displayed significantly poorer performance on two timed nonmemory cognitive measures, but there were no significant differences on any of the nontimed memory measures.

**PSYCHIATRIC DISORDERS: SCHIZOPHRENIA**

**The role of attention in affect perception: an examination of Mirsky’s four-factor model of attention in chronic schizophrenia**

*Combs DR, Gouvier WD, Dixon D*

This purpose of this study is to explore the relationship between affect perception and attention using Mirsky’s (1991) four-factor model of attention with a sample of 55 persons with chronic schizophrenia. Mirsky’s four-factor model postulates that attention is based on four independent factors labeled (1) Shift, (2) Sustain, (3) Focus-Execute, and (4) Encode. It has been argued that deficits in affect perception in persons with schizophrenia may actually be due to problems in attention, and these problems are more related to cognitive variables than social ones (Bellack, 1992). The information obtained in this study will provide further data on the role of attention in affect perception. Since different factors of attention can be selectively impaired (Mirsky et al., 1991) in different diagnostic and psychiatric groups, the present study will explore which factor of attention is most crucial for affect perception. Participants will include persons with schizophrenia who were selected from three large state hospital settings in Louisiana. Attention will be assessed with the Wisconsin Card Sorting Test (Shift), the UCLA Continuous Performance Test (Sustain), the Trail Making Test and Digit-Symbol Coding test (Focus-Execute), and the Digit Span and Arithmetic test (Span). Affect perception will be assessed using the Facial Emotion Identification Test and the Bell-Lysaker Emotion Recognition Test. This study will also examine the relationship between psychiatric symptom levels (BPRS), medication dosage, and other neurocognitive tasks (Test of Facial Recognition and Controlled Oral Word Association Test) in order to clarify the relationship between attention and affect perception.

**False recognition memory and symptoms in schizophrenia**

*Fisher-Irving M, Poole JH, Vinogradov S*

Previous research has suggested that schizophrenic subjects make more false-positive errors on delayed recognition tasks and that these errors are related to symptom profile. However, most prior studies have not examined the types of information that schizophrenic subjects confuse with actual stimuli. We evaluated 108 schizophrenic outpatients and 30 age-matched healthy controls using the California Verbal Learning Test (CVLT), the WAIS-R, and an extended Positive and Negative Syndrome Scale (PANSS-E). The CVLT was chosen because it allows identification of five types of false-positive error during the recognition trial. Schizophrenic subjects made 2.5 times as many false-positive errors as control subjects (P = .002). These errors consisted of source confusion (between list A, list B, and semantic memory), phonemic confusion, and intrusion of unrelated items. We also examined correlations between false-positive errors and PANSS-E symptom ratings within two schizophrenic subgroups, Paranoid (n = 30) and Undifferentiated (n = 36). In the Undifferentiated group, false-positive errors were mainly associated with excited/agitated symptoms (e.g., euphoric mood, racing thoughts, fluent but vacuous speech, and tension). In the Paranoid group, specific false-positive errors were associated with delusional and anxious symptoms (paranoid, somatic, fearful, and
self-blaming contents). Controlling for general intelligence (FSIQ), immediate recall (CVLT trials 1–5), age, and sex did not alter these correlations. These findings suggest that schizophrenic subjects may fail to discriminate incorrect information from correct information due to the proximity, semantic or phonemic similarity, or familiarity. This overinclusiveness in memory formation may be related to agitated or delusional symptoms in different schizophrenic subgroups.

Multiple Personality Disorder: a hypothetical model of divided self
Fisher-Sides L

Many years of intensive counseling sessions with individuals diagnosed as exhibiting Multiple Personality Disorder (MPD) led to a theoretical mapping of the human mind. The construction of this map was possible due to the realization that the mathematics of the MPD diagnosis is in error: Multiple Personality is really “Divided Personality,” and the hypothesized cerebral modules define the characteristics and location of the separate personalities. The syndrome of Divided Personality was evidenced by functional and processorial divisions: division of identity, division of labor, and even division of memory. Extensive review of neurological structures supports many premises introduced within this novel approach, and it is hereby hypothesized that the disorder exists due to the partial or complete absence of the interthalamic adhesion. Valid comparisons can be made between the chronic disorders of MPD and schizophrenia, and in many cases, the analysis reveals reciprocal characteristics between the two disorders. There is a distinct possibility that the neurological basis of this theory may help clarify some evidence already found within schizophrenia studies, as well as provide a solid neurological foundation for further research into many other chronic disorders.

Cognitive disorder in anorexia nervosa: neuropsychological status, depression and body mass
Kanz JE, Bayless JD, Moser DJ, McDowell BD, Paulsen JS, Bowers WA, Andersen AE

Several studies have provided evidence for subtle and variable neuropsychological deficits among persons with eating disorders. One early study related cognitive dysfunction to poorer outcome. However, cognitive impairments have not been significantly correlated with depression or illness variables. We sought to investigate these relationships in a larger, more homogeneous sample from an inpatient treatment program for eating disorders. We administered a battery of neuropsychological tests to 59 women with anorexia nervosa, assessing intellectual functioning, memory/learning, executive functioning, and reading level, as well as depression. Full Scale IQ was not significantly different from premorbid IQ estimates based on reading level. However, there was a high rate of cognitive dysfunction, with 51.8% of patients showing mild impairment (less than the ninth percentile) and 33.9% failing (less than the fifth percentile) on two or more neuropsychological measures. Furthermore, these deficits were not associated with level of depression or body mass. Verbal and nonverbal memory performances were significantly poorer than overall intellectual functioning. Performance IQ was also significantly lower than Verbal IQ. Our findings agree with previous results in that there was no evidence for generalized intellectual decline; however, notable impairments were seen in a significant proportion of our patients with anorexia nervosa, particularly in verbal and nonverbal memory. Despite a large sample and a relatively comprehensive battery, cognitive deficits were not correlated with measures of affective status or severity of illness. Clearly, more sensitive measures of nutritional status and illness severity may be required to account for the origins of cognitive impairment in patients with eating disorders.
Development of a web-based work-readiness protocol
Kaushik T, Festa J, Feldman D, Kroger H, Erlanger D

The likelihood of long-term employment in individuals with histories of psychiatric illness is increased by remediation of problems in cognitive functioning pertinent to work environment adaptation. The Work-Readiness Cognitive Screen (WCS) is a new Internet-based tool designed for serial assessment of vocational potential. Initial pretreatment data from a chronically mentally ill population (n=34) demonstrate construct validity. Forty-seven percent of patients scored in the impaired range, 33.3% were in the borderline range, and 20% were within normal limits. Patients scored significantly lower than controls (n=100) on the Attention/Working Memory factor (P<.05). Vocational planning is most likely to be effective with multiple, serial assessments to identify and characterize cognitive improvement with remediation. The WCS allows for identification of change through comparison of an individual’s pre- and postremediation performances using the Reliable Change Index. Traditional measures, however, classify performances of patients with known neurocognitive deficits by relying on normative means and standard deviations derived from healthy populations. Practice effects are unknown or retest scoring adjustments are applied based on practice effects demonstrated by cognitively intact groups. The possibility that standard deviations and practice effects vary by population, i.e., schizophrenics versus normal controls, is not addressed. These limitations may result in reduced ability of traditional measures to capture subtle yet functionally meaningful cognitive improvement in “impaired” populations. Longitudinal WCS data will be presented. Issues pertaining to the measurement of change will be discussed, as well as implications of the data for vocational planning.

Positive and negative symptom schizophrenia classification and neuropsychological test performance
Perkins TS, Garner RA, Murray RG

Typology of schizophrenic symptoms into positive and negative symptom groupings has received increased attention in recent years. Clinical and research efforts to practically utilize these groupings have included investigation of neurological functioning among subgroups of schizophrenics. This study investigated the type and level of neuropsychological test performance in schizophrenic patients grouped by prevalence of positive, negative, or mixed symptoms. Thirty-two inpatients diagnosed with schizophrenia who had no history of substance dependence, mental retardation, or advanced age (under 55 years old) have completed tests of attention/concentration (DS, TMT, BVRT, AVLT), verbal memory (DS, AVLT, LM), visual memory (BVRT, CFT), executive functioning (WCST, TMT, Word Fluency), and visuomotor/visuospatial skills (BVRT, TMT). Positive-symptom subjects were hypothesized to show deficits in attention/concentration, verbal memory, with negative symptom patients predicted to show weaker performance on measures of visual memory, executive functioning, and visuomotor/visuospatial skills. Results partially confirmed hypotheses, with significant between-group differences in the predicted direction observed on the Trail Making Test [A: F(3,28)=3.77, P<.05; B: F(3,28)=4.42, P<.05], BVRT [Correct: F(3,28)=4.12, P<.05; Errors: F(3,28)=3.70, P<.05; Size Errors: F(3,28)=3.66, P<.05], and Word Fluency S [F(3,28)=4.01, P<.05]. As predicted, positive symptom patients showed some impairment of attention/concentration and negative symptom patients scored more poorly on some measures of executive functioning, visual memory, and visuomotor/visuospatial skills. Group analyses also revealed that on almost all measures negative-symptom schizophrenics performed significantly poorer than those without negative symptoms,
suggesting that the presence of any negative symptoms may be more disabling than the prominent positive symptoms. Implications for research and clinical assessment are described.

Are the Digit Span forward and Digit Span backward tasks differentially sensitive to working memory deficits?
Twamley EW, Heaton RK, Palmer BW, Jeste DV

Clinical lore suggests that Digit Span Backward (DB), as well as the difference between forward and backward span (DIF), assess working memory, whereas Digit Span Forward (DF) measures auditory attention. We examined the relationships among these scores in patients with schizophrenia, a disorder associated with working memory deficits, and in normal comparison subjects (NCs). We expected that DB and DIF scores would be (1) differentially impaired in schizophrenia patients and (2) more strongly associated than DF with a different working memory measure. A total of 268 schizophrenia outpatients and 161 NCs, aged 40–89, completed the Wechsler Digit Span task as part of a larger neuropsychological battery. Sixty-one patients also completed Wechsler Letter-Number Sequencing (LNS). All scores were age-corrected using published norms; Digit Span scores were converted into age-corrected DF, DB, and DIF cumulative percentage scores (lower scores on DF and DB and higher scores on DIF indicating better performance). Compared to NCs, schizophrenia patients performed worse on DF ($d_{c} = 0.57$) and DB ($d_{c} = 0.73$) but not on DIF ($d_{c} = 0.17$). Patients performed equivalently on DF and DB ($t = 0.92$, ns). DF and DB were moderately correlated with LNS ($r's = 0.53$ and $0.60$), but DIF was not associated with LNS. Overall, we found no striking differential impairment in schizophrenia patients on DB (compared with their own DF) or DIF (compared to NCs). Nor did we find an association between DIF and another working memory measure. These results suggest that DB and DIF are not better measures of working memory than are DF scores.

Gender differences in verbal fluency in adults with ADHD
Woods SP, Lovejoy DW

Reviews of the pediatric Attention-Deficit/Hyperactivity Disorder (ADHD) literature suggest that girls with ADHD tend to exhibit greater cognitive impairment compared to boys with the disorder. To date, however, researchers have not adequately addressed whether similar gender differences exist on measures of cognitive functioning in adult ADHD populations. The present study investigated possible gender differences in a small sample of 26 ADHD adults (13 men, 13 women) on measures of intellectual ability and frontal/executive functioning (n.b., all dependent measures were scored using available published demographic corrections). Participants were screened for prior psychiatric disorders or central nervous system diseases other than ADHD and were tested off stimulant medications. There were no significant between-group differences for age, education, or self-reported DSM-IV ADHD symptoms. Although no significant differences emerged on measures of intelligence, attention/concentration, selective visual attention, verbal list-learning, or complex information processing speed, women with ADHD demonstrated significantly worse verbal letter fluency performance compared to male participants ($P < .05$). In summary, despite limited statistical power due to a small sample size, the present study extended findings from the pediatric ADHD literature indicating that women with ADHD may exhibit a greater degree of cognitive inefficiency. These findings are also consistent with recent functional neuroimaging studies reporting relatively diminished glucose metabolism in women with ADHD. Potential clinical and theoretical implications of these gender differences are considered.