

Paranoid schizophrenics may not use irrelevant signals

The use of measures of blocking and of urinary dopamine

R.D. Oades, D. Bunk, and C. Eggers

University Clinic for Child and Adolescent Psychiatry, Hufelandstrasse 55, W-4300 Essen, Federal Republic of Germany

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Summary. Conditioned blocking tests for the use of superfluous (irrelevant) information in task-solving. Paranoid psychotic, obsessive-compulsive and healthy subjects usually showed normal blocking, but non-paranoid subjects tended to learn about the superfluous stimulus. Attenuated blocking was usually associated with increased dopamine utilization measured in 24h urine samples. This may reflect poor stabilization of response to neuroleptic medication.

Key words: Blocking tests - Urinary dopamine

Introduction

The origin of the delusions of paranoid schizophrenics could lie in the uptake of information irrelevant or superfluous to a given situation. Use of these extra details could alter the interpretation of signals relevant to ongoing responses [9]. Alternatively they may select sensory input in a normal way but do not appropriately monitor and modulate its comparison with stored information for interpretation [4,6]. Both are forms of selective information processing widely believed to be impaired in schizophrenia [3,11].

Method

The conditioned blocking task measures the normal ability to suppress the use of redundant information in problem solving [5]. We recorded the blocking performance of paranoid, non-paranoid schizophrenic, obsessive compulsive patients together with sex and age matched healthy subjects (mean age 18.2 years).

Subjects learned two forms of a computer game in which they had to guide a mouse to one of two "safe" corners of a house depending on two or three colour panels displayed

above. Delays accrued minus points and success plus points. After learning, the colours were presented alone. Blocking was measured by the relative response latencies on the two tasks to the colours originally presented first and third in the panels.

Only the non-paranoid group showed attenuated blocking. Paranoid, obsessive-compulsive and healthy subjects usually suppressed processing of the extra information as shown by longer response latencies to the redundant colours when shown alone (see Fig. 1).

However, independent of the group normal blocking was associated with lower, and attenuated blocking with higher dopamine activity measured in 24 h urine samples (i.e. utilization: 9.0 the ratio - homovanillate-metabolite/dopamine more or less than 9.0: see Fig. 1). A relationship was not observed with IQ, the activity of other monoamines or with the level of medication.

The urinary results are compatible with animal studies of the neurobiological bases of blocking [2,8] and the idea that increased dopamine activity promotes the frequency of switching to other information channels for processing in the nervous system [7].

These blocking results in young schizophrenic subjects are in part consistent with those reported for older acutely ill schizophrenics using the related measure of latent inhibition [1], but go further in differentiating according to biochemical and clinical features [1]. The apparent presence of blocking in subjects with paranoid features suggests that one aspect of their selective attention to external events is normal or responsive to dopaminergic medication. Perhaps their delusional problems involve an impaired internal monitoring of stimulus associations [4].

Non-paranoid schizophrenics show less selective processing of external events and may show less cognitive response to neuroleptic treatment [11]. However, the relationship of blocking to dopamine activity across groups suggests that whereas this transmitter may be important for this type of processing, changes of dopamine activity may not explain

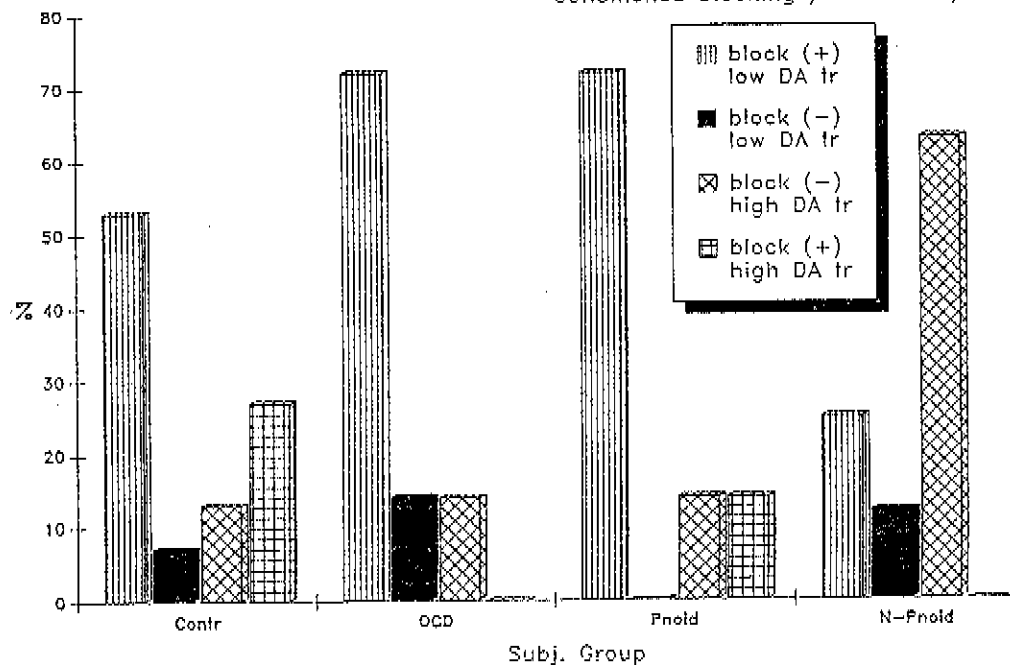


Fig.1. Anova (2-way covered for IQ, group x dopamine utilization x blocking; $df = 3,1$; $F = 6.4$, $p < 0.02$); where 1-way ANOVA and post-hoc Scheffe tests showed that non-paranoids ($n=8$) block less than paranoid ($n=7$), healthy

($n=15$) ($p < 0.05$) and obsessive compulsive subjects ($n=7$) ($p < 0.1$): corrected χ^2 8.2, $p = 0.004$ for association of high dopamine activity with reduced blocking and low activity with normal blocking across all subjects

different types of psychotic impairment without reference to a further factor. The results indicate that reduced blocking or high dopamine activity are not automatic indicators of psychosis. Normal subjects are able to keep the extra information processed (in reduced blocking) under control. This may imply that other neural system(s) are intact in healthy but impaired in non-paranoids. Recent pertinent suggestions have pointed to pathways ascending from the midbrain using serotonin [12] or corticofugal pathways that use amino acids as transmitters [10].

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