

Alcohol and Memory

Alcohol is a central nervous system depressant, and from the first drink it can blunt attention, weaken judgment, lower inhibition, and impair the formation of new memories. Because alcohol is present in a large share of the encounters that produce litigation — by some estimates roughly half of sexual-assault allegations involve alcohol use by the accused, the complainant, or both, and a still larger share of acquaintance cases — its effects on memory are frequently at issue (Abbey, Zawacki, Buck, Clinton, & McAuslan, 2001; Crowell & Burgess, 1996). This paper concerns the ordinary, non-blackout effects of alcohol on memory: how drinking short of a blackout compromises what a person perceives, encodes, and can later report, and how it distorts estimates of one's own intoxication. The complete loss of memory known as an alcohol blackout is a distinct phenomenon addressed in the companion resource noted below. As with every topic in this series, the science favors no party — alcohol can compromise the memory of a complainant and of an accused alike, and it bears on both well-founded and mistaken allegations. This overview assumes no background in psychology.

Extended resource: For an in-depth treatment of alcohol blackouts specifically — the science of en bloc and fragmentary amnesia and its application to sexual-assault cases — attorneys may consult the author's companion web resource, [Alcohol Blackouts](https://arizonaforensics.com/alcohol-blackouts-topics/) (Arizona Forensics, LLC, <https://arizonaforensics.com/alcohol-blackouts-topics/>), which includes the CLE materials “Alcohol Blackouts and Sex Offense Allegations.” The present paper focuses on alcohol's effects on memory short of a blackout.

How Alcohol Compromises Memory

Alcohol's signature effect on memory is well summarized by one leading review: it “primarily interferes with the ability to form new long-term memories, leaving intact previously established long-term memories and the ability to keep new information active in memory for brief periods,” and “as the amount of alcohol consumed increases, so does the magnitude of the memory impairments” (White, 2003, p. 1). The damage is concentrated at encoding — the laying down of new memories — rather than at the storage of memories already formed. Alcohol significantly inhibits activity in the hippocampus, the structure essential to forming new declarative memories (our memory of facts and personal experiences), so that experiences during intoxication may be encoded weakly or not at all.

The impairment is selective. Procedural memory — “remembering how” to perform well-learned actions — runs largely automatically and is relatively spared, whereas declarative and especially episodic memory (memory for specific personal events in time) is more vulnerable. Alcohol also disrupts the encoding of new semantic information while leaving previously learned knowledge intact, and it impairs working memory chiefly by degrading the executive strategies that organize it rather than by shrinking its basic capacity. The practical upshot is that a drinking person may converse, walk, and act in the moment while forming a poor and incomplete record of what is happening — a record that cannot later be retrieved because it was never fully encoded.

Alcohol Myopia: A Narrowed Field of Attention

A complementary mechanism concerns attention. The alcohol myopia model holds that intoxication narrows the range of cues a person can attend to, so that an intoxicated individual processes only the most immediate or salient features of a situation and fails to take in the rest (Steele & Josephs, 1990). Because attention is the gateway to memory, this narrowing has a direct consequence: with less perceived, there is less information available to be encoded. An intoxicated witness can therefore be compromised not only in storing what they noticed but in noticing it in the first place, attending to a fraction of the scene a sober observer would register and analyzing even that fraction less fully.

What Intoxicated Witnesses Remember Without a Blackout

A common assumption is that alcohol makes witnesses simply unreliable. The research paints a more specific and, in one respect, reassuring picture. The best current synthesis — a meta-analysis pooling more than a thousand participants — found that intoxication at the time of an event reduces the number of correct details a witness later recalls but does not increase the number of incorrect details (Jores, Colloff, Kloft, Smailes, & Flowe, 2019). In other words, alcohol tends to make an account less complete without making the reported content less accurate, a pattern echoed in field studies of crime-related memory (van Oorsouw & Merckelbach, 2012). An intoxicated witness generally remembers less, but what they do report is not, on average, more error-prone.

Several refinements matter in practice. Repeated interviewing can help: re-interviewing an intoxicated witness once sober, the next day, can elicit additional accurate details that were not reported initially, with very few contradictions (La Rooy, Nicol, & Terry, 2013; see also Hildebrand Karlén, 2018). Suggestibility findings are mixed and depend on timing. When alcohol is consumed before the event, severe intoxication has been associated with greater susceptibility to suggestive questioning, and that effect can persist when the witness is sober again (van Oorsouw, Merckelbach, & Smeets, 2015); but when alcohol is consumed after the event, it can actually reduce susceptibility to later misinformation through a phenomenon called retrograde facilitation (Gawrylowicz et al., 2017). Some studies in this literature also suggest that, at a given dose, alcohol may reduce the completeness of women's reports more than men's (Hildebrand Karlén, 2018). The overall message is not that intoxicated memory is worthless but that it is typically thinner, and that how and when it is gathered affects what can be recovered.

Alcohol can also change not only how much a witness remembers but how the event itself is perceived and interpreted. In a study of witnesses to intimate-partner violence, intoxicated witnesses rated the parties' physically aggressive behavior as comparatively less severe — yet their neutral behavior as more hostile — and distributed blame more evenly across the parties, whereas sober witnesses more often identified a single most-guilty party (Hildebrand Karlén, Roos af Hjelmsäter, Fahlke, Granhag, & Söderpalm Gordh, 2017). Effects of this kind, attributed in part to alcohol's anxiety-dampening action, matter because a witness's account of who was the aggressor and who was at fault can be shaped by intoxication independently of any gap in memory for the underlying events.

Estimating One's Own Drinking and Intoxication

A separate but related problem is that people are poor judges of how much they have had to drink, and the error grows with consumption. Observational studies that compare self-reported drinking against what people were actually seen to consume find systematic underestimation, most pronounced among heavy drinkers and during heavy-drinking occasions (Northcote & Livingston, 2011). Younger drinkers and women have been found especially likely to underestimate, and the accuracy of judging both one's own and others' intoxication declines as personal consumption rises. This matters in court because testimony often turns on how much a person drank and how impaired they were, and the witness's own estimate — whether complainant or accused — may understate both. Such estimates are best treated as approximations to be checked against objective evidence rather than as reliable measurements.

How Alcohol Acts on the Brain

The behavioral effects above trace to alcohol's action on specific brain systems (White, 2003). The hippocampus, which channels experience into new long-term memory, is strongly disrupted — in effect, the recorder is partly switched off, which is why events during heavy intoxication may

leave little trace. At the cellular level, alcohol alters the activity of receptors that bind neurotransmitters such as GABA and glutamate, and it disturbs the medial septum, a forebrain structure whose rhythmic signals normally regulate hippocampal processing; interfering with that input alone can impair memory.

Alcohol also acts beyond the memory system in ways that bear on behavior at the time of an event. It disrupts the prefrontal cortex — the seat of reasoning, planning, and the interpretation of situations — which loosens the control that normally restrains impulse. It dampens the amygdala's signaling of fear and anxiety, reducing caution. And it engages the brain's dopamine-based reward circuitry, producing the sense of euphoria that motivates much drinking. These effects help explain why intoxication can change conduct as well as memory, and why an intoxicated person may both behave differently and remember the episode poorly.

Alcohol, Memory, and the Law

Alcohol's effects on memory surface across many kinds of cases, and the science counsels precision rather than a blanket inference. For an intoxicated witness or complainant, the research suggests that gaps and reduced completeness are expected and do not by themselves indicate fabrication, while the content actually reported is not, on average, less accurate than a sober witness's — so an incomplete account is not necessarily an unreliable one. For an intoxicated defendant, the same encoding failures mean that a sincere inability to recall an event may reflect impaired memory formation rather than evasion. In sexual-offense cases in particular, alcohol may bear simultaneously on a complainant's capacity to remember and recount an event and on the parties' conduct and perceptions at the time, and these are distinct questions that should not be collapsed.

These issues reach the trier of fact chiefly through expert testimony, the admissibility of which is governed by the general standards for expert evidence — *Daubert v. Merrell Dow Pharmaceuticals* (1993), as extended by *Kumho Tire Co. v. Carmichael* (1999), or the *Frye* general-acceptance test still followed in some jurisdictions (*Frye v. United States*, 1923). A witness may testify only to matters within personal knowledge (Fed. R. Evid. 602), a limit that intoxication-related gaps directly implicate. The relevance of a defendant's voluntary intoxication to mental state is a separate, doctrinally distinct question on which jurisdictions differ, and a State may constitutionally limit its consideration (*Montana v. Egelhoff*, 1996). Two cautions apply throughout: the findings describe group tendencies and dose effects, not the capacities of a particular person at a particular blood-alcohol level, which require individualized analysis; and self-reported consumption is itself unreliable, so estimates of how much anyone drank should be corroborated where possible.

Special Issues in Legal Practice

The principles described above apply with equal force to every party in a legal proceeding. Memory operates the same way regardless of who is asking the questions, and the science summarized here favors no side. What differs between the parties is not the science but the vantage point — the particular places where memory issues tend to surface, and the particular errors each party is best positioned to guard against. The two summaries below identify those recurring issues. They are offered for orientation, not as litigation strategy; in every case the controlling question is what the evidence in that case will, and will not, support, and the expert's role is to inform the trier of fact rather than to advocate for either side.

Special Issues for Prosecutors

For the State, alcohol may bear on the account of an intoxicated complainant or witness and on the conduct and statements of an intoxicated defendant. The issue most likely to surface is the completeness of an intoxicated witness's memory: the research indicates that gaps and missing details are the expected effect of alcohol and do not, by themselves, signal that the witness is unreliable or untruthful, since the content actually recalled tends to be as accurate as a sober witness's. The error best guarded against is over-reading either side of this — treating an incomplete account as worthless, or treating it as if intoxication had no effect at all. Interviewing once the witness is sober, allowing a careful second interview that can recover additional accurate details, and corroborating estimates of consumption with objective evidence all help the State present intoxicated-witness evidence at its true weight.

Understood this way, the science supports rather than undermines well-founded cases. An intoxicated witness can give a reliable, if partial, account, and documenting how and when it was obtained lets that reliability stand; attention to the limits of self-reported drinking, in turn, keeps the State's proof on solid ground.

Special Issues for Defense

For the defense, alcohol may bear on the reliability of an intoxicated complainant's or witness's account and on a client's own impaired memory. The issue most likely to surface is reliance on an account formed under intoxication, where narrowed attention and disrupted encoding may have left the witness with a thin or gap-filled record, and where suggestive questioning before a sober re-interview could have introduced error. The error best guarded against is overclaiming — asserting that intoxication renders memory wholesale unreliable or fabricated — when the research shows that alcohol mainly reduces completeness rather than accuracy, and that a client's genuine memory gaps reflect impaired encoding rather than necessarily concealment. Examining the level and timing of drinking, the conditions of any interview, and the basis for any estimate of consumption is central to the task.

The corresponding safeguard is to ensure the trier of fact understands what the science establishes: that alcohol narrows attention and impairs the formation of new memories in a dose-dependent way; that an intoxicated account is typically less complete, though not necessarily less accurate; that suggestive questioning can distort an intoxicated witness's report; and that people, especially heavy drinkers, underestimate their own consumption. Where admissible, expert explanation of these findings, tied to individualized analysis, can help the factfinder weigh intoxicated memory with appropriate care.

References

- Abbey, A., Zawacki, T., Buck, P. O., Clinton, A. M., & McAuslan, P. (2001). Alcohol and sexual assault. *Alcohol Research & Health*, 25(1), 43–51.
- Crowell, N. A., & Burgess, A. W. (Eds.). (1996). *Understanding violence against women*. National Academy Press.
- Gawrylowicz, J., Ridley, A. M., Albery, I. P., Barnoth, E., & Young, J. (2017). Alcohol-induced retrograde facilitation renders witnesses of crime less suggestible to misinformation. *Psychopharmacology*, 234(9–10), 1267–1275. <https://doi.org/10.1007/s00213-017-4565-1>
- Hildebrand Karlén, M. (2018). Interviewing intoxicated witnesses: Memory performance in theory and practice. *Scandinavian Journal of Psychology*, 59(2), 113–126. <https://doi.org/10.1111/sjop.12404>
- Hildebrand Karlén, M., Roos af Hjelmsäter, E., Fahlke, C., Granhag, P. A., & Söderpalm Gordh, A. (2017). Alcohol intoxicated witnesses: Perception of aggression and guilt in intimate

- partner violence. *Journal of Interpersonal Violence*, 32(22), 3448–3474.
<https://doi.org/10.1177/0886260515599656>
- Jores, T., Colloff, M. F., Kloft, L., Smailes, H., & Flowe, H. D. (2019). A meta-analysis of the effects of acute alcohol intoxication on witness recall. *Applied Cognitive Psychology*, 33(3), 334–343. <https://doi.org/10.1002/acp.3533>
- La Rooy, D. J., Nicol, A., & Terry, P. (2013). Intoxicated eyewitnesses: The effects of alcohol on eyewitness recall across repeated interviews. *Open Journal of Medical Psychology*, 2(3), 107–114. <https://doi.org/10.4236/ojmp.2013.23017>
- Northcote, J., & Livingston, M. (2011). Accuracy of self-reported drinking: Observational verification of ‘last occasion’ drink estimates of young adults. *Alcohol and Alcoholism*, 46(6), 709–713. <https://doi.org/10.1093/alcalc/agr138>
- Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist*, 45(8), 921–933. <https://doi.org/10.1037/0003-066X.45.8.921>
- van Oorsouw, K., & Merckelbach, H. (2012). The effects of alcohol on crime-related memories: A field study. *Applied Cognitive Psychology*, 26(1), 82–90. <https://doi.org/10.1002/acp.1799>
- van Oorsouw, K., Merckelbach, H., & Smeets, T. (2015). Alcohol intoxication impairs memory and increases suggestibility for a mock crime: A field study. *Applied Cognitive Psychology*, 29(4), 493–501. <https://doi.org/10.1002/acp.3129>
- White, A. M. (2003). What happened? Alcohol, memory blackouts, and the brain. *Alcohol Research & Health*, 27(2), 186–196.

Legal Authorities

- Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993).
 Federal Rule of Evidence 602.
 Frye v. United States, 293 F. 1013 (D.C. Cir. 1923).
 Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999).
 Montana v. Egelhoff, 518 U.S. 37 (1996).

Further reading: [Alcohol Blackouts \(Arizona Forensics, LLC\)](#)

Related topic papers: [Intoxication and Memory](#) · [Working Memory](#) · [The Hippocampus](#) · [Misinformation Effect](#) · [Reconstruction and Recall](#) · [Emotion and Memory](#)