The effects of nonpharmacological interventions on subjective memory complaints: a systematic review and meta-analysis

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CRD summary
The authors concluded that expectancy change training appeared to be effective in influencing subjective memory complaints, and conventional memory training was more effective for influencing objective memory. Although the research recommendations appear to be justified, potential biases in the search, along with the generally poor quality of the included trials, mean that the reliability of the authors' conclusions is unclear.

Authors' objectives
To evaluate the effects of non pharmacological interventions on subjective memory complaints.

Searching
MEDLINE and PsycINFO were searched for peer-reviewed published English, Dutch, German, or French language studies. Search terms were reported. In addition, relevant reviews and the reference lists of retrieved articles were scanned. Research submitted and accepted for publication was also included. An abstract and full text article had to be available.

Study selection
Randomised controlled trials (RCTs) of all non drug interventions delivered to participants with subjective memory complaints, or a desire to improve memory performance, were eligible for inclusion. To be eligible for the meta-analysis, sufficient data (mean values, standard deviation or error, divided by the intervention group) had to be available and trials had to report at least one subjective memory outcome. Excluded were studies of patients only with objective memory difficulties, neuropsychiatric disorders, traumatic brain injury, cognitive impairment resulting from cytostatic therapy, those with test performance for declarative memory greater than one standard deviation below the population norm, and studies where objective memory was not measured by at least one validated test.

Included trials had five categories of intervention: conventional memory training; expectancy change training; combined conventional memory training plus expectancy change training; physical training; and combined physical training plus mental training. Intervention duration ranged from less than one hour, to ten weeks. In addition to comparisons between the interventions, others were conducted with waiting list and placebo. The primary outcome was subjective memory assessment; secondary outcomes were assessment of objective memory, depressive symptoms, well-being, and side effects. Details of the various interventions and outcome measures were reported in the paper.

The mean age of participants in included trials was over 50 years in all trials (range 53 to 82 years), most were female and were in living in the community (where reported). Most trials were carried out in the USA.

Two independent reviewers selected studies for inclusion. Disagreements were resolved by discussion, or by reference to a third reviewer.

Assessment of study quality
Trial quality was assessed using criteria covering blinded assessment of objective outcomes, drop-outs, use of intention-to-treat analysis, baseline comparability of groups, and the clarity of results and data analysis. Missing data was requested from the authors where necessary.

Trial quality was assessed by two independent reviewers. Disagreements were resolved by discussion.

Data extraction
Data were extracted or calculated for mean change scores (baseline to post treatment), and 95% confidence intervals.
(CI) were presented for the outcomes of interest. Standardised mean differences were calculated using Hedge’s adjusted g. Missing correlations between baseline and post treatment scores were imputed where necessary.

Two independent reviewers extracted the data. Disagreements were resolved by discussion.

**Methods of synthesis**

Standardised mean differences (SMD) of change scores and 95% confidence intervals were entered into a random-effects meta-analysis. The I² statistic was used to quantify statistical heterogeneity.

**Results of the review**

Fourteen RCTs were included in the review. Thirteen RCTs were included in the meta-analysis (n=867 participants), and 10 of these addressed the primary outcome. Trial quality was considered to be generally low, with inadequate treatment of attrition and absence of intention-to-treat analysis reported as key limiting features. Follow-up of outcomes ranged from the same day to 13 weeks.

For subjective memory, pooled results showed statistically significant effects in favour of expectancy change training compared with waiting list (SMD 0.63, 95% CI 0.20 to 1.06; I²=0%; three trials); expectancy change training compared with placebo (SMD 0.69, 95% CI 0.19 to 1.18; I²=0%; two trials); and combined conventional memory training plus expectancy change training compared with waiting list (SMD 0.61, 95% CI 0.09 to 1.22; I²=64%; two trials).

For objective memory, pooled results showed statistically significant effects in favour of memory training compared with waiting list (SMD 0.49, 95% CI 0.17 to 0.81; I²=0%; five trials); memory training compared with placebo (SMD 0.47, 95% CI 0.06 to 0.87; I²=24.3%; four trials); and memory training compared with combined conventional memory training plus expectancy change training (SMD 0.59, 95% CI 0.14 to 1.04; I²=0%; two trials).

There was a significant effect for expectancy change training compared with memory training in the reduction of depressive symptoms (SMD 1.30, 95% CI 0.43 to 2.18; I²=74.3%; two trials).

Effects were not statistically significant in other outcomes arising from the following comparisons: expectancy change versus waiting list, placebo, memory training, or combined memory training (15 trials); memory training versus waiting list, placebo, combined memory training, physical training, or physical-cognitive training (17 trials); combined memory training versus waiting list or placebo (seven trials); physical training versus waiting list (one trial); physical-cognitive training versus waiting list (two trials); or physical training versus physical-cognitive training (one trial).

Side effects were not reported in most trials.

**Authors’ conclusions**

Expectancy change training appeared to be effective in influencing subjective memory complaints. Conventional memory training was more effective for influencing objective memory. Depressive symptoms and well-being were not substantially affected by any intervention.

**CRD commentary**

The review addressed a clear question, and this was supported by potentially reproducible inclusion criteria. The search strategy included some relevant sources, but search dates were not reported. Language restrictions were applied, and the included trials were limited to those conducted in western societies. There was no apparent search for unpublished studies. This suggested that relevant studies might have been missed, and the authors acknowledge the possibility of limited generalisability. The review process was carried out with sufficient attempts to minimise error and bias.

Appropriate quality assessment criteria were applied; the results of this were used to interpret the review findings. Trial details were provided, heterogeneity was assessed, and the chosen method of synthesis appeared to be suitable.

Although the research recommendations appear to be justified, potential biases in the search, along with the generally poor quality of the included trials, mean that the extent to which the authors’ conclusions are reliable is unclear.
Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that further randomised controlled trials are needed, including those measuring depression and well-being.

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