Attention training in the cognitive rehabilitation of schizophrenic patients: a review of efficacy studies
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**Authors' objectives**
To assess the effects of attention and cognitive training on attentional functioning in schizophrenic patients.

**Searching**
The following sources were searched for peer-reviewed reports: MEDLINE from 1966 to May 1999; Current Contents from 1995 to May 1999; PsycLIT from 1981 to March 1999; and PSYNDEX from 1997 to March 1999. The reference lists in key papers were also reviewed.

**Study selection**
**Study designs of evaluations included in the review**
Studies without a control group, or with a poor report of performance data (no or only partial indication of means and standard deviations of test scores) were excluded. Studies without external measures of outcome were also excluded.

**Specific interventions included in the review**
Computer-based and non-computer-based attention training programmes were eligible. In the included studies, training programmes had been incorporated into standard in-patient or out-patient programmes. Attention training was compared with the following control therapies: no specific treatment; individual vocational therapy; creativity training; communication training; no attention training but otherwise the same treatment programme; graphics-based computer games; and viewing of documentaries. The training lasted from 3 to 12 weeks, and the total number of sessions ranged from 6 to 60.

**Participants included in the review**
Schizophrenic patients were eligible. There was no a priori definition of schizophrenia. Patients in the review included schizophrenic patients with a first episode, chronic in- and out-patients, chronic paranoid, and undifferentiated schizophrenic in-patients.

**Outcomes assessed in the review**
Studies that assessed attention functioning using external measure of outcome were eligible. Studies that assessed other cognitive functions as outcomes were excluded. The included studies used the following measures to assess outcomes: Attention Stress Test, d2; repeated psychological measures (word recognition, crossing out numbers); sustained attention (KVT); Stroop Interference; Stroop word; Stroop colour; reaction time differences; labyrinth test; mental arithmetic (KLT); span of apprehension; Continuous Performance Test; Wechsler Memory Scale; Trail-making Test (A and B); Search-a-word; and letter cancellation.

**How were decisions on the relevance of primary studies made?**
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

**Assessment of study quality**
The authors do not report a method for assessing validity.

**Data extraction**
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.
The following information were tabulated: author; the number of patients in each treatment group; details of the intervention and control treatments; chronicity and subtype of schizophrenia; training duration and frequency; and outcome measures. The effect size (Cohen's d) was calculated for the experimental and control group in each study, and the power of the tests was determined for the scores of the experimental group.

Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken.

How were differences between studies investigated?
Differences between the studies were discussed in the text of the review.

Results of the review
Nine controlled studies (395 patients) were included. Of these, four studies were non-computer based and five were computer-based.

The results on the effectiveness of attention training were inconclusive. Two of the 9 controlled trials showed significant improvements of attention functioning in schizophrenic patients receiving training, compared with control therapy, on several outcome variables. In a further 3 controlled studies, a differential training effect was found for one outcome variable. There was no performance improvement on 19 of the 35 outcome variables.

There were substantial differences between the statistical analyses of the included studies. Most studies (7 out of 9) analysed the data using parametric tests, without presenting any proof that the data met the required statistical assumptions for this type of analysis. The number of patients enrolled in the studies was generally small, ranging from 10 to 40 in the experimental groups.

Authors' conclusions
There was inconclusive evidence that attention training is effective in schizophrenia. Longitudinal efficacy studies are needed in which different aspects of attention are systematically exercised and assessed.

CRD commentary
The review aims were stated and the inclusion criteria were broadly defined in terms of the participants, study design, intervention and outcome. Several relevant sources of literature were searched but no attempt was made to locate unpublished research. Full details of the search strategy were not provided, and the methods used to select the studies were not described. It was not reported whether the included studies were randomised or non-randomised controlled studies, and whether the data had been analysed on an intention-to-treat basis. Relevant data were tabulated, but the methods used to extract the data were not described. A narrative synthesis was appropriate given the small number of studies with different interventions, which were assessed using different outcomes. Any conclusions must be interpreted with caution in view of the limitations of the review.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors state that future research on the efficacy of attention training for schizophrenia should examine larger patient samples. In addition, future research should consider different aspects or dimensions of attention, different outcome levels, different patient characteristics and different medication status.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.