

**Brief Report**

**Effect of Chronic Alcohol Use on Smooth Pursuit Eye Movements**

It is now well established that smooth pursuit eye tracking dysfunction is present in many individuals with schizophrenia (see Lacroix and Clemens, 1993, for a recent review). Less clear, however, is how a history of chronic alcohol abuse, a characteristic that often accompanies schizophrenia (e.g., Brady et al., 1991; Muessert et al., 1992), might color eye tracking performance. Although acute doses of alcohol are generally known to disrupt pursuit eye tracking (e.g., Stapleton et al., 1986), findings concerning the chronic effects of alcohol abuse on smooth pursuit are contradictory (Kobatske et al., 1983; Anderson, 1984; Radiant and Homer, 1997). Furthermore, chronic alcohol use has been known to alter other psychophysiological indicators of central nervous system functioning, such as the electroencephalogram (Johannesson et al., 1992) and event related potentials (Beecher et al., 1967). Findings such as these have led to continued speculation about the possible effects of chronic alcohol abuse on eye tracking.

We determined the role of long-term alcohol use on eye tracking by comparing the eye tracking of chronic but detoxified alcoholic subjects to that of normal subjects. We also correlated smooth pursuit tracking performance with indices of the severity of alcohol abuse.

Nineteen alcoholic patients (10 men and 9 women), ranging in age from 26 to 65 years (mean ± SD = 36.0 ± 8.9 years) were recruited from a chemical dependency impatient ward and an extended care facility (the latter reserved for individuals who had repeatedly failed previous rehabilitation programs) at a large metropolitan hospital serving a community of diverse social strata. Detailed histories of alcohol use were assessed by structured interview (Composite International Diagnostic Interview; Robins et al., 1987) and all alcoholic patients met DSM-III-R criteria for alcohol dependence (American Psychiatric Association, 1987). Patients were excluded from study if they had schizophrenia or physical or medical problems that would render study measures difficult or impossible to administer or interpret (e.g., Misdemeanor). The 18 (5 men and 13 women) normal control subjects, ranging in age from 23 to 50 years (mean ± SD = 34.4 ± 8.4 years), were hospital employees who met the same exclusionary criteria applicable to alcoholic subjects. In addition, potential control subjects were screened to ensure the absence of personal alcohol abuse or dependence and psychopathology.

The alcoholic subjects ranged in age of onset (time of first full alcohol dependence syndrome) from 13 to 52 years (mean ± SD...
Alcoholic and normal control subjects were found to have very similar log RMS error scores on the tracking task, with alcoholic subjects (mean ± SD = 2.00 ± 0.23) actually displaying slightly better than normal (mean ± SD = 2.04 ± 0.22) tracking (t = -0.60, df = 31, p < 0.55). Indices of the severity of alcoholism were correlated with log RMS scores in order to determine whether severity predicted eye tracking performance (see Table 1). None of the indices of severity were found to be significantly (p > 0.05) correlated with log RMS error, and most correlations were in the wrong direction. That is, good pursuit tended to be associated nonsignificantly with severity of alcohol abuse.

Our findings strongly suggest that chronic alcohol abuse does not adversely affect smooth pursuit eye tracking. Furthermore, the nonsignificant and negative correlations between RMS error and drinking-related severity indices suggest that studying even more severely impaired alcoholic patients would not change our results. It is of interest that RMS error scores for alcoholic and normal control subjects did not differ even though eight of our alcoholic subjects had concomitant affective disorders, disorders that can sometimes make eye tracking performance worse (Jacono et al., 1992), and three of them had other types of drug dependence.

In conclusion, our data indicate that even chronic alcohol dependence does not affect smooth pursuit eye tracking. Thus, at present, chronic abuse of alcohol is unlike confounder in studies of smooth pursuit tracking in schizophrenia.

Acknowledgments. This research was supported in part by Training MH-1 Research (MH-44643 and DA-051 from the National Institute of Mental Health and the National Institute on Drug Abuse for their assistance with collection and scoring.

References


Table 1. Indices of alcoholism severity and correlations with smooth pursuit performance (log root-mean-square error).

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Withdrawal symptoms</td>
<td>4.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Years dependent</td>
<td>18.0</td>
<td>10.7</td>
</tr>
<tr>
<td>Detoxifications</td>
<td>6.3</td>
<td>11.6</td>
</tr>
<tr>
<td>Outpatient treatments</td>
<td>2.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Inpatient treatments</td>
<td>4.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Medical complications</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Social problems</td>
<td>1.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Work problems</td>
<td>2.0</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Note: None of the correlations were significant (p < 0.05).


chronic abuse of alcohol is unlikely to be a
confounder in studies of smooth pursuit eye
tracking in schizophrenia.

Acknowledgments. This research was
funded in part by Training (MH-17069) and
Research (MH-44443 and DA-03147) grants
from the National Institute of Mental Health
and the National Institute on Drug Abuse.
The authors thank Tom Meyer and Shelley
Smith for their assistance with the data
collection and scoring.

References

American Psychiatric Association. DSM-III-R:
Diagnostic and Statistical Manual of Men-
tal Disorders. 3rd ed., revised. Washington,

Anderson, S.J. Eye tracking performance
and attention in alcohol abusers and psy-

Biederman, J.; Milberger, S.; Faraone, S.; et al.
Effectiveness of an empirically based treat-
ment program for alcoholism and
149:1398-1400.

Brecher, M.; Porjesz, B.; and Regenstreif, H.
In vivo positron emission tomography
(anterior cingulate cortex) in alco-
182:160-165.

Brecher, M.; Porjesz, B.; and Regenstreif, H.
In vivo positron emission tomography
(anterior cingulate cortex) in alco-
182:160-165.

Brecher, M., Porjesz, B., and Regenstreif, H.
In vivo positron emission tomography
(anterior cingulate cortex) in alco-
182:160-165.

Brecher, M., Porjesz, B., and Regenstreif, H.
In vivo positron emission tomography
(anterior cingulate cortex) in alco-
182:160-165.