INTRODUCTION

• Low executive working memory capacity (eWMC) is associated with alcohol use disorders (AUDs) and poor self-regulation (Finn, 2002).

• The importance of eWMC to adaptive functioning has led to a recent influx of studies attempting to improve eWMC using various training methods (Au et al., 2015; Chein & Morrison, 2010; Rabipour & Raz, 2012).

• Studies suggest that such approaches may even alleviate symptoms associated with low eWMC, such as poor attentional control in ADHD (Klingberg et al., 2002).

• Numerous studies raise questions about the effectiveness of WM training, for whom WM training may work, and the factors that predict WM training related improvements in eWMC and related symptoms (e.g. Melby-Lervåg et al., 2015; Shippstead, Hicks, & Engle, 2012).

• Working memory (WM) training studies have been hampered by a lack of appropriate control groups, questionable training methods or programs, narrow outcome measures, and a lack of assessment of the predictors of training adherence and improvements.

Current Study: This study presents a well-controlled and methodologically rigorous study testing the efficacy of a previously successful rigorous and adaptive WM training protocol (Harrison et al., 2013) in those with AUDs along with an adaptive training control condition (visual search training). Predictors of training task improvement and transfer to other measures of WM are examined.

Main Objectives:
1) To examine training task improvement and transfer effects of eWMC training in AUDs at immediate and 1-month follow-up.
2) To identify the individual predictors (e.g. symptoms and cognitive factors) of training improvement, adherence, and transfer.

METHODS

Methods & Procedure
• This study implements a WM training program for individuals with AUDs that utilizes two adaptive complex dual-span WM tasks for active training (AT) and two Visual Search (VS) tasks for control training (Harrison et al., 2013).

• Participants completed comprehensive baseline and follow-up assessments of eWMC, and 15 training sessions.

Materials
• SSAGA-IV interview (Semistructured Assessment for the Genetics of Alcoholism: COGA, 2005) to assess group criteria

• Active WM Training: Operation Span (OSpan) and Symmetry Span (SSpan) tasks

• Visual Search (Control) Training: Visual Search Letters and Hands (Harrison et al., 2013)

RESULTS

Training Task Improvement
• Linear mixed models revealed main effects of session (B=.17, p<.01), indicating improvement on training tasks as session increased; and condition (B=.56, p<.001), suggesting those in VS improved more than those in the AT (Figure 3).

• This model also revealed session by group interaction (B=-.012, p<.01), suggesting healthy controls (HC) improved more across training sessions compared to AUDs (Figure 4).

Near Transfer
• Linear mixed models revealed significant transfer among two near transfer measures (Rotation Span [RTS] and Auditory Consonant Trigram [ACT]) at follow-up 1: (RTS: B=6.64, p<.001; ACT: B=3.42, p<.05).

• At follow-up 2 (one month), both effects remained significant (RTS: B=5.69, p<.05; ACT: B=4.87, p<.001) (Figure 5).

• ACT also revealed a group by session interaction at follow-up 2 (B=4.28, p<.01), indicating controls maintained transfer effects, while AUDs did not.

CONCLUSION

• Results suggest that those with AUDs are able to improve on WM training programs, and show some evidence of near transfer, but are also less likely to complete the training protocol.

• Those who showed more improvement on active training, and higher cognitive skill at baseline, were more likely to show improved eWMC transfer.

• Baseline intelligence (before initiation of the training protocol) predicted both improvement on the AT tasks and transfer on the majority of measures, suggesting those with higher intelligence were more likely to benefit from WM training.

• This and future studies provide direct translation to the development of cognitive interventions for treating AUDs and related externalizing psychopathology.

References


