

meta-analysis of cognitive remediation for schizophrenia: methodology and effect sizes.

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Wykes T; Huddy V; Cellard C; McGurk SR; Czobor P

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Objective: Cognitive remediation therapy for schizophrenia was developed to treat cognitive problems that affect functioning, but the treatment effects may depend on the type of trial methodology adopted. The present meta-analysis will determine the effects of treatment and whether study method or potential moderators influence the estimates.

Method: Electronic databases were searched up to June 2009 using variants of the key words "cognitive," "training," "remediation," "clinical trial," and "schizophrenia." Key researchers were contacted to ensure that all studies meeting the criteria were included. This produced 109 reports of 40 studies in which $\geq 70\%$ of participants had a diagnosis of schizophrenia, all of whom received standard care. There was a comparison group and allocation procedure in these studies. Data were available to calculate effect sizes on cognition and/or functioning. Data were independently extracted by two reviewers with excellent reliability. Methodological moderators were extracted through the Clinical Trials Assessment Measure and verified by authors in 94% of cases.

Results: The meta-analysis (2,104 participants) yielded durable effects on global cognition and functioning. The symptom effect was small and disappeared at follow-up assessment. No treatment element (remediation approach, duration, computer use, etc.) was associated with cognitive outcome. Cognitive remediation therapy was more effective when patients were clinically stable. Significantly stronger effects on functioning were found when cognitive remediation therapy was provided together with other psychiatric rehabilitation, and a much larger effect was present when a strategic approach was adopted together with adjunctive rehabilitation. Despite variability in methodological rigor, this did not moderate any of the therapy effects, and even in the most rigorous studies there were similar small-to-moderate effects.

Conclusions: Cognitive remediation benefits people with schizophrenia, and when combined with psychiatric rehabilitation, this benefit generalizes to functioning, relative to rehabilitation alone. These benefits cannot be attributed to poor study methods.