For almost a century, parallels have been drawn between negative symptoms in schizophrenia and those associated with frontal lobe lesions. Studies using neuroimaging techniques have generally but not invariably supported this association. An established cognitive function of dorso-lateral prefrontal cortex is its role in spatial working memory, which has been linked to the integrity of dopaminergic neurotransmission in this region. Spatial working memory deficits have recently been reported in schizophrenia. We used a computer-presented spatial working memory task with 0- and 8-second delays to test the hypothesis that spatial working memory deficits in schizophrenia would correlate with negative symptoms. Eighteen unmedicated outpatients were tested and compared with controls. Symptoms were rated using the BPRS and either the NSA or the SANS. Patients showed a greater increase in errors with delay, consistent with previous findings in medicated patients. As predicted, patients' negative symptom scores correlated significantly with the increase in errors with delay ($r = 0.52, p < 0.03$). The specificity of this relationship must be considered preliminary, however, as total BPRS, and BPRS positive symptoms also showed nonsignificant trends towards correlating with working memory performance. All three symptom measures were highly intercorrelated in this relatively remitted group of outpatients. The implications of these findings for the pathophysiology of negative symptoms in schizophrenia will be discussed.

160. EXPECTANCY EFFECTS AND ATTENTIONAL CONTROL IN SCHIZOPHRENIA

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The Stroop Color Naming task is a paradigmatic measure of selective attention which has been used to study cognition in schizophrenia for over 30 years. Recent studies using single-trial versions of the task have reported that the facilitation effect (the reaction time advantage when naming the color of a color-congruent word such as RED printed in red) is enhanced in schizophrenia. We administered a single-trial version of this task, which manipulated the subject's expectancy for color-relevant stimuli by varying the proportion of neutral stimuli in a block of trials. Consistent with previous studies, normal subjects showed less interference (the slowing of reaction time when naming the color of a color incongruent stimulus, e.g., the word RED printed in blue) when 75% of stimuli were color words and more interference when only 25% of stimuli were color words. Facilitation did not vary with expectancy. Also consistent with previous studies, schizophrenia patients showed increased facilitation effects compared to normals. Schizophrenia patients were also distinguished from controls by failing to relax their criterion for responding under conditions of low expectancy for color words, with the result that these patients showed less interference than controls in the 25% color word condition. This apparently superior performance of schizophrenia patients will be discussed in terms of a failure of planning and strategy formation in individuals with this illness.

161. ATTENTION, SEMANTIC PROCESSING, AND SYMPTOMS IN SCHIZOPHRENIA


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Establishing relationships between symptoms and patterns of cognitive impairment can help shed light on the pathophysiology of schizophrenia symptomatology. Enhanced Stroop facilitation (faster response times color naming color-congruent words, e.g., RED printed in red) has been reported in schizophrenia. This is most evident in patients with prominent disorganization and negative symptoms. Two models linking symptoms and cognitive dysfunction could account for this: 1) Enhanced facilitation is associated with negative symptoms and a failure to initiate attentional control in a task relevant manner; 2) enhanced facilitation reflects increased automatic spreading activation in semantic networks, a phenomenon believed to be tapped by semantic priming tasks and increased in thought-disordered patients in some studies. We studied 40 patients and replicated our previous finding of increased facilitation. The magnitude of the facilitation effect correlated positively with disorganization but not negative symptoms. One semantic priming measure, lexical decision time at short SOAs, also correlated with disorganization. This measure (but not Stroop facilitation) correlated even more strongly with medication dosage. There were no correlations between Stroop measures and priming effects. This suggests that increased Stroop facilitation is related to thought disorder but not via the mechanism of increased automatic spreading activation. These results also suggest that increased automatic semantic priming effects in schizophrenia may reflect the effects of neuroleptics rather than an illness specific pathophysiological process. A further analysis in a larger group using partial correlations will be presented to address the relative contributions of medication dosage and thought disorder to both Stroop and priming effects.

162. FUNCTIONAL ANATOMY OF SELECTIVE ATTENTION IN NORMALS AND SCHIZOPHRENIA

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Abnormal selective attention in schizophrenia is reflected by increased facilitation on single-trial versions of the Stroop Color Naming Task. We measured regional cerebral blood flow (rCBF) during this task using $H_2^{15}O$ PET. Our design included two novel elements: 1) We mixed neutral and color words (incongruent in the interference condition, congruent in the facilitation condition) ensuring subjects did not read during the facilitation condition; 2) scan order was counterbalanced across subjects but fixed within subjects, to assess time on task effects. Contrasting incongruent and neutral conditions (interference) rCBF increased in left lateral prefrontal, right anterior cingulate, and orbital frontal, and inferior parietal cortex, and decreased in two extrastriate areas. Contrasting congruent and neutral conditions (facilitation) rCBF increased in left superior temporal gyrus and subcortical regions (right caudate and thalamus). Contrasting incongruent and congruent conditions revealed differences in prefrontal and inferior parietal cortex and a third extrastriate region. Preliminary analysis of time on task effects showed initially anterior cingulate and extrastriate changes predominating, but with time on task prefrontal and, for interference, parietal changes predominating. These results are consistent with findings in cognitive psychology suggesting that neither early or late selection models adequately account for attentional effects observed during Stroop performance. Rather, they conform to connectionist predictions that modular systems representing multiple aspects of word reading and color naming interact to determine Stroop performance. Data from schizophrenia patients studied using this procedure will be presented, and the functional neural correlates and pathophysiological underpinnings of
attentional dysfunction in schizophrenia will be discussed.

163. REDUCED FERTILITY IN SCHIZOPHRENIA: HERE TO STAY?

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Early studies suggested that institutionalized patients with schizophrenia have reduced fertility, defined as the number of children per patient. We examined patients in the deinstitutionalization era and explored possible contributory factors to fertility. The cohort included inpatients and outpatients with schizophrenia (DSM-III-R criteria, n = 170). The controls were women screened for the absence of schizophrenia, drawn from the same communities as the patients (n = 124). The female patients (n = 77) and controls did not differ in the mean number of children per patient. To correct for age differences, the reproductive index (N) was next calculated. (RI = number of children/standardized reproductive age, taking 15–45 as the reproductive period). RI was significantly lower among the patients (patients, 0.05 ± 0.07, controls, 0.38 ± 0.12, mean ± SD, p < 0.00001, Mann-Whitney U test). It was significantly reduced among Caucasian female patients, but not African-Americans. Multivariate analysis suggested significant associations of RI with ethnicity, illness, and socioeconomic status defined by the Hollingshead Redlich Index of Social Position (ISP). Finally, factors predictive of fertility were analyzed among the patients alone. RI was significantly lower among male patients (men, 0.02 ± 0.05; women, 0.05 ± 0.07, p < 0.001, Mann-Whitney U test). Linear regression analysis with RI as outcome showed that gender significantly predicted RI (β = 0.5, p < 0.00001). Surprisingly, ethnicity, religion, HRI, age at onset, family history of schizophrenia, and insight were not significant. The implications of these findings will be discussed.

164. FURTHER SUPPORT FOR THE "DRIFT" HYPOTHESIS OF SCHIZOPHRENIA

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Over-representation of patients with schizophrenia in the lower socioeconomic groups is well known. This has been attributed to: (1) Causation: the stress of living in deprived circumstances precipitates the illness, (2) Drift: patients “drift” downward due to illness-associated handicaps, (3) Combination of causation and drift. Previous studies have been confounded by biases in selection, leading to controversy. A recently concluded epidemiological survey of homeless individuals in Pittsburgh provided a unique opportunity to test these hypothesis among unselected individuals who had “drifted” down the socioeconomic scale: homeless individuals with schizophrenia (SZ, n = 299). Diagnostic information about participants in the survey (DSM-III criteria) was obtained by means of the DIS III. Socioeconomic information about participants and their parents was used to compute the Hollingshead-Redlich two-factor index of social position (ISP), which is inversely related to socioeconomic status. Evidently, the socioeconomic status of all the participants was similar at the time of the study. In order to dissect the “drift,” their parental socioeconomic status was examined first. The parental ISPs of both groups were similar, suggesting that they were born into similar socioeconomic backgrounds. Next, the participants' highest ever social class were analyzed. The ISPs of both groups were higher than their respective parents (SZ: t = 3.26, p < 0.01; non-SZ: t = 5.74, p < 0.00001), testifying to significant drift in both groups; however, the ISPs of the SZ groups were significantly higher than the non-SZ group (t = 4.45, p < 0.0002). In other words, the SZ group had experienced significant socioeconomic decline since birth, in support of the drift hypothesis. Further analysis of the SZ group, comparing the ages of onset of illness and of homelessness, is in progress.

165. ASSOCIATION OF CSP WITH MEDIAL TEMPORAL STRUCTURAL ABNORMALITY

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Several previous reports demonstrated the increased prevalence of cavitum septum pellucidum (CSP) in schizophrenia compared with normal controls. Degreve et al (1992) suggested that this increase in CSP indicates an arrest of normal maturation within the limbic system. In order to test this hypothesis, we examined an association of prevalence between the CSP and morphologic abnormalities of medial temporal structures. We studied 60 Japanese patients with DSM-III-R schizophrenia aged 29.2 ± 9.4 years and 23 normal controls aged 30.7 ± 8.2 years. The patients had been ill for 15.9 ± 7.7 years. MRI was performed using a Siemens MR unit operating with a 1.5 tesla magnetic field. Sagittal slices through the entire head used a FLASH sequence with a flip angle of 40 degrees, a repetition time of 40 msec; an echo time of 10 msec, and a slice thickness of 1 mm. Two neuropsychiatrists graded the presence of a CSP on a scale of 0–3 (none, equivocal, I, II, III). In schizophrenic patients, medial temporal structures were evaluated based on the size and shape of the hippocampal formation and the size of the temporal horn (none, I, II). CSP was observed in 29 patients (48.3%) (none, 25; equivocal, 6; grade I, 23; grade II, 4; grade III, 2) and 8 controls (34.8%) (13, 2, 6, 1, 1). CSP was more prevalent in schizophrenic patients, however, this difference did not reach statistical significance. Medial temporal structural abnormalities were seen in 18 grade I and 7 grade II patients, out of 57. There was no association of prevalence between CSP and medial temporal morphologic abnormalities.

166. READING VERSUS DEMOGRAPHIC-BASED ESTIMATES OF PREMORBID INTELLIGENCE IN SCHIZOPHRENIA

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Estimating premorbid intelligence in schizophrenia is difficult because the illness affects aspects of premorbid and postmorbid functioning. We assessed reading and demographic-based estimates of premorbid intelligence using: 1) the Barona Index (BI, based on age, sex, race, education, occupation, and region) and 2) the North American Adult Reading Test (NAART, a reading test of irregularly spelled words). Each yields estimates of WAIS-R full-scale (FSIQ), verbal (VIQ), and performance IQs (PIQ). We hypothesized lower BI than NAART estimates, as flawed developmental processes in schizophrenia should impair educational/occupational achievement, whereas reading should resist decay. Subjects (n =