The effects of Cognitive Load on Subjective Responses to Alcohol

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Introduction

- Alcohol researchers commonly ask participants to perform challenging—and often boring—cognitive tasks during alcohol challenge experiments in which subjective responses to alcohol are also measured.
- Existing research highlights the importance of contextual influences on reports of alcohol's sedative and stimulating effects (Corbin et al. 2021).
- We wondered whether subjective responses to alcohol might differ when participants are completing cognitive tasks compared to when they are not.
- To test this idea, we used data from a study in which participants completed reports of subjective effects while blood alcohol concentration (BAC) was rising or at peak (~0.08%) as they completed a series of cognitively demanding lab tasks or, instead, watched an episode of a popular sit-com (The Office).
- We hypothesized that performing cognitive tasks would decrease self-reported stimulation and increase self-reported sedation. There was no prediction regarding group differences in subjective intoxication.

Methodology

- Participants (Ps) were N=216 young adults (ages 21-35; 47% women).
- Ps were randomly assigned to one of three experiments, which differed according to the cognitive tasks they were asked to perform (response inhibition, working memory updating, or task switching).
- Within each experiment, Ps were randomly assigned to one of two beverage conditions: Alcohol [0.80 g/kg for men; 0.72 g/kg for women], or Placebo [0.04 g/kg].
- "A/D group" participants completed tasks while their BAC was ascending and again while their BAC was descending; "D-only group" Ps watched an episode of The Office during ascending BAC and completed cognitive tasks only during descending BAC.
- Ps in the alcohol and placebo groups were asked to self-report feelings of stimulation, sedation, and subjective intoxication on 0-10 scales.
  - Stimulation items: talkative, elated, up, energized, vigorous
  - Sedation items: heavy, down, slow thoughts, inactive, difficulty concentrating.
  - Subjective intoxication: "How drunk do you feel right now?" (0 = not at all; 10 = more drunk than I have ever been).
- BAC and subjective responses to alcohol were measured at multiple time points during ascending BAC.
- Statistical modeling (General Linear Models) was conducted using R; all models tested for **changes in subjective response compared to pre-drinking baseline** (i.e., Time 1 in the figures).
- For additional details on study procedures, see Bartholow et al. (2018).

Results

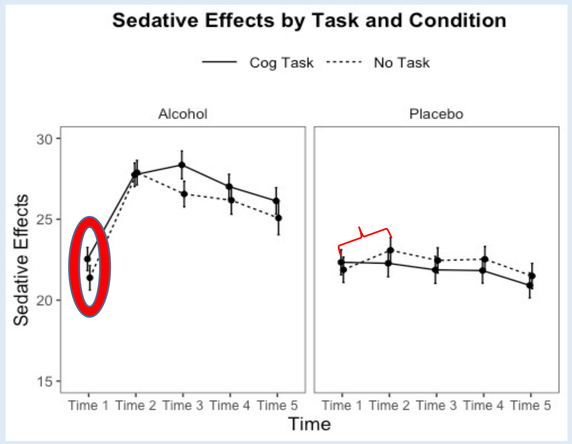

Figure 1: Sedative Effects

Group x Time interaction: z-score = 1.915, p = 0.056

- *Ps who watched The Office (No task) showed a marginally larger increase in sedation than Ps who completed cognitive tasks (Cog Task). However, this difference is attributable to a difference at pre-drink baseline (Time 1), not post-drink effects. No other time points showed significant group differences from baseline, although Cog Task Ps reported more sedation than No Task Ps at Times 3-5.*

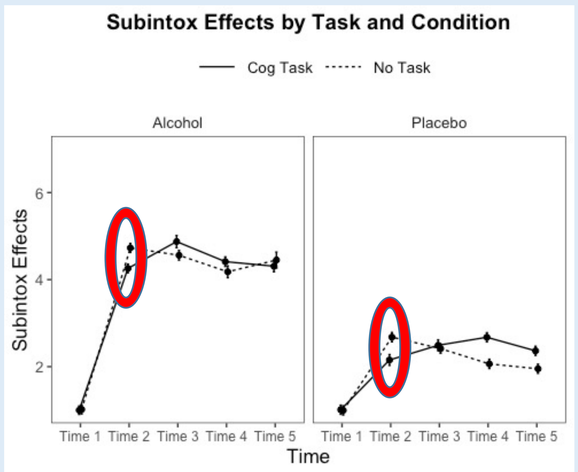

Figure 3: Subjective Intoxication

Group x Time interaction: z-score = 3.068, p = 0.002
Group x Beverage x Time: z-score = 1.90, p = .058

- *Ps who watched The Office (No Task) showed a larger increase in subjective intoxication from Time 1-2 than the Cog. Task group. This was evident in both Alc and Placebo groups. Over time, Cog Task Placebo group Ps reported greater intox than their No Task peers.*

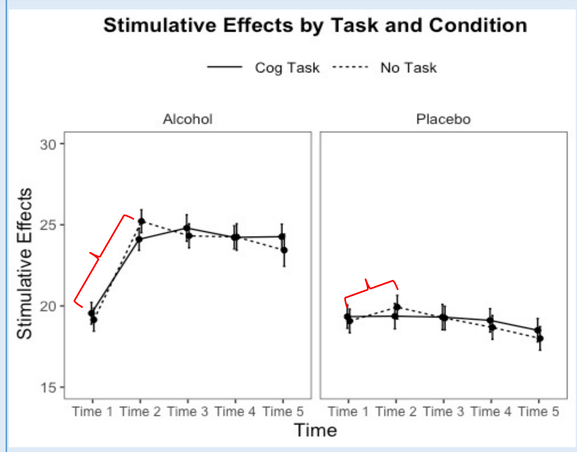

Figure 2: Stimulative Effects

Group x Time interaction: z-score = 2.24, p = 0.025

- *Ps who watched The Office (No Task) showed a larger increase in stimulation from Time 1-2 than Ps in the Cog Task group. Unlike Figure 1, this effect is not due to a group difference at baseline. No other time points showed significant group differences from baseline.*

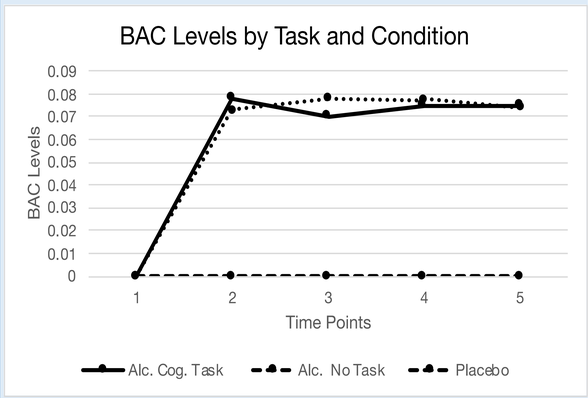

Figure 4: Blood Alcohol Concentration (BAC)

- *BAC trajectories were highly similar across the Cog Task and No Task groups. Thus, differences in subjective responses across groups cannot be attributed to different levels or trajectories of BAC across measurement occasions.*

Conclusion

- Based on these results, we can tentatively conclude that performance of standard cognitive tasks during alcohol challenge has little effect on participants' subjective responses to alcohol.
- Some small differences (changes from baseline) in stimulation and subjective intoxication were evident between groups. Ps in the No Task group reported feeling more stimulation and intoxication after drinking. These differences did not persist over time, however, nor were they restricted to the Alcohol group (i.e., Placebo participants showed a largely similar pattern).
- Limitations from this study include the inability to recreate the environmental cues and how social influence affects subjective response (Pliner and Cappell,1974).
- Alcohol and the social emotional award system yield an emotional response (Fairbairn and Sayette, 2014). Without a realistic social context in this study, we cannot easily generalize the current findings to real-world drinking situations.

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