Conclusions: Results indicate that some short-term verbal memory subtests also have promise as long-term memory measures. Further research is needed to identify additional tasks that would be psychometrically viable for these dual purposes, and whether, as such, they prove useful with various clinical populations.

C36

Selective memory impairment in attention-deficit/hyperactivity disorder

Weniger R, Adams W

Objective: To examine selective memory deficits in children with Attention-Deficit/Hyperactivity Disorder (ADHD), Primarily Inattentive or Combined subtypes, using the Wide Range Assessment of Memory and Learning, second edition (WRAML2). Method: This study consisted of 23 children ranging in age from 7 to 14 ($M = 11.09$, S.D. = 2.29) with diagnoses of ADHD and 23 controls obtained from the WRAML2's standardization sample and matched according to age and gender. Inclusion criteria for the clinical sample included: (1) FSIQ > 85 ($M = 95.64$, S.D. = 8.77), (2) standardized reading achievement >85 ($M = 91.14$, S.D. = 5.48), and (3) Conners Rating Scale-Revised (CRS-R, PF), ADHD Inattentive or Combined T-score > 65 ($M = 76.83$, S.D. = 10.88). Each participant was administered the WRAML2. Results: A multivariate analysis of variance (MANOVA) with Bonferroni corrected post hoc comparisons revealed significant group differences on the WRAML2's Working Memory Index ($p = .034$), with controls > ADHD. A forward stepwise binary regression analysis retained the WRAML2's Working Memory Index (WMI) and General Recognition Index (GRI) as significant predictors of group membership. A WMI-GRI discrepancy score was added to the regression analysis ($X^2(3, 85) = 24.34$, $P < .001$, Nagelgerke $R^2 = .38$) and accurately classified 80.0% of participants. A GRI-WMI >10 yielded optimal classification accuracy with sensitivity of 74% and specificity of 75%. Conclusion: Children with ADHD exhibited selective memory deficits in the area of working memory. The WRAML2 also demonstrated clinical utility in discriminating between children with ADHD and normal controls.

C37

Verbal fluency performance of selected right and left temporal lobe epilepsy patients: Pre-surgical data

Reese LS, Mash KM, Schoenberg MR, Werz MA, Maciunas RJ

Objective: Roughly 1% of the population is diagnosed with epilepsy, a neurological disorder that exists in various syndromes. One such frequently diagnosed epilepsy syndrome, temporal lobe epilepsy (TLE), often is associated with neuropsychological deficits. Further, language decline is often observed in individuals with medically refractory epilepsy. This study examined the extent verbal fluency test scores predicted surgical side among left and right TLE patients. Method: The study included data acquired during neuropsychological evaluation of temporal lobe epilepsy patients. Methods: Sixty-three participants were found to meet study inclusion and exclusion criteria. There were 22 left TLE (LTLE) and 41 right TLE (RTLE) patients. A thorough neuropsychological evaluation, including phonemic and semantic verbal fluency tests, were administered to each patient. Results: The mean years of education completed by the LTLE sample was 12.6 (S.D. = 1.5) while mean years of education completed by the RTLE sample was 14.5 (S.D. = 2.5). The LTLE sample had a mean FSIQ of 84.3 (S.D. = 10.4) while the mean FSIQ for the RTLE sample was 98.3 (S.D. = 13.8). Education and FSIQ were covariates in further analyses. ANCOVA revealed significant differences in the raw and t-scores of pre-surgical verbal fluency scores between the LTLE and RTLE patients. LTLE patients scored significantly lower on both the Controlled Oral Word Associations Test (COWAT) and semantic fluency than RTLE patients. Conclusions: Among the patients diagnosed with TLE, the LTLE group scored significantly worse on measures of verbal fluency than the RTLE group.

C38

Performance of selected right and left temporal lobe epilepsy patients on common verbal and "visual" memory tests

Schoenberg MR, Reese LS, Mash KM, Werz MA, Suarez M, Maciunas RJ

Objective: Temporal lobe epilepsy (TLE) is the most common form of epilepsy. Pre-surgical evaluation for refractory epilepsy often includes neuropsychological assessment. Pre-surgical memory functioning has been found to be a

predictor of post-surgical memory outcome following anterior temporal lobectomy (ATL). The Rey Auditory Verbal Learning Task (RAVLT) and the Medical College of Georgia Complex Figure (MCG) are neuropsychological tests used to measure memory. Method: Data were collected during outpatient neuropsychological evaluation. Thirty-one participants met inclusion and exclusion criteria. There were 10 left TLE (LTLE) and 21 right TLE (RTLE) patients. All participants completed comprehensive neuropsychological evaluations, including the RAVLT and MCG. Results: The mean years of education completed by the LTLE sample was 12.6 (S.D. = 1.6) with a mean FSIQ of 85 (S.D. = 10.4). The mean years of education completed by the RTLE sample was 14.5 (S.D. = 2.6) with a mean FSIQ of 99.0 (S.D. = 13.9). Education and FSIQ were used as covariates. ANCOVA revealed significant differences in the raw scores for Trials 2–5 as well as the Immediate and 30-min Delay Recall Trials. LTLE patients scored significantly lower on these trials than RTLE patients. There was no significant difference between RTLE and LTLE patients on MCG recall. Conclusions: These data support existing research that finds LTLE patients score significantly lower on measures of verbal memory. Data raised questions about the ability of MCG Complex Figures to distinguish right from left TLE patients.

NEUROPSYCHOLOGICAL DOMAINS: OTHER

C39

Examining the neuropsychological foundation of participants with and without emotional disorders using the NEPSY

Martinez JM, Bjoraker KJ, D'Amato RC

Objective: This study was designed to examine the discriminative validity of the NEPSY, a neuropsychological assessment, in students with and without emotional disabilities. Additionally, the effectiveness of the NEPSY was examined for the purpose of accurately recognizing students with emotional disabilities; thus, later assisting them through targeted interventions. Method: A total of 60 participants varying from 6 to 12 years of age were evaluated with 16 participants from a day treatment program in the Western U.S. and 14 participants from a treatment center in the Eastern U.S. Children were included in the sample if they had been identified as having an Emotional Disability. Children with other disabilities such as learning disabilities and mental retardation were excluded from the sample. This group of children receiving special education services was compared to 30 normal children who had not been identified as having a psychological or neuropsychological disorder. Results: A Multivariate Analysis of Variance (MANOVA) conducted on the NEPSY composite scores and the 14 subtests revealed significant group differences. A Univariate analyses revealed that all tasks and composites contributed to group differentiation. The NEPSY Language domain was the most significant contributor when the domains were examined. The subtests most able to discriminate between groups were the NEPSY Comprehension of Instruction, Speeded Naming, and Auditory Attention and Response Set subtests. Conclusion: This study clearly provided a neuropsychological profile of children with emotional disabilities. Neuropsychological measures seem to offer unique information in helping to understand and treat children and adolescents with emotional disorders.

C40

Use of personality assessment measures by clinical neuropsychologists

Smith S, Gorske TT, Wiggins CA

Objective: The impact of personality on neuropsychological test performance is debatable. However, a comprehensive assessment should incorporate multiple forms of data so as to best measure all facets of functioning. Despite best practices that call for comprehensive assessment, a review by Camara et al. (2000) suggests that neuropsychologists rely on the MMPI-2 as a primary measure of personality/psychopathology. The purpose of the present study is to examine the range of personality assessment measures currently used by clinical neuropsychologists in various settings and client populations. Method: One thousand members of NAN and 1000 members of INS were sent on-line surveys of test usage and assessment practices. Of these, 404 returned usable data (response rate = 20.2%). Respondents were asked the frequency with which they administer the Rorschach, MMPI/2/A, PAI, MCMI-III/MAPI, TAT, or Beck scales in addition to neuropsychological functioning. Results: Weighted test usage data were calculated. Results indicate that although neuropsychologists favor measures of symptoms (e.g., Beck scales) and behavior, they are less likely to use newer omnibus measures of personality (e.g., PAI) or performance-based assessment (e.g., Rorschach). All personality assessment measures were used significantly less than measures of cognitive processing. Conclusions: Despite calls for more "client-centered" assessment, it appears that many neuropsychologists do not incorporate comprehensive

assessments of personality. Furthermore, the measures used tend to be more symptomatic in scope. Issues related to years of experience, setting, and client populations will be discussed.

C41

Correlates of ANAM 2001 series of cognitive scales to five domains of the NEO Personality Test

Marks W, Jones W

Objective: Examination of correlation between NEO personality test and ANAM Logical Reasoning, 2-Choice Reaction Time, Sternberg Memory, Math Processing, and Matching to Sample is the purpose of this study. Method: Seventy-seven upper division university students completed the windows-based ANAM scales and the NEO Personality Inventory in 2005–2006. Age and gender were equivalent in the two groups. All testing was completed in a university lab setting. Participants included 18 male and 59 female college students. The mean age of the participants was 24.10. Ages ranged from 19 to 56 years. Participants were students meeting an undergraduate course requirement in order to participate in this research study. Results: Statistically significant correlation coefficients between ANAM scales and NEO personality inventory were evident in Sternberg Memory accuracy and NEO Extraversion, $r = .263$; Sternberg Memory response time and NEO Agreeableness, $r = .251$; Matching to Sample efficiency and NEO Neuroticism, $r = .265$; Matching to Sample efficiency and NEO Conscientiousness, $r = -.251$; Matching to Sample accuracy and NEO Conscientiousness, $r = -.234$; and Matching to Sample response time and NEO Neuroticism, $r = -.287$. Conclusions: Results suggest a modest but statistically significant relationship between selected ANAM cognitive factors and selected NEO personality traits. An unexpected finding in the data was the remarkably low correlations between ANAM scores and NEO Openness. Further study is warranted to determine whether this is an artifact of this sample and to examine the negative relationship with Conscientiousness.

C42

Neuropsychological sequelae of Moyamoya disease in children and an adolescent: Three case studies

Jarratt KP, Snow JH

Objective: Moyamoya disease is a rare disorder in most parts of the world except in Japan, and the pathogenesis is largely unknown. This condition can lead to irreversible blockage of the main blood vessels to the brain as they enter the skull and cause major strokes, TIA's, seizures, paralysis, and migraine-like headaches. This disease can have negative implications for neuropsychological sequelae depending on the frequency and severity of symptoms. Method: Three case studies, seen within the past year, were chosen to present of two Caucasian male children 6 and 15 years of age, and one African American female 10 years of age. Each child has a history of Moyamoya disease, stroke, TIA's, and/or other neurological complications. These children were administered a comprehensive neuropsychological evaluation including measures of intellectual, academic, memory, fine motor, visual–perceptual, and executive skills functioning. Results: The presentation will explain the individual neuropsychological profiles of each child and possible implications resulting from their history of Moyamoya disease. Findings suggest significant profile differences given varying degrees of medical history and other co-morbid disorders (e.g., sickle cell disease, NF1), as well as frequency and severity of symptoms. Conclusion: These findings are unique due to the rareness of the disorder and the ethnicity of the children. It is also worth noting the significant differences in profiles with these children given they are suffering from the same rare disorder.

C43

Age and education level factorial relationships to the Serial Digit Learning Test

Romero RA, Moses JA, Kumbhani SR, Hutson L, Pastrana F, Wurst L, Chester S

Objective: To examine whether Serial Digit Learning Form 8 (SDL8) and Form 9 (SDL9) measure different learning abilities and whether age and education affect performance on both forms. We hypothesized that SDL8 and 9 measure different learning abilities. We also hypothesized that both demographic characteristics have effects on test performance. Method: This study used an archival dataset of adults with mixed psychiatric and neuropsychological disorder, which were tested at the Department of Veterans Affairs Palo Alto Health Care System, Psychological Assessment Unit, in California from 1973 to 2003 for a neuropsychological evaluation. All patients with SDL8 and/or 9 were included. One hundred and thirteen participants (mean age = 51.35, S.D. = 1.5; mean education = 12.96 years, S.D. = .27) were included in this study. Results: A principal components factor analysis with Equamax rotation was used to analyze relationships between the forms and demographic characteristics. The analysis extracted a three-component solution

that explained 78.13% of the shared variance. The first component has positive loadings only on SDL9 and has a negative loading on age. The second component has positive loadings on SDL8. The last component has positive loadings on educational level and the initial three trials of both SDL forms. Conclusions: This study suggests that performance on SDL Form 8 and Form 9 are independent of each other. Age and SDL9 performance are negatively correlated on factor 1. A higher level of education is associated with better performance of the initial trials on both forms.

C44

Cognitive performance in healthy postmenopausal users and non-users of hormone replacement therapy

Biechowska D

Objective: The influence of sex hormones on human behavior is not restricted to the sphere of sexual behavior and procreation. In the last two decades, more and more studies have shown that these hormones directly affect the brain, modulating mental processes, and thus behavior. Considerable research attention has been devoted in this context to women who are receiving hormone replacement therapy (HRT) in the postmenopausal period in order to reduce or prevent such negative consequences as osteoporosis, diminished mental and physical fitness, depression, anxiety, insomnia, and other vegetative disturbances. Some hormones are attracting particular interest because of the possibility of preventing dementia. A growing amount of data indicates that estrogen may to some extent protect against the development of dementia of the Alzheimer type. Therefore the impact of HRT on the cognitive functioning of postmenopausal women is a crucial issue, still not fully explicated. Our research analyzed memory, learning, executive functions, attention, abstract thinking, verbal fluency and psycho-motor skills in a group of women on HRT. Methods: Fifty-six women at menopausal age were tested in two groups: a clinical group, consisting of 25 women on HRT, and a verification group composed of 31 women who were not receiving estrogens. The groups were matched for age, education and handedness. Results: Some statistically significant differences between groups were found. In particular, HRT was found to have a beneficial effect on memory and psychomotor skills. Conclusion: This study shows that sex hormones may play an important role in maintenance of cognitive function in older women.

C45

Predicting college GPA using neuropsychological tests versus self-rating instruments

Hannon R, Chollar S, Melendez L, Clark S

Objective: Neuropsychological tests were used in conjunction with self-rating questionnaires to predict GPA. Multiple predictors were included to evaluate the relative value of using neuropsychological measures versus self-rating instruments. Method: Participants were 436 students (297 female, 139 male, M age = 20.1, S.D. = 4.2) at a community college ($n = 256$) or a private university ($n = 180$). They were tested in groups, and completed the Shipley Vocabulary subtest, the Symbol Digit Modalities Test (SDMT), and the second story from the Logical Memory subtest of the Wechsler Memory Scale-II. Self-rating instruments included the Metacognitive Reading Strategies Questionnaire (MRSQ); the Approaches and Study Skills Inventory for Students (ASSIST); the Memory Functioning Questionnaire (MFQ); and a Memory Strategy Use scale designed by the authors. Results: Overall GPA was subjected to simultaneous multiple regression analysis with the following predictor variables: Shipley Vocabulary, SDMT, Logical Memory-delayed, MRSQ, MFQ, ASSIST, and Memory Strategies. R = .435 and was significant ($F = 15.04$, $p < .000$), R-squared = .198, adjusted R-squared = .177. Standardized beta coefficients showed a positive relationship of GPA with study skills (beta = .293, $p = .000$), Shipley Vocabulary (beta = .193, $p = .000$), and SDMT (beta = .131, $p = .007$). Conclusions: Study skills (ASSIST) were the strongest positive predictor of GPA, and interventions to improve GPA should target these skills. Neuropsychological tests were also significant predictors of GPA, and the predictive value of these tests should be explored more thoroughly.

C46

Neuropsychological profile of a female with partial trisomy 1 (q32.1-42.1)

Basista CE, Arffa S, McAllister Jr. J

Objective: Whole arm duplications of the long arm of chromosome one (1q) are rare, even in the mosaic form, with fewer than 40 cases reported. In partial trisomy 1q, the degree of neuropsychological impairment and associated physical abnormalities is associated with the area of chromosome duplicated. Large duplications (q24-qter) cause the most severe abnormalities and are associated with the shortest life span, with many fetuses not surviving until term.

Terminal duplications (1q32-qter) occur with less severe malformations and longer periods of survival, but typically with marked mental retardation. Finally, small terminal duplications (1q42-qter) result in more mild dysmorphism and intellectual performance is typically in the normal range. Method: A 19-year-old female diagnosed with partial trisomy 1q (q32.1–42.1) completed a comprehensive neuropsychological evaluation. Results: Reliable differences were noted between the Verbal Comprehension (SS = 88) and Perceptual Organization (SS = 62) indices of the WAIS-III, as well as in memory assessment (WRAML-2): Verbal Memory (SS = 97) and Visual Memory (SS = 67). Language skills were within normal limits on the CELF-4 and the SCAN-A. The Rey-Osterreith Complex Figure, Grooved Pegboard, and Vineland-II fell within the Impaired range. Executive functioning skills were Superior for Verbal Fluency and Borderline for Design Fluency (DKEFS). Conclusions: Results are consistent with a Nonverbal Learning Disability that spans across the deficits associated with 1q32-qter and 1q42-qter duplications. This case adds to the scarce literature regarding cognitive sequelae of partial trisomy 1q.

C47

Cortical visual impairment: Implications for neuropsychological afssessment

Yarger L, Basista CE, Trettel M, Knapp J, Arffa S

Objective: Cortical Visual Impairment is caused by damage to the posterior visual pathways and/or the occipital lobes of the brain. Common causes of CVI include perinatal and acquired hypoxia, cerebral vascular accident, and meningitis (Huo, Burden, Hoyt, & Good 1999). Children with CVI often have associated neurological abnormalities, including seizures, cerebral palsy, hemiparesis, and hypotonia. Due to these impairments, children are often referred for neuropsychological evaluations to assist in determining effective treatment interventions. Therefore, it appears important to consider CVI within the context of the testing environment. We propose methods for adaptive, neuropsychological testing to obtain reliable assessment results. Method: A child with CVI was assessed using standardized measures of receptive language. Performance on the PPVT-III fell substantially below performance on the PPVT-IV, perhaps due to changes in stimuli format. Qualitative assessment using the Reynell Developmental Language Scales, which incorporates three dimensional objects, also resulted in improved performance with regard to receptive language. Results: Children with CVI may perform differently across neuropsychological measures due to the nature of the materials presented and their degree of visual impairment. Conclusions: Clinicians should be aware of CVI and its impact upon results of neuropsychological testing. Recommendations for adapting neuropsychological testing for children with CVI include: modifying instructions to include one sensory modality at a time, providing a high contrast background and using color cues to guide child's visual attention to appropriate test stimuli, limiting complexity of visual material presented, and orienting materials to the child's preferred visual field.

C48

A comparison of Gestaltic closure performance with visual spatial retention in a clinical sample

Doig HM, Kandra LV, Tong K, Lobaugh M, Soper HV

Objective: The Street Completion Test is being used more frequently in research and the clinic as an assessment of gestaltic closure abilities. We decided to compare performance on this task with that on other visual perceptual tasks, some involving copying stimuli and some retention. It was expected that the Street scores would be more highly associated with performance on the less structured retention tasks than on the more structured copy tasks. Method: Data were culled from 71 patients, each of whom has a Street score and scores on the Rey Complex Figure. In addition, 38 of these individuals also had scores on the Developmental Visual Motor Integration Test (DVMI). Results: As hypothesized, the Street Completion scores did not correlate very well with the copying tasks (DVMI, $r = .144$, $p = .389$; Rey Copy, $r = .116$, $p = .336$) but did with the retention tasks (Rey Immediate, $r = .299$, $p = .012$; Rey Delay, $r = .323$, $p = .006$). As expected, the two copying tasks correlated well with each other, $r = .643$, $p = .000$. Curiously, the DVMI also correlated very highly with both the Rey Immediate, $r = .712$, $p = .000$, and Rey Delay, $r = .636$, $p = .000$. Conclusions: The main hypotheses were confirmed, but the results are tempered by the high correlations between retentions tasks and the copy ones. The results are discussed in terms of this being a clinical sample and the general effects of brain damage on relatively unstructured tests.

C49

Comparison of a clinic sample to group and individual administrations of visual organization tests

Shiota L, Mitchell CM, Kandra LV, Isaacs C, Soper HV

Objective: The purpose of this research was to compare the results from a clinical sample on two visual organization tests to group and individual administrations to control subjects (college students). One test, the Hooper Visual Organization Test (HVOT) is designed for both group and individual administration. Methods: The Street Completion test, a Gestalt closure test, and the HVOT were administered to 85 college students, 67 in a group format and 18 individually. These scores were compared to those of 28 outpatients. For the group administrations the stimuli were administered through projection onto a screen and the participants were asked to write their answers on answer sheets. It was anticipated that the group and individual administration results would be about the same and better than that of the outpatients. If group and individual administrations resulted in equivalent outcomes, a group approach would facilitate normative data collection in some cases. Results: Curiously, the group results were significantly poorer than either the patient and the individual scores for both the Street, $t(93) = 2.429$, $p = .017$, and $t(83) = 3.859$, $p = .000$, respectively, and the HVOT, $t(93) = 3.489$, $p = .001$, and $t(83) = 3.295$, $p = .001$, respectively. Although the individual administration had higher means on the Street and HVOT than the patient group, the differences were not significant, $t(44) = 0.791, 0.225$, $p = .433, .823$, respectively. Conclusion: Although a second group administration should be conducted to confirm these results, they certainly indicate that such administration has a deleterious effect on performance.

PROFESSIONAL ISSUES: EFFORT AND MOTIVATION

C50

Poor effort, cognitive performance, and latency patterns with psychiatric and closed head injury patients

Viglione DJ, Pizitz T, Suzanne O, Connell KE, Abramsky A

Objective: This study addresses a cross-over effect in malingering research, whether performance characteristics generally applied to the assessment of neuropsychological malingering also apply to malingered psychiatric conditions. Does poor effort, as demonstrated by (1) failing easy cognitive problems; (2) differential patterns of performance, as demonstrated by interactions between latency and pass vs. fail of cognitive problems, and (3) latency to self-report items distinguish bona fide psychiatric patients from simulators, as well as bona fide close head injury patients from simulators. Method: Participants are 300 bona fide and simulators of schizophrenia, post-traumatic stress disorder, depression, and closed head injury neuropsychological dysfunction. Patients and simulators were solicited through psychiatric facilities and the community. Previous studies have demonstrated that the measure used for this study, the Inventory of Problems easily distinguishes control non-patients from both these groups. The IOP is a new multiple detection strategy, decision-making test of malingering. Measures of malingered poor effort, cognitive latency patterns, latency to self-report items were developed from a random half of the sample and cross-validated on the other half. Results: All four groups differed on both the malingered poor effort and the cognitive latency pattern scales, the effect sizes from ROC curves and logistic regression differed for each. Different scaling emerged as a function of the patient groups. Conclusion: Performance characteristics can be used not only to discriminate bona fide neuroposychologically damaged individuals from simulators, but also bona fide psychiatric patients from simulators. Different patterns and item/scale interactions are necessary to optimize classification.

C51

Why one fakes a head injury affects how one fakes a head injury

Erdal K

Objective: This study assessed the impact on neuropsychological test performance of four types of motivation given to participants in experimental vignettes when asked to fake a head injury. While compensation and blame-avoidance motivations have been explored experimentally, attention-seeking has received little empirical attention. Method: Undergraduates ($n = 202$) were assigned to one of four motivation conditions (No Motivation, Avoiding Blame, Compensation, Attention-Seeking) and were asked to fake a head injury on the Dot Counting Test (DCT), California Verbal Learning Test (CVLT), and Benton Visual Retention Test (BVRT). Results: Analyses revealed that those in the Compensation and Attention-Seeking conditions performed significantly worse than those in the Avoiding Blame and No Motivation conditions on DCT number correct, $p = .016$, and grouped and ungrouped time, $p = .03$, CVLT Recognition

and False Positives, $p = .015$, and BVRT errors, $p = .036$. The Compensation group tended towards errors of omission on the CVLT and BVRT, while the Attention-Seeking group tended towards errors of commission on the DCT and CVLT. Conclusions: Performance on neuropsychological tests appears to be similarly affected when participants are given attention-seeking and compensation-seeking motivations, consistent with Rogers et al.'s (2005) comparison of factitious and malingering groups. The attention- and compensation-seeking groups malinger more flagrantly than those avoiding blame or given no stated motivation to fake a head injury, consistent with research on compensation-seekers alone (Erdal, 2004). That compensation-seekers commit errors of omission and attention-seekers commit errors of commission would require replication to be considered robust.

C52

The utility of the d2 test of attention as a malingering indicator

Vilar-López R, Gómez-Río M, Antonio PE, Bellón-Guardia M, Rodríguez-Fernández A, Pérez-García M

Objective: The aim of this study was to prove the utility of the attentional test d2 in malingering detection. Method: Fifty-four patients with Mild Traumatic Brain Injury were divided as follows: 30 non-compensation-seeking patients, with a median age of 32.50 years (S.D. = 13.67) and a median of 9.30 years of schooling (S.D. = 3.45); 14 compensation-seeking patients not suspected of malingering, with a median age of 35.92 years (S.D. = 10.88) and a median of 9.14 years of schooling (S.D. = 3.50); and 10 individuals suspected of malingering. All of them underwent an extensive neuropsychological assessment that also included the d2 test in the "Hospital Ruiz de Alda". The selected variables were: the selective and sustained attention measure TR; the processing accuracy measure TA; number of commission errors C; the attentional and inhibitory control measure TOT; the concentration measure CON; and the consistency in the task measure VAR. Results: Statistical significant differences among the groups were found in all the variables except VAR. TR [$\div 2(2) = 9.40$; $p < 0.024$], TA [$\div 2(2) = 20.52$; $p < 0.000$], C [$\div 2(2) = 15.61$; $p < 0.001$], TOT [$\div 2(2) = 18.78$; $p < 0.000$], CON [$\div 2(2) = 26.76$; $p < 0.000$]. Conclusions: Some variables of the d2 test could be used as malingering indicators. Surprisingly, the only variable proposed in the manual as a possible indicator of the motivation (VAR) is not a valid indicator of malingering according to our data.

C53

The contribution of response inhibition to malingerer's response times on the Victoria Symptom Validity Test (VSVT)

Slick D, Schwartz D, Strauss E

Objective: On average, malingerers take significantly longer to respond to VSVT items than non-malingerers. This finding is generally assumed to reflect dissimulated cognitive slowing. However, we conjectured that this finding is partially reflective of time penalties associated with inhibiting correct responses. We carried out two analog studies to test this hypothesis. Method: Study 1—The VSVT was administered to healthy subjects instructed to give good effort ($n = 20$), malinger believably ($n = 20$), or respond incorrectly to all items ($n = 20$). Study 2—The VSVT was administered twice to healthy subjects ($n = 20$), once with instructions to give good effort and once with instructions to respond incorrectly to all items, with order of instruction set counterbalanced across subjects. Results: Study 1—The expected group trend was found for both easy and hard items; mean response latencies were progressively longer across, good effort, all incorrect and malingering groups, though only the difference between good effort and malingering groups reached significance. Study 2—The expected task contrast trend was found; mean response latencies were longer for the all incorrect condition, though the difference only reached significance for hard items. The within-subjects effect size for response inhibition in Study 2 is approximately half the between-subjects effect size for malingering in Study 1. Conclusions: The long response latencies of malingerers on the VSVT appear to reflect both dissimulation and time costs of inhibiting correct responses, particularly on hard items. Similar analog studies using clinical participants would be useful in further evaluating this phenomenon.

C54

Evaluating memory complaints in non-head-injury disability claimants using the MMPI-2-RF FBS-r and RBS

Gervais RO, Lees-Haley PR, Ben-Porath YS

Objective: The Fake Bad Scale-Revised (FBS-r) and the Response Bias Scale (RBS) are MMPI-2-RF (Restructured Form) scales designed to detect exaggeration of cognitive symptoms in forensic neuropsychological and disability settings. Numerous studies have supported the use of the original FBS in these settings. RBS validation studies have

found that the scale is correlated with SVT test failure but not actual memory impairment. This study examined the joint use and interpretation of the FBS-r and RBS in evaluating response bias associated with memory complaints in a sample of non-head injury disability claimants. Method: Archival data from 1257 consecutive referrals (male 52%, WCB 56%, legal 25%). Primary diagnoses: chronic pain (37%), anxiety/PTSD (33%), and depression (21%). MMPI-2 exclusion criteria (CNS > 30, VRIN/TRIN > 80) reduced the sample to $N = 1187$. Memory Complaints Inventory (MCI) scores were examined across four combinations of low-high FBS-r/RBS score ranges. Results: FBS-r and RBS were moderately correlated with memory complaints but not with CVLT performance when controlling for SVT failure. ANOVA indicated significant increases in memory problems across four combinations of low-high FBS-r/RBS score ranges using T80/T90 cutoffs ($p < .0005$). *t*-Tests comparing MCI scores across the four levels produced large effect sizes (*d*). Conclusions: FBS-r and RBS were correlated with all MCI scales. There was no correlation between FBS-r/RBS and objective memory performance on the CVLT, suggesting that elevated FBS-r/RBS scores are associated with over-reporting of memory complaints.

C55

Predicting SVT performance with the MMPI-2-RF FBS-r, RBS, and FS scales

Gervais RO, Lees-Haley PR, Ben-Porath YS

Objective: The Fake Bad Scale (FBS) was designed to detect exaggeration of post-injury cognitive/physical disability. A shorter version of the scale, the FBS-Revised (FBS-r) appears on the new version of the MMPI, the MMPI-2-RF (Restructured Form). The Response Bias Scale (RBS) is sensitive to exaggerated cognitive and pain complaints and the Infrequency-Somatic (FS) scale (a new MMPI-2-RF scale) taps infrequently endorsed physical complaints. Numerous studies have examined the FBS as a measure of biased responding within forensic neuropsychological and disability assessment settings, and initial validation studies of the RBS and FS in these settings are also promising. We examined SVT correlates and interpretive implications of joint use of the FBS/FBS-r, RBS, and FS scales in a sample of non-head injury disability claimants. Method: Archival data from 1257 consecutive referrals (WCB 56%, legal 25%, men 52%). Primary diagnoses: chronic pain (37%), anxiety/PTSD (33%), and depression (21%). $N = 1187$ with MMPI-2 exclusion criteria (CNS > 30, VRIN/TRIN > 80). Results: SVT failure rates increased significantly from below sample baserate to nearly double the baserate across five combinations of low-high FBS/FBS-r/RBS/FS score ranges using T80/T90 cutoffs ($p < .0005$). Failure rates ranged from 2 to 63% depending on the cutoff score combination and SVT examined. Conclusions: Joint use of the FBS/FBS-r, FS, and RBS appears to be an effective means of enhancing detection of negative response bias by determining the rate of SVT failure associated with different score combinations.

C56

Using the Millon Clinical Multiaxial Inventory (MCMI-III) to examine the relationship between personality and performance on the Word Memory Test

Bauer L, McCaffrey RJ

Objective: Neuropsychologists must sometimes interpret failed symptom validity test (SVT) results from people with Axis II pathology. To date, scant research has directly addressed the relationship between personality pathology and SVT performance. The current study seeks to elucidate this relationship with a focus on dramatic, emotional and erratic personality pathology. Methods: Sixty-one non-litigating participants with presumed or self-reported emotional, relationship, and/or impulsivity problems were recruited with community flyers and ads. All participants completed a larger neuropsychological battery that included the MCMI-III and the Word Memory Test (WMT). Results: Thirteen participants demonstrated poor effort on the WMT. Due to their correlation with SVT failure, elevations (scores of 75 or above) on MCMI-III Schizotypal, Borderline, Depressive, and Anxiety Scales were examined for those who put forth sufficient effort on the WMT versus those who did not. An ANOVA revealed that those who put forth insufficient effort on the WMT exhibited responses in the pathological range on approximately twice as many of the scales versus those who put forth sufficient effort (insufficient effort $M = 1.92$ (1.1), sufficient effort $M = 1.06$ (0.78); $F(1, 59) = 10.2$, $p = .002$). Conclusions: Results suggest that people who perform poorly on SVTs may endorse more psychopathology across multiple scales than those who perform well. Hence, over-endorsement of psychopathology and symptom enhancement may be "risk factors" for poor performance on SVTs. Future research should attempt to ascertain whether SVT performance can be predicted from elevated levels of psychopathology in certain areas.

C57

Effort test performance in patients with dementia

Dean AC, Victor TL, Boone KB, Philpott LM, Hess RA, Razani J

Objectives: Scant research exists regarding effort test performance in patients with dementia. Thus, minimal information is available regarding objective techniques to assist the clinician in the differential diagnosis of actual versus feigned dementia. Method: Archival neuropsychological data were obtained from 175 outpatients and inpatients who met criteria for dementia. Exclusionary criteria included motive to feign (i.e., applying for disability or in litigation at the time of testing) or clinical suspicion of suboptimal effort for any reason. Subjects were administered an average of 5 effort indicators from 17 possible indices derived from 11 tests (Digit Span, Dot Counting, Warrington Recognition Memory Test—Words, WMS-III Logical Memory, Rey Word Recognition Memory Test, Finger Tapping, b-Test, Rey 15-Item, TOMM, RAVLT, and Rey Complex Figure Test). Results: Higher rates of effort test failure were associated with lower MMSE scores ($r = -.58$, $p < .001$): subjects with MMSE scores from 0 to 14 failed 92% of effort indicators administered, subjects with MMSE scores from 15 to 20 failed 52%, and subjects with MMSE scores 21–30 failed 40% of indicators administered. For the group as a whole, highest specificities were found for Digit Span indices (73–87%), Logical Memory Rarely Missed Index (77%), and Rey Word Recognition (77%). Adjusted cut-offs with specificity set >90% for MMSE groups are provided where possible. Conclusion: Using traditional cut-offs, effort test failure in patients with dementia is common and may require use of adjusted cutoffs or the development of effort indicators specific to this population.

C58

Preliminary data on the use of Finger Tapping as an effort test in demented populations

Dean AC, Victor TL, Boone KB, Curiel AR, Zeller MA

Objectives: Recent research has suggested that the specificity of several effort tests in patients with dementia may be poor. Finger tapping cutoffs were shown to have a specificity of only 69% in a heterogeneous dementia sample (see Dean et al., poster under submission). We sought to re-analyze these data according to dementia subtype. We hypothesized that patients with vascular dementia would have a higher false positive rate due to stroke-associated motoric difficulty, while the specificity in Alzheimer's dementia would be within acceptable limits (i.e., >90%) due to relative sparing of motor cortex in this disorder. Methods: A subset of 19 outpatients with finger tapping scores was obtained from the Dean et al. archival dataset. Exclusionary criteria included motive to feign (i.e., applying for disability or in litigation at the time of testing) or clinical suspicion of suboptimal effort for any reason. Primary diagnoses included Alzheimer's dementia ($N = 7$) and vascular dementia ($N = 12$). Results: The diagnostic groups did not differ in demographic variables (age, gender, education, ethnicity) or MMSE score ($p > .05$). Chi-square analyses revealed that the specificity of finger tapping in Alzheimer's dementia (100%) was significantly better than that for vascular dementia (42%, $p = .01$), which was unacceptably poor. Conclusion: Finger tapping scores may be particularly effective measures in the differential of actual versus feigned Alzheimer's disease, although they appear to be inappropriate for determination of actual versus feigned vascular dementia due to high false positive identifications (58%). Replication with larger samples is needed.

C59

Cross-validation of the Psycho-Assistant Test for malingering

Allen III LM, Celinski MJ

Objective: Cross-validation of Psycho Assistant (PA; Celinski, 2002) a new computerized non-verbal two-part symptom validity test was undertaken. The PA Objects subtests employ 25 commonly "known"(famous) and 25 "unknown" stimuli. Suppression of remote knowledge is almost unheard of in cases of verified brain injury and is not easily affected by interference. However, to overcome cultural bias PA Objects also employs recognition and learning elements that can compensate for genuine knowledge gaps. Two additional PA culture-fair Shapes subtests utilize trivial learning and attention-concentration tasks involving geometric shapes. Method: Binary logistic regression was employed using known groups drawn from 245 consecutive personal injury cases. Genuine and exaggerating cases were selected based on TOMM performance and using well-established embedded malingering measures derived from the CVLT, CAT, HR-SRT, RDS and WAIS variables. Results: Objects variables correctly classified 87% of patients who either passed or failed both subtests of the TOMM ($N = 92$, combined) with 89% specificity and 85% sensitivity. When further qualifying effort based on failing both TOMM subtests and any one of five derived measures ($N = 57$), PA

Object variables correctly identified 88% of patients overall, with accompanying 95% specificity and 67% sensitivity. Conclusions: These results strengthen and extend existing validation for Psycho Assistant. Previous work using these same PA Objects subtest variables classified 79% of patients based only on TOMM performance. Although adding PA Shapes subtest variables further improves classification, poor performance on PA Objects can be interpreted as "intentional" in selected patients.

PROFESSIONAL ISSUES: FORENSIC PRACTICE

C60
Third party observation in children and its effects on the TOMM
Constantinou M

Objective: This study investigated the effects of third party observation during a neuropsychological assessment that included the TOMM. Method: Children between the ages of six and seven were administered the TOMM and a brief neuropsychological battery; 33 children were assessed in the presence of their mother or father, 33 children were assessed in the presence of a non-familiar person (a student), 33 children were assessed in the presence of a video camera, and 33 children were assessed with no third party being present. Children were recruited from Greek-speaking schools in Cyprus. The children were assessed at a child psychology clinic. The original pool was larger, but children with neuropsychological, neurodevelopmental, and severe medical problems were excluded. The groups were matched on age, gender, parental education, and SES. Results: Analyses of the data revealed that third party observation (in all forms) reduced the children's performance significantly on measures of memory and executive functioning. Children under no observation performed better than all the other groups ($p < .05$). Children under parental observation had the highest decline of performance while even their TOMM scores were significantly lower than their peers ($p < .05$) and significantly lower than the proposed cutoff of 45, $p < 05$). Conclusion: This study revealed that third party observation affects negatively the performance of young children, while the presence of a familiar person is the most detrimental. The presence of parents reduces the performance of children even on TOMM, which was found in the past to be a good motivation test for young children.

C61
The MMPI-2 Restructured Form (MMPI-2-RF) validity scales: Association with malingered neurocognitive dysfunction
Wygant DB, Gervais RO, Ben-Porath YS

Objective: Examine the utility of the validity scales of the MMPI-2-RF (Ben-Porath, Tellegen, & Kaemmer, in preparation) with the Slick, Sherman, and Iverson (1999) criteria for Malingered Neurocognitive Dysfunction in a sample of non-head injury disability referrals. Method: Archival data from 1554 non-head injury disability referrals were examined. Participants were excluded if they left more than 30 MMPI-2 responses blank ($n = 375$), or had *T*-scores greater than 80 on the revised versions of VRIN or TRIN (VRIN-r/TRIN-r) ($n = 55$). The final sample included 1124 participants (581 men, 551 women). The Slick et al. (1999) criteria for Malingered Neurocognitive Dysfunction (MND) were utilized to classify participants into one of four groups: no incentive [$n = 149$], incentive only [$n = 473$], suspect MND [$n = 327$], and probable/definite MND [$n = 175$]. ANOVA was used to examine differences on MMPI-2-RF validity scales between the four classifications. Effect sizes were calculated between the no incentive and probable/definite MND groups. Results: Scores on all four MMPI-2-RF over-reporting indicators increased from the no incentive to probable/definite MND groups. Effect sizes between the no incentive and probable/definite MND groups were largest on the revised versions of F (F-r; $d = 1.3$), the FBS (FBS-r; $d = 1.1$), and Fs (Infrequency-Somatic; $d = 1.0$). Conclusions: Malingered Neurocognitive Dysfunction is associated with over-reported psychological symptoms and somatic complaints. The MMPI-2-RF validity scales can contribute usefully to detecting response bias associated with MND.

C62
Detecting feigned dementia: Survey of the American Academy of Forensic Psychologists (AAFP)
Victor TL, Dean AC, Boone KB, Hess RA

Objectives: The mental status older adults is often of medicolegal significance (e.g., to determine competency to stand trial or ability to independently manage one's own affairs). However, there is little research examining the validity of

effort testing in this population or professional guidance as to how to handle suspicion of feigned dementia. Methods: A confidential survey was sent to diplomates of the American Academy of Forensic Psychologists (AAFP). Of the 222 surveys distributed through a combination of electronic- and land-mail, 40 were returned. Seventeen respondents indicated that they did not conduct geriatric competency assessments, rendering a final sample of 23. Results: The sample was highly sophisticated, with a mean of 18.3 years of experience in forensic work. The respondents indicated that approximately 7.1% of the individuals they had assessed in the last year were faking dementia, and the most frequently used measures to assess such feigning were the Test of Memory Malingering (73%), the Validity Indicator Profile (59%), the Rey 15-Item Test (45%), the Dot Counting Test (23%), and the Structured Inventory of Reported Symptoms (18%). Further, while 77.2% of the sample felt that the problem of detecting feigned dementia was "very important" or "extremely important", over half (65.0%) of the sample felt "not at all confident" or only "somewhat confident" about the ability of effort tests to detect noncredible effort in a potentially demented individual. Conclusions: The field currently lacks adequate guidelines for assessing effort in individuals who may be demented.

C63
Executive functioning, psychopathy, and moral reasoning among sex offenders

O'Connor Pennuto T, Moses Jr. JA

Objective: Primary objective was to explore demographic and test variable correlations, and group differences between sex- and non-sex offenders. Method: Part of a larger study, the basic design was exploratory, descriptive, and correlational. Participants/Setting. Setting was a male, medium security correctional facility. Participants were 33 males (of which 9 were sex-offenders), randomly selected from the 3000 facility inmates (mean age = 41 years, education = 11 years, IQ estimate = 98; 60% African American, 36% Caucasian). Inclusion criteria: males, 18+ years, currently incarcerated. Exclusion criteria: IQ below 70, color-blindness, history of neurological brain disorder, active severe psychiatric disorder. Measures: Demographic/descriptive information was collected, WASI Matrix Reasoning provided general IQ estimate, Rey 15 Item Test assessed effort, Psychopathy Checklist—Revised: second edition assessed level of psychopathy, Defining Issues Test—2 measured moral reasoning ability, and executive functioning was measured using Sorting Test and Color Word Interference subtests of the Delis–Kaplan Executive Function System. Results: Analysis of between-group differences revealed sex offenders had higher IQ ($p = .035$), and Rey FIT performance ($p = .030$). Among non-sex offenders, age was negatively correlated with IQ ($p = .046$), moral reasoning ($p = .046$), and Rey FIT ($p = .003$), and IQ was correlated with Rey FIT ($p = .011$). Among sex offenders, moral reasoning was correlated with D-KEFS Sorting ($p = .003$). Conclusion: The small sample size necessitates further study and makes generalization of these findings difficult. However, the correlation between moral reasoning and problem solving among sex offenders is particularly interesting and deserves further scrutiny.

PROFESSIONAL ISSUES: TEST DEVELOPMENT AND METHODS

C64
Screening for brain damage with adults: A cross-validation

Horton AM Jr.,

Objective: With reductions in the amount of time that Managed Care organizations allow for clinical neuropsychological assessment, interest in screening procedures has increased. Work by Reitan and Wolfson (2006) has demonstrated that a 30 min short battery composed of the Trail Making Test, Finger Tapping Test and Tactile Form Recognition Tests can accurately predict performance on the full Halstead–Reitan Neuropsychological Test Battery (HRNTB) in adults. Horton (2006) cross-validated Reitan and Wolfson's (2006) results in a small adult brain injured sample. This abstract describes an application of the Reitan and Wolfson screening procedure for adults with a large sample of brain injured adults. Methods: A sample of 52 brain injured adults (44 males, 49 subjects were right handed) who had been administered the complete HRNTB was composed (age $M = 42.6$, S.D. = 16.4; education $M = 13.2$, S.D. = 4.2). Types of brain injury included head trauma (18), Brain Tumors (10), Cerebrovascular accidents (9) Multiple Sclerosis (3), Alzheimers Disease (2) among other dementias. Results: Screening procedure values were calculated and for the combination of Phase I and II, 92% of the subjects were correctly identified as brain injured. Conclusions: The results are comparable to the earlier results of Reitan and Wolfson (2006) and Horton (2006) with different samples of brain injured subjects. The screening procedure was cross-validated without showing a decrease in hit rate suggesting the screening

procedure may be helpful in screening patients to determine which patients should be given full neuropsychological evaluations.

C65

Neuropsychological profile analysis on three NAB modules: Attention, memory, and executive functions

Brooks BL, Iverson GL, White T

Objective: The Neuropsychological Assessment Battery (NAB; Stern & White, 2003) can be used as a fixed or flexible battery. The purpose of this study is to illustrate how often healthy adults obtain low scores (Neuropsychological Profile Analysis) when only three of the five NAB modules are administered: Attention, Memory, and Executive Functions. These three modules yield 25 *T*-scores and 3 Index scores. Methods: Participants were 1269 adults between 18 and 79 years old (mean age = 55.1, S.D. = 17.8) selected from the normative sample. Results: When the three index scores were considered simultaneously, 29% of healthy adults had 1 or more scores 1 S.D. below the mean and 11.3% had 1 or more scores at or below the 5th percentile. When the 25 primary test scores were considered simultaneously, 83.3% of the sample had one or more scores below −1 S.D., 65.8% had 2 or more, and 29.2% had 5 or more. Using 2 S.D.s below the mean as a cutoff for impairment, approximately 33% had at least 1 impaired score and 7.1% had 3 or more impaired scores. Low scores were more common with lesser intellectual abilities. For example, 35% of healthy adults with low average intellectual abilities obtained 2 or more scores below 2 S.D. compared to 3.6% of adults with superior/very superior intellectual abilities. Conclusions: Knowing the base rates of low scores on these three NAB modules will help to reduce over-interpretation of isolated low scores.

C66

Virtual Reality Cognitive Performance Assessment Test: Initial validation for assessment of memory functioning

Parsons TD, Rizzo AA, Bamattre J, Brennan J

Objective: While standard neuropsychological measures have been found to have adequate predictive value, their ecological validity may diminish predictions about real world functioning. Virtual environments (VEs) are increasingly recognized as an ecologically valid tool for neuropsychological assessment. We attempted to validate a VE assessment of learning and memory, the Virtual Reality Cognitive Performance Assessment Test (VRCPAT). We examined convergent and discriminant validity and hypothesized that the VRCPAT's Learning and Memory scores would correlate with traditional measures of learning and memory, but not with measures involving potential confounds (i.e., executive functions; attention; processing speed; and verbal fluency). Methods: The 15 min VRCPAT battery and a 1.5 h in-person neuropsychological assessment were conducted with a sample of 30 healthy adults, between the ages of 21 and 36, that included equivalent distributions of men and women from ethnically diverse populations. No subjects had history of psychiatric or neurologic conditions. Results: Results supported both convergent and discriminant validity. VRCPAT correlated significantly with traditional neuropsychological Learning ($r = 0.69$, $p < 0.001$, 48% of variance) and Memory ($r = 0.67$, $p < 0.001$, 45% of variance) composites. No significant correlations existed between VRCPAT measures and non-memory composites: Executive Functions; Attention; Processing Speed, Verbal Fluency. Conclusions: Findings suggest that the VRCPAT measures a capacity consistent with that of traditional measures of learning and memory; and is inconsistent with potential confounds. We conclude that the VRCPAT is a valid test that provides a unique opportunity to reliably and efficiently study memory function within an ecologically valid environment.

C67

Are there sex differences on the CNS Vital Signs computerized neurocognitive battery?

Brooks BL, Iverson GL, Ashton V, Johnson LG, Gualtieri C

Objective: Normative test scores often are corrected for demographic variables that can have an impact on neurocognitive abilities (e.g., sex, age, education, and ethnicity). The purpose of this study is to determine whether there are gender differences on a computerized neurocognitive test battery, the CNS Vital Signs (Gualtieri & Johnson, 2006). Methods: Participants were selected from a large normative database. They were 100 healthy adults between the ages of 18 and 68 (mean age = 35.8 years, S.D. = 13.6) with 15.5 years of education (S.D. = 2.2). Men ($n = 50$) and women ($n = 50$) were individually and precisely matched on age, education, ethnicity, computer familiarity, English as a first language, occupation, and handedness. All participants completed the CNS Vital Signs. This battery of seven tests yields 23 test scores, five domain scores (Memory, Psychomotor Speed, Reaction Time, Complex Attention, and Cog-

nitive Flexibility), and a total score. Results: Men had significantly higher scores than women on the Finger Tapping test for the right hand [$t(98) = 2.84$, $p = .006$, Cohen's $d = .57$]. No other test scores were significantly different between men and women, although there were small-medium effect sizes in favor of women on the number correct on Symbol Digit Coding ($d = .39$) and on Verbal Memory ($d = .37$). There were no significant differences on the five domain scores. Conclusions: An isolated sex difference was found for finger tapping speed for the right hand. In general, carefully demographically-matched men and women perform very similarly on this computerized test battery.

C68

Variance explained by elevation and scatter in profiles of the Stanford-Binet, 5th Edition (SB5)

Schmitt AL, Livingston RB, Jennings E, Reynolds CR, Norton SG

Objective: Psychological test profiles have three dimensions: elevation which is the mean of the profile elements; shape which is the pattern of high and low points across elements; and scatter which reflects how dispersed elements are from the profile average. In this study the authors examined the variance explained by elevation and scatter in profiles of the SB5. Method: This study used the standardization test–retest data set described in the SB5 manual. This data set involved 356 participants with a median test–retest interval of seven days. Canonical redundancy analysis was used to estimate the proportion of profile variance explained by elevation and scatter. Results: Canonical redundancy analysis of SB5 subtest profiles indicate that approximately 51% of the variance was explained by profile elevation. Less than 1% of the profile variance was explained by scatter. While shape cannot be directly estimated, the 48% of profile variance not explained by elevation and scatter can be attributed to profile shape and measurement error. Conclusions: Previous research has shown that of the three profile dimensions, elevation is the most stable, followed by shape, then scatter. Evidence that elevation accounts for a large proportion of profile variance, and is also the most stable dimension, argues against interpretative approaches that remove it from consideration (i.e., ipsative profile analysis). The evidence that profile scatter accounts for a small proportion of the variance is favorable from a measurement perspective since it is the least stable dimension.

C69

Preliminary norms for 85-99 year olds on the Memory Test for Older Adults (MTOA:S)

Hubley AM

Objective: The study purpose was to provide preliminary norms for 85–99 years old adults on the Memory Test for Older Adults: Short (MTOA:S) Word List and Figure to supplement those provided in the manual for adults ages 55–84 years. Methods: The sample consisted of 35 adults ages 85–99 years ($M = 88.8$, $s = 3.7$) with 4–21 years of education ($M = 11.7$, $s = 4.1$). Participants were recruited through local organizations, seniors' buildings, local newspaper, and personal contacts in a rural community. Individuals with a history of stroke, head injury, or multiple cognitive risk factors were excluded as were individuals with low MMSE scores given their education or scores >13 on the Geriatric Depression Scale (GDS). Participants typically were tested in one session. Results: Internal consistency estimates for MTOA:S subtest scores and inter-scorer reliability estimates for the figure subtest were satisfactory. The sample showed considerably lower raw score performance on both subtests relative to the next youngest group (75–84 years) in the manual. Norms were reported for learning and retention scores on the MTOA:S Word List and Figure using cumulative percentiles. Conclusion: The MTOA:S Word List and Figure raw score performance by this sample clearly demonstrates the need to extend the norms provided in the manual to include this age group. This study provides preliminary MTOA:S norms for adults ages 85–99 years and recognizes that obtaining a larger normative sample will increase confidence in the study findings.

C70

The clinical utility of the Mini-Mental Status Evaluation when assessing decision-making capacity

Pachet A, Newberry A

Objective: The main objective of this study was to determine if cognitive deficits, as measured by the Mini-Mental Status Evaluation (MMSE), can accurately predict decision making capacity. An additional question addressed in this study was determining if the sensitivity and specificity of the MMSE varied based upon the patient population assessed. Methods: A sample size of 120 was obtained, with patients having completed the MMSE within one week of the capacity evaluation. Sixty-seven patients were in the community and 53 were from acute care. The most frequent diagnostic groups were Dementia NOS, traumatic brain injury, Vascular Dementia, and alcohol dependence.

Additional data points collected were MMSE scores and determinations of capacity made the clinician. The MMSE is an extensively researched brief cognitive screen and the FI is a semi-structured clinical interviewed often viewed as the gold standard when making a capacity determination. Results: Using the FI and a MMSE cut-off score of 24 revealed an unacceptably high rate of type one errors and poor specificity. Sensitivity and specificity did not start to approach acceptable levels until cut-off scores were moved toward the extreme (e.g., <18). Sensitivity and specificity remained poor across diagnostic groups, but were significantly poorer for patients diagnosed with psychiatric illness. Conclusions: The use of the MMSE as a stand alone tool to assess decision making capacity is not recommended. False positive rates are unacceptably high and hit rates are unacceptably low at both extremes of the MMSE (e.g., scores less than <18 and scores >28).

C71

Construct validity evidence for the Memory Test for Older Adults (MTOA:S) with a much older sample

Hubley AM

Objective: The study purpose was to examine the construct validity of the Memory Test for Older Adults (MTOA:S) Word List and Figure subtests by (a) examining their factor structure, and (b) correlating them with age, education, WMS-III Logical Memory (LM) and Brief Visuospatial Memory Test—Revised (BVMT-R) scores. Methods: The sample consisted of 58 men and women ages 69–99 years (Mdn = 84) recruited through local organizations, seniors' buildings, local newspaper, and personal contacts in a rural community. They were administered a mental status exam, depression screen, WAIS-R Vocabulary, MTOA:S Word List and Figure, LM, and BVMT-R. Results: A single factor accounted for learning and memory scores on both MTOA:S subtests. Correlations of the Word List and Figure with age were moderately negative whereas, with years of education, they were low and non-significant. Correlations between the verbal measures (Word List and LM; $r = .47–.72$) and between the visuospatial measures (Figure and BVMT-R; $r = .60–.70$) were only slightly higher than those between the verbal and visuospatial measures (i.e., Word List and BVMT-R, Figure and LM; $r = .41–.64$). Correlations between Word List and Figure showed a similar pattern. Conclusion: These results provide additional evidence to support the construct validity of the MTOA:S. They also suggest, however, that verbal and visuospatial performance may be more highly related in an older sample as compared to the original normative group (ages 55–84 years; Mdn = 69).

C72

FSIQ and GAI in ability-memory discrepancy analysis

Ryan JJ, Glass LA

Objective: Clinicians examine discrepancies between WAIS-III and WMS-III composites to determine whether an examinee's ability to acquire new material is consistent with overall intelligence. The General Ability Index (GAI) has been offered as a more accurate assessment of ability than the FSIQ. To test this assertion, we compared GAI-WMS-III with FSIQ-WMS-III discrepancies in patients with memory complaints. The primary question is whether the GAI-WMS-III and FSIQ-WMS-III comparisons yield similar results. Method: Inpatients with substance abuse disorders ($N = 138$) served as participants. Means for age and education were 47.01 years and 12.58 years. The FSIQ and GAI and the WMS-III Immediate Memory and General Memory indexes were obtained. A Delayed Memory Index (DMI) was also calculated (Tulsky et al., 2004). Difference scores were obtained for the GAI-IMI, GAI-DMI, GAI-GMI, FSIQ-IMI, FSIQ-DMI, and FSIQ-GMI. Results: When compared to each WMS-III index, the GAI consistently produced larger discrepancy scores than did the FSIQ. Case-by-case comparisons of the GAI-GMI and FSIQ-GMI agreed 85% of the time. The GAI-DMI and FSIQ-DMI discrepancy scores yielded an 82% concordance rate, while the GAI-IMI and FSIQ-IMI revealed 86% concordance. Conclusion: The GAI-WMS-III discrepancies consistently resulted in larger difference scores compared to the FSIQ-WMS-III discrepancies. The GAI may be more useful than the FSIQ for making ability-memory comparisons.

C73

Concurrent validity of the IDS-SR with the MMPI-2 in epilepsy

Osuji J, Van Ness P, Agostini M, Cullum CM, Lacritz LH

Objective: The Inventory for Depressive Symptomatology, Self Report (IDS-SR; Rush et al, 1996) is used in clinical studies of depression (30 items, max score = 84), although its use in neurologic populations has been limited. Concurrent validity of the IDS-SR was examined via comparisons with the MMPI-2 in a mixed epilepsy sample. Method: Subjects

included a consecutive series of 197 individuals with epilepsy referred for neuropsychological evaluation as part of a comprehensive assessment of their seizure disorder [*M* age = 37.2 (11.0), *M* education = 12.6 (2.5)]. Results: IDS-SR scores fell in the mildly elevated range [24.9 (13.1)], as did Scale 2 [66.6 (13.8)]. Thus, as expected, the IDS-SR was significantly correlated with Scale 2 (Depression) of the MMPI-2 [$r = .59$, $p < .0005$]. However, the IDS-SR was also highly correlated with Scales 7 and 8 [Scale 7 ($r = .67$, $p < .0005$), Scale 8 ($r = .69$, $p < .0005$)]. Conclusion: Results support the utility of the IDS-SR as a measure of depression in epilepsy. The higher correlations with MMPI-2 Scales 7 and 8 versus Scale 2 may reflect the item overlap between certain MMPI scales, the fact that some MMPI items are frequently endorsed by individuals with neurologic symptoms, and the possibility that some IDS-SR items may relate to anxiety. Therefore, as a screening measure of mood, the IDS-SR may capture symptoms of emotional distress in an epilepsy population that go beyond depression.

C74
The Cleveland Card Sorting Test

Poreh AM, Fishman DM, Yocum AA

Objective: The goal of the study was to develop a new card sorting test possessing robust psychometric properties, such that it will serve as an alternative to the Wisconsin Card Sorting Test (WCST). Method: Initially, various combinations of novel card designs, sorting rules and number of sorting categories were qualitatively and statistically examined by the first author until an optimal paradigm was achieved. Next, the new measure, the Cleveland Card Sorting Test as well as the WCST, were administered to a large random sample in the general population, a sample of college students, and a sample of independent living elderly. Results: Initial statistical analysis showed that the new measure possesses moderate split half reliability. Additional analyses showed that the new measure correlates highly with the WCST, confirming its construct validity. Conclusion: The results suggests that the Cleveland Card Sorting Test posses appropriate psychometric properties. However, additional research using clinical population, such as patients suffering from lateralized frontal lobe lesions, is needed prior to its adoption by clinicians.

C75
Application of informatics to commonly used neuropsychological Tests

Poreh AM

Neuropsychologists have long been interested in discerning the strategies subjects employ to solve neuropsychological tests. Until recently, however, much of this work has relied on qualitative observations. In the past decade, a growing number of studies have attempted to quantify the process approach, leading to the emergence of a new paradigm, the Quantified Process Approach. This approach, however, has been hindered by the use of pencil and paper as the means of data collection data. In this presentation, the QPA will be reviewed and a novel platform that employs informatics (the combination of "information" and "automation",) will be introduced. It will be argued that the application of informatics to commonly used neuropsychological tests will increase our understanding of such tests through the creation of new data driven algorithms and models. Examples of such models and new and exciting psychometric data regarding within task strategies on widely used measures, such as the Trails Making Test, Five Points Test, RAVLT, and GPT, will be described.

C76
The Lebby-Asbell Neurocognitive Screening Examination for Children (LANSE-C) and for Adolescents (LANSE-A)

Lebby P, Asbell S

The Lebby-Asbell Neurocognitive Screening Examination for Children (LANSE-C) and the Lebby-Asbell Neurocognitive Screening Examination for Adolescents (LANSE-A) were developed as tools to help clinicians identify areas of relative weakness involving cognitive functioning in children ranging in age from 6-years to 11-years and adolescents from 12-years to 18-years. The instruments consist of 14 sections, each designed to measure different cognitive abilities. Tasks given as part of the administration of the LANSE-C and LANSE-A involve cognitive skills related to the following: Level of Consciousness, Orientation, Verbal Memory, Visual Memory, Passive and Sustained Attention, Active

Attention or Working Memory, Speech and Language (Receptive and Expressive), Verbal Reasoning, Visual-Spatial Reasoning, Judgment, Visual-Motor Integration, and Visual Neglect. The measures come complete with a scoring table based on age-based expectancies for each of the subtests. Plotting a patient's score on the table will immediately provide the examiner with information relating to weather the score is within the normal range for that age group, or outside of the normal range, suggesting a relative limitation or deficit. Observing the profile of scores can assist the clinician in determining whether additional assessment is necessary, in addition to providing an overview of pertinent strengths and weaknesses.

Poster Session D

AGING AND DEMENTIA: ALZHEIMER'S DISEASE

D1

Psychometric misdiagnosis of amnestic MCI in healthy older adults: Part I. WMS-III Primary and Index Scores

Brooks BL, Iverson GL, Holdnack JA, Feldman HH

Objective: The psychometric criterion for identifying amnestic mild cognitive impairment (aMCI) requires having an objective impairment in memory (i.e., generally 1.5 standard deviations (S.D.) below the mean). However, researchers have reported that healthy older adults will obtain low scores when multiple memory measures are administered (Brooks, Iverson, & White, 2007; Palmer et al., 1998), and there is a substantial risk of psychometrically misdiagnosing aMCI. The present study examined the base rates of low memory scores in older adults on the Wechsler Memory Scale, Third Edition (WMS-III; Wechsler, 1997). Method: Participants included older adults (55–87 years; $N = 550$) from the WMS-III standardization sample. The WMS-III consists of 6 primary co-normed memory tests that yield 11 age-corrected standard scores and 8 age-corrected Index scores. Results: When 10 primary scores (Auditory Recognition not included) were examined simultaneously, 30.3% of older adults had one or more low scores (−1.5 S.D.s). Obtaining low memory scores occurs more often in older adults with lower education and lesser intellectual abilities. For example, 52.9% with low average intellectual abilities obtained one or more low memory scores (−1.5 S.D.s). When the 8 Index scores were examined simultaneously, 16.3% of older adults obtained 1 or more low Index scores (−1.5 S.D.s). Similarly, low Index scores are more common in lower education and lesser intellectual abilities. Conclusion: Understanding the base rates of low scores can reduce over-interpretation of low memory scores and minimize false positive diagnoses of aMCI.

D2

Psychometric misdiagnosis of amnestic MCI in healthy older adults: Part II. An abbreviated WMS-III Battery

Brooks BL, Iverson GL, Holdnack JA, Feldman HH

Objective: Many clinicians prefer to use only a few memory tests, combined with other neurocognitive tests, when assessing patients for amnestic mild cognitive impairment (aMCI). The present study examined the prevalence of low memory scores in older adults on an abbreviated version of the Wechsler Memory Scale, Third Edition (WMS-III; Wechsler, 1997), which contains three tests (Logical Memory, Visual Reproduction, and Word List) and produces eight age-corrected standard scores (Logical Memory I, Logical Memory II, Visual Reproduction I, Visual Reproduction II, Visual Reproduction Recognition, Word List I Total Recall, Word List II Total Recall, Word List II Recognition). These measures likely represent a typical memory battery administered to older adults with suspected aMCI. Methods: Participants included older adults (55–87 years; $N = 550$) from the WMS-III standardization sample. Results: When the eight age-corrected scores were examined simultaneously, 28.4% of older adults had one or more low scores (i.e., 1.5 S.D.s below the mean). Obtaining low memory scores occurs more often in older adults with lower education and lesser intellectual abilities. For example, 48.6% of older adults with low average intellectual abilities obtained one or more low memory scores (−1.5 S.D.s) compared to 12.2% with high average intellectual abilities. The potential to psychometrically misdiagnose aMCI is substantial. Conclusion: Clinicians and researchers should understand the base rates of low memory scores, and be careful to not over-interpret low memory scores, in order to minimize false positive diagnoses of aMCI.

D3

Olfactory dysfunction distinguishes amnestic-type mild cognitive impairment from dementia syndrome of depression

Koenitzer JC, Webbe FM

Objective: Measurement of olfactory functioning has emerged as a promising supplemental assessment tool in the diagnosis of Alzheimer's dementia. The present study investigated the sensitivity of olfactory measures to the earliest, preclinical stages of AD, that is, amnestic-type mild cognitive impairment (MCI). The purpose of the study was to determine whether olfactory measures are effective in discriminating MCI from dementia of psychogenic origin (i.e., dementia syndrome of depression (DSD). Method: Thirty-seven patients assessed for possible memory problems at the East Central Florida Memory Disorder Clinic between 2005 and 2006 were recruited and assigned to one of three groups (MCI, DSD, and healthy controls) based upon objective inclusion criteria. These criteria included performance on the DRS-2, the Geriatric Depression Scale, Logical Memory I and II from the WMS-R, interviews with informants, and medical/psychosocial history. Commercially available psychophysical tests of odor detection and odor identification (Sniffin' Sticks) were administered within the same session as the other assessments. Results: Olfactory measures proved to be sensitive discriminators of the participants included in the three groups. A MANCOVA (with age as the covariate) comparing the groups was significant with odor threshold and odor identification each differentiating the MCI group from both the DSD and control groups, Pillai's Trace (used due to the small sample and unequal group sizes) = .51, $F(4, 56) = 4.79$, $p < .01$. Conclusion: Olfactory measures are sensitive to the preclinical AD changes associated with MCI and are effective in distinguishing MCI from a DSD condition.

D4

Verbal memory deficits and changes among those at risk for Alzheimer's disease

Rogers SA, Miller KJ, Siddarth P, Ercoli L, Small GW

Objective: This study cross-sectionally and longitudinally examined the verbal memory of asymptomatic individuals with a preclinical risk for developing Alzheimer's disease (AD), either by virtue of a family history of AD or posession of the APOE-4 allele. Method: Three hundred and seventy-four participants responded to newspaper advertisements and completed a neuropsychology battery. Of the 289 who received genetic testing, 42% were either heterozygous or homozygous for the APOE-4 allele. Twenty-one participants were then evaluated four times across an average of 4–6 years. Results: Those with APOE-4 had significantly lower scores than those without APOE-4 on two verbal memory tasks: (a) total recall of the Bushke Selective Reminding test, $F(1, 244) = 4.10$, $p < .05$, and (b) immediate recall of the WMS-III Logical Memory, $F(1, 171) = 3.91$, $p < .05$. Longitudinally, there was a significant interaction between age and genetic risk factor for Buschke total recall, $F(1,19) = 4.31$, $p = .05$, and Bushke long term storage, $F(1, 19) = 17.15$, $p < .001$. Specifically, verbal memory declined with advancing age among those with a genetic risk factor for AD. Conclusions: Those with a genetic risk for AD appear to have reduced verbal memory relative to those without this risk and exhibit greater declines in verbal memory as they age. Subtle deficits in verbal memory may therefore represent preclinical signs of AD, and these deficits are likely to decline further with age, perhaps increasing the risk for AD at an earlier age.

D5

Staging dementia severity with CDR Sum of Box scores: An investigation by the Texas Alzheimer's Research Consortium (TARC)

O'Bryant SE, Waring S, Cullum CM, Hall J, Lacritz LH, Massman P, Doody R, Lupo P, Reisch J

Objective: The Clinical Dementia Rating Scale (CDR) is commonly administered in clinical and research settings for staging dementia severity; however, little has been published regarding the utility of the Sum of Box scores (CDR-SB) relative to the Global score (CDR-GS) for this purpose. This study investigated the effectiveness of the CDR-SB score in staging dementia severity as compared to the CDR-GS. Method: There were 1602 participants (Controls $n = 113$, MCI $n = 217$, Probable AD $n = 1272$) in the TARC Minimum Dataset available for analysis. Subjects were randomly assigned into the training or validation samples. ROC curves were generated to determine optimal CDR-SB cut-scores and ranges and scores were then applied to the validation sample. Similar results were generated for the MMSE. Results: Optimal ranges of CDR-SB scores corresponding to the CDR-GS were 0.5–3.5 for CDR-GS = 0.5, 4–9 for CDR-GS = 1.0, 9.5–14.5 for CDR-GS = 2, and 15–18 for CDR-GS = 3. When applied to the Validation sample, Kappa

scores ranged from 0.82 to 0.95 ($p < .001$ for all ranges) with an 86% overall classification agreement compared to 44% overall agreement for the MMSE. Conclusions: Our findings suggest that the CDR-SB provides a more reliable measure of dementia severity than the MMSE and may have greater utility in tracking changes within and between stages of dementia severity than the CDR-GS owing to the increased range of scores.

D6

Differences between UDS Logical Memory and the CVLT II in discriminating levels of cognitive impairment

Triebel K, Viamonte S, Griffith H, Hebert K, Harrell LE, Clark D, Brockington J, Marson DC

Objective: The National Alzheimer's Coordinating Center mandates use of an abbreviated WMS Logical Memory test (LM). We compared the ability of this LM version with the CVLT-II in detecting cognitive impairment. Method: Twenty AD patients, 45 MCI patients, and 51 neurologically normal controls participated. There were no differences for age, sex, race, or years of education among groups. The UAB Alzheimer's Disease Research Center diagnosed MCI patients (Mayo criteria) and AD patients (NINCDS/ADRDA criteria). Using baseline neuropsychological test scores, receiver operating characteristic (ROC) curves were used to compare the discriminative ability of the LM immediate and delayed recall and the CVLT-II short- and long-delay free recall. Results: Control vs. MCI: Both LM and CVLT-II discriminated between MCI and controls with a high degree of accuracy (AUC; 0.80) with areas under the curve (AUC) ranging from 0.81 to 0.90. However, the CVLT-II long-delay free recall was significantly better than the LM delayed recall at discriminating between MCI and controls ($z = 1.97$, $p < .05$). MCI vs. AD: The CVLT-II was better at discriminating AD from MCI, although this was not statistically significant. For the CVLT-II, AUC ranged from 0.85 (short delay free recall) to 0.82 (long delay free recall), whereas for LM, both immediate and delayed recall AUCs were 0.76. Conclusion: Both UDS LM and CVLT-II are able to differentiate MCI from controls with a high degree of accuracy, but the CVLT-II appears to do so better.

D7

Accuracy of informant-based reports about patients with Alzheimer's disease differs by type of questionnaire administered

Dave J, Vigen C, McCleary CA

Objective: To determine the relative accuracy of an open-ended interview versus a closed-ended questionnaire in obtaining information about AD patients from family informants. Method: The sample included probable AD patients and a family informant (e.g., children, spouses) obtained from a longitudinal study at USC's Alzheimer's Disease Research Center. Informant report was taken closest to the first testing after AD diagnosis. Two hundred and thirty-eight informants completed an open-ended clinician-administered interview (asking to describe the patients' worst problems). One hundred and thirty-three informants completed the memory and disorientation factors of the Memory and Behavior Problem Checklist (MBPC). Informant answers were dichotomized to reflect either patient impairment or non-impairment. Patients completed standardized neuropsychological tests of memory, visuospatial skills, language, comprehension, and executive functioning. Patients' scores were categorized as impaired (more than two S.D.s below published means) or non-impaired. Informant accuracy was determined by comparing informant reports with patient's neuropsychological performance in related domains. Results: Association of the two informant measures with patient performance on neuropsychological instruments was calculated using chi-square tests. On the open-ended questionnaire, informants failed to endorse patient cognitive problems in any domain (all $ps > .05$). In contrast, informants' responses to the MBPC memory factor items were associated with impaired performance on the CERAD word list learning ($p < .05$). However, the disorientation factor did not relate to patient performance ($p > .05$). Conclusion: Closed-ended, self-administered questionnaires may be more accurate informant measures of patient memory status than open-ended, clinician-performed interviews. Implications and limitations will be discussed.

D8

Functional assessment using the Texas Functional Living Scale in AD and FTD

Long SF, Hester AL, Hynan LS, Weiner M, Cullum CM, Lacritz LH

Objective: The Texas Functional Living Scale (TFLS) is a brief, performance-based measure that assesses instrumental activities of daily living (max score = 52). We explored whether the total score and sub-domains (Dressing, Time, Money, Communication, Memory) of the TFLS distinguish patients with frontotemporal dementia (FTD), Alzheimer's disease (AD), and normal controls (NC). Method: FTD ($n = 15$), AD ($n = 15$) and NC ($n = 19$) subjects

were selected to have similar age, education, and gender distributions, and FTD and AD participants were matched for level of cognitive impairment based on MMSE scores [$M = 24.9$ (3.7) and 24.8 (3.7), respectively]. ROC analyses were conducted for TFLS total score and each sub-domain. Results: NCs performed significantly better on the TFLS (median = 50, range: 41–52) than AD (median = 38, range: 18–52) and FTD (median = 42, range: 13–50) subjects [Kruskal–Wallis, $p < .0001$]. Total TFLS scores were able to differentiate NC from AD and FTD [AUC = 0.895, $p = .0001$, and AUC = 0.881, $p < .0002$, respectively]. Of the five TFLS sub-domains, only Memory demonstrated utility in differentiating AD from FTD subjects [AUC = 0.760, $p < .015$]. Conclusion: Results support the use of the TFLS in dementia populations and highlights the similarities in functional difficulties between AD and FTD in the early stages of dementia, as measured by the TFLS. However, the AD group demonstrated greater impairment in the Memory sub-domain of the TFLS than the FTD group, indicating that some differences do exist between the groups.

D9

Prediction of motor vehicle accidents in older adults enrolled in a study of driving and dementia

Smith MM, Daiello LA, Davis JD, Ott BR

Objective: Research demonstrates that cognitive deficits negatively impact driving performance. This study examined neuropsychological predictors of motor vehicle accidents (MVAs) in older adults enrolled in a longitudinal study of driving and dementia. Methods: One hundred and twenty-eight participants completed on-road testing with a driving instructor, clinical examination, and cognitive testing (every 6 months for dementia patients and at 18 months for controls). Twenty participants were in a MVA in the 3 years prior to study initiation. During the study, drivers deemed unsafe on the driving test or by their caregivers were discontinued. Fifty participants (29 dementia patients and 21 controls) completed 18-month follow-up. At follow-up, 6 of these participants (1 patient and 5 controls) had been involved in a MVA. Results: Logistic regression revealed that poor performance at baseline on finger-tap significantly predicted past MVAs. However, correlation analyses revealed that better baseline MMSE and Trails B performance was significantly related to future MVAs. Compared to participants who did not have a MVA, participants involved in a MVA completed more than triple the car trips per week. Logistic regression with MVAs as the DV revealed that, if number of trips per week (#T) was entered prior to cognitive variables, #T was the only significant predictor ($p < .001$). Conclusion: Our results suggest that older adults participating in a driving assessment program may limit their driving in ways that increase their road safety. Drivers with dementia may benefit from future intervention efforts targeted at regular monitoring of driving.

D10

Behavioral problems and length of cognitive symptoms are associated with burden among caregivers of patients with Mild Cognitive Impairment

Bruce J, McQuiggan M, Williams V, Westervelt H, Tremont G

Objective: Patients with Mild Cognitive Impairment (MCI) have cognitive declines and often report significant behavioral changes. Nevertheless, few studies have examined the impact of MCI on caregiver burden. We examined the relationship between caregiver burden and neuropsychological, behavioral, and emotional functioning in MCI. Methods: The study included 56 individuals who were diagnosed with MCI using Petersen's criteria. Patients underwent a neuropsychological evaluation and completed the Beck Depression Inventory and Cognitive Difficulties Scale. Caregivers completed the Zarit Burden Inventory and the Revised Memory and Behavior Checklist. Results: Nearly 30% of caregivers reported clinically significant burden. Increased burden was associated with a longer course of cognitive symptoms ($r = .59$, $p < .001$), patient reports of worse depression ($r = .35$, $p < .01$) and greater self-reported cognitive difficulties ($r = .36$, $p < .01$). Increased burden was also associated with caregiver reports of worse patient depression ($r = .48$, $p < .01$), behavior ($r = .59$, $p < .001$), and memory ($r = .40$, $p < .01$) problems. Burden was not significantly associated with patients' neuropsychological test performance. Exploratory stepwise regression showed that only length of cognitive symptoms (R^2 change = .37, $p < .001$) and informant report of patients' behavioral problems (R^2 change = .15, $p < .001$) accounted for unique variance in burden. Conclusions: Increased caregiver burden in MCI is associated with a longer course of symptoms and patients' behavioral and emotional difficulties. In contrast, objective neuropsychological deficits are not significantly associated with burden. Results highlight the importance of addressing patients' behavioral and emotional difficulties, as well as caregiver burden, as part of the neuropsychological exam in MCI.

D11

A double-blind, placebo-controlled, randomized trial of the efficacy of dark chocolate and cocoa on variables associated with neuropsychological functioning and cardiovascular health: Clinical findings from a sample of cognitively intact older adults

Crews D, Harrison DW, Wright JW, Holland AK

Objective: Interest in the neurorehabilitative effects of foods high in antioxidants has increased as the older adult population has grown. The purpose of this research was to conduct the first known clinical trial of the short-term efficacy of dark chocolate on the neuropsychological functioning of healthy older adults. Consumption of dark chocolate over a six week time period was predicted to decrease blood pressure and heart rate among older adults, and improve performance on neuropsychological tests. Method: Using a double-blind, placebo-controlled, randomized design, the clinical and physiological effects of cocoa consumption in healthy older adults was investigated. One hundred and one participants underwent screening for physical and neurocognitive impairment for inclusion in the study. Neuropsychological, physiological, and hematological functioning was assessed at the beginning of the test period, and again at 3 and 6 weeks after daily consumption of dark chocolate. Results: Two-factor, mixed analyses of variance revealed no significant group (dark chocolate/cocoa and placebo) by trial (baseline, midpoint, and end-of-treatment assessments) interactions across neuropsychological, hematological, or blood pressure variables. A significant group × trial interaction was found ($F(1, 86) = 9.508$; $p = .003$), indicating that the dark chocolate group exhibited significantly higher heart rate at the 3- and 6-week intervals. Conclusions: The results indicate a need for future research examining the long-term restorative effects of chocolate consumption in healthy older adults. Short-term consumption of dark chocolate may be of limited efficacy in lowering heart rate and blood pressure in healthy older adults.

D12

The Memory Screening Outreach Program: Findings from a large community-based sample of middle-aged and older adults

Crews WD, Harrison DW, Keiser AM, Miller CL, Carmona JE

Objectives: The present study examined the efficacy of a large-scale, community-based program targeting middle-aged and older adults for detection of early age-inappropriate memory impairments. Memory and depression screenings were provided free of charge to individuals who were concerned about possible memory difficulties and/or interested in screening their memory processes. Method: A total of 1000 participants, aged 44–91 (mean age = 68.07 years, S.D. = 9.51), were recruited from Central and Southwest Virginia. The Wechsler Memory Scale-III Word List-I and -II, and Faces-I and -II subtests comprised standardized assessment of verbal and visual memory, respectively. The Beck Depression Inventory-II and Geriatric Depression Scale screened for depressive symptoms. Participants recommended for follow-up evaluations by their health care providers (HCP) were subsequently mailed a follow-up survey. Results: The primary finding indicated that 44.3% of participants were recommended for follow-up evaluations secondary to age-inappropriate memory impairments, depressive/psychiatric symptomotology, and/or significant self-reported neurocognitive complaints. The prevalence of memory impairment reached 20.5% for WMS-III Word List-I subtest- the subtest most sensitive to age-inappropriate memory impairment. Of 443 participants recommended for follow-up, approximately 25% of these participants followed up with their HCP. Conclusions: The results indicate successful identification of age-innappropriate memory impairments, clinically notable depressive/psychiatric symptomotology, and significant self-reported neurocognitive complaints in a large-scale sample of community-dwelling, middle-aged and older adults. The findings reflect positive implications for provision of memory screening services.

D13

Common blood laboratory values are associated with cognition among elderly inpatients referred for neuropsychological testing

Bruce J, Westervelt H, Harrington C, Foster S

Objective: Neuropsychologists increasingly provide consultation to inpatient services. Clinical beliefs suggest that laboratory tests are associated with cognitive changes, though few studies have examined the association between laboratory values and objective cognitive measures in inpatient settings. This study examines the relationship between common laboratory values and cognitive functioning among inpatients referred for neuropsychological testing. Method:

The current study included 127 consecutive elderly individuals referred for bedside inpatient neuropsychological evaluation at a major medical center. Patients with histories of dementia, neurological illness, alcohol dependence, or severe mental illness were excluded. Laboratory values included those drawn at admission and the worst value from admission to neuropsychological testing. Cognitive status was evaluated with the modified mini-mental state exam (3MS). Results: At admission, patients with hyperglycemia ($p < .05$), hypochloremia ($p < .01$), and elevated creatinine ($p < .01$) demonstrated more cognitive deficits than patients with normal laboratory results. When examining patients' worst laboratory values during their hospitalization, hyperglycemia ($p < .01$), leukocytosis ($p < .01$), low hemoglobin ($p < .001$), elevated blood urea nitrogen ($p < .001$), and elevated creatinine ($p < .01$) were associated with poorer performance on the 3MS. Patients with abnormal laboratory results scored as many as 12 points fewer than patients whose labs were within normal limits. Conclusions: Results support and quantify common clinical beliefs that abnormal labs are associated with global cognitive changes among elderly inpatients. Caution is recommended when diagnosing lasting cognitive difficulties among patients with abnormal laboratory results. Longitudinal investigations would be useful to examine whether the resolution of abnormal laboratory values eventually leads to improved cognitive status.

D14

Sexually-inappropriate behavior in a 75-year-old man: How a literature search trumped neuropsychological assumptions

Hoffnung DS

Objective: With onset of irritability and hypersexuality in older age, might evaluate for: Dementia (e.g., FTD), Head injury, stroke, tumor in frontal lobes, Other: psychiatric, endocrine, disease affecting frontostriatal circuits. Method: Neurology referral. Seventy-five-year-old man. Beginning in February 2006, family reports new irritability and sexually suggestive comments/fondling of grandaughter. Independent in ADLs. Two frontal CHIs—ages 19 and 70: w/HI at 70—bilateral frontal subdurals evacuated. Seizures since age 13—frequency since recent HI: 2/week. Mom—dementia, dad—stroke. Medications: Keppra, Dilantin, Lamictal, Zoloft, baby aspirin. Neuro exam June 2006: no parkinsonism, focal findings, or frontal signs. Lab tests normal. MRI June 2006: Old lacunar infarct, right anterior limb internal capsule, mild WM changes. EEG July 2006: Right temporal focal slowing and occasional sharps. Results: July 2006. Cooperative/appropriate. On neuropsych: Average to Low Average: motor; list recall/recognition; story learning/recall; attention; working memory; naming; letter/category fluency; visuoconstruction; angle judgment; reasoning; practical judgment. Borderline to Impaired: list learning; design fluency; speed of performance and mentation. Conclusion: No suggestion of dementia. Mild frontal dysfunction, severity not consistent w/level of irritability and hypersexuality. Seizures: Hypersexuality rare, but possible—ictal/interictal activity in limbic areas. Iatrogenic: Literature search—side effects of newer AEDs: Epilepsy and Behavior (May 2006): hypersexuality in two patients on lamotrigine. In this patient, Lamictal started 1 month before irritability and hypersexuality. Lamictal discontinued August 2006. No inappropriate behaviors as of February 2007.

D15

RBANS Index scores in geriatric inpatients

Soetaert DK, Heinrichs RJ, Baade LE, Duff K, Schoenberg MR, Mold J, Scott JG, Adams RL

Objective: This study compares individual Index scores on Repeatable Battery for the Assessment of Neuropsychological Status (RBANS, Randolph, 1998) in a geriatric psychiatric inpatient population and an outpatient optimally aging population. Method: While in a geriatric psychiatric hospital unit, 120 participants were given the RBANS. Demographic data were as follows: average age 77 years (S.D. = 8.21, range 60–97) and mean education = 12. Majority of participants were female (82%) and 119 participants were Caucasian. While this sample does not reflect the demographic makeup of the U.S., it is characteristic of the Midwest region. This inpatient data was compared to data from the Oklahoma Longitudinal Assessment of Health Outcomes in Mature Adults study (OKLAHOMA; Patton et al., 2005). Results: One-way multivariate analysis of covariance (MANCOVA) was conducted to determine effect of age and education on RBANS Index Scores of the inpatient population as compared to the community dwelling sample. MANCOVA determined that participants' Index Scores were significantly different in age, sex, and education. Significant differences were found between the two samples on variables of Immediate Memory (IM), Visuospational/Constructional, Language, Attention, and Delayed Memory (DM). A large effect size was found on DM; medium effect was found on all others. Conclusions: Psychiatric geriatric inpatients had significantly different

index scores. The largest difference between the groups was on delayed memory with immediate memory showing less effect. Therefore delayed and immediate memory may be separate constructs in geriatric inpatients.

D16

Gender differences in the clinical presentation of familial frontotemporal dementia

Salamone AR, Macias A, McDowell EJ, Ngo D, Coerver K, Ringholz G, York MK, Schulz P

Objective: We have identified a large family with a high prevalence of FTD and have begun to characterize the differences in clinical phenotype between genders. Methods: Twenty-five family members (11 males and 14 females) underwent a comprehensive neuropsychological assessment. Statistical analyses included K-means cluster analysis (impaired versus non-impaired) and ANOVAs (gender differences). Results: Cluster analysis with a two-group solution demonstrated groups with impaired ($n = 9$) and intact ($n = 16$) cognitive function. Gender representation in the two groups did not differ ($p = .35$). As with typical FTD, attention ($p < 0.001$), executive function ($p = 0.002$), language ($p = .05$), and visuospatial ability ($p < 0.001$) were significantly worse in the affected group. Short-term memory abilities did not differ significantly ($p = .40$). Preliminary results indicate a possible gender difference in the severity of cognitive difficulties. Affected women ($n = 6$) were significantly more cognitively impaired than affected men ($n = 3$) on tests of attention ($p = .002$) and visuospatial abilities ($p = .05$). Conclusion: The cognitive impairment found in our familial FTD cohort is consistent with a typical FTD pattern, highlighting impairments in attention and executive functioning with intact memory abilities. Although results are preliminary given the small sample size, findings present a unique clinical phenotype in terms of the severity of cognitive impairments found in the female members as compared to their male counterparts. Future work will involve characterizing additional family members to ascertain this family's clinical phenotype and to identify the genetic mutation underlying their disorder.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: OTHER

D17

Children with Rolandic Epilepsy (RE) and children with dyslexia do not differ significantly in reading abilities

Murphy PL, Clarke T, Strug LJ, Dorta NJ, Pal DK

Objective: Our Multicenter Genetic Linkage Study of RE reported that RE children and epilepsy-free siblings had reading difficulties. We hypothesized: (1) children with RE do not differ from children with dyslexia in reading; and (2) children with RE will differ from children with dyslexia in attention. Methods: We conducted neuropsychological evaluations on 13 RE children enrolled in study and 17 children with dyslexia seen privately. Subjects were M:F, 17:13, 5–18 years of age. Measurements included: the GORT (reading) and the ADDES, CPT and WCST (attention). The two groups of children were compared with a two sample Wilcoxon rank-sum and against normative means using a one sample *t* test. Results: No differences in reading ability were seen between the two groups (Gort-rate $p = 0.144$, accuracy $p = 0.243$, comprehension $p = 0.276$). In tests of attention, children with RE were worse than children with dyslexia (CPT-consistency $p = 0.018$). Compared to norms: children with RE were impaired in attention/inhibition (CPT-commission errors $p = 0.005$, consistency $p = 0.016$); and, children with dyslexia were impaired in reading (GORT-rate $p = 0.001$, accuracy $p = 0.001$), but not in measures of attention/inhibition. Conclusion: Children with RE and children with dyslexia do not differ significantly in reading measures. Children with RE are worse than those with dyslexia on tests of attention. When compared to a normal population: children with dyslexia perform significantly worse in reading, and children with RE perform significantly worse on measures of attention.

D18

Seeing the tree from the forest: a "trunk and branch" model for assessing depression in Multiple Sclerosis (MS)

Strober LB, Arnett PA

Objective: Depression among the medically-ill is common and poorly understood. Disentangling disease symptoms, reactionary grief, and biological contributors complicates assessment of depression. Assessment of depression in MS is difficult given the overlap of neurovegetative symptoms of depression and MS. The present investigation sought to develop a model to aid in the assessment of depression in MS. "Trunk and branch" models are proposed for use in the medically-ill. Such models suggest that "trunk" items are those common to disease, but may be more severe in the depressed, while "branch" items are independent of disease and indicative of depression. Methods: Seventeen clinically depressed MS, 67 non-depressed MS, and 22 controls were administered a modified Beck Depression Inventory-I. Chi-

square and Mann–Whitney *U* analyses were conducted to determine the disparate frequency and severity of symptoms among these groups. Results: MS patients were more likely to endorse fatigue, indecision, loss of libido, work difficulty, irritability, disinterest, crying, dissatisfaction, and self-criticism than controls ($p < .05$). However, symptoms that best differentiated depressed MS from non-depressed MS were sadness, pessimism, failure, guilt, disappointment, and appetite/weight changes ($p < .05$). Moreover, symptoms of irritability, loss of interest, crying, dissatisfaction, and self-criticism were more severe in the depressed MS than non-depressed ($p < .05$). Conclusions: Findings suggest that not all symptoms of depression are adequate at differentiating depression in MS. Moreover, findings lend credence to the development of a "trunk and branch" model for use in MS and reliance on certain symptoms most indicative of depression.

D19

Cognitive fatigue mediates the relationship between depressive symptoms and self-reported attention, memory, and executive deficits in multiple sclerosis

Bruce J, Arnett PA, Randolph J

Objective: Depression is associated with self-reported cognitive difficulties in MS. However, the differential impact of vegetative and mood/evaluative depressive symptoms on perceived cognitive difficulties is unknown. Moreover, few studies have examined the possible dual roles that depression and fatigue play in patients' perceived cognitive difficulties. We tested the hypothesis that depressive symptoms contribute to fatigue and that fatigue leads to more self-reported cognitive difficulties. Method: The current study included 91 relapsing-remitting and secondary progressive clinically definite MS patients. Depression was measured with the Chicago Multiscale Depression Inventory. Self-reported executive, memory, and attentional difficulties were measured using the Dysexecutive, Memory Functioning, and Meta-Attention questionnaires. Cognitive fatigue was measured using the Cognitive Fatigue subscale from the Fatigue Impact Scale. Results: Higher levels of vegetative depressive symptoms were associated with more self-reported executive ($r = .29$), memory ($r = .40$), and attentional problems ($r = .36$). Mood/evaluative symptoms of depression and perceived cognitive difficulties were not significantly correlated. Worse fatigue was associated with more vegetative depressive symptoms ($r = .45$) and more self-reported executive ($r = .52$), memory ($r = .56$), and attentional ($r = .61$) problems. Fatigue mediated the relationship between vegetative depressive symptoms and self-reported executive, memory, and attentional problems (all p's $< .001$). Conclusions: Results suggest that fatigue mediates the relationship between depression and self-reported cognitive difficulties in MS. Specifically, more vegetative symptoms of depression were associated with more fatigue; in turn, patients with more fatigue reported more cognitive difficulties. Treatment of fatigue or depression may ameliorate perceived cognitive difficulties.

D20

Cogstate in pre-diagnostic Huntington's disease: Sensitivity to disease-related changes

Swain SN, Carlozzi N, Stout JC, Queller S, Solomon AC, Beglinger LJ, Duff K, Miura TK, Langbehn DR, Paulsen JS

Objective: Predict-HD (Neurobiological Predictors of Huntington's Disease; Paulsen et al., 2006) is a prospective, longitudinal study investigating cognitive, motor, psychiatric, and other neurobiological changes associated with pre-diagnostic Huntington's disease (pre-HD). As part of the cognitive assessment for Predict-HD, we used a brief computerized test battery (CogState) to examine whether reaction time and accuracy variables were related to estimates of proximity to disease diagnosis in pre-HD. Method: Four hundred and sixty-five CAG-expanded pre-HD and 56 CAG-normal participants from the Predict-HD study completed the CogState battery. We used CogState variables from four psychomotor speed, two visual learning, one attention task, and one visual discrimination task. Proximity to clinical diagnosis was based on CAG repeat length and age (Langbehn et al., 2004). Results: Closer proximity to clinical diagnosis was associated with poorer performance on all CogState tasks, except for one visual learning task, after controlling for age, sex, education, estimated IQ, and gene status (p's $< .05$). Proximity to disease onset generally accounted for the largest amount of variance for psychomotor speed tasks (partial r^2 ranged from .06 to .13), followed by visual discrimination (partial $r^2 = .08$), visual learning (partial r^2 ranged from .00 to .06), and attention (partial $r^2 = .01$). Conclusions: CogState is sufficiently sensitive to psychomotor deficits in a large pre-HD sample; however, the battery's ability to detect mild decline in other cognitive domains appears to be more limited in this population.

D21

Neurovegetative symptoms in assessment of depression in Multiple Sclerosis

Beeney J, Arnett PA

Objective: Because of overlap between depression and Multiple Sclerosis (MS) symptoms (e.g., fatigue, sleep disturbance), some researchers have suggested that neurovegetative symptoms be excluded from depression assessment among those with MS. However, research on this issue is mixed. We addressed this issue by examining two questions: (a) Are mood, evaluative and neurovegetative symptoms differentially correlated with depression history? (b) Is reliable change in neurovegetative symptoms related to reliable change in other depression symptoms? We hypothesized that neurovegetative, in contrast to mood and evaluative symptoms, would neither be associated with depression history nor reliable change in other depression symptoms. Method: First, in a sample of 53 MS patients, we assessed correlations between depression history and mood, evaluative and vegetative symptoms from the Beck Depression Inventory (BDI) and the Chicago Multiscale Depression Inventory (CMDI). Secondly, using a prospective approach, we assessed the relationships between reliable change over a 3-year period among the three subscales of the CMDI. Results: Depression history was significantly correlated with CMDI ($-.39$, $p < .01$) and BDI ($-.38$, $p < .01$) mood and evaluative symptoms, but not vegetative items (CMDI, $-.23$, ns; BDI, $-.08$, ns). While reliable change in mood and evaluative symptoms were highly associated ($r = .62$, $p < .001$), neither were significantly associated with such change in neurovegetative symptoms. Conclusion: In contrast to mood and evaluative symptoms, neurovegetative symptoms were not related to depression history or reliable change in other depression symptoms, supporting the exclusion of neurovegetative items on depression inventories for MS populations.

D22

Variance in the relative risk of specific psychiatric manifestations in the presence of infectious diseases

Noggle CA, Myers-Pagoria M, Steiner AR, Dean RS

Objectives: Brinkman, Noggle, and Dean (2005) demonstrated the relative risk of psychiatric disorders following specific neurological insult; however, differentiation in the risk of specific psychiatric disorders was not established. Given this, the essential next step is to determine relative risk of different psychiatric (e.g. depression, anxiety, etc.) following a specific neurological/ physical impairment. The current study, investigated the relative risk of different psychiatric manifestations following infectious diseases. It was hypothesized that the rate of specific psychiatric manifestations will differ based on the type of infectious disease possibly secondary to the nature of the said disease. Methods: Relative risk of specific psychiatric disorders occurring in patients diagnosed with an infectious disease was calculated. Participants ($n = 32$) included individuals diagnosed with an infectious disease and no diagnosed comorbid psychiatric disorder and individuals diagnosed with both an infectious disease and a psychiatric disorder. The control group ($n = 19{,}640$), was derived from Robins and Reiger's (1991) Epidemiological Catchment Area Study (ECA). Results: Results indicated patients with infectious disease are significantly ($p < .01$) more likely to present with psychiatric disorders compared to the general population with depression and anxiety representing the most commonly occurring across groups. Additional variance, which will discussed further in the poster, was found in that relative risk of specific psychiatric disorders differed based on type of infectious disease. Conclusions: Results suggest a need to provide additional emotional, if not psychotherapeutic, support for individuals with infectious disease and to be extremely vigilant in monitoring emotional responsiveness.

D23

Relapsing polychondritis: Symptom constellation, central nervous system involvement, and neuropsychological features

Pimental PA, Gregor MM, Scherdell T

Objective: Relapsing Polychondritis (RPC) is an episodic and progressive multi-inflammatory rheumatic disease that can be debilitating, and life-threatening. It is characterized by episodes of inflammation of the cartilaginous tissue, affecting cartilage in multiple systems including the sensory organs, joints, the central nervous system, and the cardiovascular system. RPC may cause symptoms associated with central nervous system dysfunction including: headache, ataxia, confusion, seizures, psychiatric signs, focal weakness/sensation changes, and palsies of or pain in the cranial nerves. Although symptoms can be varied, it is believed that vasculitis is the underlying etiology. The cause of RPC remains unknown and is a diagnostic enigma with no set universal protocol for differential diagnosis. The

occurrence and prevalence of neuropsychological difficulties has not been extensively studied, especially in terms of formal neuropsychological evaluation. Method: The present case study involved a left-handed, 51-year-old, Caucasian female with Relapsing Polychondritis who was referred for complaints of anomia, slowness of processing, attention and concentration difficulties, and recent memory loss. The patient had also suffered an infarct of the right middle cerebellar peduncle and complex-partial seizure disorder. The cause of the stroke and seizure disorder was attributed to CNS vasculitis, which was suspected to result from the RPC. Results: Neuropsychological testing revealed mild neurocognitive deficits characterized by executive function, working memory, speed of information processing, and sensorimotor deficits. Conclusion: Neuropsychological testing proved to be of significant diagnostic import in RPC, both in terms of identifying neuropsychological deficits and facilitating the development of a more comprehensive treatment plan.

D24

Factor analysis of neuropsychological tasks in pre-diagnosed Huntington's disease

Carlozzi N, Stout JC, Langbehn DR, Solomon AC, Queller S, Duff K, Beglinger LJ, Paulsen JS

Objectives: The purpose of this study was to examine the factor structure of a comprehensive neuropsychological battery in individuals with the CAG-expansion for Huntington's disease (HD) using a battery of tests emphasizing executive and psychomotor function, episodic and working memory, olfaction, and emotion processing. Methods: In our sample of 708 participants with the HD CAG-expansion (693 pre-diagnosis [pre-HD] and 15 HD) from Predict-HD, we conducted confirmatory and exploratory factor analyses (CFA and EFA, respectively) on 27 variables targeted to assess eight different cognitive domains. We then computed factor scores and examined their associations with age-based estimates of proximity to clinical diagnosis using hierarchical regression. Results: The hypothesized model was not well supported by CFA; however, EFA revealed 6 factors (accounting for 58.85% of the variance) that are generally consistent with theoretical neurocognitive domains: executive functioning/working memory, psychomotor functioning, verbal functioning, verbal memory, sensory/perceptual functioning, and implicit learning. Estimated proximity to clinical diagnosis (controlling for age, education, and gender) was most strongly associated with psychomotor functioning, followed by sensory/perceptual, and verbal functioning (all p's $< .01$). Conclusions: There is little precedent for predicting whether factor analytic approaches in pre-HD support the commonly used framework for cognitive assessment; however, our findings show that the expected set of neurocognitive domains are identifiable using the Predict-HD cognitive assessment. Analyses with the resulting factor scores suggest that sensitivity in neurocognitive assessments of pre-HD may be enhanced by targeting tests of psychomotor, sensory/perceptual, and verbal functioning.

D25

The relationship of COGNISTAT performance to positive and negative symptom schizophrenia

Valenti ME, Cloud B, Johnson D, McHale TJ, Soper HV

Objective: The purpose was to determine the differential types of cognitive deficit arrays exhibited by positive and negative symptom patients based on their performance on a brief neuropsychological assessment, the COGNISTAT. Method: Data were collected from 82 participants with a diagnosis of schizophrenia and who were receiving outpatient treatment in a county mental health system. All patients were administered the 4-Item Positive Rating Scale, the Brief Negative Symptom Assessment (BNSA), and the COGNISTAT. Four groups were created (high on both scales, low on both, and high on one and low on the other). Results: Negative symptoms were significantly associated with impairments in executive functions, memory, and language and the negative symptom score was positively correlated with scores on eight different scales of the COGNISTAT (all but Orientation and Repetition). No significant main effects were found for positive symptoms. A significant interaction effect was noted. For the two "Low Negative Symptom" categories, respondents with low positive symptoms had higher scores than those with high positive symptoms. The reverse was noted for the two "High Negative Symptom" categories. Those with low positive symptoms had lower scores than those with both high negative symptoms and high positive symptoms. Conclusions: The results of this study were similar to and consistent with those found using more comprehensive batteries. The brief COGNISTAT does a very good job picking up the neuropsychological deficits observed among schizophrenics with negative symptoms and through this is able to discriminate among these important subsets of psychotic people.

D26

Cognitive function in essential tremor

Higginson CI, Wheelock V, Levine D, King D, Pappas C, Sigvardt K

Objective: Essential tremor (ET) is the most common movement disorder, involving postural and kinetic tremor. Although traditionally other neurologic signs and symptoms are thought to be absent, there is evidence that ET patients exhibit cognitive deficits in addition to tremor. The purpose of the current study was to compare the performance of a group of ET patients with that of normal control (NC) subjects on a battery of neuropsychological measures. Method: The ET group consisted of 24 patients (13 female) evaluated at a functional neurosurgery program. Patients were excluded if they had prior neurosurgical intervention or additional neurologic diagnoses. Nine ET patients met criteria for a DSM-IV Depression diagnosis. Average (S.D.) age and education were 70.0 (13.6) and 13.6 (2.4) years, respectively. The NC group consisted of 21 individuals similar to the ET group in terms of age and gender proportion, but having completed more years of education. Analyses of covariance with education as a covariate were computed to compare the ET and NC groups on 17 neuropsychological measures. One-way analyses of variance were computed to compare the performance of depressed and non-depressed ET patients. Results: The ET group performed significantly worse than the NC group on 13/17 measures. On only one measure did depressed ET patients perform significantly worse than non-depressed ET patients. Conclusion: These results provide further evidence that ET patients exhibit cognitive deficits. Although a proportion of patients experience depression, it appears that their mood symptoms cannot fully account for their cognitive dysfunction.

D27

Cognitive profiles in Parkinson's disease and their impact on quality of life

Glisky M, Olson K

Objective: The purpose of the study was to examine neuropsychological profiles among individuals with Parkinson's disease (PD) and to understand how they impact quality of life (QOL). Method: The neuropsychological profiles of our PD sample ($N = 120$) indicated that 12% had pure amnestic difficulties (WMS-III Logical Memory I impaired, intact executive functions), and 21% had pure executive dysfunction (combination of COWAT and Trails B impaired, intact memory). The following groups were formed: Amnestic (AM; $n = 10$); Executive Dysfunction (ED; $n = 16$); Low Both (LB; $n = 24$), and High Both (HB; $n = 39$). Results: Differences were significant at the $p < .05$ level. Education was greater for HB ($M = 16.28$) than both the LB group ($M = 14.58$) and the EF group ($M = 14.56$). On perceived QOL (PDQ-39) both AM ($M = 8.00$, S.D. = 3.61) and LC ($M = 6.27$, S.D. = 3.04) reported more cognitive concerns than the ED group ($M = 3.67$, S.D. = 2.45). The ED group had higher stigma scores ($M = 8.56$, S.D. = 3.50) than either the AM group ($M = 2.33$, S.D. = 3.22) or the HB ($M = 3.36$, S.D. = 3.78) group. Conclusions: Results indicate that there are different cognitive profiles in PD, based on memory versus executive function impairment. In terms of QOL, those with memory difficulties perceived more cognitive difficulties, whereas those with primarily executive dysfunction reported more perceived stigma. Thus, identifying the type of cognitive profile can assist in understanding the impact it has on quality of life.

D28

Cognitive functioning and medical compliance in hemodialysis patients

Williams MA, Donovick P, Burright R, Sklar A

Objective: Compliance with prescribed medical regimens is a multi-factorial problem in End-Stage Renal Disease (ESRD) patients receiving hemodialysis. Hemodialysis patients have also been shown to experience cognitive difficulties as a result of the disease process. The goal of the current study was to examine the relationship between treatment compliance and cognitive functioning in hemodialysis patients. Method: The present study examined compliance rate of 31 ESRD patients during a 3-month period across various treatment demands including; restriction of diet and fluid, medication maintenance and attending hemodialysis sessions. In addition, we examined differences in cognitive functioning between High-compliant (HC) and Low-compliant (LC) patients. Results: The group was found to be the most compliant with attendance and the least compliant with fluid restrictions. Patients in the LC group were more likely to have memory impairments. We found no significant difference between groups on self-reports of psychiatric symptoms or perceived social support. Conclusions: Results suggest that assessment of cognitive functioning should have an important role in future compliance evaluations in ESRD. Future research

needed to clarify the relationship between memory impairment and non-compliance to treatment regimens in ESRD patients.

D29

Neuropsychological evaluation of a practicing physician with mold exposure

Singer R, Gray M

Objective: Differential diagnosis of mold exposed patient to demonstrate an application of neuropsychology to medicine and toxicology. Method: A former chemical engineer, currently employed full time as a board-certified chiropractic doctor, worked with documented excessive levels of neurotoxic mold for 3 years, 3–10 h/day, 5 days/week. Current diagnoses, supported by lab tests, include mold infection and antibodies, including the molds found in the room; elevated oligodendrocyte IgG and IgA; mild obstructive airways disease and hypoxia from occupational exposure; neurologic abnormalities ie re sway balance with eyes closed, and visual field testing bilaterally. Current symptoms included chronic fatigue, loss of erection, irritability, confusion, memory problems. Upon examination, the patient was neurotoxically-symptomatic, with declines in memory, social, physical and occupational activity. Results: Demographic equation pre-exposure IQ, 128 (97%tile); WAIS-III Processing Speed, 58%ile; WMS-III Immediate Memory, 70%tile; Auditory Retrieval, 21%tile; Figural Fluency, 40%tile; Stroop Color-Word, 10%tile, Visual Search and Attention Test, 40%tile, WRAT-II Reading, 50%tile, Beck mild anxiety and depression, and Quick Environmental Exposure and Sensitivity Inventory elevated. Distortion not found, including TOMM (47, 50, 50); Boone et al. Dot Counting, Portland Digit Recognition Test (15/15 correct) and additional malingering tests. NEO Personality testing showed emergence of possible personality disorder (paranoid, obsessive-compulsive, but not anti-social). Conclusions: Mold poisoning in this case probably produced mild neuropsychological decline, autonomic dysfunction and resulting personality disruption. Case description contributes to the scientific picture and clinical evaluation of mold poisoning.

D30

Clinical Implications for Working with and Testing Deaf Elderly Clients

Dean PM, Feldman D, Morere D

Previous research has indicated that psychologists who worked with the deaf elderly population reported working outside their area of competency. Because of the limited number of mental health professionals working with the deaf population, and others not cognizant of Deaf culture, there is an increased risk of misdiagnosis of deaf patients. This presentation will present clinical and ethical implications of test administration when assessing deaf elderly individuals for dementia and other neuropsychological disorders. Information covered will include how aspects of cognition and deafness can affect the outcome of cognitive tests, cultural and language differences with deaf senior citizens (with a brief description of deaf culture, variations in educational backgrounds, and diversity of signed communication within the deaf community), ethical considerations when using an interpreter and potential impacts on test results, evaluation of dementia measures (including the Mini Mental Status Exam and Dementia Rating Scale), potential language issues (including reading level and comprehension ability) that can affect test administration and interpretation of results, and potential impacts (including ethical considerations) of test item modification. This information will help to provide more resources for mental health care professionals who may work with the elderly deaf population. Furthermore, understanding how and why to adjust cognitive tests when working with deaf individuals may help practitioners to provide a more accurate diagnosis.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: PSYCHIATRIC ILLNESS

D31

Cognitive functioning in a clinical sample of patients with post-traumatic stress disorder

Horner MD, Mintzer J, Turner TH, Edmiston K, Brawman-Mintzer O

Objective: Patients with PTSD were compared to patients with other psychiatric disorders, and patients without psychiatric disorder, on neuropsychological measures. Method: Of 441 consecutive patients evaluated in a VAMC, only those exerting adequate effort (using, e.g., TOMM or Portland Digit Recognition Test) were included. Patients with dementia, delirium, or cognitive disorder without psychiatric diagnosis were excluded. Twenty-nine patients had PTSD, 151 had other psychiatric disorders, and 42 had no Axis I or cognitive diagnosis. Mean (S.D.) age was 50.1 (13.1), with

12.8 (2.6) years of education; 94% were male. Groups did not differ in frequency of TBI with loss of consciousness. Tests included WMS-III Digit Span and Mental Control, Trails, FAS, Rey Complex Figure, CVLT-II, and Wisconsin Card Sort. Age differed significantly across groups and was used as a covariate in one-way ANCOVAs. Results: Group differences ($p < .05$) were found on Digit Span, Mental Control, Trails A, Rey copy, CVLT-II total trials 1–5, and WCST percent perseverative errors; except on CVLT-II, participants without diagnoses outperformed PTSD patients, with other psychiatric patients scoring between them. In post hoc contrasts, PTSD patients performed more poorly than other psychiatric patients on Digit Span (contrast estimate = 2.02, $p < .05$, 95% CI 0.36–3.68), with no other differences between these two groups. Conclusions: PTSD patients were impaired relative to participants without psychiatric diagnoses on multiple measures, but showed circumscribed attentional impairment compared to other psychiatric patients. Small sample sizes necessitate that results be considered preliminary.

D32

Prevalence of and risk factors for major depression in an advanced AIDS cohort

Dawes S, Casey CY, McCutchan A, Grant I, Atkinson JH, The HNRC Group

Objective: Despite advances in medical therapy major depressive disorder (MDD) is a prevalent and disabling complication of AIDS. Screening for major depressive disorder (MDD) in advanced disease may be difficult because of cognitive impairment, somatic symptoms, or side effects of treatment. The main aim of this study is to determine the correlates of depressive symptomatology in AIDS and derive potential cut-scores. Methods: We examined scores on the Beck Depression Inventory (BDI-I; Cognitive and Somatic subscales, and Total scale) to neurocognitive function, HIV-related cofactors and presence of mood and substance related disorders in 330 research participants of whom 75% were neuropsychologically impaired and 72% on combination antiretroviral therapy. In a subset ($N = 195$) we compared BDI scores of those with and without MDD based on standardized psychodiagnostic assessment (Psychiatric Research Interview for Substance and Mental Disorders), using Wilcoxon rank sum and Fisher's Exact Test. Results: Depressive symptoms were more frequent and severe in AIDS than in normal populations (16% versus 7%). Although, HIV characteristics, comorbid illness or substance dependence did not influence these findings, cognitively impaired participants scored significantly higher on the Somatic subscale ($M = 7.33$, S.D. = 3.92 versus $M = 6.33$, S.D. = 3.78) and Total score ($M = 16.15$, S.D. = 9.62 versus $M = 13.68$, S.D. = 9.84) than those not impaired. Cut-scores were derived based on impairment. Conclusions: Cut-scores for screening for MDD using the BDI should reflect the increased intensity and incidence of depressive symptomatology in advanced HIV disease accompanied by cognitive impairment.

D33

Borderline intellectual functioning in adult clinical populations

Ferrari M

Objective: Borderline Intellectual Functioning (BIF) is a diagnostic term used when clinical attention is warranted for problems associated with sub-average intellectual performance. By itself it is typically not considered a disability, however, it can be a significant and often under recognized clinical condition or comorbidity. Within a rehabilitation setting, this study addressed the neuropsychological characteristics of adults with BIF. Method: As part of an ongoing referral and evaluation service, the present study targeted three groups of adults with borderline intellectual functioning (primary psychiatric disorders, learning disabilities and physical disabilities). Individuals with acquired brain injury were excluded. Neuropsychological test data were gathered from 560 individuals wherein BIF was identified and investigated. Results: All demographic and test information were compiled and analyzed statistically. The study provides new data on neuropsychological functioning and outcome in adults with a degree of generalized cognitive disorder that is not specifically addressed in educational and clinical environments. Conclusion: BIF affects both children and adults and is associated with reduced or even poor outcomes in psychiatric disorders, school settings and vocational environments. It is an increased risk factor for disability, and limits prognosis for acquired neuropsychological disorders. BIF represents a large segment of the population that is markedly over-represented in clinical settings and one where serious study has been neglected. This presentation is an attempt to begin a course toward increased attention to BIF with implications for a comprehensive neuropsychology of this Axis II V-code.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: TRAUMATIC BRAIN INJURY

D34

Cumulative effects of multiple concussions: A neuropsychological case study

Raymond M

Objective: This case study describes the neuropsychological consequences of a 52-year-old, Caucasian, right handed male who sustained multiple concussions within one week. Method: While concussion is considered the mildest form of traumatic brain injury (TBI) and generally with symptoms subsiding rapidly, consequences from multiple concussions, within days of one another, might prove problematic. This event is frequently referred to as second impact syndrome. PE sustained an initial concussion following a 1-26-06 fall and second concussion following a subsequent fall on 2-2-06. Given the persistent nature of his subjective neurocognitive and behavioral complaints, he was referred for a baseline neuropsychological consultation at eight months post-concussions. Results: Results of PE's neuropsychological evaluation (10-17-06) suggested mildly reduced adaptive abilities as indicated by scores on standardized neuropsychological indices (Halstead Impairment Index 0.6. GNDS 31). Primary deficits were in verbal fluency, recent/delayed verbal memory, recent visual memory, executive functions and RUE sensorimotor abilities. Conclusions: This case study underscores the importance of obtaining baseline neuropsychological data in individuals sustaining multiple concussions and especially in those with persistent symptoms.

D35

Sustained attention and behavioral inhibition among pediatric patients following Traumatic Brain Injury

Hoover HV

Objective: The main purpose of this study was to investigate problems with sustained attention and behavioral inhibition, as measured by the Conners' Continuous Performance Test (CPT-II), for pediatric patients (6–18 years old) status post-Traumatic Brain Injury (TBI). Method: Twelve patients (50% female), aged 7–17 years old (mean = 13.17 years; S.D. = 3.54 years) were included in the study. All 12 patients were referred for an outpatient neuropsychological evaluation following discharge from a Level I Trauma Center. The Conners' CPT-II (Conners, 2000) is a computerized continuous performance test that is intended to detect deficits in with vigilance, sustained attention and behavioral inhibition. Results: Contrary to hypothesis, as a group, the TBI patients in this study did not demonstrate clinically significant attention problems on the CPT-II. On all CPT-II indices, the TBI group's performance was commensurate with the non-clinical sample from the normative data. Chi-square analyses revealed no differences based on GCS. Conclusion: The clinical sample in this study did not demonstrate clinically significant problems on the CPT-II. There are a number of possible explanations for the finding of non-clinical CPT-II performance among the TBI patients in the present study. Limitations of the present study and plausible explanations for the findings are discussed. Small sample size may have led to the lack of finding significant deficits. A more encouraging explanation is: it is possible that adolescents are more resilient than younger children and adults in their cerebral recovery status post-traumatic brain injury.

D36

Understanding the risk taking behaviors of individuals with and without TBI

Vannice JE, Walters-Kemp P, D'Amato RC, Davis AS

Objective: This study was designed to examine the relationship between personality and risk taking in participants with and without traumatic brain injuries (TBI). The goal was to investigate premorbid personality and behavioral characteristics and how those features may have contributed to the occurrence of a TBI. Method: A total of 145 male students varying from 14 to 40 years of age were divided into two groups, not experienced a brain injury and self-reported brain injury group based on their response to self-report questions. All participant were administered the Jackson Personality Inventory-Revised and a Life Activities Questionnaire (LAQ). Results: Multiple regression and stepwise regression procedures were utilized to analyze the data. The results indicated that higher risk-takers were found to score lower on the Traditional Values scale and the Innovation scale of the JPI-R and higher on the Risk Taking scale of the JPI-R. Furthermore, the TBI group was more likely to engage in risky, dangerous, and impulsive behaviors. Conclusion: This study provides insight into the kinds of people who are most likely to take risks which could result in a TBI and similarly supports the notion that persons engaged in high risk-taking behaviors are more

prone to TBI. This study indicates support for the belief that a definite profile exists for persons at risk for a TBI and subsequent areas of research regarding prevention and intervention.

D37

Behavioral change differentiation among neurologic subtypes

Hartlage LC, Williams BL

Objective: There is considerable literature confirming that, while 80–83% of MTBI patients appear to recover without significant neuropsychological sequelae, among the remaining 17–20% there may be long term changes in behavioral status relatively independent of neurocognitive impairment severity. Method: This study compared behavioral change patterns among MTBI, neurotoxic brain injury, general neurologic patients, and controls, to assess whether the behavioral changes documented following MTBI were unique or were typical of problems noted among other diagnostic categories (e.g., Neurotoxicity, General Neurologic) and controls. Results: Totally, 128 patients were studied on pre- versus post-behavioral status, representing 32 patients from each classificatory diagnostic group. Findings confirmed that patients with MTBI showed behavior change patterns different from other diagnostic groups, with up to 94% discriminability between discrete diagnostic groups. Conclusions: It is hypothesized that behavior change patterns can be a useful complement in diagnostic discrimination, as well as providing data useful for treatment and practical management purposes.

D38

Factors affecting work success/failure following TBI

Hartlage LC, Williams BL

Objective: Although potential for return to work remains an important consideration for neuropsychologists who deal with TBI patients, this aspect of sequelae of TBI has received comparatively little study. Method: This project followed TBI survivors over a 20-year period to assess factors contributory to residual disability versus successful return to work. Totally, 72 patients (70% male) who suffered work related TBI were followed, and success/failure at work was compared with comprehensive neuropsychologic and demographic variables. TBI severity ranged from mild to severe, with modal patient demonstrating residual HRNB Impairment Index in the moderate range. Results: Factors most related to job success/failure involved job requirements: jobs requiring sustained alertness and quick decisions in ambiguous contexts (e.g., policemen, correctional officers) were least likely to sustain successful performance, independent of severity; whereas ability to self pace (e.g., owners) or to delegate (e.g., senior managerial) jobs were least impaired, independent of level of severity. Jobs with pace demands externally imposed, or requiring divided attention with pace requirements, such as secretaries) were next most impaired. Conclusions: Motivational factors were less contributory than the job characteristics/demands. Hierarchies of most limiting factors and interactive factors are identified.

D39

Reliability of self/significant other behavior change ratings

Williams BL, Hartlage LC

Objective: Patients seen for neuropsychological assessment following TBI or neurotoxic exposure do not typically have available premorbid data concerning behavioral status. Thus behaviors noted post-event do not necessarily represent change from prior status. The Behavior Change Inventory provides a measure of change form pre-event status, and has been found to produce sensitive differentiation among controls, TBI, and neurotoxic exposure patients. Method: This project compared behavior change ratings made by 209 neurotoxic exposure patients with independent ratings of behavior changes noted by their spouses. IA total of 418 Behavior Change Inventories were involved, each contained 68 behavior change variables. *T*-tests were computed between patient and spouse on ratings of each variable. Results: Significant differences were noted on three variable (i.e., nonsignificant at $p < .05$ level). Conclusions: Data indicate that the Behavior Change Inventory produces reliable congruence between patients and spouses on measures of variables which have changes subsequent to neurotoxic exposure. Specific behaviors showing change following neurotoxic chemical exposure are identified.

D40

Developmental interaction of biologic and demopgraphic factors in neuropsychological function

Williams BL, Hartlage LC

Objective: Separation and identification of biological from environmental factors represents a considerable challenge for neuropsychologists, especially in cases involving such factors as causation/etiology of subnormal neuropsychological findings following putative traumatic or neurotoxic event. Method: This project followed a sample of 386 neonatal intensive care survivors over a period of seven years, with testing of neuropsychological functions every 6–12 months during that period, along with monitoring of environmental factors potentially relevant to mental development. There were 224 African-American, 159 Caucasian children, and three others. Fifty-two percent were male. Demographic records included parental education along with 14 other measures. Multiple stepwise regression coefficients were computed at ages 6, 12, 18, 24, 36 48, 60, 72, and 84 months among demographic and mental development variables, with *T*-tests for independent measures. Results: There was relatively little difference between African American and Caucasian children in the birth to 6 month period, with a major separation becoming significant after 24 months and continuing thereafter in favor of Caucasian children. Differences in test content between early age (i.e., more motor items to more verbal items), along with socioeconomic factors, accounted for considerable variance. Conclusions: Data provide considerable illumination on early developmental substrates of neuropsychological function among Caucasian and African American children, and on the interaction of cultural and physiological phenomena in neuropsychological development among at-risk children.

D41

The role of persistent pain on neuropsychological functioning and community integration in traumatic brain injury

Basile R

Objectives: To examine the role of chronic pain on neuropsychological functioning and community integration among patients with a history of head trauma. Methods: Thirty patients with a history of traumatic brain injury particpating in an outpatient neuropsychological evalaution were administered a set of measures examining level of pain, depression, community integration and neuropsychological functioning. Results: Intial analysis from a pilot study have indicated that at least one of the dependent variables (Trails B) has a correlation of approximately .60 with the independent variable pain. Conclusion: With the incidence of chronic pain in at least one body region ranging as high as 89% among patients with a history of traumatic brain injury, the possibility of serious confounds to the valid interpretation of test results is likely without a proper understanding of the effects of pain.

D42

Gender differences in recovery from sport related concussion

Schnakenberg-Ott SD, Pardini JE, Ryan JJ, Lovell MR

Objective: In the general TBI literature, females tend to exhibit poorer outcomes than males in recovery from injury. However, few studies have explored gender differences in recovery following sports concussion. The purpose of the present study is to assess gender differences in symptoms and neurocogntive recovery following sports-related concussion. Method: The sample consisted of 30 males and 33 females (mean age = 15.49; S.D. = 1.63) who had sustained a concussion while playing either soccer (75%) or basketball (25%). Participants were administered the ImPACT computerized test battery and the Post Concussion Symptom Scale as part of a standard neuropsychological evaluation. Athletes were considered recovered and were returned to play when they were asymptomatic and cognitive scores were within expected limits. Results: There was no significant difference in recovery time by gender, though a trend toward longer recovery in females was observed ($p = .07$). There were no significant gender differences in ImPACT composite scores or total symptom score during initial or final evaluation. Examination of individual symptom report by gender revealed increased endorsement of photosensitivity (Chi Square = 5.42; $p = .02$) and a trend toward increased difficulty falling asleep (Chi Square = 3.65; $p = .056$) in females. Conclusions: Results of this study revealed no significant differences between males and females in terms of days to recover. Overall, both males and females demonstrated a typical decline in cognitive scores after concussion when compared to baseline. These scores appeared to return to pre injury levels when recovered. Few gender differences were found in symptoms endorsed following concussion.

D43

Prediction of psychological outcome one year post-moderate-severe traumatic brain injury

Demakis G, Hammond F, Knotts A

Objective: To prospectively examine psychological outcomes in individuals who suffered a moderate-severe traumatic brain injury (TBI) one year previously. Method: Eighty-eight participants with moderate-severe TBI treated at a large rehabilitation hospital were evaluated at the time of injury and one year later with the Personality Assessment Inventory (PAI). The PAI score was the average of the 11 clinical scales. The following variables were assessed at the time of injury: age, prior drug use, employment status, loss of consciousness, and region of brain damaged (frontal versus non-frontal). The Disability Rating Scale (DRS) and the Functional Independence Measure (FIM) were assessed at the time of discharge from the rehabilitation hospital. Demographic and injury characteristics of the participants were as follows: Age = 36 years, Education = 12 years, Male = 73%, Glasgow Coma Scale = 9.9, Loss of Consciousness = 10 days, Posttraumatic Amnesia = 29 days, and Length of Rehabilitation Hospital Stay = 41 days. Results: A hierarchical multiple regression analysis accounted for 16% of the variance in psychological outcome ($p = .048$), but only age and DRS at rehabilitation discharge significantly predicted psychological functioning. Younger age predicted poorer psychological functioning and worse disability status predicted better psychological functioning. Conclusions: Contrary to hypotheses, prior drug use and employment status, as well as loss of consciousness and brain region damaged did not predict psychological outcome. Younger age and DRS score at discharge, however, predicted PAI scores one year post-TBI. Findings are discussed with respect to previous research and challenges of predicting psychological outcome in TBI.

D44

Language and confusion influence performance on forced-choice recognition scores at one-month post-traumatic brain injury

Nakase-Richardson R, Mani T, Evans C, Sepehri A, Stouter J, Stookey E

Objective: To characterize performance on an effort task in a consecutive series of traumatic brain injury (TBI) patients hospitalized at a fixed-point post-injury. Method: Seventy-six of 119 consecutive TBI Model System admissions to inpatient rehabilitation completed brief neuropsychological testing at one month post-injury. Subjects were primarily male (68%), white (63%), injured in a motor-vehicle collision (75%), with a median education level of 12, and age of 25. Emergency department GCS revealed 49% had severe injuries (GCS = 3–8), 33% had moderate (GCS = 9–12) and the remainder mild. Data reduction techniques to reduce mulit-collinearity resulted in TMT and Animal Naming being selected from neuropsychological testing. Age, GCS, and confusion status (Confusion Assessment Protocol) were also entered into univariable and multivariable logistic regression analyses to predict performance on the forced-choice recognition subtest of the California Verbal Learning Test—2 (CVLT-2 FC-R). Results: Of the 76 study participants, 15 scored below the cutoff on the CVLT-2 FC-R. Examination of univariable effects of predictors for CVLT-2 FC-R revealed Animal Naming ($p < .01$), TMT-A ($p < .01$), and Confusion status ($p < .01$) made significant contributions. Severity of confusion ($p = .05$) and animal naming ($p = .04$) made unique contributions in multi-variable prediction of CVLT-2 FC-R score after adjustment for all other predictors. Conclusion: Verbal fluency testing and confusion are important factors in considering performance on forced-choice testing in more severely impaired patients post-traumatic brain injury.

D45

Lingering effects of concussion in athletes with multiple injuries

Iverson GL, Echemendia RJ, Brooks BL

Objective: There is considerable interest in the possibility of cumulative effects in athletes who suffer multiple concussions. The purpose of this study was to examine whether athletes with a history of three or more concussions perform more poorly on neuropsychological testing, or report more subjective symptoms, during a baseline, preseason evaluation. Methods: An archival database including 786 male athletes who underwent preseason testing with a computerized battery (ImPACT) was used to select the participants. Twenty-six athletes, between the ages of 17 and 22 (mean = 19.7, S.D. = 1.4) with a history of three or more concussions, were identified. Athletes with no history of concussion were precisely matched, in a case–control fashion, on age, education, school, sport, and, when possible, position. Results: The two groups were compared on the four neuropsychological composite scores from ImPACT using multivariate

analysis of variance (MANOVA) followed by univariate ANOVAs. MANOVA revealed no overall significant effect [$F(4, 47) = 1.6$, $p = .19$, observed power = .46). Exploratory ANOVAs were conducted using Verbal Memory, Visual Memory, Reaction Time, Processing Speed, and Post-Concussion Scale composite scores as dependent variables. There was a significant effect for only the Verbal Memory composite ($p = .028$, Cohen's $d = .63$). Nonparametric analysis of the Verbal Memory composite also revealed a significant difference ($p = .005$). Conclusions: Participants in this study were more carefully matched than any previously published study. The results of this study were not definitive. However, there is modest evidence that athletes with multiple concussions could have a lingering adverse effect.

D46

Long-term neuropsychological outcomes of pediatric Traumatic Brain Injury (TBI)

Tangen RB, Taylor G, Yeates KO, Stancin T

Objective: Short-term neuropsychological outcomes after pediatric TBI have been investigated, but longer-term neuropsychological outcomes, especially beyond 5 years post-injury, are unclear. The purpose of this study was to investigate the neuropsychological progression and long-term outcome of pediatric TBI. It was hypothesized that children with TBI would demonstrate poorer neuropsychological performance than children with orthopedic injuries even 5–6 years post-injury. Method: The original sample included 50 children with severe TBI, 53 with moderate TBI, and 80 with orthopedic injuries recruited from 4 Ohio hospitals. Participants were hospitalized for their injuries between 6 and 12 years of age. Initial assessment was conducted soon after injury, with follow-up at 6 and 12 months, and again at means of 4, 5, and 6 years post-injury. Neuropsychological evaluation included measures of intelligence, verbal fluency, naming, sentence repetition, visual motor integration, verbal memory, attention, and executive function. Differences between groups and changes over time were examined using growth modeling analysis. Results: Findings revealed that the severe TBI group had persistent neuropsychological deficits, especially on measures of attention, learning, and memory even 6 years after injury. After the first year post-injury, the neuropsychological effects of severe TBI neither increased nor decreased with advancing age. Attrition was substantial (51% of original sample at 6 years), but results were not altered when completion status was taken into account. Conclusions: We conclude that the effects of TBI on children's neuropsychological functioning persist over time as relatively stable deficits.

D47

Traumatic brain injury, atrophy of the entorhinal cortex and neuropsychological outcome in children

Cleavinger HB, Bigler ED, Wilde EA, Hunter JV, Li X, Levin HS

Objective: Despite well documented evidence of mesial temporal lobe volume loss in moderate-to-severe traumatic brain injury (TBI), including hippocampal atrophy, previous studies have not specifically examined the role of atrophic changes in the entorhinal cortex (EC), the mesial temporal structure with direct hippocampal input. In this study, we compared EC volumes of children who had sustained a moderate-to-severe TBI at least one year earlier with findings in an age-, education- and gender-matched comparison group of uninjured children. Method: Quantitative MR imaging analyses were based on 1.5 T MR imaging and controlled for head size. Right and left EC volumes were measured in 16 children (ages 9–16) and 16 demographically-matched typically developing children (ages 9–16). In addition to EC volume, other major temporal lobe structure volumes were obtained, so the relationship between EC volume and these regions could be examined, along with the relationship of EC atrophy to neuropsychological outcome. Results: After controlling for age and head size differences, EC volume was significantly reduced, bilaterally, in comparison to the control sample. Furthermore, EC volume was robustly correlated with hippocampal volume and significantly related to impaired memory and executive function in the TBI children. Conclusion: As expected, substantial EC focal atrophy occurs in moderate-to-severe TBI. EC atrophy relates to atrophic changes in other mesial temporal lobe structures and likewise relates to impaired cognitive outcome in TBI. Additional implications of understanding the role of EC atrophy to neuropsychological outcome in children will be discussed.

D48

Feasibility of the HeadMinder CSI for screening of blast-injury related cognitive impairment in a combat field hospital

Grant G, Islet W, Erlanger D, Kaushik T

Objective: This study examined feasibility of computerized cognitive screening for field assessment of concussive blast injuries. Method: In 2006, 81 male members of the armed services who sustained blast-concussive type injuries were

administered the CSI within 48 h of injury at a U.S. combat field hospital in Iraq. Four were retested. The mean age of subjects was 26.2 (S.D. = 6.1). Approximately 65% were Caucasian, 10% African American, and 15% Hispanic. Sixty-four percent had high school degrees, and 34% had some completed some or all of college. Forty-eight percent reported history of concussion. The HeadMinder Cognitive Stability Index (CSI) is a 30 min battery that produces standardized reports enabling triage and decision-making appropriate to a user's qualifications. Results: Valid test results were obtained for all 81 patients. Of a total of 324 potential factor scores (4 per patient), 312 were considered statistically valid. Thirty-seven percent had difficulty in one domain, 33% in two domains, 20% in three domains, and 10% in all domains. Attention was most frequently below expected levels (45%), followed by Memory (41%), Processing Speed (31%), and Response Speed (23%). Standardized scores were weighted and summed to form an Impairment Index score. Significant linear trends ($p < .01$) across Impairment classifications were identified for each of the cognitive domains. Illustrative case studies of individuals tested longitudinally demonstrate the clinical utility of the CSI. Conclusion: The CSI appeared to be a feasible computerized assessment system for rapidly assessing concussive blast injuries in hospitals or near combat areas.

D49

Neurological and neuropsychiatric disorders: Traumatic brain injury using the CVLT-II to assess proactive interference in individuals with traumatic brain injury

Lengenfelder J, Smith A, DeLuca J

Objective: To investigate whether proactive interference (PI) could be detected on the CVLT-II in individuals with traumatic brain injury (TBI). Research on the effects of PI in TBI is limited and the findings are inconsistent. Methods: Participants were 15 individuals with moderate to severe TBI (13 males) and 10 matched healthy individuals. PI on the CVLT-II was assessed by two methods reported previously: (1) Recall of items on List B vs. List A Trial 1; and (2) Recall of items on List B shared vs. nonshared categories. Results: In comparing recall of List B to List A Trial 1, an ANOVA revealed that individuals with TBI showed evidence of PI similar to that of the healthy individuals. The two groups did not differ on the two measures of PI from the CVLT-II; PI Percent Change ($p = .10$) and PI z-score Difference ($p = .98$). The analysis comparing List B shared vs. nonshared categories, revealed no evidence of PI in either TBI or healthy groups. Conclusions: Using the CVLT-II, this study detected PI in individuals with TBI using the first method but not the second. Our findings will be presented relative to the existing literature. Previous studies utilized the CVLT to asses PI but the CVLT-II, commonly used in clinical practice, provides the addition of PI standardized measures. PI is an important construct when assessing learning in a population known to demonstrate learning impairments. Therefore, the impact of PI is central to understanding learning in individuals with TBI.

D50

Associations of TBI severity with performance on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)

Dickson S, Stucky KJ

Objective: Early indicators of traumatic brain injury (TBI) such as the GCS and length of post-traumatic amnesia (PTA) have been found to be associated with long-term cognitive and functional deficits. The aim of the current study was to determine whether physical indicators were associated with performance on the RBANS early in the course of TBI, and which factors were the most predictive of cognitive dysfunction. Method: The study was a retrospective chart review of 59 patients admitted to a level-1 trauma center over 5 years with a diagnosis of TBI. Cognitive functioning was measured with the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). On average, neuropsychological tests were administered 31 days after injury. We used multiple regression analysis to investigate the hypotheses, with GCS and PTA as predictors in the model and RBANS subtests and overall index as dependent variables. Results: Results suggested GCS and PTA were significantly associated with the RBANS overall index (p's $< .02$) after controlling for age, education, and length of stay in the hospital. On the individual subtests, PTA was significantly associated with the Immediate Memory index ($p = .003$), Language index ($p = .029$), and Attention/concentration index ($p = .03$). GCS was significantly associated with the Delayed Memory index ($p = .019$). Conclusions: Results demonstrated that both length of PTA and GCS were associated with overall cognitive status early in the course of recovery from TBI. These results have implications for the use of neuropsychological testing in treatment planning early in the course of recovery from TBI.

D51

Neuropsychological outcome following complicated vs. uncomplicated mild traumatic brain injury

Lange RT, Iverson GL, Franzen MD

Objective: Slow or incomplete recovery from mild TBI is poorly understood. It would be logical to assume that patients with intracranial abnormalities (i.e., complicated MTBIs) would have worse outcome than patients without these abnormalities (i.e., uncomplicated MTBIs). However, the literature is limited and somewhat mixed regarding outcome in patients with complicated MTBIs. The purpose of this study is to employ a carefully controlled research design to compare the acute neuropsychological outcome in patients following complicated versus uncomplicated MTBI. Method: Participants were 20 patients with complicated MTBI and 20 patients with uncomplicated MTBI selected from an archival database of 465 patients. Patients were carefully matched on age, education, ethnicity, days assessed post-injury, and mechanism of injury. Patients were assessed an average of 3.5 days (S.D. = 1.9) post-injury with 14 common cognitive variables. Results: There were significant group differences on only 3 of the 14 cognitive measures ($p < .05$; Cohen's $d = .70–.76$; complicated MTBI < uncomplicated MTBI). There were no significant differences in the number of impaired scores between groups on all measures, with the exception of Hopkins Verbal Learning Test Delayed Recall ($p = .038$; complicated = 85%, uncomplicated = 55%). Discriminant function analysis failed to successfully discriminate between groups based on neuropsychological test performance ($p = .405$, correct classification = 70%). Conclusion: Patients with complicated MTBIs performed more poorly only on a small number of tests during the acute recovery period. Overall, neuropsychological test performance failed to differentiate those patients with complicated versus uncomplicated MTBI in this sample.

D52

Effect of blood alcohol level on Glasgow Coma Scale scores following traumatic brain injury

Lange RT, Iverson GL, Franzen MD

Objective: The Glasgow Coma Scale (GCS) is commonly used to evaluate severity of traumatic brain injury (TBI). Although it is a common perception that alcohol intoxication will systematically lower GCS ratings, the research findings in this area are mixed. The purpose of this study is to examine the effects of day-of-injury blood alcohol level (BAL) on GCS scores in patients following TBI. Method: Participants were 357 patients with TBI (71.4% male) selected from a database of 2160 patients from the Allegheny General Hospital Level 1 trauma center. Patients were selected if they (a) were injured in a motor vehicle accident, (b) had an available GCS and BAL, and (c) had a BAL > 0 mg/dl. The sample was classified into four GCS groups (GCS: 15, 13–14, 9–12, and 3–8) and three BAL groups (BAL in mg/dl: 1–100, 100–200, and 200+). Results: There was no significant correlation between BAL and GCS scores ($p > .05$, $r = -.03$). There was no group mean differences in GCS scores ($p = .310$) when compared across the three BAL groups. Similarly, there were no group mean differences in BAL ($p = .182$) across the four GCS groups. A replication analysis using only those patients with GCS of 13–14 revealed no changes in this pattern of results. Conclusion: These results suggest that day-of-injury alcohol intoxication had no significant effect on GCS scores, even in those patients whose BALs were twice the legal limit for intoxication.

D53

Norming the Social Intelligence Test-Revised (SIT-R): New norms and applications

Palucka AM, Celinski MJ, Allen III LM, Salmon, Jr. J, Spik A, Dobrzynski M, Shermer P

Objective: Social intelligence is conceptualized as the ability to function adaptively in social environments. The Social Intelligence Test (SIT) was developed by F.A. Moss, T. Hunt, K.T. Omwake and L.G. Woodward in the first half of the 20th century and includes four subtests assessing social problem-solving, attribution of emotions and motives, understanding social rules, and applying a sense of humor. Although outdated, the SIT has recently demonstrated surprising utility in predicting recovery from traumatic brain injury. The current study provides normative data for a revision of the Social Intelligence Test (SIT-R; Celinski, Salmon, & Allen, 2005) undertaken to modernize its content and improve its psychometric properties. Method: The original SIT and SIT-R were administered to different student populations including 212 first year psychology students at York University in Canada and Arizona State University, 123 Engineering students at Ryerson University, 200 Business Administration students in Poland and 196 patients with a traumatic brain injury. Old and new scoring methods for the SIT-R were compared, as well as content changes and between group performance differences. Results: Results will be presented for each re-standardization group as

well as the combined student sample ($N = 535$). Findings for patients with traumatic brain injury will be presented separately, stratified by head injury severity and compared with students. Conclusions: The updated SIT-R represents an improvement over the original outdated version, and is sensitive to the severity of traumatic brain injury.

D54

Certification for Psychometrists

Malek-Ahmadi M, Gedert V, McCarthy K, Charles M, Lindbergh K, Marsh-Reed J, Fisher-Eastep J, Hansen A, Erickson T

The use of psychometrists in clinical neuropsychology is commonplace and essential in providing timely, accurate, and valid assessments. However, there has been a great deal of controversy regarding the specific education and qualification requirements of psychometrists in clinical settings. Recent legislation from individual states, such as New York, and anticipated changes in health insurance reimbursement underscore the need for a credentialing process for psychometrists. The Certified Specialist in Psychometry (CSP) credential has been created to set forth a standardized credentialing process for psychometrists. The overall aim of the CSP designation is to benefit psychometrists, neuropsychologists, and the public as it serves to increase the level of confidence that the tests given to a patient are administered and scored by an individual who has mastered the requisite knowledge base for the safe, competent, and ethical practice of psychometry. The credential also assures that the certified psychometrist has met minimum standards of training and education.

NEUROLOGICAL AND NEUROPSYCHIATRIC DISORDERS: TREATMENT AND REHABILITATION

D55

How to develop successful school and home interventions to serve children and youth with TBI

Zafiris CM, Thomas-Duckwitz CM, D'Amato RC

Objective: The public schools are the largest provider of neuro-rehabilitation services in the United States. As such, it is essential that practitioners become familiar with the demands of students in school settings. This presentation will help practitioners reintegrate children with traumatic brain injuries (TBI) from medical facilities into school settings. Data selection: The literature suggests that a smooth transition can be facilitated via interventions immediately following an injury, after stabilization, and upon hospital discharge. Interventions are designed to evaluate the neuropsychological domains of sensory and perceptual processing, intelligence, memory/learning, communication/language skills, academic achievement, personality/behavior/family, and environmental fit. This presentation will emphasize evidenced-based, school neuropsychological interventions for children with TBI that can be easily implemented in the schools. Data synthesis: It is critical for school staff to understand the severity of the TBI, collect premorbid information, plan for the child's social and emotional needs, and offer targeted academic interventions (Clark, 1996; D'Amato, Fletcher-Janzen, & Reynolds, 2005). Specific components of interventions might include creating a home–school partnership, increasing consistency of teachers across the years, providing clear and constant behavioral expectations, utilizing a life-skill focus, and controlling environmental stimulation. Practical interventions within the context of the school culture will be provided. Conclusions: The intervention model presented highlights modifying structure (the physical setting), organization (how to best present information), and strategies (matching student needs with instructional activities) in a student's life. A strength-based focus which can differentiate between remedial approaches and compensatory methods will be presented.

D56

Understanding neuropsychologically-based executive functioning in female adolescents with emotional disorders

Hulac D, Vannice JE, Zafiris CM, D'Amato RC

Objective: In the United States, more than 10,000 adolescent females reside in residential treatment centers each year. They have been placed in this restrictive setting because their behaviors have endangered themselves or others. Residential treatment centers (RTC) are among the most expensive treatment options for adolescents. This study evaluated the Executive Functioning (EF) and academic achievement of adolescent females currently residing in a RTC. Method: This study evaluated the Executive Functioning (EF) of 93 female adolescents placed in a RTC in the West. Primary care providers and managers completed the Behavior Rating Inventory of Executive Functions (BRIEF), a behavioral check-

list that assessed EF. Adolescent females completed the verbal achievement and math achievement subtests of the Basic Achievement Skills Inventory (BASI) to evaluate current academic achievement. Results: In an effort to understand the underlying construct of EF, a factor analysis was conducted and suggested that a single factor best described EF. Furthermore, to understand EF and its relationship with verbal and math achievement, correlations were calculated between the math and achievement subtests from the BASI and the BRIEF. A significant negative relationship was found between EF skills and verbal and math achievement. Conclusion: Adolescent females residing in a RTC appeared to have difficulty in the areas of EF as well as in skill areas related to verbal and math achievement. It appears that EF is a critical area for neuropsychologists to assess when working with females in a RTC. Recommendations for future research will be discussed.

D57

Phantom limb pain: Etiology, attributes of the sensory pain experience, and neuropsychological assessment considerations

Carter CC, Peterzell DH, McQuaid JR, Cone R, Velez D, Ortega JC

Objective: Phantom limb pain (PLP), the perception of pain in an amputated limb following amputation, is common and distressing. Current theories attribute PLP to reorganization of the somatosensory cortex (i.e., cortical sensory maps of amputated body parts integrate with adjacent sensory maps). Considerable evidence indicates that pain is relieved by reversing this integration. Determining the efficacy of novel interventions requires subjective measures of pain. This study examined two oft-used pain scales in order to identify discrete components of PLP and limitations of current outcome measures. Methods: Twelve veterans (mean age = 48 years) with unilateral amputations attending a VA prosthetics clinic completed the Short-Form McGill Pain Questionnaire (SF-MPQ) and Descriptor Differential Scale (DDS). The SF-MPQ provides a Sensory Pain Rating (SPR) and an Affective Pain Rating (APR). With the DDS, respondents rate the intensity and unpleasantness of their pain relative to 26 descriptors. Results: SPR and APR indexes of the SF-MPQ were within the Mild range ($M = 1.05$ and .81). The highest rated sensory and affective descriptors were, respectively, "Shooting" ($M = 1.75$) and "Tiring-Exhaustive" ($M = 1.44$). DDS Unpleasantness and Intensity ranged from Very Weak to Mild ($M = 7.53$ and 8.42). Conclusion: Standardized pain measures identify attributes and treatment characteristics of PLP. However, inferences regarding treatment mechanisms (somatosensory restoration) are limited. Neuropsychological assessment techniques, including variations of tactile perception examinations, may provide objective markers of cortical remapping, further elucidating PLP etiology and treatment efficacy.

D58

Crisis intervention training program: Influence on staff attitudes in a post-acute rehabilitation setting

Temple RO, Zgaljardic DJ

Objective: Acquired brain injury produces a host of behavioral changes, and specialized training is essential to properly manage these behaviors in order to manage crises and de-escalate aggressive clients. This study was conducted to determine whether crisis intervention training was effective in increasing staff comfort with difficult client behaviors in a residential post-acute acquired brain injury rehabilitation program, and whether changes in comfort level would be maintained over time. Method: Twenty-five rehabilitation staff members participated in Nonviolent Crisis Intervention training and completed the Rehabilitation Situations Inventory prior to training, immediately following completion of the program, and one month post-training. Results: Immediately following completion of the program, participants reported increased comfort when faced with client behaviors related to motivation and adherence, aggression, interactions with other staff, and interactions with client families. All of the observed changes in comfort level were maintained one month post-training. Conclusions: These results suggest that crisis intervention training is effective in increasing levels of staff comfort with difficult situations commonly experienced in the rehabilitation setting, and the changes are maintained following training.

D59

Coping style as mediator of health-related quality of life and depression after an acquired brain injury

Shepherd JG

Objective: This study investigated dispositional coping styles used by adults who have suffered an acquired brain injury (ABI) and the relationship of these coping styles to health-related quality of life (HRQOL) and depressive symptoms.

Method: Fifty-four participants, living in the community and enrolled in an ABI cognitive remediation program, were placed in the traumatic brain injury (TBI) or nontraumatic brain injury (NTBI) group. Participants (31 TBI; 23 NTBI) were administered the Coping Orientations to Problems Experienced Scale (COPE), Short Form Health Survey-2 (SF-36v2), and the Beck Depression Inventory-II (BDI-II). Results: The results indicated a general pattern of coping; the NTBI group reported using more passive coping and the TBI group reported using more active coping. Active coping was a mediator for the relationship between the amount of time since the brain injury and HRQOL ($p < .05$) and depressive symptoms ($p < .05$). A two-way ANOVA showed a significant main effect for coping, which indicated that passive copers exhibited a lower HRQOL ($p < .01$) and more depressive symptoms ($p < .01$) than active copers. However, the nonsignificant interaction indicated that the effect of coping style on HRQOL and depressive symptoms did not depend on time since the injury. The average time post-injury was 4 years. Conclusion: Brain-injured people who utilize more active coping styles reported higher HRQOL and lower levels of depressive symptoms. Time since injury does not have a direct effect on HRQOL or depressive symptoms, but has indirect effects through the use of active coping.

D60

Can computerized cognitive rehabilitation programs improve the reading scores of students with learning disorders?

Vannice JE, Tincup M, D'Amato RC

Objective: Although empirical data are lacking, cognitive rehabilitation has become popular with the widespread availability of computers in clinical practice. This study evaluates the effects of a computer-based neuropsychological processing intervention with students diagnosed as reading disordered. Method: The participants were 16 elementary students age 6–12, identified as learning disabled. Participants were administered nine tests to assess their phonological processing and reading achievement. Eight randomly assigned participants received half-hour sessions of computer-based cognitive reading rehabilitation training, four times per week for 4 weeks. At the completion of treatment, both groups were re-administered all tests. Results: The Woodcock–Johnson Achievement Battery-Revised and the Qualitative Reading Inventory-Second Edition were used to measure the participant's reading achievement levels before and after the intervention. The treatment group showed more improvement than the control group on four of the nine subtests. Phonological Processing skills which consist of phonological awareness, working memory, and lexical memory did not appear to improve as a result of this intervention. However, the results suggested that the rehabilitation intervention significantly improved basic reading skills. Conclusions: For decades the field of neuropsychology has advocated for the use of computer-based cognitive retraining or rehabilitation activities although little data has been available to support such recommendations. This study provides data indicating that computer-based rehabilitation activities can improve reading scores. Further evaluation of neuropsychologically-based programs for children with reading disorders is needed in order to establish evidenced-based treatments.

D61

University of Toronto/Toronto Rehabilitation Institute Varsity Concussion Program: Specificity and sensitivity of neuropsychological test battery

Comper P, Richards D, Mainwaring L, Hutchison M

Objective: The University of Toronto/Toronto Rehabilitation Institute (UT/TRI) Varsity Athlete Concussion Program involves several components, including baseline testing and post-injury neuropsychological follow-up of athletes and prudent medical management. The neuropsychological test battery (NP) includes standardized paper and pencil tests sensitive to mild traumatic brain injury. More recently, we have introduced computerized neurocognitive measures, specifically, the Automated Neuropsychological Assessment Metrics (ANAM) battery (Bleiberg & Reeves, 2003). The objective of this study was to determine if differences exist in sensitivity and specificity values between the paper and pencil and ANAM neuropsychological tests. Method: Since 2000, more than 1200 UT varsity athletes—potentially at risk for concussion have been baseline tested. In the same time period, 87 athletes sustained concussions. Receiver–Operator Characteristic (ROC) curves for each test were calculated for each of the tests in our neuropsychological test battery. Results: Several paper and pencil tests demonstrated some capability of identifying concussion, with area under the curve (AUC) values between 60% and 70%. The computerized tests performed better with AUC ranging between 55% and 76%. Specifically, Code Substitution (AUC = 0.761; 95% CI: [0.634, 0.761]; $p < 0.001$) and Match

to Sample (AUC = 0.718; 95% CI: [0.582, 0.853]; $p < 0.05$) subtests provided a moderate to high predictive ability for concussion. Conclusion: Most of the paper and pencil tests performed slightly less than fair ability to moderate. The computerized tests performed superior with AUC values representing moderate to high in ability to identify concussed athletes.

D62

Outcome findings in comprehensive day treatment program for survivors of acquired brain injury

Smigielski JS, Bergquist TF, Stobaugh WS, Brown AW, Kendall KS

Objectives: Evaluation of treatment outcomes for survivors of Acquired Brain Injury (ABI) in a Comprehensive Day Treatment Program (CDTP). Outcomes of interest included changes in independence in living status and vocational status as well as other functional changes. Factors predictive of outcome were explored as well. Method: Sixty-two program graduates (1999–2005) were studied. They participated in daily group treatment aimed at development of cognitive and behavioral skills. Participants were 66% male with a mean age of 37. Participants were well-educated (58% 12–15 years, 32% 16+ years). Fifty percent were survivors of traumatic brain injury, while 26% had history of CVA. Mean time since injury was 2.5 years. Primary variables of interest included independent living status, vocational status, and functional status as measured by the Mayo-Portland Adaptability Inventory (MPAI). Program progress was measured using Goal Attainment Scaling (GAS). Measurements were recorded at program initiation, program conclusion and at one year follow-up. Results: Findings showed substantial improvement in independent living status (8% independent at program start, 44% at completion, 57% at follow-up), and employment status (89% unemployed at program start, 63% at completion, 35% at follow-up). GAS findings proved a strong predictor of favorable employment outcome. MPAI results showed similar favorable trends. Comparison to an earlier cohort with predominant traumatic etiology of ABI (72%) is presented. Conclusions: Findings support the conclusion that a group CDTP can have a favorable and durable impact for meaningful improvements in functioning for a mixed diagnostic group of survivors of ABI.

D63

Validation of the Resourcefulness for Recovery Inventory

Celinski MJ, Allen III LM

Objective: The Resourcefulness for Recovery Inventory (RRI; Celinski & Antoniazzi, 2001, 2006) is a broadly applicable self-report assessment that can be used in various trauma situations that require coping or adjustment. The present study chiefly involved cross-validation of the RRI using external measures. Method: A total of 182 consecutive outpatient trauma victims were assessed. The sample was 54% male with 41.1 mean years of age (S.D. = 12.5) and had 13.6 mean years of education (S.D. = 3.0). Patients were given the RRI, BDI, BAI, TOMM, MCMI-3, MPI, Davidson Trauma Scale (DTS) and Rehabilitation Survey of Problems & Coping (RSOPAC). Thirty patients also underwent psychotherapy and the RRI was used to predict outcome based on pre-post-changes in RSOPAC total score. Results: Although 43% of patients failed TOMM, this was unrelated to MPI pain severity or interference ($p > .53$), BAI ($p > .24$), DTS total score ($p > .10$) or RSOPAC Total ($p > .05$). Failure on TOMM was related to higher BDI scores ($p < .001$), negative image presentation on the RRI ($p < .01$) and lower overall resourcefulness ($p < .05$). Hierarchical multiple regression (HMR) indicated that RRI variables uniquely explained 38% and 29% of the respective explained variance in BDI and MPI pain interference scores. The RRI scales were also sensitive to treatment outcome, producing a multiple R of .91 (adjusted $R^2 = .70$). Conclusion: The RRI shows promise as a broadly applicable assessment of the factors related to coping and adjustment in response to trauma experiences.

D64

Development, reliability and work validation of a brain injury symptom rating scale

Montgomery G, Solberg K, Mathison A, Arntson-Schwalbe S

Objective: Cognitive behavior theory identifies self-perceptions and inner dialogue as strong determinants of behavior. We report the reliability, factor reduction and clinical validation of a locally developed Brain Injury Rating Scale (BIRS). Data selection: Patients rate "How much of a problem s/he has recently had" (0—None; 4—Severe) with each item, "e.g., "Losing my train of thought while speaking". Data synthesis: Through an iterative process of factor analyses and

rational examination, 34 items were assigned to 5 sub-scales: Executive Management, Memory, Language, Aggressive Behavior, and Somatic Symptoms. An unambiguous factor structure (63% of total variance) was evident from a principal factor analysis and varimax rotation on ratings from patients with moderate-to-severe brain injuries ($N = 212$). Test–retest reliability for all sub-scales was demonstrated (Pearson r's .545–.780, $n = 31$). Level of employment was determined pre- and post-treatment, and on follow-up, and scaled over four levels (Unemployed-to-Working and/or School Full Time). Patients' post-treatment ratings predicted employment one year later. Employment was associated with ratings of less concern about all cognitive and behavioral problems, illustrated by mean composite cognitive scores of 1.4 versus 1.9 for employed versus unemployed patients, respectively, $F(2, 43) = 8.25$, $P = .001$. Scores on the Somatic subscale were less sensitive. Conclusions: We have demonstrated the BIRS reliability and predictive validity, adding support to cognitive–behavioral theory predictions. This poster will encourage a discussion of advantages and challenges for assessing mediating self-perceptions.

D65

Collaborative Therapeutic Neuropsychological Assessment

Smith S, Gorske TT

One challenge faced by clinical neuropsychologists is to provide services that meet the needs of patients and goes beyond the traditional practice of diagnosing cognitive deficits. Evidence suggests patients are not satisfied with a diagnosis alone, and are looking for tangible guidelines for care that will address their cognitive and emotional needs (Ruff, 2003). One method for doing so might be to adapt models of psychotherapy that address the cognitive, emotional, and psychosocial challenges clients face. The presenters hope to meet this goal by describing their technique, entitled Collaborative Therapeutic Neuropsychological Assessment (CTNA), for providing client-centered feedback from neuropsychological test results. This presentation will describe CTNA methods and the results of studies investigating the effects of CTNA on patient satisfaction and clinical outcomes. Additionally, the presenters will provide case examples and video demonstrations of CTNA. Finally, recommendations will be given for the use of CTNA in clinical practice and research. Participants will receive handouts of materials used to evaluate the effectiveness of feedback sessions in clinical practice.

D66

Child Neuropsychology, Developmental Concepts and School Psychology: From Infancy through Adolescence Together

Crittenden M, Packman W

We all view children through different lenses, based on our academic and professional experiences. Given current concerns about child health and schooling, the times call for an integrated perspective. The task requires us to look at behavior from infancy up rather than old age down, and focus on development as much as pathology. Children are growing organisms, so we need to focus on what is going right, as well what is going wrong. We will 1) look closely at some assumptions about development; 2) view the contributions of key developmental theorists (Piaget, Erikson, etc); 3) relate those to Luria's developmental concepts and share recent research about brain development, and 4) apply those ideas by taking a walk from infant interventions to post high school years to see how the views enhance assessment, diagnosis, interventions and advocacy when children need our help.

D67

Treatment Principles and Interventions of Holistic Milieu-Oriented Neurorehabilitation Programs

Klonoff P, Pepping M, Watt L, Myles S, Talley M, Dawson L

This presentation will provide an overview of holistic milieu-oriented treatment principles in the outpatient neurorehabilitation setting that facilitate and enhance recovery and transition to productive community-based activities for patients and their families after brain injury. It will review integral principles, including process variables (e.g., working alliance; awareness, acceptance and realism; therapists' dynamics and conceptualization of treatment themes) as well as practical considerations (e.g., datebook systems, checklists, structure and regimen). The presentation will describe Cognitive Group, which is a psychoeducational group designed to improve patient's knowledge and insight into their injuries and sequelae. Specific modules to be described include Neuroanatomy, the Roadmap to Rehabil-

itation, patients' Strengths and Difficulties, and Memory. The presentation will describe the purpose, format, goals and benefits of Group Psychotherapy. The protocol, specific topics, and experiences of Group Psychotherapy will also be described. The presentation will describe the milieu approach to interventions with families of patients with brain injuries. Specific formats for dialogue and collaboration between therapists and families in the holistic treatment environment will be described. A newly developed eight-stage experiential model of family recovery will be presented. All of the presentations will provide relevant "hands-on" treatment innovations that can be applied to multiple treatment settings to optimize patients' and families long-term adjustment and quality of life following a brain injury.

ERRATUM

The following poster abstracts for the 26th Annual Conference of the National Academy of Neuropsychology in San Antonio, Texas, October 25–38, 2006 were incorrectly listed in *Archives of Clinical Neuropsychology*, *21*(6).

A64

Identification of judgement and safety concerns for persons with disabling neurological disorders

Livingston L, Kreutzer J, Williams K, Everley R

Objective: Referral sources often express concern about patients' abilities to live independently, drive, manage finances, and make other important decisions. Because of uncertainties about neuropsychological tests' ecological validity, clinicians often interview caregivers to obtain information. Using a newly developed assessment tool, this investigation identified caregivers' primary concerns for outpatients with severe neurological disorders (57% TBI). Method: Judgment and safety screening inventory responses of 106 family caregivers were examined using a cross-sectional design. The JASSI is a 55-item structured inventory which identifies caregivers' concerns in nine critical daily living domains: travel; financial; interpersonal; food and kitchen; appliances, tools and utensils; household; medications and alcohol; fire safety; firearms. Respondents rate concern levels for each item on a scale ranging from 0 ("none") to 3 ("very"). Means for each item and domain were calculated. Results: Family caregivers greatest concerns were in the travel (mean = 1.32, S.D. = 0.93) and financial (mean 1.28, S.D. = 0.99) domains. Most prominent travel concerns related to driving (slow reacting, 62%; easily distracted, 58%; not alert or having accidents, 56%). Most prominent financial concerns related to forgetting bills (57%), checkbook management (54%), and losing money (40%). Forgetting to shut off appliances (39%), leaving cooking food unattended (39%), and being careless with flammable items (21%) were also major concerns. Conclusions: Clinicians often rely heavily on neuropsychological testing to make recommendations about living independently, power of attorney, guardianship, and driving. The present investigation indicates that the JASSI helps identify caregivers' concerns and can serve as a useful complement to neuropsychological tests.

C11

Interrelationships between acculturation, gestaltic processing, and abstract reasoning ability in a Mexican-American Population

Mcgough TD, Ducharme JK, Soper HV

Objective: Acculturation is difficult at best, so we decided to look at some of the factors which might facilitate acculturation. To do this we decided to investigate (right hemisphere?) visual gestaltic and (left hemisphere?) verbal abstract reasoning abilities. Method: The 96 participants were volunteers from Northern California who had emigrated from Mexico 1–3 years ago and who had no or limited English-speaking ability. Each was given the Marin Short Acculturation Scale for Hispanics; the Social, Attitudinal, Familial, and Environmental Acculturation Stress Scale; the Street Completion Test (a series of gestalt closure problems); and a modified Gorham Proverbs Test, a 15-item multiple choice test, each item having a direct Spanish equivalent and concrete as well as abstract alternatives. Results: As expected, acculturation and acculturation stress were inversely related, but weakly ($r = -0.172$, $p = 0.094$). Both were also unrelated to either Proverbs score ($r = 0.050$, -0.076, respectively) or Street score ($r = 0.044$, 0.008). Curiously, however, the Street and Proverb scores were related ($r = 0.203$, $p = 0.048$). This verbal–visual spatial relationship suggests that abstract reasoning may have a right hemisphere component. Conclusions: Strengths in gestaltic or abstract reasoning processing do not seem to facilitate acculturation nor reduce acculturation stress among those recently immigrated from Mexico. As expected, acculturation stress is inversely related to level of acculturation. Curiously, performance on proverbs, a verbal reasoning task, is related to gestaltic closure ability as assessed by the Street, a task already known to be unrelated to tested intelligence score.

ADDENDUM

Accessing cognitive potential in a child with multiple deficits secondary to Kernicterus

Dean PM & Morere DA

Objective: Testing deaf children with multiple deficits can be challenging when attempting to ascertain their maximum potential. This case illustrates the important contributions of qualitative data in addition to the adaptation of standard testing procedure in a child with a rare neurological disorder. Methods: The child has multiple deficits secondary to RH incompatibility and Kernicterus, a rare disorder secondary to neonatal jaundice. Diagnoses included athetoid cerebral palsy, deafness, oculomotor disturbance, psychosocial delays, limited language functioning, seizure disorder, ADHD, and suspected Autism or Asperger's. Modifications of standard instruments were required, including signed communication for instruction and response; continuous prompting to ensure attention; allowing additional time for processing information before responding; and obtaining qualitative data based on observations. The evaluation was conducted weekly for approximately an hour to an hour and a half over a four-month period. Results: With the above modifications he was able to demonstrate average or above intelligence, as well as the ability to learn over time despite limited initial recall, and variable executive functioning. His ability to demonstrate his skills was hindered by his multiple disabilities. Using these modifications, Autism was ruled out, enabling more accurate school programming. Additionally, extensive recommendations were developed to enhance both home and school management. Conclusion: Using standardized measures this child was inaccurately diagnosed, while appropriate modification allowed for both a more accurate understanding of his abilities and needs and the generation of recommendations in order to optimize his programming. This demonstrates the importance of qualitative observation and nontraditional evaluation when working with complex children.