Journal of Applied Research in Memory and Cognition

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Online First Publication, April 25, 2024. https://dx.doi.org/10.1037/mac0000173

Journal of Applied Research in Memory and Cognition

ISSN: 2211-3681
https://doi.org/10.1037/mac0000173

EMPIRICAL ARTICLE

The Impact of Alcohol Intoxication and Short-Sighted Decision Making in the Interrogation Room

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Suspects are often intoxicated during arrest and interrogation, yet little is known about intoxicated suspects during interrogation. Student participants ($n = 141$) were assigned to an intoxication group (sober, placebo, intoxicated at approximately .08%) and to be guilty or innocent of cheating (i.e., the cheating paradigm). To test whether alcohol myopia leads intoxicated suspects to focus on immediate salient consequences during interrogation, an interrogator accused participants of cheating and used one of two possible interrogation scripts that varied the consequences of confession and denial. There were no significant effects of intoxication, although all false confessors were intoxicated. Guilty participants focused more on short-term consequences than innocent participants when providing statements that could be interpreted as incriminating. Most participants made such a guilt-suggestive statement, indicating that if they talk to police anyone is at risk of saying something to reinforce investigators' suspicions. Low-to-moderate intoxication, surprisingly, does not amplify that risk.

General Audience Summary

Understanding the causes of wrongful conviction with a focus on conviction integrity has received considerable attention across psychology, criminal justice, and the law over recent decades, with false confessions being identified as a common contributor to miscarriages of justice. Despite evidence that suspects are often intoxicated at the time of their arrest and interrogation, no experimental research exists on the effects of alcohol intoxication on innocent or guilty suspects' behavior when questioned. The present study is the first to compare alcohol-intoxicated, placebo, and sober suspects' statements when interrogated, yielding important insights regarding the consequences of alcohol intoxication in high-stakes situations. Further, it is the first to investigate and confirm the tendency to focus on short-term consequences at the expense of long-term consequences in an interrogation context. The results suggest that everyone, guilty and innocent, sober and intoxicated, is at risk of saying something that could be interpreted as incriminating. Findings have the potential to inform subsequent research, law enforcement practices when questioning intoxicated and sober suspects, and legal decision makers who assess information gathered from this potentially vulnerable group.

Keywords: intoxication, confession, interrogation, temporal discounting, alcohol myopia

Supplemental materials: https://doi.org/10.1037/mac0000173.supp

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This study was funded by Grant SES-1556762 from the National Science Foundation's Directorate for Social, Behavioral and Economic Sciences (United States; Jacqueline R. Evans) and Grant 2014-6693 from the Swedish Research Council (Sweden; Angelica V. Hagsand). The authors thank the army of research assistants who worked on this study. The authors have no conflicts of interest to disclose.

Preliminary findings from this study were presented at the 2022 American Psychology-Law Society Annual Conference and at the 2022 American

continued

Research consistently finds that criminal suspects are often alcohol-intoxicated when encountered by police, and many are interrogated while intoxicated (e.g., Evans et al., 2009; Hagsand, Evans, et al., 2022; Hagsand, Zajac, et al., 2022). Police report that they tend to use similar interrogation approaches for sober and intoxicated suspects (Evans et al., 2009), and police may employ more confrontational techniques with the intoxicated (Hagsand, Zajac, et al., 2022). Further, prisoner self-reports suggest that intoxication may contribute to confusion during interrogations (Sigurdsson & Gudjonsson, 1994). In the United States many interrogation approaches are guilt-presumptive; such accusatorial techniques can generate false confessions (Kassin et al., 2010; Meissner et al., 2014), creating a risk of wrongful conviction. No experimental research has investigated the impact of intoxication on suspects' risk of self-incrimination during interrogations. The only relevant study in this context failed to identify an effect of intoxication on disclosing past transgressions (Mindthoff et al., 2019). However, participants were simply asked to tell an interviewer about a past transgression after being assured their response was confidential and only for research purposes. There was no accusation or suspicion of the participant transgressing nor the possibility of any consequence as a result of the information provided. The current research addresses this void in the literature.

It is well-established that people tend to focus on short-term consequences and discount more long-term (potentially less certain) consequences when making decisions (Kahneman & Tversky, 1979; Kalenscher & Pennartz, 2008). Such temporal discounting in decision making is concerning in an interrogation context as interrogators often suggest to suspects that confessing will lead to short-term rewards like ending the interrogation (see Kassin et al., 2010). Contrastingly, the long-term consequences of confessing (i.e., possible criminal charges) may be minimized or ignored by the interrogator and/or perceived as less salient and/or certain by the suspect. Madon et al. (2012, 2013, see also Yang et al., 2015) consistently demonstrated that temporal discounting applies to admissions about transgressions. Their participants chose to admit or deny transgressions as a function of which choice allowed them to avoid an aversive experience in the short term. In their approach, known as the repeated question paradigm, a denial leads to answering a lengthy series of monotonous questions on the computer while an admission increases the likelihood of a future meeting with a police officer, or vice versa. While these consequences are based on the short- and long-term consequences in an interrogation context, participants' decisions occur outside of an interrogation context. There is no accusation or suspicion of inappropriate behavior. Further, the interview's purported purpose is to learn about rates of criminal activity among the student body, involves going through a checklist of 20 transgressions, and is interrupted by participants answering questions on a computer. As such, while Madon and colleagues' work is suggestive of the importance of short-term consequences in interrogations, it does not directly address the issue.

Decision-making research has yielded inconsistent results regarding the impact of intoxication on temporal discounting: Intoxication has both reduced (e.g., Ortner et al., 2003) and increased temporal discounting (e.g., Reynolds et al., 2006) or had no effect at all (e.g., Wray et al., 2015). This research fails to reflect a typical interrogation context in multiple ways. It pits two gains against each other with no negative consequence and involves a series of many decisions. Further, it employs artificial scenarios often involving hypotheticals wherein participants are aware that there are no impactful consequences to their decisions. Relatedly, study participants do not make decisions within stressful or negative contexts.

While the decision-making research cannot tell us how intoxication impacts temporal discounting in an interrogation context, alcohol myopia theory (Steele & Josephs, 1990) may provide a solid basis for predictions. Alcohol myopia theory posits that the intoxicated have less capacity to attend to and/or process information leaving them less likely to attend to or process distal or peripheral information. Thus, their behavior is driven by only the most immediate and salient information. We expect the most salient aspects of a suspect's interrogation experience will be (a) their internal experience and (b) the interrogator's message. More concretely, (a) suspects likely feel some distress at being accused and questioned and (b) an interrogator's message will often convey that confessing will allow them to escape the situation. If present at all, any message from the interrogator about the negative consequences of confessing (e.g., charges filed) will tend to be relatively long term, irrelevant to the suspect's immediate experience, and thus less salient. Alcohol myopia theory applied to an interrogation thus suggests that intoxicated suspects are at heightened risk for focusing on their desire to escape the situation and any immediate salient consequences while failing to process longer term, less salient consequences that can serve as inhibiting cues for sober suspects (see also Steele & Southwick, 1985). In sum, intoxicated suspects should show stronger signs of temporal discounting than sober suspects, leaving them more vulnerable to self-incrimination.

The Present Study

The current experiment investigated whether intoxication impacts true and false confessions by exacerbating the tendency for suspects to focus on short-term consequences compared to longer term consequences using a psychologically realistic interrogation paradigm in which we manipulated suspect intoxication and culpability. Our intoxication manipulation included a placebo group to distinguish

Psychological Association Convention. Data and materials are posted on the Open Science Framework at https://osf.io/jv6ep/, and the study was not preregistered.

Jacqueline R. Evans played a lead role in conceptualization, formal analysis, funding acquisition, methodology, supervision, visualization, and writing–original draft and an equal role in data curation and writing–review and editing. Amelia Mindthoff played a lead role in project administration, a supporting role in conceptualization, methodology, and supervision, and an equal role in data curation and writing–review and editing. Devon E. LaBat played a supporting role in methodology and an equal role in data curation and writing–review and editing. Maria Sparacino played a supporting role in methodology and an equal role in data curation and writing–review and editing. Nadja Schreiber Compo played a supporting role in conceptualization, funding acquisition, and methodology and an equal role in writing–review and editing. Karina Polanco played a lead role in investigation and an equal role in data curation and writing–review and editing. Angelica V. Hagsand played a supporting role in methodology and visualization and an equal role in writing–review and editing.

The data are available at https://osf.io/6yf7u/

The experimental materials are available at https://osf.io/6yf7u/

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between alcohol's pharmacological and psychological (expectancy) effects (Schlauch et al., 2010). In addition, we manipulated the behavior associated with an immediate reward. In the confession-rewarded condition, the interrogator told participants that a confession would stop questioning but lead to potential future charges while a denial would result in continued questioning, and the long-term consequence was left unspecified. In the denial-rewarded condition, the contingencies of confession and denial were switched (see Table 1).

We hypothesized that participants would engage in the behavior, either confession or denial, that the interrogator tied to a short-term reward (i.e., temporal discounting). Further, we expected this tendency to be stronger in intoxicated participants than in sober and placebo participants (i.e., an interaction effect) due to alcohol myopia. The same pattern of results was expected for the outcome measure of confessions as the broader outcome measure of the presence of a guilt-suggestive statement.

Method

The study was not preregistered. We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study.

Design

We employed a 3 (intoxication: intoxicated, active placebo, sober control) × 2 (culpability: guilty, innocent) × 2 (immediately rewarded behavior: confession rewarded, denial rewarded) between-participants experimental design with participants randomly assigned to conditions.

Participants

We recruited student participants for a study about alcohol and cognition from a large university in the United States via (a) fliers posted around campus and (b) the psychology department participant pool. We used the cheating paradigm, allowing us to randomly assign participants to be guilty or innocent of cheating in an academic context and to establish ground truth (Russano et al., 2005). Given the transgression was academic in nature, students were the appropriate population. According to their preference, participants received either research credits or $50 compensation for their time. (Note: for the last 25% of the study, we added a $20 Amazon gift card to the cash compensation to improve recruitment.)

Of the 179 participants who passed all screenings (described in detail below), we excluded data from nine pilot participants and 29 additional participants for the following reasons: Participants were assigned to the guilty condition but refused to cheat ($n = 15$); technical issues resulting in no interrogation video ($n = 4$); denied consent for the use of the interrogation video ($n = 2$); session terminated because participant felt ill ($n = 2$); participant requested to withdraw ($n = 1$); participant became upset and the interrogation was ended early ($n = 1$); participant was assigned to the innocent condition but cheated ($n = 1$); session terminated because participant lied during the medical screening ($n = 1$); interrogator error when delivering the interrogation script ($n = 1$); and interrogator missed session ($n = 1$). The final sample size was $N = 141$. (Note that we decided a priori to exclude participants who did not conform to their assigned culpability condition, with the allowance that if this group was sufficiently large, that decision would be reconsidered; see Redlich et al., 2023, for a discussion of potential implications of this decision). Data collection was ongoing when the COVID-19 pandemic hit, and we halted data collection early in March 2020. Our original (pre-COVID) target was $N = 260$, which would allow us to detect small-to-medium effects (around $d = .35$) using a logistic regression. With $N = 141$, a sensitivity analysis with G-power indicated a power of .80 to detect medium effects (approximately $d = .50$) for dichotomous and continuous outcomes at the $p < .05$ level. However, we cut the sample to 76 for one analysis (true confessions, as described in the Results); we, therefore, had the power to detect large effects in this analysis ($d = .74$) with a power of .80. To detect medium effects ($d = .54$) we only had power of .60. The specifics of the power analyses are provided on Open Science Framework at https://osf.io/jv6ep/.

Participants in the final sample were 21–49 years of age ($M = 24$, $Mdn = 22$, $SD = 4.06$), with 45% male and 55% female. The most reported race/ethnicity was Hispanic White (62%); the remaining participants self-identified as non-Hispanic White (14%), non-Hispanic Black (13%), Asian (4%), Hispanic Black (4%), and other (4%).

Procedure

The relevant institutional review board approved all procedures. All materials, data, and a photo of the Bar Lab are provided on Open Science Framework at https://osf.io/jv6ep/. The current procedures and data are part of a larger study. Some data have already been published elsewhere (Meldrum et al., 2023; Mindthoff et al., 2021, 2022). Procedures not relevant to the present article are not described here. A schematic presentation of the procedure is provided in Figure 1. Participants were run individually.

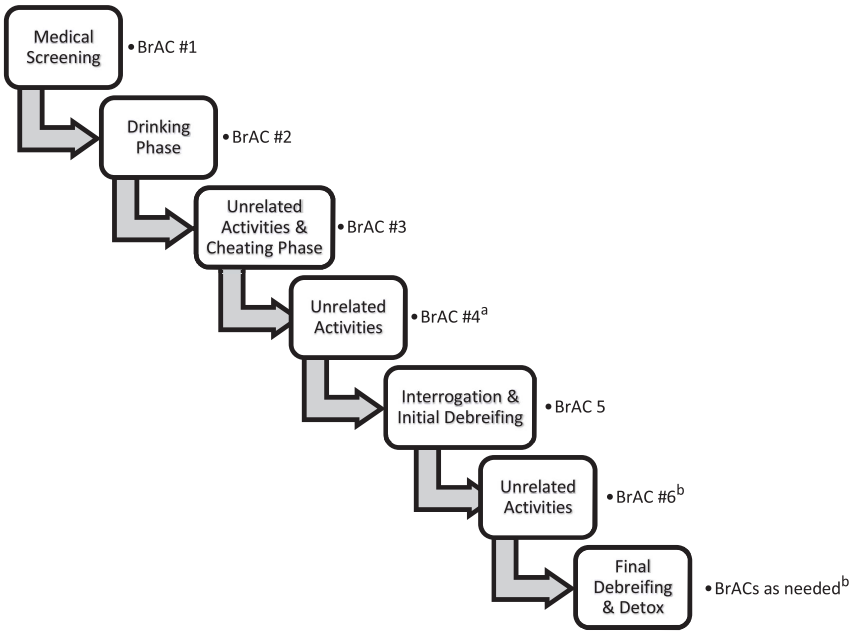
Screening

Participants provided basic information in a phone screening (see Figure 2). Participants who passed the screening were scheduled

Table 1
Immediately Rewarded Behavior Manipulation

Potential behavior	Confession rewarded condition	Denial rewarded condition
If you confess …	Questioning ends now but potential plagiarism investigation and academic dishonesty charges in a few weeks.	Write out a detailed statement and answer questions now for about 45–60 min + no mention of any long-term consequences.
If you deny …	Write out a detailed statement and answer questions now for about 45–60 min + no mention of any long-term consequences.	Questioning ends now but potential plagiarism investigation and academic dishonesty charges in a few weeks.

Figure 1
Schematic of Procedure of Experimental Session



Note. BrAC = breath alcohol content.
[a] Indicates the key BrAC immediately preceding the interrogation, approximately 1 hr after the drinking phase. [b] Only measured for the intoxicated group.

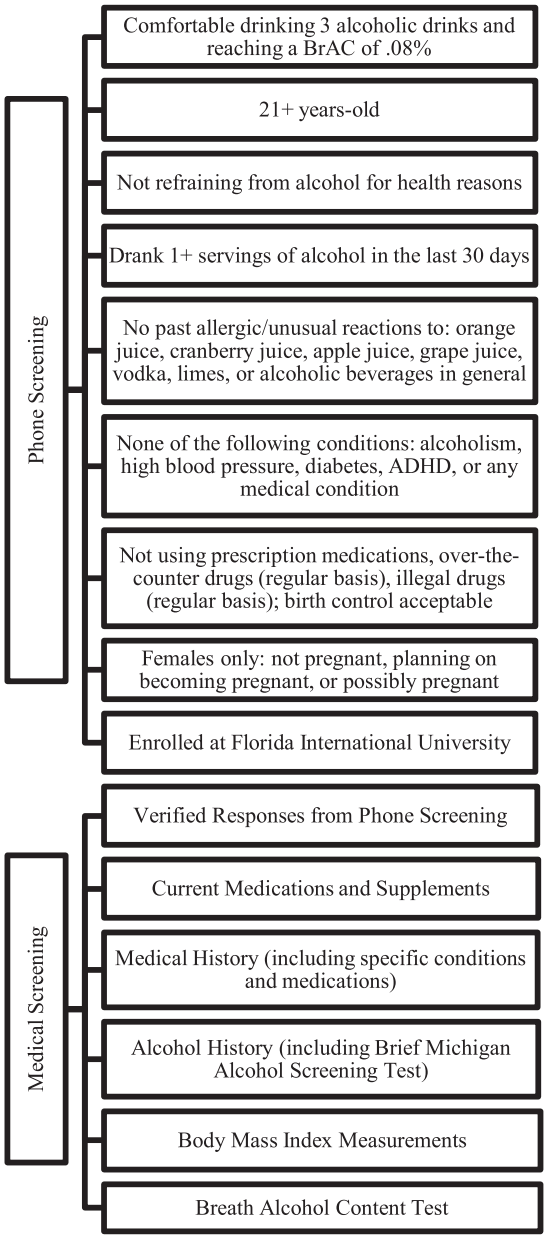
for an on-campus session. Upon arrival, a research assistant led participants through a consent process that addressed the risks associated with participating in an alcohol consumption study. After consenting, participants completed a thorough medical screening to minimize potential risks related to medical issues, current medications, possible pregnancy, and alcohol use and potential abuse. A full list of the criteria is in Figure 2. An on-call medical doctor provided advice when needed. Research assistants measured participants' height and weight to establish their body mass index and calculate their specific alcohol dose. They also measured participants' breath alcohol content (BrAC) to ensure a baseline BrAC of 0%. All BrAC readings in the study were taken via either a BACtrack S80 professional handheld breathalyzer or an Intoxilyzer 5,000 benchtop machine. Only the test administrator could see BrAC test results. Each time BrAC was measured during the study, participants completed a five-question scale designed to check in on how participants were feeling which we refer to as the "status scale." Specifically, participants rated the extent to which they felt relaxed, anxious, alert, sleepy, and were thinking clearly (1 = *not at all*, 7 = *extremely*). After passing the medical screening, participants completed a demographic questionnaire and measures unrelated to the present research objectives.

Drinking Phase

A research assistant used participants' body mass index and sex to calculate the participants' alcoholic beverage mixture in line with their randomly assigned intoxication condition. To achieve a peak BrAC of .06%–.08% 30–60 min after consumption, participants in the intoxicated condition received a dose of vodka at the rate of 2.82 ml/kg for males and 2.35 ml/kg for females (e.g., MacDonald et al., 2000). To increase believability, participants in the placebo condition received a very low dose based on the same formula (i.e., active placebo; e.g., MacDonald et al., 2000). Peak BrAC was adjusted to around .01% for placebo participants. To protect participants with high body mass indexes (i.e., those categorized as "overweight") from high doses of alcohol, the dose was modified to align with their "ideal weight" based on their height and sex using the Hamwi approach (Hamwi, 1964). Participants' respective doses of vodka were mixed with orange juice using a ratio of four parts orange juice to one part vodka. This was divided across three drinks. Participants in the control condition received the same volume of liquid to consume as the other participants but received only orange juice.

In a room modeled after a bar, the participants met two research assistants: The "bartender" and a confederate in the role of another participant. The bartender, confederate, and participants engaged in small talk as the bartender prepared three drinks, one at a time, based on the calculations described above. To increase believability for placebo participants the bottle of vodka the bartender poured from contained a precalculated mixture of vodka and water, the rim of their glass was dipped in vodka, and their drinks were served with a vodka-soaked lime. We told participants in the intoxicated and placebo conditions that they were in the intoxicated condition, and participants in the control conditions that they were in the sober condition. All participants were allotted 10 min to consume each of their three drinks for a total consumption time of 30 min. Participants then completed a BrAC measurement after rinsing their mouths out with water to ensure residual mouth alcohol did not interfere with the reading (see Holt et al., 1980).

Figure 2
Phone and Medical Screening Criteria



Note. BrAC = breath alcohol content; ADHD = attention-deficit/hyperactivity disorder.

Cheating Phase

Participants next entered a small room with a large one-way mirror on one side. Other than BrAC measurements, the rest of the study took place in this room. At all times a research assistant was with the participants, and/or, unbeknownst to participants, observed and recorded them through the mirror.

Participants completed an unrelated task and then the cheating phase began (Russano et al., 2005). The experimenter tasked participants and the confederate with completing two sets of logic problems and explicitly instructed them to complete the first set as a pair and to complete the second set individually. When the participants were randomly assigned to the guilty condition, the confederate asked for help on one of the individual problems, known as "the triangle problem," and the participants agreed to help on their own volition. In contrast, in the innocent condition, the confederate did not ask for help and the participants did not help. The participants turned in their completed problems and BrAC was measured again.

Participants then completed more unrelated activities and their BrAC was measured for the fourth time. This measure took place roughly an hour after the participants finished drinking and immediately preceded the interrogation phase, making it the key BrAC measure. The experimenter stated that they forgot to administer the status scale, which had otherwise been administered during each BrAC measurement, and asked the participants to wait alone for a moment while they retrieved a copy. Leaving the participant alone allowed for the introduction of a new research assistant, known as the interrogator.

Interrogation Phase

While the experimenter was out, the interrogator entered the room, introduced themselves, and said: "So, there seems to be a problem with one of the tasks you just completed. Please wait here and I'll be back with more information." One minute later, the experimenter returned and administered the status scale, said they would go check what was going on, and again left participants alone. The interrogator returned soon thereafter and explained that there was an issue with the responses on the problem sets (i.e., from the cheating phase). Specifically, the interrogator claimed that the participants and confederate got the same wrong answer on one of the individual problems, which never happens. Because of this, cheating, which can be considered academic misconduct, was suspected. The interrogator then commenced with the interrogation, delivering one of two scripted interrogations depending on the participants' randomly assigned condition.

In the confession-rewarded condition, the interrogator told participants that if they confessed questioning would end for now but the professor in charge of the study might pursue a full plagiarism investigation and bring academic misconduct charges when she returns in a few weeks (i.e., a short-term benefit but a potential long-term negative consequence). Participants were told that if they denied any cheating the interview would continue, likely for 45–60 min (i.e., negative consequence in the short term). It was not explicitly stated what would happen in the long term after the hour of questioning, as it would not be plausible for the interrogator to know what would happen after another hour of questioning. In the denial-rewarded condition, the consequences were reversed such that a confession resulted in continued questioning and a denial would end questioning but potentially would result in charges later. See Table 1 for a summary of these contingencies.

After explaining the situation, the interrogator directly asked the participants if they had shared answers. If participants denied, the consequences were reiterated, and participants were asked again if they shared answers. If participants continued to deny any wrongdoing the consequences were again repeated. After a confession, or after the participant denied sharing answers for the third time, the interrogator asked participants to provide an account of what happened and how they came to have the same wrong

answer as the confederate. To minimize participant distress as soon as possible, at the end of the interrogation the interrogator indicated they did not think that the participants would be in trouble. The experimenter monitored the interrogation from the other side of the mirror. The interrogator and experimenter were trained to stop the interrogation if the participants appeared highly distressed at any point. The entire interrogation was covertly recorded.

Two changes were made to this protocol after approximately 25% of our data collection was complete. First, the interrogator brought in the university academic misconduct guidelines to assist with any follow-up questions from the participants and add to the believability of the accusation. Second, the interrogator wrote out a statement saying "I shared answers with the participant on the individual task" before asking any questions of the participants and if at any point the participants offered a confession, they were asked to sign the statement. Confession rates were virtually identical before and after this change. The full interrogation scripts including these changes are provided on Open Science Framework.

Postinterrogation Phase

As soon as the interrogation ended the experimenter returned and explained that the cheating phase and the interrogation phase were part of the study and why the deception was necessary. Participants were told they would not be in any trouble regardless of their behavior. The experimenter then administered a debriefing questionnaire. The experimenter informed participants that they had been recorded and asked for consent to use their video. If they did not consent their video was immediately deleted. Participants also signed a confidentiality agreement, agreeing not to tell other potential participants about the study.

Following debriefing, participants' BrACs were measured and they completed unrelated activities. The participants then went through the final debriefing during which they provided ratings of their perceived intoxication level and beliefs about the beverages they consumed. At this time, participants who had a BrAC <.04% were allowed to leave. Participants with higher BrACs remained in the lab until their BrACs declined to <.04% and the research assistant assessed them as safe for dismissal.

Coding

Research assistants transcribed the interrogation recordings. Transcripts were coded by trained scorers who were unaware of study hypotheses and the intoxication and culpability conditions. Whether a confession or denial was immediately rewarded was apparent from the transcripts and thus scorers could not be kept unaware as to that condition. Coders scored for (a) whether participants confessed to cheating on the task (binary outcome), (b) whether participants provided at least one guilt-suggestive statement (binary outcome), and (c) the number of details provided about what happened (continuous outcome). Guilt-suggestive statements included confessions but also included any statement that could raise suspicions, be perceived as incriminating by an interrogator, or be interpreted as suggestive of culpability. Accusatorial interrogations are guilt-presumptive (e.g., Meissner et al., 2014) and interrogators are vulnerable to confirmation biases (e.g., Kassin et al., 2003; Narchet et al., 2011). Thus, any statement that could be interpreted as incriminating or as a reason to continue pursuing a suspect was considered important to capture. Such statements included things like admitting to breaking experimental rules (e.g., discussing an individual problem with the confederate), admitting cheating might have happened (e.g., "maybe they [the confederate] copied me"), mentioning "the triangle problem" (this was the problem for which the confederate asked for help in the guilty condition, but the interrogator did not mention specifically), or any other statement that could be interpreted as incriminating by the interrogator. Of the 141 transcripts, 44 (31%) were coscored to establish interrater reliability. Reliability was very good: confessions (Cohen's $\kappa = .78$); guilt-suggestive statements (Cohen's $\kappa = .81$); number of details (intraclass correlation coefficient = .84).

Results

Manipulation Checks

Alcohol Condition

To assess the effectiveness of the intoxication manipulation, we compared the BrAC levels measured immediately before the interrogation (BrAC 4 in Figure 1) across the three intoxication conditions using a one-way analysis of variance (ANOVA). The measure was taken about 1 hr after drinking. There was a main effect of intoxication, $F(2, 137) = 847.28$, $p < .001$, $\eta_p^2 = .93$, with intoxicated participants having higher BrACs ($M = 0.08$, $SD = 0.02$) than participants in the placebo condition ($p < .001$; $M < 0.01$, $SD < 0.01$), and in the control condition ($p < .001$; $M = 0.00$, $SD = 0.00$). The control and placebo conditions did not differ. BrAC levels across the study are shown in Figure 3.

Placebo Condition

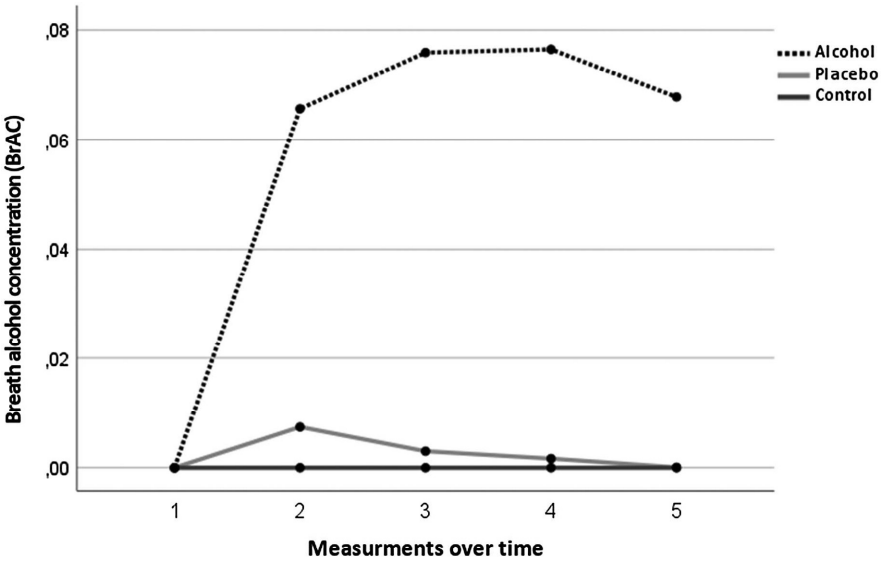
To assess the effectiveness of the placebo manipulation, we examined two measures: (a) whether the participants reported that there was alcohol in their drink, and (b) their estimated peak intoxication measured on a 10-point scale (1 = *extremely low* and 10 = *extremely high*). Only one out of 46 control participants reported that there was alcohol in their drink, compared to 31 out of 45 placebo participants and 50 out of 50 intoxicated participants. As only those who reported there was alcohol in their drink provided a peak intoxication rating, we compared ratings between the intoxicated and placebo groups. The placebo group's mean rating of 4.00 ($SD = 1.69$) was significantly less than that of the intoxicated group ($M = 5.82$, $SD = 1.81$), $t(79) = 4.50$, $p < .001$, $d = 1.04$. As such, the placebo group believed they were intoxicated but not to the same extent as the intoxicated group. This is often the case with studies using a placebo group (Schlauch et al., 2010).

Primary Analyses

Analysis Plan

The presence of confessions and guilt-suggestive statements were each analyzed via binary logistic regression. As the intoxication variable had three levels, each analysis was run twice, varying the intoxication reference group. This allowed for all possible comparisons between the intoxication levels. In the first run, the control group was the reference group allowing for a direct comparison between both the control and placebo groups and the control and intoxicated groups. In the second run, the intoxicated group was the reference group which

Figure 3
BrAC Readings Across the Study



provided the missing comparison between intoxicated and placebo groups.

Quantity of statement details was analyzed via a 3 (intoxication) × 2 (culpability) × 2 (immediately rewarded behavior) between subjects factorial ANOVA. Significant ($p < .05$) findings are reported in their respective sections in the text below. Full results of logistic regressions and the ANOVA are reported in Tables 2–4. A table with full descriptive statistics across all cells is provided on OSF.

Confessions

Only 4% of innocent participants confessed. All three of these false confessors were in the intoxicated condition. In contrast, 57% of guilty participants confessed (i.e., provided true confessions). Given the low frequency of false confessions, we excluded innocent participants' data and examined the effects of intoxication condition and immediately rewarded behavior on true confessions only. Intoxication condition and immediately rewarded behavior were included as categorical predictors in the first step of the regression, and their two-way interaction term was included in the second step. Neither block was significant, and there were no significant main or interaction effects (all bs ≤ 1.54; all ps ≥ .119). Confession rates are plotted in Figure 4.

Guilt-Suggestive Statements

Most participants (75%) provided at least one guilt-suggestive statement. All three independent variables were included as categorical predictors in the first step of the regression on self-incrimination, and the two-way and three-way interaction terms were included in the second and third steps, respectively. There was no significant three-way interaction, and none was hypothesized. As such, the final model included only the categorical predictors and two-way interaction terms. The model was significant, $\chi^2(9) = 27.09$, $p = .001$; see Table 3 for full results. Guilt-suggestive statement rates are plotted in Figure 4.

Table 2
Binary Logistic Regression Results for True Confessions

Manipulation	*B*	*SE B*	Wald	*df*	*p*	*OR*	95% CI Exp(*B*) *LL*	95% CI Exp(*B*) *UL*
Intoxication[a]			3.01	2	.22			
Control versus intoxicated[a]	1.39	0.94	2.20	1	.14	4.00	0.64	25.02
Control versus placebo[a]	1.54	0.99	2.43	1	.12	4.67	0.67	32.36
Placebo versus intoxicated[b]	0.15	0.92	0.03	1	.87	1.17	0.19	7.12
Immediately rewarded behavior[a]	0.47	0.98	0.23	1	.63	1.60	0.24	10.81
Intoxication × Immediately Rewarded Behavior[a]			0.56	2	.76			
Intoxication (Control vs. Intoxication) × Immediately Rewarded Behavior[a]	−0.91	1.26	0.53	1	.47	0.40	0.03	4.72
Intoxication (Control vs. Placebo) × Immediately Rewarded Behavior[a]	−0.76	1.35	0.32	1	.57	0.47	0.03	6.59
Intoxication (Placebo vs. Intoxication) × Immediately Rewarded Behavior[b]	0.15	1.22	0.02	1	.90	1.17	0.11	12.85

Note. *SE* = standard error; *OR* = odds ratio; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.
[a] From first model with control as the reference group. [b] From second model with intoxication as the reference group.

Table 3
Binary Logistic Regression Results for Guilt-Suggestive Statements

Manipulation	*B*	*SE B*	Wald	*df*	*p*	*OR*	95% CI Exp(*B*) *LL*	*UL*
Intoxication[a]			0.62	2	.73			
Control versus intoxicated[a]	0.60	0.97	0.38	1	.54	1.81	0.27	12.12
Control versus placebo[a]	0.74	1.01	0.53	1	.47	2.09	0.29	15.14
Placebo versus intoxicated[b]	0.14	1.00	0.02	1	.89	1.15	0.16	8.11
Culpability[a]	−0.97	0.84	1.33	1	.25	0.38	0.07	1.97
Immediately rewarded behavior[a]	3.05	1.27	5.78	1	.02	21.21	1.76	255.72
Intoxication × Culpability[a]			1.57	2	.46			
Intoxication (Control vs. Intoxication) × Culpability[a]	1.79	1.43	1.57	1	.21	6.01	0.36	99.19
Intoxication (Control vs. Placebo) × Culpability[a]	0.83	1.23	0.45	1	.50	2.28	0.21	25.20
Intoxication (Placebo vs. Intoxication) × Culpability[b]	−0.97	1.33	0.53	1	.47	0.38	0.03	5.17
Intoxication × Immediately Rewarded Behavior[a]			5.20	2	.07			
Intoxication (Control vs. Intoxication) × Immediately Rewarded Behavior[a]	−1.19	1.39	0.73	1	.39	0.31	0.02	4.62
Intoxication (Control vs. Placebo) × Immediately Rewarded Behavior[a]	−2.50	1.10	5.16	1	.02	0.08	0.01	0.71
Intoxication (Placebo vs. Intoxication) × Immediately Rewarded Behavior[b]	−1.31	1.33	0.97	1	.32	0.27	0.02	3.63
Culpability × Immediately Rewarded Behavior[a]	−2.34	1.14	4.22	1	.04	0.10	0.01	0.90

Note. *SE* = standard error; *OR* = odds ratio; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.
[a] From first model with control as the reference group. [b] From second model with intoxication as the reference group.

There was a significant effect of immediately rewarded behavior, $B = 3.05$, $SE = 1.27$, Wald (1) = 5.78, $p = .016$, Exp(B) = 21.21 [1.76, 255.72], such that the confession-rewarded script yielded more guilt-suggestive statements than the denial-rewarded script (.78 vs. .71, respectively). This effect was qualified by an interaction with culpability, $B = -2.34$, $SE = 1.14$, Wald (1) = 4.22, $p = .040$, Exp(B) = .10 [.01, .90]. Follow-up chi-square analyses revealed no effect of immediately rewarded behavior on the tendency to provide a guilt-suggestive statement for innocent participants, .64 and .66 for confession versus denial rewarded, respectively; $\chi^2(1) = .01$, $p = .905$. However, for guilty participants, immediately rewarded behavior mattered: The confession-rewarded script yielded guilt-suggestive statements from nearly all guilty participants (.94), while the denial-rewarded script was less successful at yielding guilt-suggestive statements (.77), $\chi^2(1) = 4.15$, $p = .042$. This interaction is displayed in Figure 5.

Statement Details

The number of details provided ranged from 0 ($n = 3$) to 629; $M = 162.52$; $Mdn = 143$; $SD = 117.06$. Three data points were identified as outliers (>3 *SD*s above the mean). ANOVA analyses were run both with and without the outliers and patterns were the same: There were no significant effects of any of the predictor variables on the number of details provided. The results of the analysis that included the outliers are reported in Table 4.

Table 4
ANOVA Results for Statement Details (Outliers Included)

Variable	*F*	*df*	*p*	η_p^2
Intoxication	0.67	2, 126	.52	0.01
Culpability	0.02	1, 126	.90	0.00
Immediately rewarded behavior	0.27	1, 126	.60	0.00
Intoxication × Culpability	1.65	2, 126	.20	0.03
Intoxication × Immediately Rewarded Behavior	0.71	2, 126	.50	0.01
Culpability × Immediately Rewarded Behavior	1.68	1, 126	.20	0.01
Intoxication × Culpability × Immediately Rewarded Behavior	0.35	2, 126	.70	0.01

Note. ANOVA = analysis of variance.

Exploratory Analysis of Anxiety Ratings

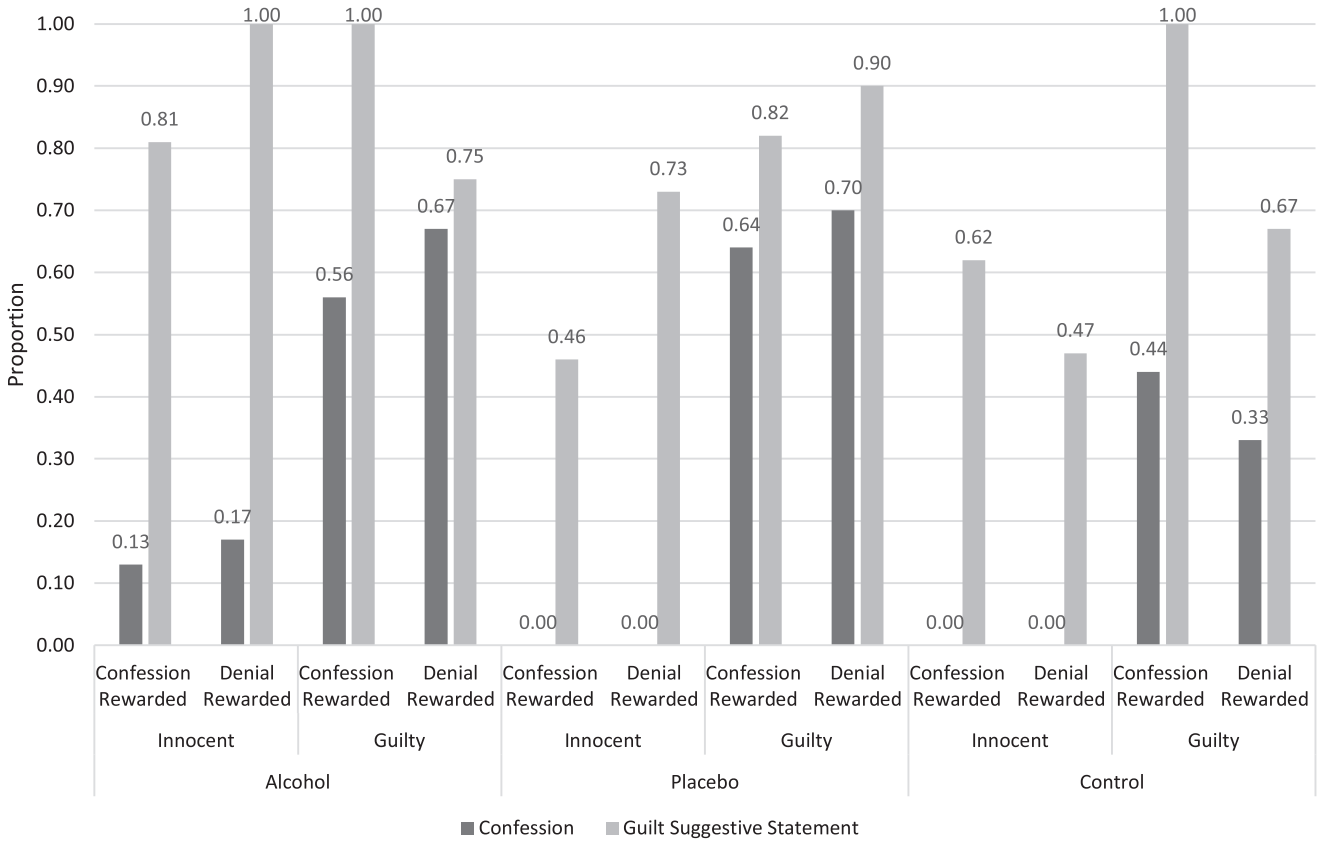
To determine if the interrogation context created anxiety among participants, we examined participants' reported level of anxiety on the debriefing questionnaire. Specifically, participants rated their level of anxiety at the start of the study, at the start of the interrogation, at the end of the interrogation, and at the time of completing the questionnaire (i.e., the current time) on a 7-point scale (1 = *not at all anxious*; 7 = *extremely anxious*). A repeated measures ANOVA comparing the four responses revealed a significant effect; however, Mauchly's test showed that the assumption of sphericity was violated. After applying a Greenhouse–Geisser correction the effect remained significant, $F(3, 347.06) = 24.82$, $p < .001$, $\eta_p^2 = .15$. Pairwise comparisons indicated all four ratings significantly differed from each other ($ps < .001$), with the exception that the difference between reported anxiety at the start of the study and at the current time did not differ ($p = .101$). Anxiety increased at the start of the interrogation, declined by the end (as intended), and fell even further by the time of the debriefing (see Figure 6).

Discussion

This study presents the first empirical test of the impact of intoxication and temporal discounting in an interrogation context and provides important evidence of suspects' short-sighted decisions across intoxication levels. Participants tended to say something suggestive of guilt more often when an admission was associated with a short-term reward, compared to when a denial was associated with the short-term reward. These findings confirm the importance of short-term rewards in decisions about admissions, with the critical

Figure 4

Rates of Confessions and Guilt-Suggestive Statements Across Conditions



benefits of ground truth and high ecological validity that past studies lacked (Madon et al., 2012, 2013; Yang et al., 2015).

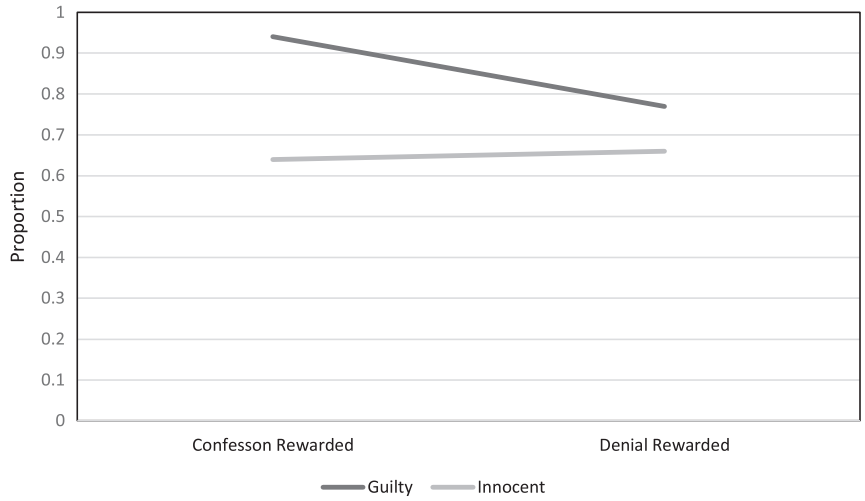
Unexpectedly, the impact of the immediately rewarded behavior manipulation depended on suspect culpability. The immediately rewarded behavior impacted statements made by guilty, but not innocent, participants. We suggest that the innocent participants with nothing to hide judged the short-term benefit of ending questioning to be less valuable than guilty participants. Indeed, the innocent often assume their innocence will shine through when they tell their side of the story (Kassin et al., 2010). While it needs replication, this finding is interesting as it suggests that the innocent may be better able than the guilty to withstand the urge to make a short-sighted choice. That said, most innocent participants said something guilt-suggestive, indicating that the innocent are far from immune from saying something that could make them appear suspicious when they agree to be questioned, which they typically agree to do (Kassin, 2012).

Intoxication had no significant effects. However, 88% of intoxicated participants in the present study said something guilt-suggestive, and all three false confessors were intoxicated. This suggests that intoxicated suspects may be at high risk of saying something suggestive of culpability; however, these data cannot inform us on the effects of intoxication on false confessions given the floor effects. In contrast to our primary hypothesis, there was no evidence that alcohol myopia exacerbated temporal discounting. It is possible that our interrogations, which were quite direct, did not create an environment conducive to alcohol myopia. For ethical reasons, we did not create a particularly coercive experience given some of our participants would be intoxicated. The anxiety findings confirm that while the interrogation increased reported anxiety, the level of anxiety was only around the midpoint of the scale. Thus, the interrogation environment may not have created a salient desire to escape, making our short-term reward of ending the interrogation uncompelling. Conditions are most ripe for alcohol myopia when there is a clear conflict between salient motivations and those that are more peripheral (Steele & Josephs, 1990; Steele & Southwick, 1985). The relatively low level of anxiety induced in participants may also explain the low rate of true and false confessions relative to past research using the cheating paradigm (e.g., Guyll et al., 2013; Russano et al., 2005). As such, care should be taken generalizing from the current, fairly low-stress, lab-based, interrogation to a criminal police interrogation. Higher pressure interrogations provoking higher levels of anxiety are likely to increase the suspect's desire to escape, and thus, the relevance of alcohol myopia and short-sighted decision making and increase the rate of true and false confession.

The null findings regarding intoxication could further be explained by the hypervigilance hypothesis (e.g., Testa et al., 2006) which suggests that under the actual or perceived influence of alcohol, people can modify their behavior to compensate for expected

Figure 5

Proportion of Participants Providing a Guilty-Suggestive Statement as a Function of Immediately Rewarded Behavior and Culpability Conditions



impaired performance. Although typically used to explain the behavior of placebo participants (e.g., Schreiber Compo et al., 2011), given the low-moderate average BrAC level in our alcohol condition (.08), our intoxicated participants may have been able to compensate and adjust their responses accordingly. Indeed, research has supported that hypervigilance may be most prominent when participants *expect* to consume alcohol (Stevens et al., 2023) which applies here to both the placebo and alcohol conditions. Furthermore, the perceived severity of the interrogation situation may have heightened participants' motivation to be vigilant and to fight the urge to act impulsively regardless of intoxication condition.

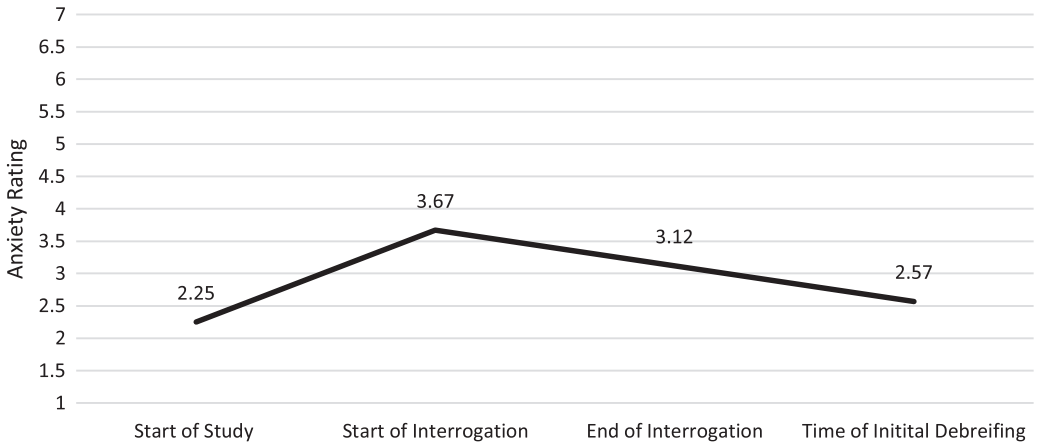
Of note, the lack of intoxication effect is consistent with Mindthoff et al. (2019), who found no impact of similar levels of intoxication on reporting a transgression. However, their procedure departed from an interrogation context in several important ways. The null findings are also consistent with other lab-based research investigating low-moderate doses of intoxication on interviewee cognition which yields mixed results (see Jores et al., 2019).

Limitations

First, there was limited power, which offers a straightforward explanation for the null findings. Second, our intoxicated participants' mean BrAC was .08%, which is less than the BrAC of many criminal suspects (Evans et al., 2009). For ethical reasons, this is the reality of lab-based alcohol administration experiments. However, it precludes us from determining if higher, more ecologically valid levels of intoxication would reveal significant effects. Relatedly, because of the limited range in the BrAC levels, we achieved across intoxicated participants, it is not possible to look for a dose–response relationship in the present study. Future work using field study methods can address these limitations by including BrAC levels across the full spectrum.

Figure 6

Comparison of Participant Anxiety Ratings on 1 (Not at All Anxious) to 7 (Extremely Anxious) Scale



Another limitation to the generalizability of our results is the population used: healthy unmedicated students over the age of 21 who reported moderate drinking behaviors. Our participants differ in many important ways from the typical criminal suspect (e.g., Evans et al., 2009; Hagsand, Zajac, et al., 2022). However, this population was necessary to ensure participant safety and permit use of the cheating paradigm, which is only effective with enrolled students.

Future Research

Our findings highlight the need to find creative ways to ethically study intoxicated suspects. Of particular concern may be internalized false confessions where the suspect comes to (temporarily) believe their confession is true (Kassin & Wrightsman, 1985). Memory distrust is key to such confessions (Gudjonsson & MacKeith, 1982) and intoxication may interfere with a suspect's memory of an (alleged) offense (e.g., Read et al., 1992; Van Oorsouw et al., 2015), thereby contributing to internalized confessions. The impact of intoxication on *Miranda* waiver decisions is also unknown. This issue is critical to examine as the intoxicated can often legally waive their Miranda rights (e.g., *State v. Keith*, 1993). Many laypersons are unaware of this fact (Mindthoff et al., 2020). Making this of greater concern, intoxication may hinder understanding of those rights (Mindthoff et al., 2022).

Implications and Conclusions

Our results add to the inconsistent findings regarding the impact of intoxication on temporal discounting. Nonetheless, with three quarters of our sample providing a guilt-suggestive statement, it seems anyone undergoing interrogation is at risk of confirming interrogators' suspicions and thereby increasing interrogators' use of guilt-presumptive interrogation approaches (e.g., Kassin et al., 2003; Narchet et al., 2011). Given past findings on the vulnerabilities of intoxicated suspects (e.g., Mindthoff et al., 2022), the high rates of guilt-suggestive statements among the intoxicated suggest to us that, in line with potential jurors' beliefs (Mindthoff et al., 2020), suspects should not be questioned while under the influence. Indeed, research comparing police interrogations of sober and intoxicated suspects found evidence that the intoxicated (vs. the sober) may be interrogated in a more confrontational manner (Hagsand, Zajac, et al., 2022). Our findings provide a starting point for crucial follow-up research on alcohol's effects during interrogations.

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Received October 11, 2023
Revision received March 6, 2024
Accepted March 10, 2024 ■