INTRODUCTION

In recent years alcohol researchers have increasingly sought to investigate the impact of alcohol intoxication on behavioral dysregulation, which can be defined as a failure (a) to implement appropriate behavioral responses, or (b) to appropriately adjust one’s behavioral patterns in response to changing contextual demands. In this connection, results from laboratory analogues provide compelling evidence that in a number of tasks, alcohol increases behavioral dysregulation. 

To determine the extent to which alcohol intoxication interacts with the cognitive demands or complexity of tasks to differentially influence the likelihood of commission errors, these alcohol intoxication errors should be compared to “perseverative” errors. These error types are believed to reflect interference in effortful control over different cognitive processes. We predicted that alcohol would increase both types of errors, but would do so differentially, depending on working memory load.

Hypothesis 1 – Premature Response Errors

As noted above, task stimuli were arranged in configurations that elicited active responses on 85% of trials, thereby creating a prepotent inclination to respond in both light and heavy load conditions. Thus, in both of these contexts, significant cognitive effort was needed to effectively support the inhibitory process that is needed to prevent premature response selection and allow time for sufficient contextual processing. Because alcohol was expected to interfere with this aspect of cognitive control, a main effect of beverage group on premature commission errors was predicted. Specifically, alcohol was expected to increase these errors (relative to sober) at both the light and heavy working memory loads.

Hypothesis 2 – Context Processing Errors

Because contextual processing required substantially more cognitive effort/control at the heavy load level than at the light load level, and because alcohol was expected to interfere with this aspect of cognitive control, a Beverage group X Memory load interaction was predicted with regard to context processing errors. In particular, the increase in the type of error from light to heavy load conditions was expected to be greater among intoxicated participants than among their sober counterparts.

METHOD

SAMPLE

Participants were 16 undergraduate social drinkers (8 male), at least 21 years of age (M = 22.9, SD = 2.6), with recent and exclusive beverage consumption. In the Alcohol condition, they consumed a 95% ethyl alcohol + juice mixture calculated to yield an approximate mean peak BAC of .075. In the No Alcohol condition, a juice-only beverage of comparable volume was administered. Average consumption was paced evenly over a 20-min period.

PROCESSES

Beverage Manipulation

After completion of preliminary screening measures, we randomly assigned equal numbers of participants of each sex to a beverage condition. In the Alcohol condition, they consumed an 95% ethyl alcohol + juice mixture calculated to yield an approximate mean peak BAC of .075. In the No Alcohol condition, a juice-only beverage of comparable volume was administered. Average consumption was paced evenly over a 20-min period.

DISCUSSION

Overall, the current study provided preliminary support for the notion that alcohol-induced behavioral dysregulation may result, at least in part, from impairment in a two-stage cognitive control mechanism responsible for guiding contextually appropriate behavior. Evidence strongly indicated alcohol-induced impairment in contextual processing (i.e., the second stage of the mechanism). Evidence was only tentative for alcohol-induced impairment in inhibitory processes (i.e., the first stage of the mechanism). Further research on this topic would benefit greatly from recruitment of larger samples and inclusion of psychophysiological measures of cognitive processing (e.g., EEG) that could be used to validate the distinction of error types by RT.