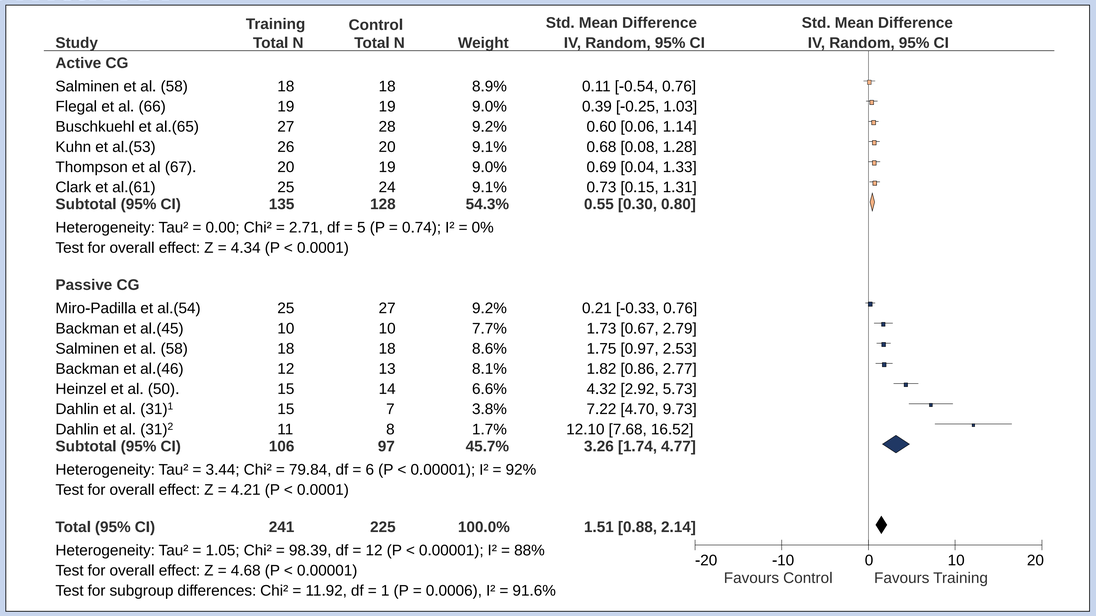
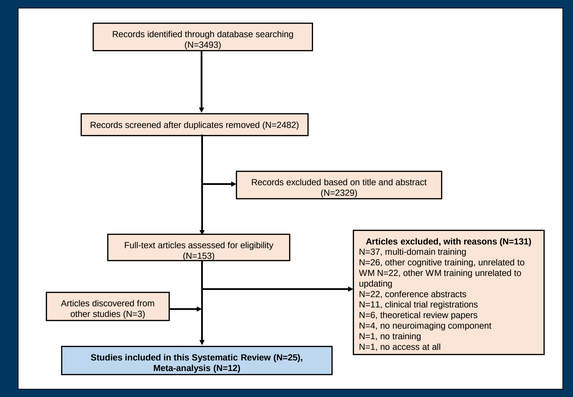
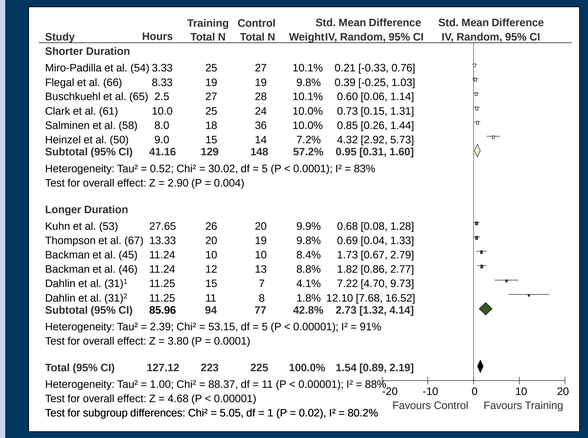
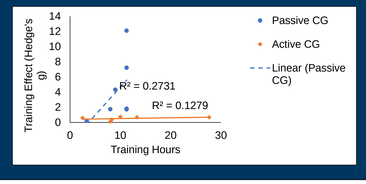
Training effect: Active Vs Passive Control Groups

- **WMU training produces large training and moderate near transfer behavioural effects**
- **no evidence of far transfer to more general cognitive domains.**

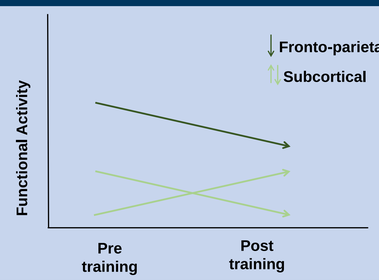








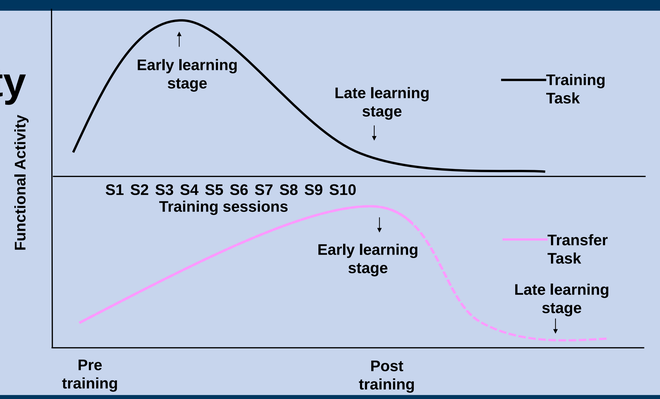
Training-Related Neural Changes

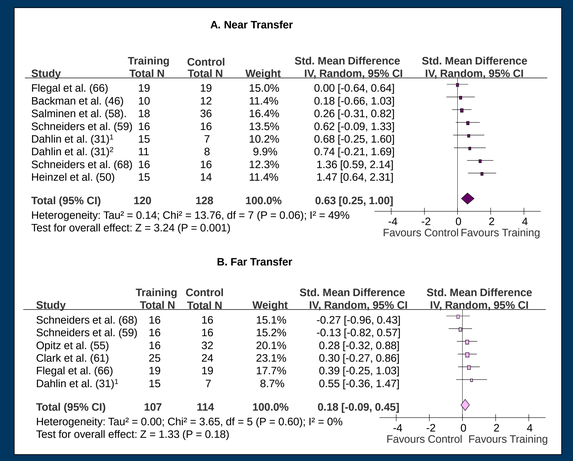


- **consistent fronto-parietal activity decreases**
- **unclear pattern for subcortical regions**

Theoretical Model for Dynamic Activity Changes

- **fast-early training related activity increase and a late-slow decrease**
- **transfer of training-related neural changes follow the same pattern albeit with a lag**





Systematic review and meta-analysis of working memory updating training effects on task performance and neuroimaging measures in adults.

Background

Recent reviews yield contradictory findings regarding the efficacy of working memory training and transfer to untrained tasks. We reviewed working memory updating (WMU) training studies and examined cognitive and neural outcomes on training and transfer tasks.

Methods

Ovid EMBASE, Ovid MEDLINE, PsycINFO, CINAHL, Scopus & Cochrane database searches were conducted up to 28 January 2019 for adult brain imaging studies measuring the effect of WMU training. Training-induced neural changes were assessed qualitatively, and meta-analyses were performed on behavioural training and transfer effects.

Results

A large behavioural training effect was found for WMU training groups compared to control groups. There was a moderate near transfer effect on tasks in the same cognitive domain, and a small non-significant effect for far transfer to other cognitive domains. Functional neuroimaging changes for WMU training tasks revealed consistent frontoparietal activity decreases while both decreases and increases were found for subcortical regions. Transfer effects were generally associated with functional activity increases.

Conclusion

WMU training promotes plasticity and has potential applications in optimizing interventions for neurological populations. Future research should focus on the mechanisms and factors underlying plasticity and generalisation of training gains.

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