

Intoxicated Eyewitnesses: The Effects of Alcohol on Eyewitness Recall across Repeated Interviews

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ABSTRACT

The study evaluated the usefulness of repeat-interviewing of witnesses to crimes who were intoxicated by alcohol at the time of the incident and their first interview, and then re-interviewed when not intoxicated the following day. Sixty young, social drinkers were divided into three groups. One group was given a “placebo” (alcohol-like) beverage, a second was given a “low dose” of alcohol (0.2 g/kg men; 0.17 g/kg women), and a third was given a “high dose” of alcohol (0.6 g/kg men; 0.52 g/kg women) over a 15 minute period. Twenty minutes later they viewed a 4-minute video of a crime, and afterwards they were given two opportunities to recall everything that they could remember from the incident; the first opportunity was immediately after the event, and the second was 24 hours later. Analyses of the quantity and accuracy of the details recalled revealed no overall increase in the total amount of information recalled between the first and second recall opportunities. However, on average, 18% of the details recalled by participants in the second test were new and accurate. The incidence of contradictions between the first and second recall opportunities was less than 1%. Surprisingly, none of the effects were influenced by alcohol, even at the highest dose. The results imply that 1) memory for at least some incidents observed under the influence of alcohol is resilient even up to relatively high blood-alcohol levels; and 2) the repeated interviewing of witnesses who were intoxicated at the time of the crime can reveal additional, reliable information that is not present at the initial interview, just as is the case for non-intoxicated witnesses.

Keywords: Alcohol; Eyewitness Memory; Repeated Interviews; Reminiscence

1. Introduction

Many crimes are committed and witnessed by people under the influence of alcohol and this presents many challenges for police involved in the investigations [1-4]. Given that the accuracy of eyewitness testimony is often central to investigations, and to the successful outcomes of criminal trials, it is important to examine carefully the reliability of information elicited from intoxicated witnesses. However, despite the important real-world implications of interviewing intoxicated witnesses, remarkably little research has been conducted on the topic. Of the few studies that have examined the effects of alcohol on eyewitness memory, two have suggested a significant impact of alcohol on recall veracity [5,6], but one reported surprisingly few deleterious effects on eyewitness recall [7]. The aim of the present study was to further our understanding of the effects of alcohol on eyewitness

memory by using a repeated interview to test the stability and consistency of memory in intoxicated witnesses over time.

Research suggests that one way of maximising the information obtained from witnesses is to give witnesses a second interview; in effect, a second chance to recall information about the event in question. Re-interviewing witnesses is a common feature of investigations, either to crosscheck details from other witnesses as the investigation develops, or simply to see if any new information has come to mind since the first interview. However, the practice of using evidence obtained from re-interviews may be problematic during later stages of investigations, because the credibility of a witness's memory may be questioned if new details emerge subsequent to the initial interview. Investigators may be left wondering “why didn't they tell us the first time they were asked?”. Such a challenge to the credibility of an intoxicated witness, who may already be perceived as less credible than a

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sober witness, may be even more of an issue because their inconsistency in recall across the repeated interviews could be attributed (or misattributed) to the effects of alcohol, rather than to the normal workings of memory.

However, applied psychological research investigating the efficacy of repeated interviews in eyewitness contexts suggests that we should not necessarily be skeptical of new information reported by witnesses in repeated interviews. Studies have established that it is normal for witnesses to recall new information when they are questioned a second time. Indeed, almost without exception, people recall new information on subsequent interview (e.g. [8]). Moreover, studies in which eyewitnesses are asked to recall an event on more than a single occasion show that the new information recalled is generally correct, with little or no concomitant increase in errors or false information [8-14]. Brainerd *et al.* [15] suggested that the recall of additional correct information reflects either "retrieval relearning", a process whereby the recall cues for information become increasingly effective, or to a process whereby the memory trace is correctly reconstructed over time. However, regardless of its cause, it remains to be seen whether the advantages of repeated interviewing also apply to the interviewing of witnesses who are intoxicated when they witness a crime. Such research is necessary given that witnesses of crimes are often under the influence of alcohol, and that repeatedly interviewing witness is a commonplace.

Research to date has shown that alcohol disrupts both the storage (encoding) of information as well as retrieval processes, with more marked effects on the former [16,17]. However, most studies of alcohol's effects on memory have tended to focus on the short-term recall of isolated stimulus materials rather than on the recall of entire events that have more obvious ecological validity. Addressing these concerns, a recent study of the effects of alcohol on autobiographical memory [18] required participants to consume drinks in a "bar lab" university setting while interacting with a researcher playing the role of a bar tender for approximately 1 hour. Those in the alcohol group were administered doses of 2.35 or 2.82 (female/male) ml/kg of 40% alcohol over 30 minutes (approximating 8.5 UK measures of vodka for a typical 80 kg male). Approximately one hour later they were asked to recall everything that they could remember about their experience in the bar using a free-recall and a context reinstatement procedure known to enhance memory. Alcohol produced no effects on either the total amount of information recalled or the number of accurate central details reported. However, alcohol reduced the recall accuracy of peripheral details, suggesting that it may have narrowed attention to central details.

These results show that, even after the consumption of

a high dose of alcohol, recall of experiences in an environment of "social drinkers" may be minimally impaired. Similarly, the few studies that have attempted to examine alcohol's influence specifically on eyewitness memory for crimes have not always demonstrated impairment by alcohol [7,19]. Where impairment has been shown, the alcohol dose has often been very high [5,6] and the size of the effect very small [6]. Dysart *et al.* [19] demonstrated that moderate blood-alcohol levels were associated with a propensity towards more false positive identifications in recognition tests, but the study did not control alcohol administration.

Consequently, given the evidence currently available, it is difficult to predict the impact of alcohol on eyewitness recall in circumstances where alcohol intake is typical of social drinking and interviews are repeated (and thus the number of recall opportunities increases). For example, if alcohol impairs the initial encoding of information at the time a crime is committed, then the repeated interviewing of a witness may be of limited value, because the witness will never be able to report any additional, accurate information; indeed, repeated interviews might then inadvertently encourage the recall of inaccurate material if the witness feels pressured into providing new information. Alternatively, an intoxicated witness at first interview might lack the communication skills necessary to convey what they know, or they may be distracted, confused, or overcome by the emotional valence of what they have seen or by the interview process itself. Hence an additional interview, conducted when the witness is fully sober, may actually yield more accurate recall.

Yuille and Tollstrup [6] conducted the only previous study examining the effects of repeated eyewitness recall with witnesses under the influence of alcohol; however, their findings are limited. In their study participants viewed a live staged theft and were either interviewed immediately and again 1-week later or they were only interviewed at the 1-week delay. Participants, all males, were also divided into an alcohol, no-alcohol, or alcohol placebo group. Those in the alcohol group were administered a dose of alcohol calculated to be 1.32 ml/kg of bodyweight (this equates to an 80 kg male consuming 106 ml of alcohol, or approximately 10 UK units). The participants were interviewed using a free-recall procedure followed by focused cued-recall questions. Participants who were not under the influence of alcohol recalled more information (in excess of 20%) immediately and one week later compared with participants who had consumed alcohol. Alcohol also had a very small detrimental effect on accuracy (a decrease of 2%), but accuracy overall was very high (over 90% overall). These findings, however, leave many questions unanswered about the effects of repeated interviewing that have been

the focus of relatively recent research with both children [20] and adults [8]. Important variables such as the consistency of recall, the number of contradictions and omissions between interviews, and the amount of reminisced new information added into the repeated interview were not measured although they were very relevant in assessing eyewitness testimony.

More recently, Compo *et al.* [7] examined the effect of alcohol on eyewitness memory and produced some very counterintuitive findings. Using the same doses of alcohol as in their study of alcohol's effects on autobiographical memory [18], participants were asked to recall details about the theft of a laptop witnessed after consuming drinks in their "bar lab" setting. When participants were questioned about their memory for the staged theft, the results showed no differences in accuracy or the total numbers of details reported between the alcohol and no-alcohol groups. Alcohol seemed once again to have little detrimental effect at these "social" doses.

While these recent findings have produced valuable insights and challenged assumptions regarding the cognitive abilities of intoxicated witnesses, there is still much to learn. One important avenue for researchers is to explore the dynamics of eyewitness recall by intoxicated witnesses when they have been given more than a single opportunity to recall what they can remember. More specifically, it is important to examine whether or not the memories of intoxicated witnesses change over time in the same way as do witnesses who are not intoxicated who have been the focus of the vast majority of previous research on eyewitness memory. In addition, because the effects of alcohol on psychological processes are not consistently linear in terms of dose-response the proposed experiment will test, for the first time, the relationship between eyewitness recall across repeated interviews at both moderate-to-high and low doses of alcohol; at low doses (typically, below 0.3 g/kg) alcohol can elicit performance improvements of the kind commonly associated with stimulant drugs [21,22], whereas at higher doses alcohol may produce deleterious effects more consistently.

2. Method

2.1. Participants

Sixty undergraduate students from Kingston University were recruited to participate in a study advertised as looking at the effects of alcohol on memory. Two participants failed to return for the second test session, producing a final sample of 58 participants (mean age = 21.5 yrs, SD = 2.2 yrs; 28 males, 30 females). Participants were recruited via posters on campus and compensated for their time with £15 cash (or research participation credits if preferred). No participant had a history of al-

cohol-related problems, as determined by the Michigan Alcohol Screening Test [23]. They were social drinkers (minimum of 12/14 UK units consumed weekly by women/men, respectively; maximum 30 units/week; 1 UK unit = 8 g alcohol) who drank an equivalent number of units to the dose given here in a single session at least once every two weeks. Inclusionary criteria were that participants were in good health and not taking any medication (except the contraceptive pill), they had not experienced any unusual adverse reactions to alcohol, and they were not pregnant or trying to become pregnant. Participants gave written informed consent after reading a description of what the study involved. The research protocol was approved by Kingston University Faculty of Arts and Social Sciences Ethics Committee, and the study was conducted according to the ethical standards of the Declaration of Helsinki 1964. Participants were allocated at random to one of three conditions: placebo, low dose alcohol or high dose alcohol.

2.2. Drinks and Breath-Alcohol Measurement

Drink formulations were based on Terry *et al.* [24]. Preliminary tests were conducted at the planned "high dose" of 0.42 g/kg (males) and 0.37 g/kg (females), but due to limited effects in these pilot tests the "high dose" was increased to 0.6 g/kg (males) and 0.52 g/kg (females) for the full study. The "low dose" was one-third of the high dose, *i.e.* 0.2 g/kg (males) and 0.17 g/kg (females). The alcohol drinks comprised Waitrose vodka (37% alcohol-by-volume) plus diet Schweppes Indian tonic water to a total beverage volume of 240 ml, plus 4 ml Angostura Bitters. The placebo drink replaced vodka with equivalent tonic water, and 3 - 4 drops of vodka were floated on the drink surface and around the rim of the glass to mask olfactory cues. Breath-alcohol concentration (BrAC) was also measured.

2.3. Procedure

Participants attended two sessions scheduled between 11:00 - 17:00 hrs on weekdays; the two sessions were at the same time of day for a given participant, spaced 24 hrs apart. Participants were asked to abstain from alcohol and other drugs from at least the night before each session. At the beginning of the first session, a breathalyser reading was taken to ensure that no alcohol had been consumed recently (all tested at zero). They were given instructions about the task, weighed, and then waited in separate room while the allocated drink was mixed. They completed a self-report questionnaire that presented 100 mm VAS scales anchored at "Not At All" and "Very" for the descriptor "Intoxicated" (based on Birak *et al.*, [25]). Participants were asked to drink the beverage at a steady rate over 15 minutes. After a further 20 minutes post-

consumption, participants were breathalysed again, they completed the intoxication questionnaire a second time, and then they watched the 4-minute video sequence (which had been transferred to the hard drive of a PC for presentation on a PC monitor). The video showed an unsuccessful armed robbery and hostage negotiation; the film was a professionally-made training video for US police officers, and it has been used in previous studies of eyewitness testimony (e.g., Gilbert & Fisher [8]).

Next, participants were given a 10 minute distracter task where they were asked to solve challenging word puzzles after which they were provided with a blank sheet of paper and asked to write down, in any order or format that they preferred, as much as they could recall of the incident shown in the video sequence. They were given no time limit, but one minute after they stopped writing they were asked to make one more effort to recall any additional information, and were given a further 2 minutes to do so. After they had written as much as they felt they could remember, they were breathalysed again, thanked for attending, and asked to come back 24 hrs later. It was recommended that they stay on site for up to two hours after the completion of the first session. The information sheets advised against driving, cycling, and operating hazardous equipment for up to 6 hours after completing the first session. The second session only involved a recall phase, conducted just as in the first session. After completing the second session, participants were given feedback about the study's purpose before being paid and thanked for their time.

2.4. Measures and Analyses

A master-list of 154 facts relating to the video had been compiled by Gilbert and Fisher [8] and was used to score the recall information using the same principles adopted in that study. Briefly, the data were coded and scored by breaking responses down into elementary items of information and checking these with the details on the master-list; if an item appeared on the master list then it was scored as correct, if not then its accuracy was evaluated by checking it against the video. Looking across the 2 recall opportunities, each bit of information recalled was then categorized as: 1) "consistent" (same details reported in both recall opportunities); 2) "contradiction" (contradictory details across recall opportunities); 3) "forgotten" (a detail was provided in first recall but not the second); and 4) "reminiscent" (a detail was provided in second recall—but not the first). The numbers of consistent, contradictory, forgotten, and reminiscent details were then summed for each participant and analysed.

Every detail was coded against a master list by two raters, who independently achieved 89% reliability, on a random selection of 10% of the transcripts. The rest of the recall tests were coded by one researcher.

3. Results

3.1. Breath-Alcohol Concentration (BrAC)

Two BrAC measures at the second sampling point were lost due to equipment malfunction. The mean BrACs produced by the "low dose" of alcohol at the first and second sampling points were, respectively, 8.9 g/100ml (SD = 3.9 g/100ml) and 6.7 g/100ml (SD = 3.9 g/100ml); the mean BrACs produced by the "high dose" of alcohol at the first and second sampling points were, respectively, 32.4 g/100ml (SD = 13.2 g/100ml) and 30.5 g/100ml (SD = 8.8 g/100ml). Hence the peak BrAC produced by the high dose of alcohol approximated to the legal limit for driving in the UK (35 g/100ml). The high dose produced a significantly higher BrAC than the low dose [$F(1, 36) = 86.2, p < 0.001, \eta^2 = 0.71$]; BrAC did not decline significantly between the two sampling points [$F(1, 36) = 1.82, p = 0.19, \eta^2 = 0.05$], and there was no interaction between dose and sampling time [$F(1, 36) = 0.74, p = 0.40, \eta^2 = 0.02$].

3.2. Self-Reported Intoxication

Self-reported intoxication showed a significant increase in the presence of alcohol: [$F(2, 55) = 22.0, p < 0.001, \eta^2 = 0.45$]. Bonferroni tests indicated that the high dose produced significantly greater intoxication than the placebo dose [$p < 0.001$] and the low dose [$p < 0.001$]. Participants' levels of intoxication were directly related to BrAC at the time of test [excluding placebo group: $r = 0.49, p < 0.001$].

3.3. Total Correct Recall and Errors

The total numbers of correct details recalled and errors were examined by conducting a mixed-model ANOVA with the number of correct details reported at each recall delay (immediately and 24 hours later) as within-subjects factors, and alcohol dose (placebo, low and high) as a between-subjects factor (**Table 1**). There was no evidence that recall increased across the first and second recall

Table 1. The numbers of correct details and errors in recall (SDs in parentheses) for each alcohol dose condition.

Condition	Immediate	24-hour	Cumulative
	Recall	Recall	Recall
	Correct		
Placebo	26.39 (7.34)	26.78 (7.84)	31.77 (8.44)
Low dose	29.70 (9.38)	29.55 (9.61)	34.20 (10.56)
High dose	27.00 (6.82)	26.70 (7.30)	31.75 (8.09)
	Errors		
Placebo	0.56 (0.85)	0.67 (0.90)	0.88 (1.13)
Low dose	0.50 (0.65)	0.65 (0.81)	0.70 (0.80)
High dose	0.35 (0.48)	0.80 (0.89)	0.85 (0.87)

opportunities [$F(1, 55) = 0.001, p = 0.95, \eta^2 = 0.001$], and nor was there any effect of alcohol dose [$F(2, 55) = 0.92, p = 0.40, \eta^2 = 0.03$]. There was no interaction between recall time and the different alcohol doses [$F(2, 55) = 0.10, p = 0.90, \eta^2 = 0.004$].

Errors were examined using the same analysis design (**Table 1**). Results showed that errors increased a little from the first ($M = 0.47, SD = 0.81$) to the second recall period ($M = 0.71, SD = 0.86$): $F(1, 55) = 6.55, p = 0.01, \eta^2 = 0.11$. However, the number of errors did not differ significantly across alcohol doses [$F(2, 55) = 0.02, p = 0.98, \eta^2 = 0.001$], and there was no interaction between these two factors [$F(2, 55) = 1.35, p = 0.27, \eta^2 = 0.05$].

3.4. Reminiscence (New Details) Reported in the Second Eyewitness Recall Session

Every participant recalled at least 1 piece of new information during the second interview and the number of new details ranged from 1 to 19 across participants. Reminiscence was analyzed as the cumulative recall of new details across the first and second recall periods (**Table 1**), allowing comparison of details reported in the first eyewitness recall session with the total number of unique details reported across both recall sessions. We found that the cumulative recall increased from the first eyewitness recall session ($M = 27.74, SD = 7.94$) to the second ($M = 32.60, SD = 0.9.03$): $F(1, 55) = 131.77, p = 0.001, \eta^2 = 0.71$; that is, the number of unique details provided across both recall session in total was substantially greater after the second recall session. There was no effect of alcohol on the amount of reminiscence as measured by cumulative recall [$F(2, 55) = 0.69, p = 0.51, \eta^2 = 0.02$], and no interaction between the alcohol dose and the eyewitness recall session [$F(2, 55) = 0.38, p = 0.69, \eta^2 = 0.01$].

It was also of interest to compare the total number of errors made in the first interview with the total number of unique errors reported across both eyewitness recall sessions. The analysis revealed that there was a small, but significant, increase in the cumulative recall of errors from the first ($M = 0.47, SD = 0.65$) to the second recall sessions ($M = 0.81, SD = 0.92, [F(1, 55) = 20.74, p = 0.001, \eta^2 = 0.27]$). There was no effect of alcohol on the cumulative recall of errors [$F(2, 55) = 0.16, p = 0.85, \eta^2 = 0.001$], and no interaction between alcohol dose and recall session [$F(2, 55) = 1.37, p = 0.264, \eta^2 = 0.05$].

3.5. Reminiscent, Forgotten, Consistent, and Contradictory Details

When analysed independently, the amount of new information reported in the second eyewitness recall session did not differ significantly across the alcohol dose conditions with 4.86 ($SD = 3.19$) details recalled on average

[$F(2, 55) = 0.37, p = 0.68, \eta^2 = 0.01$]. The same number of items, 4.86 ($SD = 3.71$), were forgotten or omitted from the repeated recall conducted 24 hours later, and the amount of forgotten information did not change as a function of alcohol dose [$F(2, 55) = 0.07, p = 0.93, \eta^2 = 0.003$]. Participants were also equally consistent in the second eyewitness recall condition irrespective of alcohol dose [$F(2, 55) = 1.52, p = 0.23, \eta^2 = 0.05$]. The numbers of direct contradictions of information between the initial and second recall sessions were all less than 1% and they were not significantly affected by alcohol [$F(2, 55) = 0.004, p = 0.99, \eta^2 = 0.001$; see **Table 2**].

3.6. Post Hoc Analyses: Associations between BrAC Levels and Recall Measures

For all 40 participants who received alcohol, correlation coefficients were calculated to evaluate the relationships between BrAC (separately at each timepoint post-alcohol consumption) and every recall score described above. Despite the lack of conservatism that arises from such a large number of independent, unadjusted analyses (30 correlations), none were significant (for all correlations: $r < 0.27$; $p > 0.09$). Thus there was no relationship between BrAC and performance.

4. Discussion

Looking across all participants, irrespective of the nature of the drink consumed, there was no overall increase in the total amount of information recalled between the first and second recall opportunities; on average, 18% of the details recalled by participants during the second test, 24 hrs after the first, were new and accurate. Hence, there was a cumulative increase in the amount of new, unique and accurate information reported over the 2 test sessions. Consistently, previous studies have demonstrated that repeat-testing/interviewing can yield a significant increase in the amount of new information recalled with little effect on witness accuracy [8,11,13]. Our study shows

Table 2. Mean numbers of reminiscent, forgotten, consistent, and contradictory details (SDs in parentheses) for each alcohol dose condition.

Condition	Response category			
	Reminiscence	Forgotten	Consistent	Contradictory
Placebo	5.39 (4.13)	5.00 (4.47)	21.39 (6.59)	0.06 (0.23)
Low dose	4.50 (3.13)	4.60 (3.70)	25.05 (8.05)	0.05 (0.22)
High dose	4.75 (2.27)	5.00 (3.19)	21.95 (6.38)	0.05 (6.38)
Total	4.86 (3.19)	4.86 (3.71)	22.84 (7.12)	0.05 (0.22)

that these effects are also present in intoxicated witnesses using a similar eyewitness paradigm.

Alcohol had no impact on the other aspects of recall within or between the two recall opportunities that we investigated. The consumption of alcohol did not affect the overall number of errors within or between sessions. Moreover, no alcohol effect was evident even when the data were partitioned in terms of reminiscent, forgotten, consistent, and contradictory details. The lack of any alcohol effect on these variables occurred even though the highest dose administered produced breath-alcohol concentrations that were generally very close to the legal limit for driving in the UK. These levels were achieved at the highest dose by a quantity of alcohol that equates to around 6 UK units consumed by an average-weight UK male social drinker over a 15-minute period: clearly a significant intake likely to cause marked intoxication (confirmed by the VAS self-report measure). Hence, the results imply that memory for at least some kinds of incident observed under the influence of alcohol is resilient, even up to relatively high blood-alcohol levels.

Importantly, the findings also imply that the repeated interviewing of witnesses who were intoxicated at the time of a crime can reveal additional, reliable information that is not present at the initial interview, just as is the case for non-intoxicated witnesses. Alcohol consumption (at least to the socially-relevant levels tested here) is not associated with increased errors or contradictions, and does not lead to a decline in the capacity to retrieve additional, useful information after repeat-testing. These findings are likely to challenge assumptions about the reliability of the intoxicated witness, and the risks associated with interviewing such witnesses on more than one occasion. For example, the value if information elicited from intoxicated witnesses should not be automatically dismissed, and nor should their credibility elsewhere in the legal system be automatically questioned.

Our results are consistent with the findings of recent research [7,18] that also showed little or no effect of alcohol on the amount and accuracy of eyewitness recall; indeed, the average BrAC obtained here at the “high” dose was consistent with the blood-alcohol levels achieved by Compo *et al.* [7] but lower than those reported by Yuille and Tollestrup [6] after a very large dose of alcohol. Typically, the effects of alcohol have previously been studied in relation to witnesses having a single opportunity to recall information with the total amount of information recalled being the variable of interest. Our results show that other variables such as reminiscence (the ability to recover new information) and witness consistency are similarly unaffected, and that intoxicated witnesses do not forget any more detail after a short delay as non-intoxicated witness.

There are of course limitations and caveats to the findings of our study, and those of other studies that have also found non-significant findings in relation to the effects of witness intoxication. Simply finding “no difference” does not prove the null hypothesis that alcohol will have no effect on witness memory. Although we chose sample sizes in the current study based on those used in similar eyewitness memory studies that have found effects, larger samples with increased power would be required to make absolutely sure that the current lack of effect is not simply due to a lack of experimental power. While this is a possibility for future research it may be hard to justify the commitment of research resources to rule out this possibility when there are many other aspects of the effects of intoxication that deserve priority.

We suggest that a more profitable avenue for future research would be to examine factors that might be more likely to show possible decrements in eyewitness recall. In our study participants were asked for “free recall” of what they could remember following a paradigm used by Gilbert & Fisher [8]. However, testing free recall is only one of a number of ways in which witnesses are required to communicate their experiences, but in many jurisdictions eliciting free recall from witnesses in interviews (or interrogations [26]) may not be the norm. For example, how would intoxicated eyewitness perform when they are under pressure to provide information, asked suggestive questions or when they participate in co-witness discussions about their experiences prior to be interviewed? Would deleterious effects of alcohol be more easily observed?

It is also going to be important to study the effects of alcohol in a variety of different witness populations using study designs that are more ecologically valid. Our study, like most eyewitness memory studies, examined recall by college students of a short video clip; participants were typically young, intelligent, and healthy. The effects of intoxication in older adults, people with alcohol dependency, those with intellectual disability, and those traumatised by what they have witnessed (for example) all need to be examined to see whether alcohol consumption can be an important influence on their eyewitness accounts. Our findings have shown that alcohol need not automatically cast doubt over the reliability of witnesses recall, but clearly this is an area of research that deserves much greater attention by researchers before firm conclusions can be drawn.

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REFERENCES

- [1] J. R. Evans, N. S. Compo and M. B. Russano, "Intoxicated Witnesses and Suspects: Procedures and Prevalence According to Law Enforcement," *Psychology Public Policy and Law*, Vol. 15, No. 3, 2009, pp. 194-221. [doi:10.1037/a0016837](https://doi.org/10.1037/a0016837)
- [2] G. H. Gudjonsson, I. C. H. Clare, S. Rutter and J. Pearse, "Persons at Risk during Interviews in Police Custody: The Identification of Vulnerabilities," *Research Study No. 12*, The Royal Commission on Criminal Justice, HMSO, London, 1993.
- [3] U. Haggard-Grann, J. Hallqvist, N. Langstrom and J. Moller, "The Role of Alcohol and Drugs in Triggering Criminal Violence: A Case Crossover Study," *Addiction*, Vol. 101, No. 1, 2006, pp. 100-108. [doi:10.1111/j.1360-0443.2005.01293.x](https://doi.org/10.1111/j.1360-0443.2005.01293.x)
- [4] G. Palk, J. Davey and J. Freeman, "Prevalence and Characteristics of Alcohol-Related Incidents Requiring Police Attendance," *Journal of Studies on Alcohol and Drugs*, Vol. 68, No. 4, 2007, pp. 575-581.
- [5] K. Van Oorsouw and H. Merckelbach, "The Effects of Alcohol on Crime Related Memories: A Field Study," *Applied Cognitive Psychology*, Vol. 26, No. 1, 2012, pp. 82-90. [doi:10.1002/acp.1799](https://doi.org/10.1002/acp.1799)
- [6] J. C. Yuille and P. A. Tollestrup, "Some Effects of Alcohol on Eyewitness Memory," *Journal of Applied Psychology*, Vol. 75, No. 3, 1990, pp. 268-273. [doi:10.1037/0021-9010.75.3.268](https://doi.org/10.1037/0021-9010.75.3.268)
- [7] N. S. Compo, J. R. Evans, R. N. Carol, D. Villalba, L. S. Ham, T. Garcia and S. Rose, "Intoxicated Eyewitnesses: Better Than Their Reputation?" *Law and Human Behavior*, Vol. 36, No. 2, 2012, pp. 77-86. [doi:10.1037/h0093951](https://doi.org/10.1037/h0093951)
- [8] J. A. E. Gilbert and R. P. Fisher, "The Effects of Varied Retrieval Cues on Reminiscence in Eyewitness Memory," *Applied Cognitive Psychology*, Vol. 20, No. 6, 2006, pp. 723-739. [doi:10.1002/acp.1232](https://doi.org/10.1002/acp.1232)
- [9] S. Bluck, L. J. Levine and T. M. Lauhere, "Autobiographical Remembering and Hypermnnesia: A Comparison of Older and Younger Adults," *Psychology and Aging*, Vol. 14, No. 4, 1999, pp. 671-682. [doi:10.1037/0882-7974.14.4.671](https://doi.org/10.1037/0882-7974.14.4.671)
- [10] B. H. Bornstien, L. M. Liebel and N. C. Scarberry, "Repeated Testing in Eyewitness Memory: A Means to Improve Recall of a Negative Emotional Event," *Applied Cognitive Psychology*, Vol. 12, No. 2, 1998, pp. 119-131. [doi:10.1002/\(SICI\)1099-0720\(199804\)12:2<119::AID-ACP500>3.0.CO;2-4](https://doi.org/10.1002/(SICI)1099-0720(199804)12:2<119::AID-ACP500>3.0.CO;2-4)
- [11] D. Dunning and L. B. Stern, "Examining the Generality of Eyewitness Hypermnnesia: A Close Look at Time Delay and Question Type," *Applied Cognitive Psychology*, Vol. 6, No. 7, 1992, pp. 643-657. [doi:10.1002/acp.2350060707](https://doi.org/10.1002/acp.2350060707)
- [12] F. Gabbert, L. Hope, R. P. Fisher and K. Jamieson, "Protecting against Misleading Post-Event Information with a Self-Administered Interview," *Applied Cognitive Psychology*, Vol. 26, No. 4, 2012, pp. 568-575. [doi:10.1002/acp.2828](https://doi.org/10.1002/acp.2828)
- [13] D. La Rooy, M.-E. Pipe and J. E. Murray, "Reminiscence and Hypermnnesia in Children's Eyewitness Memory," *Journal of Experimental Child Psychology*, Vol. 90, No. 3, 2005, pp. 235-254. [doi:10.1016/j.jecp.2004.11.002](https://doi.org/10.1016/j.jecp.2004.11.002)
- [14] E. Scrivner and M. A. Safer, "Eyewitnesses Show Hypermnnesia for Details about a Violent Event," *Journal of Applied Psychology*, Vol. 73, No. 3, 1988, pp. 371-377. [doi:10.1037/0021-9010.73.3.371](https://doi.org/10.1037/0021-9010.73.3.371)
- [15] C. J. Brainerd, V. F. Reyna, M. L. Howe and J. Kingma, "The Development of Forgetting and Reminiscence," *Monographs of the Society for Research in Child Development*, Vol. 55, No. 3-4, 1990.
- [16] J. T. Hartley, I. M. Birnbaum and E. S. Parker, "Alcohol and Storage Deficits: Kind of Processing?" *Journal of Verbal Learning & Verbal Behavior*, Vol. 17, No. 5, 1978, pp. 635-647. [doi:10.1016/S0022-5371\(78\)90392-4](https://doi.org/10.1016/S0022-5371(78)90392-4)
- [17] B. M. Jones and M. K. Jones, "Alcohol and Memory Impairment in Male and Female Social Drinkers," In: I. M. Birnbaum and E. S. Parker, Eds., *Alcohol and Human Memory*, Wiley Press, New York, 1976, pp. 127-138.
- [18] N. S. Compo, J. R. Evans, R. N. Carol, D. Kemp, D. Villalba, L. S. Ham and S. Rose, "Alcohol Intoxication and Memory for Events: A Snapshot of Alcohol Myopia in a Real-World Drinking Scenario," *Memory*, Vol. 19, No. 2, 2011, pp. 202-210. [doi:10.1080/09658211.2010.546802](https://doi.org/10.1080/09658211.2010.546802)
- [19] J. E. Dysart, R. C. L. Lindsay, T. K. MacDonald and C. Wicke, "The Intoxicated Witness: Effects of Alcohol on Identification Accuracy from Showups," *Journal of Applied Psychology*, Vol. 87, No. 1, 2002, pp. 170-175. [doi:10.1037/0021-9010.87.1.170](https://doi.org/10.1037/0021-9010.87.1.170)
- [20] D. La Rooy, M. E. Lamb and M.-E. Pipe, "Repeated Interviewing: A Critical Evaluation of the Risks and Potential Benefits," In: K. Kuehnle and M. Connell, Eds., *The Evaluation of Child Sexual Abuse Allegations: A Comprehensive Guide to Assessment and Testimony*, Wiley, Hoboken, 2009, pp. 327-361.
- [21] E. A. Maylor, P. M. A. Rabbitt, A. Sahgal and C. Wright, "Effects of Alcohol on Speed and Accuracy in Choice Reaction Time and Visual Search," *Acta Psychologica*, Vol. 65, No. 2, 1987, pp. 147-163. [doi:10.1016/0001-6918\(87\)90024-2](https://doi.org/10.1016/0001-6918(87)90024-2)
- [22] H. M. Lloyd and P. J. Rogers, "Mood and Cognitive Performance Improved by a Small Amount of Alcohol Given with a Lunchtime Meal," *Behavioural Pharmacology*, Vol. 8, No. 2-3, 1997, pp. 188-195.
- [23] M. L. Selzer, F. E. Vanosdall and M. Chapman, "Alcoholism in a Problem Driver Group: Field Trial of Michigan Alcoholism Screening Test (MAST)," *Journal of Safety Research*, Vol. 3, No. 4, 1971, pp. 176-181.
- [24] P. Terry, M. Dumas, R. I. Desai and A. M. Wing, "Dissociations between Motor Timing, Motor Coordination, and Time Perception after the Administration of Alcohol or Caffeine," *Psychopharmacology*, Vol. 202, No. 4, 2009, pp. 719-729. [doi:10.1007/s00213-008-1352-z](https://doi.org/10.1007/s00213-008-1352-z)
- [25] K. S. Birak, S. Higgs and P. Terry, "Conditioned Tolerance to the Effects of Alcohol on Inhibitory Control in Humans," *Alcohol and Alcoholism*, Vol. 46, No. 6, 2011, pp. 686-693. [doi:10.1093/alcalc/agr084](https://doi.org/10.1093/alcalc/agr084)

- [26] D. Davis and R. A. Leo, "Acute Suggestibility in Police Interrogation in the USA: Self-regulation Failure as a Primary Mechanism of Vulnerability," In: A. M. Ridley, F. Gabbert and D. J. La Rooy, Eds., *Suggestibility in Legal Contexts: Psychological Research and Forensic Implications*, Wiley-Blackwell, 2012, pp. 171-197.