this procedure is the fact, that it makes minimal demands on attentional capacities and motivation.

Methods: We present the technical methodology of this new procedure, which is actually used in an ongoing study aiming to investigate temporal lobe function in SZ. Three groups of SZ patients according to DSM-III-R (different ages of onset and illness durations) and matched controls are examined.

DYNAMIC EYE MOVEMENTS IN SCHIZOPHRENIA, AFFECTIVE AND SCHIZOAFFECTIVE DISORDERS—A LABORATORY INVESTIGATION USING ELECTROOCULOGRAPHY

I. Gerdsen 1, J. Pinkert 2, R. Foetisch 3, B. Ripke 4, S. Oester 5, L. Oehme 6, O. Bach 7, W.G. Franke 8

Dept. of Psychiatry 1, Heidelberg University. D-69115 Heidelberg, Germany; Dept. of Nuclear Medicine 2, Neuroophthalmology 3 and Psychiatry 4, Dresden University of Technology, Germany

Background: Smooth pursuit performance varies considerably among individuals and is affected by many factors such as the properties of the stimulus, attention, age and neuropsychiatric disorders. In schizophrenia and affective disorders increased rates of saccadic intrusions have been observed during smooth pursuit. The aim of our ongoing study was to compare various dynamic measures of smooth pursuit and saccadic eye movements between depressive schizophrenic and schizoaffective disorders to evaluate a possible diagnosis related specificity.

Methods: 15 schizophrenic, 14 depressive and 10 schizoaffective patients with superimposed mood disturbance were diagnosed according to DSM-IV criteria. 14 normal controls were also included. Psychopathological symptoms were assessed on the BPRS, SANS, SAPS and Hamilton Depression Rating Scale. Pursuit was measured during tracking of a predictable, sinusoidal target motion using the Nicolet Nystar oculomotor standard testing protocol.

Results: Compared to normal controls all patients showed an elevated rate of inappropriate saccades which was clearly higher for schizophrenic subjects. Also differences in performance of patients peaked velocity to peak stimulus was observed. Mean gain values were 0.64 for depressive patients including patients with schizoaffective disorder and 0.78 for schizophrenics (p<0.0118). Other measures including delay and accuracy (p<0.055) failed to reach significance.

Conclusion: Our preliminary data show that oculomotor testing significant diagnosis related differences in eye tracking pattern between all groups can be identified. Of particular significance could be that impaired gain performance is similar for both affective and schizoaffective disorders in contrast to schizophrenic patients. This might suggest more involvement of frontal lobe structures for schizophrenics with superimposed mood disturbance.

NEUROPSYCHOLOGICAL CORRELATES OF SCHIZOPHRENICS' EYE TRACKING DYSFUNCTION: EVIDENCE FOR INDIVIDUAL DIFFERENCES

Diane C. Gooding, William G. Iacono, William M. Grove

Dept. of Psychology, University of Wisconsin-Madison, Madison, Wisconsin 53706

One hypothesis regarding the functional significance of schizophrenics' ocular motor dysfunction is that their impairments reflect frontal lobe dysfunction. This study examined the neuropsychological and oculomotor performance of 28 schizophrenic patients. Patients receiving traditional neuroleptics differed from those receiving atypical neuroleptics in terms of their neuropsychological correlates of tracking performance. Patients receiving traditional antipsychotics (n=10) showed stronger associations between their pursuit performance and performance on putative measures of prefrontal cortical functioning (Wisconsin Card Sorting, verbal fluency, and Stroop tests). Patients receiving Clozapine (n=18) showed stronger associations between their eye tracking and measures of temporal lobe functioning (RAVLT and recall portions of Rey-Osterrieth Complex Figure Test). The results of this study indicate individual differences within the schizophrenic group. Because impaired pursuit represents a final common pathway for numerous neuropathological conditions, it is possible that in different clinical syndromes of schizophrenia, eye tracking dysfunction is differentially related to specific neuropsychological deficit patterns. These results have implications for delineating various subtypes of schizophrenia.

OCULAR MOTOR PERFORMANCE IN SCHIZOPHRENIC PATIENTS AND NEUROLOGICAL PATIENTS

Diane C. Gooding, William G. Iacono, William M. Grove

Dept. of Psychology, University of Wisconsin-Madison, Madison, Wisconsin 53706

The study of ocular motor dysfunction in schizophrenia holds promise for informing us about the underlying neuropathology of the disorder. Schizophrenic patients have consistently shown to produce impairment during pursuit tracking tasks and antisaccade tasks. These ocular motor deficits are hypothesized to reflect frontal lobe dysfunction. This investigation is one of the few direct comparisons of schizophrenic and neurological patients with known lesions. The sample included 28 schizophrenic patients, 10 neurological patients with dorcubalateral prefrontal lesions, 15 neurological patients with temporal lobe lesions, and 22 nonpatient controls. All three patient groups displayed significantly worse pursuit than the normal comparison group. Neither the schizophrenic patients nor the temporal antiscadate patients performed patients, who cardiac their pursuit. Although the involvement purines, they ing reflects a

SMOOTH FIRST EP PATIENTS

S.B. Hutton, C. Kennard.

Dept of Psych School, London

Smooth pursued feature been performed a one time of antipsychotics determined. The patients and 2 and gender of relationship. Receiving neuro tracked a range of velocities, had significant speeds (F). Target speed (mean) have been, the real the speed, significant difference. The results are present at of antipsychotic treatment this abnormal patient group.

FAST REA SACCADI PATIENTS: FAILURE

Jennifer E. Brett A. Cie

Department of LA Jolla, CA

Saccadic tracking task
this procedure is the fact, that it makes minimal demands on attentional capacities and motivation.

Methods: We present the technical methodology of this new procedure, which is actually used in an ongoing study aiming to investigate temporal lobe function in SZ. Three groups of SZ patients according to DSM-III-R (different ages of onset and illness durations) and matched controls are examined.

DYNAMIC EYE MOVEMENTS IN SCHIZOPHRENIA, AFFECTIVE AND SCHIZOAFFECTIVE DISORDERS—A LABORATORY INVESTIGATION USING EYE TRACKING


1. Dept. of Psychiatry, University of Wisconsin-Madison, Madison, Wisconsin 53706

Background: Smooth pursuit performance varies considerably among individuals and is affected by many factors such as the properties of the stimulus, attention, age and neuropsychiatric disorders. In schizophrenia and affective disorders increased rates of saccadic intrusions have been observed during smooth pursuit. The aim of our ongoing study was to compare various dynamic measures of smooth pursuit and saccadic eye movement between depressive schizophrenic and schizoaffective disorders to evaluate a possible diagnosis related specificity.

Methods: 15 schizophrenic, 14 depressive and 10 schizoaffective patients with superimposed mood disturbance were diagnosed according to DSM-IV criteria. 14 normal controls were also included. Psychopathological symptoms were assessed on the BPRS, SANS, SAPS and Hamilton Depression Rating Scale. Pursuit was measured during tracking of a predictable, sinusoidal target motion using the Nicolet Nystar oculomotor standard testing protocol.

Results: Compared to normal controls all patients showed an elevated rate of inappropriate saccades which was clearly higher for schizophrenic subjects. Also differences in performance of patients peak velocity to peak stimulus was observed. Mean gain values were 0.64 for depressive patients including patients with schizoaffective disorder and 0.78 for schizophrenics (p<0.001). Other measures including delay and accuracy (p<0.055) failed to reach significance.

Conclusion: Our preliminary data show that by oculomotor testing significant diagnosis related differences in eye tracking between all groups can be identified. Of particular significance could be that impaired gain performance is similar for both affective and schizoaffective disorders in contrast to schizophrenic subjects. This might suggest more involvement of frontal lobe structures for schizophrenics with superimposed mood disturbance.

NEUROPSYCHOLOGICAL CORRELATES OF SCHIZOPHRENICS’ EYE TRACKING DYSFUNCTION: EVIDENCE FOR INDIVIDUAL DIFFERENCES

Diane C. Gooding, William G. Iacono, William M. Grove

1. Dept. of Psychology, University of Wisconsin-Madison, Madison, Wisconsin 53706

One hypothesis regarding the functional significance of schizophrenics’ oculomotor dysfunction is that their impairments reflect frontal lobe dysfunction. This study examined the neuropsychological and oculomotor performance of 28 schizophrenic patients. Patients receiving traditional neuroleptics differed from those receiving atypical neuroleptics in terms of their neuropsychological correlates of tracking performance. Patients receiving traditional antipsychotics (n=10) showed stronger associations between their pursuit performance and performance on putative measures of prefrontal cortical functioning (Wisconsin Card Sorting, verbal fluency, and Stroop tests). Patients receiving Clozapine (n=18) showed stronger associations between their eye tracking and measures of temporal lobe functioning (RAVLT and recall portions of Rey-Osterrieth Complex Figure Test). The results of this study indicate individual differences within the schizophrenic group. Because impaired pursuit represents a familiar common pathway for numerous neuropsychological conditions, it is possible that different clinical syndromes of schizophrenia, eye tracking dysfunction is differentially related to specific neuropsychological deficit patterns. These results have implications for delineating various subtypes of schizophrenia.

OCULAR MOTOR PERFORMANCE IN SCHIZOPHRENIC PATIENTS AND NEUROLOGICAL PATIENTS

Diane C. Gooding, William G. Iacono, William M. Grove

1. Dept. of Psychology, University of Wisconsin-Madison, Madison, Wisconsin 53706

The study of ocular motor dysfunction in schizophrenia holds promise for informing us about the underlying neuropathology of the disorder. Schizophrenia patients have consistently been shown to produce impairment during pursuit tracking tasks and antisaccade tasks. These ocular motor deficits are hypothesized to reflect frontal lobe dysfunction. This investigation is one of the few direct comparisons of schizophrenic and neurological patients with known lesions. The sample included 28 schizophrenic patients, 10 neurological patients with dorsolateral prefrontal lesions, 13 neurological patients with temporal lobe lesions, and 22 nonpatient controls. All three patient groups displayed significantly worse pursuit than the normal comparison group. Neither the schizophrenic patients nor the temporal antisaccade patients performed significantly worse than the schizophrenic patients. Although there was involvement of the frontal lobe, the findings reflect a complex pattern of deficits.

SMOOTH FIRST EFFORT PATIENTS

S.B. Hutton

Dept. of Psychology, University of Wisconsin-Madison

Smooth pursuit of an antisaccade has been performed partially determined, patients and gender of schizophrenic patients receiving neuroleptics tracked a rare target speed (10) had significant speeds (F1,12 target speed, leptoic naive se the neuroleptic significant difference. These results are present at the psychotic behavior in this abnormal patient group.

FAST REACTIONS SACCADIC PATIENTS' FAILURE

Jennifer E. D., Brett A. Cle

Research Department, University of California, Los Angeles

Saccadic re-tracking task
ELATES

KING

Significance of their impairments examined the effect of 28 schizophrenic neurolepticics in terms of performance. t = (10) showed improved performance and lowered Stroop performance of temporomandibular joint pathway, errors of commission, eye tracking neuropyschopathologies for schizophrenia patients. Frontal lesion patients could be distinguished from the temporal patients in terms of pursuit performance. On the antisaccade task, both schizophrenic patients and frontal patients performed significantly worse than the temporal patients, who performed as well as normal controls. The schizophrenic patients did not show an association between their pursuit tracking scores and their antisaccade error rates. Although these results provide strong evidence for frontal involvement in the underlying pathophysiology of schizophrenia, they also suggest that schizophrenic impaired tracking reflects a fronto-temporal dysfunction.

SMOOTH PURSUIT ABNORMALITIES IN FIRST EPISODE SCHIZOPHRENIC PATIENTS


Dept of Psychiatry, Charing Cross and Westminster Medical School, London, W6 8RP

Smooth pursuit eye tracking abnormalities are a well documented feature of schizophrenia. However, most research has been performed on chronic medicated patients and the contribution of antipsychotics and disease duration has not been fully determined. We compared 26 first episode schizophrenic patients and 26 healthy controls, matched for age, NART-IQ, and gender on smooth pursuit performance. Thirteen of the schizophrenic patients were neuroleptic naive and 13 had been receiving neuroleptics for between 1 and 6 weeks. Subjects tracked a ramp stimulus which moved at 4 different constant velocities (10, 20, 30 and 36 deg/s). As a group the patients had significantly lower velocity gain than controls across all speeds (F(1,50)=9.85, p < 0.01). This difference increased with target speed (F(3,150)=36.69, p < 0.001). When the neuroleptic naive schizophrenic patients were compared directly with the neuroleptic treated schizophrenic patients, there was no significant difference in velocity gain (F(1,24)=1.7, p > 0.2). These results demonstrate that smooth pursuit abnormalities are present at the onset of schizophrenia and are independent of antipsychotic medication effects. This suggests that oculomotor dysfunction is intrinsic to schizophrenia. The specificity of this abnormality requires further study with other psychiatric patient groups.

ATTENTIONAL MEASURES AND EYE TRACKING IN THE FINNISH ADOPTIVE STUDY OF SCHIZOPHRENIA

Julia Moring, Lyman C. Wynne, Robert Asarnow, Keith Nuechterlein, Philip S. Holzman, Heini Hakko and Pekka Tienari

Department of Psychiatry, University of Oulu, FIN-90014, Oulu, Finland

The Finnish Adoptive Study of Schizophrenia has provided an opportunity to study genetic vulnerability, with postnatal environmental factors separated out, by comparing offspring adopted away by schizophrenic index mothers and by non-schizophrenic control mothers. Accumulated evidence suggests that certain information processing tasks may be sensitive endophenotypic measures of vulnerability to schizophrenia. Three such putative indicators have been evaluated: (1) the partial-report, forced-choice Span of Apprehension Test (SOA), which requires subjects to process rapidly large amounts of information that is presented simultaneously; (2) the degraded-stimulus Continuous Performance Test (d-cPT), which requires subjects to detect perceptually degraded, briefly presented stimuli over an extended period of time; and (3) Smooth Pursuit Eye Movement (SPEM), which requires that eye movements be synchronized with a moving target. Adoptees were tested at the time of a diagnostic long-term followup. CPT and SOA tests were administered for over 200 and SPEM for over 100 adoptees during the field work. Data will be reported on index versus control differences for each of these measures, testing the extent to which these indicators are genetically based. In addition, repeat testing of a sample of adoptees will evaluate the stability of these measures during late adolescence.

FAST REACTION TIME PREDICTIVE SACCADIES AMONG SCHIZOPHRENIA PATIENTS MAY BE CONSISTENT WITH A FAILURE OF INHIBITION

Jennifer E. McDowell, Laura D. Blumenfeld, Brett A. Clementz

Department of Psychology, 9500 Gilman Drive, UC-San Diego, La Jolla, CA 92037-0109

Saccadic reaction times during a 0.4 Hz predictive saccadic tracking task were reported previously as faster among schizophrenic patients (McDowell, Clementz, & Wixted, 1994). Decreased reaction time saccades may be consistent with failure of inhibition mediated by dorsolateral prefrontal cortex. Ross & Ross (1987) reported that frequencies slower than approximately 0.4 Hz resulted in fewer anticipatory saccades. If faster reaction time saccades during predictive tracking are related to inhibition failure among schizophrenic patients, then slower oscillation frequencies should lead to an increased frequency of anticipatory saccades; increased interstimulus intervals should increase the probability of anticipatory saccade generation. In the current study, 24 schizophrenic patients and 24 normal comparison subjects will be presented with square wave tasks consisting of three different oscillation frequencies (0.2, 0.4, & 0.8 Hz). Consistent with our previous report, schizophrenic patients had faster reaction time saccades across conditions than normal comparison subjects (effect size = 0.51). Preliminary analyses also demonstrated that schizophrenic patients generated proportionally more anticipatory saccades than normal comparison subjects during 0.2 Hz (42%) than during 0.4 Hz (35.5%) and 0.8 Hz (17.5%) square wave frequencies. The pattern of results is consistent with the notion that schizophrenic patients' faster reaction time saccades during predictive saccade tracking results from failed inhibition.