The Impact of Alcohol on the Different Components of Working Memory

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Abstract

Alcohol consumption related deficits on complex executive functions and short-term memory have been reported in the literature, usually based on group comparisons. A repeated measures design was used, assessing 21 to 35 year old male participants (n = 16) on the Automated Working Memory Assessment's twelve verbal and visuo-spatial short-term and working memory subtests. A low dose of alcohol (13.6 grams) was administered, breath alcohol concentration (BAC) was measured and subjective feelings of stimulation were assessed on the Brief Biphasic Alcohol Effects Scale (B-BAES). Repeated measures analysis of (co)variance models indicated that performance improved on the working memory processing tasks, particularly in the verbal domain. This may have been related to changes in attention functions, stimulus evaluation task demands and tacit recall. However, several of the short-term memory tasks deteriorated under the experimental condition, where Word Recall was significant when age was controlled for. This may have been due to alcohol-related changes in stimulus representations. Partial correlation coefficients suggested that higher BACs were related to deficits in performance if participant age was controlled for. The structure of the B-BAES was consistent with the literature, but subjective feelings of stimulation were not associated with performance changes. Shorter test-retest delays were slightly associated with improved performance, but the research data did not fully support practice effects or a mitigating influence of alcohol consumption. Based on the findings, the specific influence of alcohol consumption on working memory could depend on methodological design, task types, memory domain and other sources of variance.

Keywords: Acute alcohol consumption, alcohol dosage, breath alcohol concentration, Working memory, Short-term memory, Automated Working Memory Assessment, Brief Biphasic Alcohol Effects Scale