

Alcohol Blackouts and Sex Offense Allegations

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Dr. Paul Simpson, (doc@ArizonaForensics.com)
Megan Caminos, doctoral intern (megan@ArizonaForensics.com)

For in-depth resources regarding alcohol blackouts, go to www.psy.law. On the top ribbon click on *Resources > Forensic Topics > Alcohol Blackouts*. There you will find:

- Handout for today's talk
- Publication: Prosecuting Alcohol-Facilitated Sexual Assault. American Prosecutors Research Institute.
- Publication: Alcohol Toxicology for Prosecutors. American Prosecutors Research Institute.
- Publication: Harmful Effects: Mixing Alcohol with Medicines (National Institute of Health).
- Article: Reconstructing alcohol-induced memory blackouts (Nash, 2011)
- Article: Alcohol-Induced Blackout as a Criminal Defense or Mitigating Factor: An Evidence-Based Review and Admissibility as Scientific Evidence (Pressman, 2013)
- Article: Alcohol-Induced Blackouts: A Review of Recent Clinical Research with Practical Implications and Recommendations for Future Studies (Wetherill, 2016)
- Article: What Happened? Alcohol, Memory Blackouts, and the Brain (White, 2003)
- Topic paper: Alcohol, Marijuana and Blackouts
- Topic paper: Alcohol and Asian and Native American Populations
- A sample affidavit for petitioning the convening authority for a forensic expert (already included in this handout)

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I. Alcohol and Sex Offense Allegations

Alcohol is a central nervous system depressant. From the very first drink it can create confusion, memory loss, impaired judgement, behavioral changes, cognitive impairment and reduced inhibitions. Alcohol has serious effects with regard to a number of societal ills, including domestic violence, car accidents, and risky behaviors. For this paper, our focus is on its potential effects for sexual offense and true or false allegations. Approximately half of sexual assault allegations are associated with alcohol use by the accused, victim, or both. (Abbey, et al., 2001) and up to 75% of acquaintance rape allegations involve alcohol (Crowell & Burgess, 1996). Appendix A provides a number of research abstracts about alcohol and sexual disinhibition.

Notice that the negative effects of alcohol can occur without either party entering blackout. Before we take a deeper dive into blackouts, let examine how alcohol in general can compromise memory for events, crimes, and estimation of consumption.

A. Compromise of General Memory:

“Alcohol primarily interferes with the ability to form new long-term memories, leaving intact preciously established long-term memories and the ability to keep new information active in memory for brief periods. As the amount of alcohol consumed increases, so does the magnitude of the memory impairments.” (White, 2003, p. 1)

Alcohol, and the effects of alcohol on memory and general cognitive functioning, has been the subject of much research over the years. Alcohol acts as a central nervous system depressant, but it affects some areas of the brain more than others. Specifically, it leads to distraction and inattention and significantly inhibits neuronal activity in the hippocampus, which impairs memory encoding since the hippocampus plays an important role in the formation of new declarative memories. Because procedural memory functions more or less automatically, retrieval of procedural memory (“remembering how”) is not as severely impaired by alcohol as retrieval of declarative memory (“remembering what”).

Alcohol particularly impairs the encoding of episodic memory (that part of declarative memory that relates to our personal experiences and specific events in time), especially for certain types of recall, such as cued recall, the recognition of completed word fragments and free recall. A "blackout" is an example of a difficulty in the encoding of episodic memories due to high doses of alcohol. It is caused by a rapid increase in blood alcohol concentration, which in turn distorts the activity of neurons in the hippocampus, thus impairing person's ability to form new episodic memories. Alcohol also severely disrupts the encoding and storage process of new semantic memories (our memory of facts, meanings and acquired knowledge about the external world), although apparently not that of previously learned information.

Alcohol also impairs short-term (working) memory, although mainly by affecting certain mnemonic strategies and executive processes rather than by shrinking the basic holding capacity of working memory or by physically altering the structure of those parts of the brain which are critical for working memory function. Although light-to-moderate drinking does not appear to impair long-term cognitive functioning significantly (and according to some studies, may actually decrease the risk of cognitive decline), heavy drinking and chronic alcoholism is associated with long-term impairment in sustained attention and working memory function, especially visual working memory.

Serious over-consumption of alcohol, especially in comparison with the intake of other foods, can cause a thiamine deficiency, leading to a much more serious form of amnesia known as Korsakoff's syndrome. The Human Memory website: http://www.human-memory.net/disorders_alcohol.html

B. Alcohol's Impact on Memory of Criminal Events (non-blackout) – (Appendix C)

- Research on *alcohol myopia* finds alcohol consumption decreases perceptual and cognitive functioning, and ultimately the amount of information that individuals can process. Consequently, when a person is intoxicated, the range of information they can pay attention to is restricted, such that they are able to attend to only some of the information that could be registered by a sober person. In addition, their ability to fully analyze registered information is impaired.
- This has important implications for memory encoding. With less perception, less data is available to be recorded into memory. Intoxicated witnesses can potentially be compromised in their ability to perceive and encode various details of an event.
- Alcohol affects women's reports more than men's, which may be because alcohol affects attention and memory consolidation more clearly at a lower dose for women than for men. (Karlén, 2015)
- Moderately and highly intoxicated individuals are less complete when recollecting crime details. (van Oorsouw, 2012)
- One study suggests that a second interview 24-hours after intoxication can produce additional details of a crime. (La Rooy, 2013)
- Severely intoxicated participants display a greater tendency to go along with suggestive cues compared with sober participants. Intoxication impaired memory and increased suggestibility during an immediate interview, and both effects persisted when sober again. (Van Oorsouw, 2015, but see Gawrylowicz, 2017)

C. Underestimation of Alcohol Consumption – (Appendix D)

- People underestimate their own consumption by increasing amounts when engaging in heavy drinking. (Northcote, 2011)
- Young people and women are more likely to underestimate how much they drank. (Martin, 2016)
- Female students who reported typically drinking larger amounts of alcohol in party settings were more likely to make errors when estimating their intoxication for moderately high numbers of drinks. (Mallett, 2009)
- Accurate estimation of peer's drinking decreased significantly with increasing personal consumption. (Stock, 2014)

D. How Alcohol Impacts the Brain

"If recreational drugs were tools, alcohol would be a sledgehammer. Few cognitive functions or behaviors escape the impact of alcohol, a fact that has been recognized in the literature. As Fleming stated nearly 70 years ago, 'the striking and inescapable impression one gets from a review of acute alcoholic intoxication is of the almost infinite diversity of symptoms that may ensue from the action of this single toxic agent' (1935, pp. 94-95). In addition to impairing balance, motor coordination, decision making, and a litany of other functions, alcohol produces detectable memory impairment beginning after just one or two drinks. As the dose increases, so does the magnitude of the memory impairments." (White, 2003, p. 1)

- Hippocampus
 - Important for the formation of long-term memories by transferring sensory data into short- and long-term memory. (Atkinson and Shiffrin, 1968, Modal Model of Memory, White 2003, p.9)
 - Alcohol disrupts the function of the hippocampus. (Ryback 1971, Parker 1976; White 2003, p. 10-15)
 - The recorder is turned off.
- Proteins and Receptors

- *“Substantial evidence now indicates that alcohol selectively alters the activity of specific complexes of proteins embedded in the membranes of cells (i.e., receptors) that bind neurotransmitters such as gamma-aminobutyric acid (GABA), glutamate, serotonin, acetylcholine, and glycine (for a review, see Little 1999). In some cases, only a few amino acids appear to distinguish receptors that are sensitive to alcohol from those that are not (Peoples and Stewart 2000). It remains unclear exactly how alcohol interacts with receptors to alter their activity.” (White, 2003, p.10)*
- Medial Septum
 - *One brain region that is central to hippocampal functioning is a small structure in the fore brain known as the medial septum (Givens et al. 2000). The medial septum sends rhythmic excitatory and inhibitory signals to the hippocampus, causing rhythmic changes in the activity of hippocampal pyramidal cells. . . Given the powerful influence that the medial septum has on information processing in the hippocampus, the impact of alcohol on cellular activity in the medial septum is likely to play an important role in the effects of alcohol on memory. Indeed, in rats, putting alcohol directly into the medial septum alone produces memory impairments (White, 2003, p. 14)*
- Prefrontal Cortex
 - First glass of wine disrupts the prefrontal cortex.
 - Important for executive functioning – reasoning, planning, decision-making, assessment and interpretation of events.
 - Disinhibits primitive brain impulse.
 - *“The Horse and Rider”* analogy
- Amygdala
 - Attaches emotional status to a stimulus.
 - Reduces fear and anxiety.
 - Alcohol calms the chatter from the prefrontal cortex to the amygdala.
- *“Reward Center”* (Incentive Saliency Circuitry)
 - Alcohol activates the *“Reward Center”*
 - Primarily dopamine, which creates a feeling of euphoria
 - Some drink to reduce stress, others drink for pleasure. Quick drinkers are looking for the reward.

II. Alcohol Blackouts

The following description is offered by Wikipedia (*yes - quit smirking. This is actually a good summation*). Much longer, detailed descriptions are provided by White and Rose (at www.drpaulsimpson.com).

A **blackout** is a phenomenon caused by the intake of any substance or medication in which long term memory creation is impaired, therefore causing a complete inability to recall past events. “*Blacking out*” is not to be confused with the mutually exclusive act of “*passing out*”, which means loss of consciousness.

Blackouts can generally be divided into 2 categories, “*en bloc*” blackouts and “*fragmentary*” blackouts. *En bloc blackouts* are classified by the inability to later recall any memories from the intoxication period, even when prompted. These blackouts are characterized also by the ability to easily recall things that have occurred within the last 2 minutes, yet inability to recall anything prior to this period. As such, a person experiencing an en bloc blackout may not appear to be doing so, as they can carry on conversations or even manage to accomplish difficult feats. It is difficult to determine the end of this type of blackout as sleep typically occurs before they end.

Fragmentary blackouts are characterized by the ability to recall certain events from an intoxicated period, yet be unaware that other memories are missing until reminded of the existence of these ‘gaps’ in memory. Research indicates that such fragmentary blackouts, also known as “*brownouts*”, are far more common than en bloc blackouts. Memory impairment during acute intoxication involves dysfunction of episodic memory, a type of memory encoded with spatial and social context. Recent studies have shown that there are multiple memory systems supported by discrete brain regions, and the acute effects of alcohol and learning and memory may result from alteration of the hippocampus and related structures on a cellular level.

A rapid increase in blood alcohol concentration (BAC) is most consistently associated with the likelihood of a blackout. However, not all subjects experience blackouts, which implies that genetic factors play a role in determining CNS vulnerability to the effects of alcohol. The former may predispose an individual to alcoholism, as altered memory function during intoxication may affect an individual’s alcohol expectancy, one may perceive positive aspects of intoxication while unintentionally ignoring the negative aspects.

Various studies have also given rise to proof of links between general alcohol consumption and its effects on memory capacity. These studies have shown in particular, how the inebriated or intoxicated individual makes poorer associations between words and objects than does the sober individual. Later blackout-specific studies have indicated that alcohol specifically impairs the brain's ability to take short-term memories and experiences and transfer them to long-term memory.

Blackouts are commonly associated with the consumption of large amounts of alcohol; however, surveys of drinkers experiencing blackouts have indicated that they are not directly related to the amount of alcohol consumed. Respondents reported they frequently recalled having “*drank as much or more without memory loss*,” compared to instances of blacking out. Subsequent research has indicated that blackouts are most likely caused by a rapid increase in a person's blood-alcohol concentration. One study, in particular, resulted in subjects being stratified easily into two groups, those who consumed alcohol very quickly, and blacked out, and those who did not black out by drinking alcohol slowly, despite being extremely intoxicated by the end of the study.

A. Alcohol Blackouts are a frequently occurring phenomenon.

“Blackouts are much more common among social drinkers – including college students – than was previously assumed and have been found to encompass events ranging from conversations to intercourse.” (White, 2003, p. 1)

- Thirty-five percent of trainees in a pediatric residency program had experienced at least one blackout. (Knight 1999)
- Thirty-three percent of first-year medical students had at least one blackout. (Goodwin 1995)
- A large study in Finland revealed 35% of males had experienced at least one blackout. (Poikolainen 1982)
- Fifty-one percent of college students who had ever drank alcohol reported blacking out at some point in their lives and 40% reported blacking out in the previous year. (White 2002)

B. What are Alcohol Blackouts?

- Episodes of amnesia during which a person can actively participate in events. (Goodwin 1995)
- Does not erase memories that were formed before (retrograde). (White 2003 p. 1)
- Inhibits memory of events after the level of intoxication reaches critical mass (anterograde) (Westrick 1988; Mintzer and Griffiths 2002; White 2003, p. 1 & 4)
- *Blacking out* is different than *passing out*.

Julia Shaw, Ph.D. , a renowned memory researcher, describes her own experience of blackout:

“I experienced this first-hand when I was put to sleep for a hospital procedure, which was then completed more quickly than anticipated. As expected, afterwards I was conscious, talking, and coherent, but clearly unable to form memories. My partner, who had come with me, apparently asked me the same ridiculous questions every few minutes, to see whether I realized that he was just on repeat. I did not. I answered as if for the first time, every time. I also apparently kept thinking I had just woken up, and that now I was fine. This is an interesting little side effect of not being able to remember the recent past, and some patients with severe amnesia due to injury report the same thing. My partner even gave me a notepad to write down my responses to his questions, and kept flipping the page so I could not see that I had written exactly the same thing a few minutes earlier. Of course, I cannot actually remember any of this, but he did show me the notepad as corroborating evidence. Clearly, then, the brain chemistry which is so crucial for our ability to form memories can be manipulated by the ingestion of certain kinds of drugs. But memories are more than just biochemistry.

Shaw, Julia (2016-06-16). *The Memory Illusion: Remembering, Forgetting, and the Science of False Memory* (Kindle Locations 1088-1096).

C. Two types of *Blackouts* (Goodwin 1969 & 1970; White 2003, p.1)

- Fragmentary (aka “Gray-outs” or “Brownouts”)
 - Most blackouts are fragmentary (White 2003 & 2004; Hartzler and Fromme 2003b; Goodwin et al. 1969b)
 - Partial blockage of memory formation
 - Bits and pieces get lost
 - Sometimes partial memories can be recovered with cues, BUT these “recollections” are subject to significant distortion. (Nash 2011)
- En Bloc (White 2003, p.4)
 - Zero memory for a period of time.
 - The record button was never on, so there are no memories to retrieve.
- Either version of blackouts can occur with a Blood Alcohol Concentration (BAC) as low as 0.14 (Ryback 1970; White 2003, p.6)

D. It is more about “How quickly” than it is “How much.” (White 2003, p.1 &5; Goodwin 1969. But also see Ryman 1970 and Perry 2006)

“Alcohol produces detectible memory impairments beginning after just one or two drinks. As the dose increases, so does the magnitude of the memory impairments” (White 2003, p.1)

- “*Gulping*” alcohol is more of a shock to the system than steady ingestion.

E. Factors that increase the potential for alcohol blackout.

- If the person is a novice drinker.
- If a person has experienced blackouts in the past.
- Drinking on an empty stomach. (Goodwin 1969, White 2003, see the “*Toxicology*” section in this handout)
- “*Gulping*” drinks (White 2003, p. 5)
- Proof of the alcohol - Proof is 2x the alcohol content (80% proof is 40%) (White 2003, p.7)
- Females do not metabolize alcohol as quickly due to body weight, proportion of body fat, and levels of key enzymes. (White 2002, Dettler, 2009, Jones 2010). There is also evidence that females are more susceptible than males to milder forms of alcohol-induced memory impairments. (Mumenthler 1999).
- Some Asians and Native Americans lack a critical enzyme to better process alcohol. (ADH & ALDH)
- Alcohol combined with benzodiazepine sedatives (White 1997, Saum and Inciardia 1997, Silvers 2003)
- THC – marijuana (Ciccocioppo 2002).

F. Medications that can “*potentiate*” alcohol.

- Allergy and cold meds (Zyrtec, Claritin, Tylenol Sinus) – drowsy, dizzy
- Antidepressants
- Anxiety meds (Xanax, Valium, Klonopin, Ativan) – difficulty breathing, motor problems, memory probs, unusual behaviors.
- Blood pressure meds – fainting, drowsiness
- Pain meds (Percocet, Vicodin) – risk for OD, dizziness, drowsiness, impaired motor control.
- Sleep meds (Ambien, Unisom, Lunesta) – sleepiness, drowsiness, unusual behaviors, memory problems.
- MARIJUANA!

G. Gender differences

- Females do not metabolize alcohol as quickly due to body weight, proportion of body fat, and levels of key enzymes. (White 2002, Dettler, 2009, Jones 2010). Water content varies from person to person. Obese individuals have less water per pound of body weight than individuals of average build because fat cells contain little water. Females tend to have a higher proportion of body fat than males. **About 68% of an average male’s body weight is due to body water, while the percentage is 55% for average females.** In general, the heavier a person is, the greater the amount of alcohol that must be consumed to reach a specific alcohol concentration in the body.
- There is also evidence that females are more susceptible than males to milder forms of alcohol-induced memory impairments. (Mumenthler 1999).
- Binge drinking has a greater effect on memory encoding and retrieval for females. A recent study examined the effects of binge drinking in emotional episodic memory from a gender perspective. Intoxicated subjects aged 18-20 completed an emotional list-learning task. In females, binge drinking was associated with an emotional memory bias in favor of negative

information and lower recall of positive and neutral words. In addition, females showed more false alarms for negative distractors. Whereas in males, no alcohol-related effects were found. The researchers concluded that young female binge drinkers had greater difficulties with “*negative memory bias, poor learning and delayed episodic recall linked to the interference of negative content, which suggests difficulties in disengaging attention to salient negative stimuli and a reduction of inhibitory capacities. This might result in greater vulnerability to alcohol-related emotional disturbances among women.*” (Carbia, 2020)

H. Possible genetic component.

- Baer and colleagues (2003) examined the drinking habits of pregnant women in 1974 and 1975, and then studied alcohol use and related problems in their offspring at seven different time points during the following 21 years. These authors observed that prenatal alcohol exposure was associated with increased rates of experiencing alcohol-related consequences, including blackouts, even after controlling for the offspring’s general drinking habits. (White, 2003)
- A study by Nelson and colleagues (2004) suggests that there might actually be a genetic contribution to the susceptibility to blackouts, indicating that some people simply are built in a way that makes them more vulnerable to alcohol-induced amnesia.

I. When do blackouts tend to occur?

- Memory problems and blackouts are most likely to occur as BAC is in ascending limb and during its peak. (Rose, 2010)
- Remember that BAC is rising approximately one hour after the last drink.
- Quick gulps of that “*last-call*” drink can create an alcohol rush if there is already a considerable amount of alcohol in the person’s system.
- Unconsciousness is most likely later in the evening (descending limb). (Davis, 2009)
- “*Acute Tolerance*” – the brain is trying to get back online. The longer a person is intoxicated, the more the brain is trying to get back in control.

J. Can you tell when someone is in blackout?

No. There is no way to tell when someone is in blackout because you can’t see their hippocampus. They are conscious. At any given moment they can recall the last couple of minutes of temporary data, which allows them to carry on a discussion, drive a car, or have sex. But that temporary data keeps disappearing behind them. Even researchers in controlled laboratory studies can’t tell when a subject has moved into a blackout (they must do timed questioning).

K. Prior blackouts can impact future memory abilities.

White (2003, p.8) explains:

“A recent study by Hartzler and Fromme (2003) suggests that people with a history of blackouts are more vulnerable to the effects of alcohol on memory than those without a history of blackouts. These authors recruited 108 college students, half of whom had experienced at least one fragmentary blackout in the previous year. While sober, members of the two groups performed comparably in memory tasks. However, when they were mildly intoxicated (0.08 percent BAC) those with a history of fragmentary blackouts performed worse than those without such a history. There are two possible interpretations for these data, both of which support the hypothesis that some people are more susceptible to blackouts than others. One plausible interpretation is that subjects in the fragmentary blackout group always have been more vulnerable to alcohol-induced memory impairments, which is why they performed poorly during testing under alcohol, and why they are members of the blackout group in the first place. A second interpretation is that

subjects in the blackout group performed poorly during testing as a result of drinking enough in the past to experience alcohol-induced memory impairments. In other words, perhaps their prior exposure to alcohol damaged the brain in a way that predisposed them to experiencing future memory impairments. This latter possibility is made more likely by recent evidence that students who engage in repeated episodes of heavy, or binge, drinking are more likely than other students to exhibit memory impairments when they are intoxicated (Weissenborn and Duka 2000). Similar results have been observed in animal studies.” (White et al. 2000a)

L. Blacked Out vs. Passed Out

CAUTION: Lawyers, witnesses and even experts will often use the terms “*blacked out*” and “*passed out*” interchangeably. These are two completely different cognitive states. You’ll need to make sure the witness defines what they mean for each phrase and be prepared to suggest corrections during the course of testimony. The members will also need to be educated on these terms.

- Blackout is...
 - Things a person does while drunk
 - They are CONSCIOUS!
 - The person is capable of carrying out complex and goal-directed behaviors (including sexual behaviors)
- Passed out is...
 - A person falling asleep or becoming unconscious.
 - They are NOT CONSCIOUS!
- You can have a blackout and then pass out.
 - “Blackout” tends to occur during ascending BAC. (Goodwin 1970; White 2003, p.6)
 - “Pass out” tends to occur during descending BAC.
- People can’t tell the individual is in a blackout state. They just see the behaviors the person is doing.

M. Can a person experience a blackout and not know it the next morning? (Goodwin 1969)

- That’s not going to happen with en bloc, because there is too large of a missing gap for a person to overlook. But it can happen with fragmentary (Goodwin 1969, White 2004, p. 4)
- Let’s say Bob has gone to a party and ingested a lot of alcohol quickly. He experiences fragmentary blackouts but remains conscious the entire night until he drives himself home and goes to bed at 3am. Throughout the evening Bob is talking with others, dancing, and hitting on a number of women with no success. He is not slurring his speech, not stumbling around, and he is not passed-out drunk. But friends can tell he’s got a good buzz going. What they can’t tell is that Bob’s hippocampus is intermittently turning on and off. Remember, there are no external signs of blackouts and no one at the party can see inside Bob’s brain to notice his hippocampus is turned off. So, the next morning Bob wakes up with a hangover. He has enough recollection from the night before to know that he talked with four interesting people, hit on three beautiful women, and drove himself home. What he doesn’t know is that he actually had conversations with nine people, flirted with five women, and threw up on his best friend’s shirt. He doesn’t know that he doesn’t know. And unless one of his buddies reminds him of a missing conversation or event, Bob will remain blissfully unaware there are memory gaps from the night before.

CAUTION: Sometimes the complaining witness will use the phrase “*I went to sleep*” when s/he actually slipped into blackout. For example, I recently assisted in a trial in which the complaining witness testified that she could remember a sergeant, whom she didn’t know that well, helping her

back to her dormitory from the bar. She couldn't recall how she got into her apartment, but she "woke up" and could see the sergeant in her kitchen, which confused her. She then went back to "sleep". Next, she recalls waking up and he was sitting beside her on the bed with his hand on her breast. She was annoyed and then "I went back to sleep." She then recalls waking up and he was having coitus with her. Then she went back to "sleep". When she woke up in the morning, she was confused and her friend down the hall told her she was raped.

Imagine the juries' skepticism regarding her testimony – here's a stranger in her kitchen, then hand on her breast, and then having sex with her; with no shock or screams from the victim coming out of sleep. My testimony was her description was consistent with moving in-and-out of blackout. But that experience is novel for her. So, she references something we all are familiar with – going to sleep and waking up. I see this phrasing come up in a number of cases.

N. Can you "wake up" in the middle of a blackout? Meaning in the actual moment can you suddenly be aware that you can't recall portions of the evening?

- In blackout, the person is conscious and there is constant awareness of the past few minutes. So, there is nothing to "wake up" from. Our current understanding of alcohol blackouts doesn't have a mechanism for a person knowing they are not remembering while in the midst of a blackout (called "metacognition").
- The hippocampus is transferring memories off-and-on. But a person's "Islands of Memory" won't be apparent until the morning. These islands of recall tend to be random.
- The salience of an event does not seem to matter. Goodwin's rats in a frying pan and pain does not bring the hippocampus back online.
- Recall will occur the next morning, but not two weeks later. (Nash, 2011)

There are at least three possible explanations for the sense of "waking up" from blackout.

- Waking up from being asleep or passed out - Alcohol reduces sleep onset and REM sleep while increasing wakefulness and Slow Wave Sleep across the entire night. In plain English – someone under the influence of alcohol falls asleep more quickly and wakes up more easily. (Arnedt, 2011)
- Retrospective bias – a memory reconstruction error. As a person puts the pieces together from the previous night, they misinterpret they were "passed out" in the minutes leading up to a sexual encounter. In fact, they were in fragmentary blackout, but don't know that experience or don't want to admit it could happen to them. They're scared, disgusted and/or confused about the fragment of memory in which they are having sex with a person they barely know. So, they retrospectively place those emotions into the fragment they are now recalling.
- There may exist a phenomenon in which a person can suddenly become aware of themselves in the midst of blackout. Science has not yet identified what that process entails. But in hundreds of subjects in controlled studies, this has never happened.

III. Toxicology

- The *Dubowski Scale* is shown further down in this section. The problem is blackouts are not parallel to degrees of intoxication. Remember, it's not how much, it's how quickly.
- *Behavioral Tolerance*: Over time, alcoholics will tend to develop increasing tolerance and may show less effects. One study was conducted at an emergency room over a two-year period on individuals presenting for minor emergencies (lacerations, etc.) Of those who admitted to drinking alcohol but appeared sober to medical staff, researchers found men with an average of .272 BAC and women with an average of .260 BAC. (Urso, 1980)
- The *Mellanby effect* has been demonstrated for intoxication and willingness to drive. Objective measures of skills necessary for safe driving, such as response to inhibitory cues and skills measured on driving simulators, were generally worse on the descending part of the BAC-time curve for the same BAC. (Holland, 2017)
- Practical questions regarding the victim...
 - Behavioral tolerance?
 - How much did s/he have to drink? Too drunk to accurately remember events?
 - How much was eaten eight hours prior/during the instant event?
 - Were there medications / OTC / recreational drugs?
 - How much sleep had s/he gotten?
 - Has s/he had previous blackouts?
 - Was a BAC taken? How long after the last drink?
- A good expert knows his/her limits.

A. Alcohol Concentration (AC) Estimates

The prosecutor may need to establish an AC at time of driving, rather than at the time that the test sample was obtained. Sometimes a sample cannot be taken until several hours after the driving, requiring expert testimony to relate the AC to the time of driving. The estimate may be complicated by allegations that additional alcohol was consumed after the crash or traffic offense and prior to obtaining the sample. The defense may claim that the alcohol concentration at the time of the offense was lower than at the time of the test due to the consumption of alcohol just prior to the offense (the so-called rising curve defense). The defense may also use an AC estimate based on the drinking history in an attempt to discredit the test result (i.e. "I only had two beers"). Conversely, the prosecutor may wish to discredit the defendant's drinking history by using the test result. Other scenarios, some quite imaginative, may be posed as defenses. A basic understanding of the principles of alcohol pharmacokinetics will aid in effectively dealing with these issues in court.

Note: By itself, the measured AC cannot be used to reliably estimate an AC at any other time, but the measured AC can be used as the foundation of an estimate when knowledge of how alcohol is absorbed, distributed and eliminated is combined with the facts surrounding the case.

B. Absorption

Absorption is the process of moving alcohol from outside the body into the bloodstream where it can be distributed throughout the body. As a small, completely water-soluble molecule, ethyl alcohol is readily absorbed into the mucous lining of the digestive tract. When it comes into contact with the digestive tract, alcohol is absorbed via simple diffusion into the mucous lining and then into the blood. The amount absorbed at any given site depends upon the surface area, the thickness of the lining and the blood supply. Unlike most other ingested substances, alcohol is not digested and can be absorbed unchanged directly through the stomach lining. Only about 20-25% of ingested alcohol is absorbed in

this manner because the stomach has a relatively small surface area and limited blood supply. The remaining 75-80% of the alcohol is rapidly and efficiently absorbed when it leaves the stomach and enters the small intestine, which has a large surface area and rich blood supply.

C. Rate of Absorption and Time to Peak

Because alcohol is rapidly absorbed once it reaches the small intestine, anything that delays the stomach from emptying its contents into the small intestine will slow the rate of alcohol absorption. The most rapid absorption takes place when a 20% solution of alcohol is consumed on an empty stomach. Diluted drinks take somewhat longer to absorb. In concentrated drinks (greater than 40% by volume) alcohol acts as an irritant to the gastric lining and will be retained in the stomach until it can be diluted. Alcoholic beverages containing ingredients that require digestion, such as carbonated beverages, may also slow absorption somewhat. Absorption may also be affected by emotional state, shock and medications that impact stomach function and the general condition of the gastrointestinal tract. **The most important factor affecting absorption is the presence of food in the stomach concurrent with alcohol.** Food requires digestion and any alcohol trapped in food particles will take longer to be absorbed. The extent of the effect depends on the amount and type of food. . . The delay in absorption causes a lower peak alcohol concentration that lasts longer compared to consumption on an empty stomach.

Absorption rates and times vary considerably between subjects - even within the same subject at different times under similar conditions. The rate of alcohol absorption is non-linear. An initial rapid rise in AC is followed by a gradual tapering off until a peak concentration is attained. Of greatest forensic use is the time it takes for alcohol to reach its peak concentration after consumption. Peak concentrations are generally attained within 30 - 60 minutes of the cessation of drinking. Because of the initial rapid rise of AC after drinking, most of the peak AC is reached within the first 30 minutes. This is true whether or not food is present, even though food can affect the magnitude of the peak concentration. When alcohol is consumed successively over time, as in social drinking situation, peak concentrations are generally attained within 30 minutes of the last drink and may even be attained before the last drink is finished. Pp. 11-14

Alcohol Toxicology for Prosecutors (July 2003). American Prosecutors Research Institute, pp. 11-14

D. Distribution

Once absorbed, alcohol is transported by the blood and distributed throughout the body. As blood flows to the body's organs and tissues, alcohol diffuses across membranes into all areas that contain water. Alcohol always moves by simple diffusion from a higher concentration to a lower concentration.

Because **alcohol is completely soluble in water**, the AC in the whole body is directly proportional to total body water content. Water content varies from person to person. Obese individuals have less water per pound of body weight than individuals of average build because fat cells contain little water. Females tend to have a higher proportion of body fat than males. **About 68% of an average male's body weight is due to body water, while the percentage is 55% for average females.** In general, the heavier a person is, the greater the amount of alcohol that must be consumed to reach a specific alcohol concentration in the body. The relative alcohol concentration in any fluid or tissue is also directly related to its water content. The higher the water content, the higher the relative alcohol concentration.

Alcohol Toxicology for Prosecutors (July 2003). American Prosecutors Research Institute, pp. 14-15

E. Elimination

Alcohol is eliminated from the body through metabolism, excretion and evaporation. **Metabolism accounts for approximately 95% of alcohol elimination.** Enzymes act on alcohol molecules to change them into other compounds; these by-products are further metabolized. Alcohol dehydrogenase (ADH) in the liver is the enzyme that is primarily responsible for alcohol metabolism. ADH is also located in the stomach lining, causing a small portion of an alcohol dose to be eliminated before it has a chance to be absorbed. Other enzyme systems also act on alcohol, coming into play especially at higher alcohol concentrations.

Alcohol is also excreted unchanged through urine, tears, sweat, semen and saliva. Each drop of urine that is produced and pooled in the bladder reflects the alcohol concentration of the circulating blood at that time. Because alcohol has a high vapor pressure at body temperatures, alcohol will evaporate from the blood into the lungs and be excreted in breath, allowing it to be measured in a breath sample.

Rate of elimination. The average rate of elimination (combining metabolism, excretion and evaporation) is between 0.015 to 0.018% per hour. Expressed in terms of common alcohol measurement units this is 0.015 - 0.018 g/100 mL or g/210 L per hour. Although the range of rates reported in the scientific literature can be quite large, as a practical matter you can expect a range of rates from 0.01 to 0.025% per hour in drinking drivers. Inexperienced drinkers tend to have a lower average rate than moderate drinkers, while chronic drinkers and alcoholics will have the highest average rates of elimination. Elimination rates do not vary significantly within the same person at different times, although alcohol will be eliminated more rapidly during periods of heavy drinking. At low AC's (0.02 and below), the rate of elimination slows considerably as the enzymes no longer have enough alcohol available to work at peak efficiency.

Because metabolism accounts for the vast majority of elimination, there is no practical way for a subject to alter it. As long as blood is flowing to the liver, alcohol will continue to be metabolized.

Alcohol Toxicology for Prosecutors (July 2003). American Prosecutors Research Institute, pp. 15-16

Stages of Acute Alcoholic Influence / Intoxication

BLOOD-ALCOHOL CONCENTRATION grams/100 mL	STAGE OF ALCOHOLIC INFLUENCE	CLINICAL SIGNS/SYMPTOMS
0.01-0.05	Subclinical	Influence/effects usually not apparent or obvious Behavior nearly normal by ordinary observation Impairment detectable by special tests
0.03-0.12	Euphoria	Mild euphoria, sociability, talkativeness Increased self-confidence; decreased inhibitions Diminished attention, judgment and control Some sensory-motor impairment Slowed information processing Loss of efficiency in critical performance tests
0.09-0.25	Excitement	Emotional instability; loss of critical judgment Impairment of perception, memory and comprehension Decreased sensory response; increased reaction time Reduced visual acuity & peripheral vision; and slow glare recovery Sensory-motor incoordination; impaired balance; slurred speech; vomiting; drowsiness
0.18-0.30	Confusion	Disorientation, mental confusion; vertigo; dysphoria Exaggerated emotional states (fear, rage, grief, etc) Disturbances of vision (diplopia, etc.) and of perception of color, form, motion, dimensions Increased pain threshold Increased muscular incoordination; staggering gait; ataxia Apathy, lethargy
0.25-0.40	Stupor	General inertia; approaching loss of motor functions Markedly decreased response to stimuli Marked muscular incoordination; inability to stand or walk Vomiting; incontinence of urine and feces Impaired consciousness; sleep or stupor
0.35-0.50	Coma	Complete unconsciousness; coma; anesthesia Depressed or abolished reflexes Subnormal temperature Impairment of circulation and respiration Possible death
0.45+	Death	Death from respiratory arrest

KURT M. DUBOWSKI, Ph.D., D.A.B.C.C., D.A.B.F.T.
The University of Oklahoma
Department of Medicine
Oklahoma City, Oklahoma
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IV. Strategies for the Prosecution

- The Goldilocks Challenge – “*This bed’s too soft and this one’s too hard*”
- The defendant knew or should have known the victim was severely intoxicated/unconscious and unable to give consent to a sexual encounter. Dr. Simpson’s website has two excellent articles:
 - *Prosecuting Alcohol-Facilitated Sexual Assault*. Scalzo, 2007. Nat. District Attorneys Association.
 - *Alcohol Toxicology for Prosecutors*. American Prosecutors Research Institute, 2003.
- Testimony regarding alcohol blackouts tends to favor the defense because most often the defendant is not taking the stand. So, it is the complaining witness whose account is under intense scrutiny. When cross-examining the expert, be sure to ask: “*Dr. Jones, isn’t it true that everything you’ve just described about alcohol blackouts could apply to the accused in this case?* (Yes) “*So it’s possible that the victim in this case could have said “no” and resisted him, but he doesn’t recall that because he was in blackout that night?*” (Yes, it is possible).
- Be sure to challenge the expert on dynamics about blackouts that are not well understood. For instance, there is little research on how *passing out* is different than *falling asleep*. This is because it is unethical for researchers to induce such severe intoxication levels that subjects could potentially die from alcohol poisoning. So, during your cross-examination work to emphasize what is not yet understood about this phenomenon.

V. Strategies for the Defense

Affirmative Defense

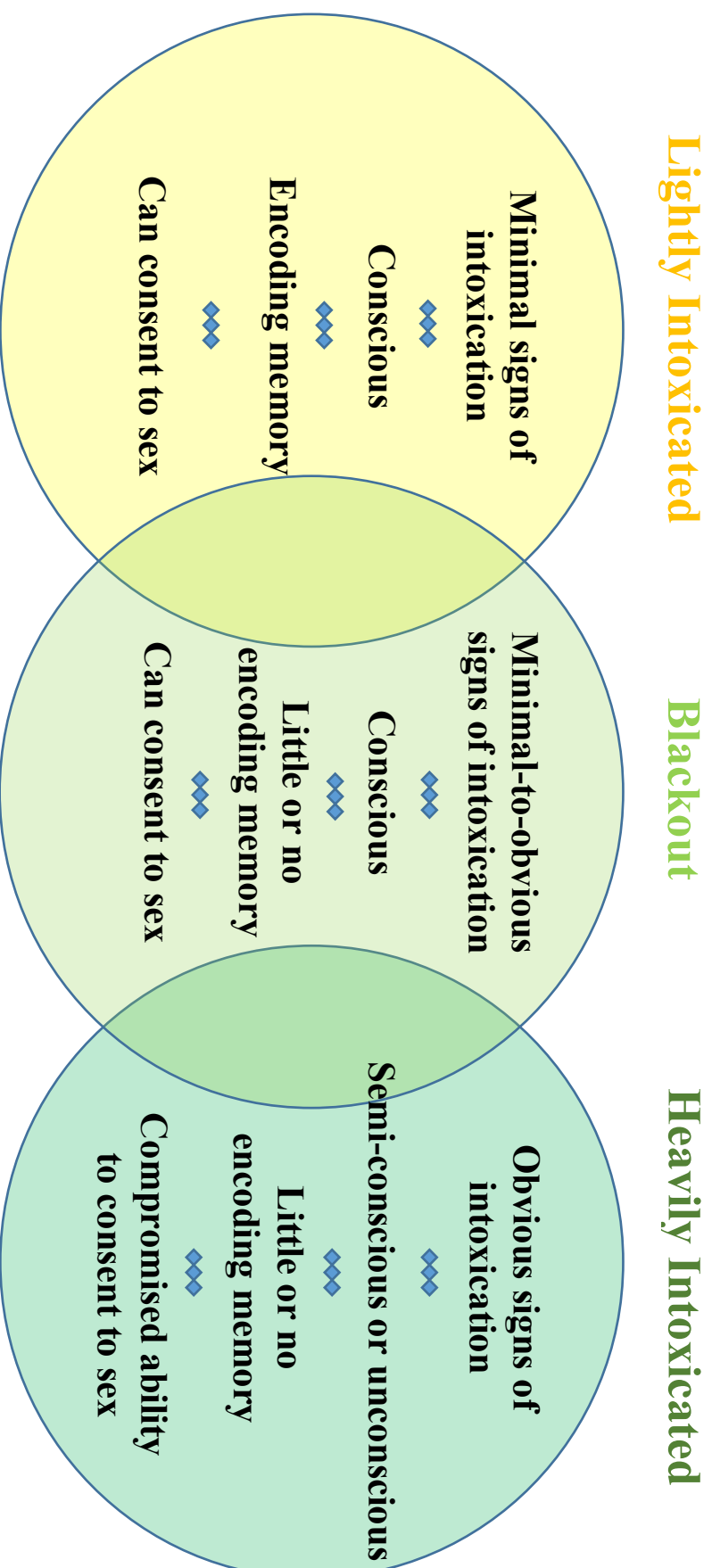
- The Goldilocks Challenge – “*This one’s just right!*”
- “*Mistake of fact as to consent*”
 - “*The accused held, as a result of ignorance or mistake, an incorrect belief that the other person engaging in the sexual conduct consented. The ignorance or mistake must have existed in the mind of the accused and must have been reasonable under all the circumstances.*”
 - It is possible that a complaining witness in a sexual assault case, who was in the midst of an alcohol-induced blackout, willingly engaged in sexual acts but does not remember doing so and/or remembers events inaccurately.
 - In a blackout state, the identified victim is still fully conscious and maintains an ability to engage in a wide array of complex behaviors (including sexual acts).
 - If the complaining witness is in an alcohol-induced blackout, the accused does not know this. The accused just sees behaviors that the identified victim is engaging in.

False claim of sexual assault because . . .

- “*Confabulation*”
 - It’s not a bimodal question: “*She’s either lying or telling the truth.*” There is a third explanation, a memory reconstruction error.
 - Filling in the missing spaces with what is supposed to be there.
- Confusion
 - Wake up unaware of where/how they got here.
 - Unable to recall what happened the night before.
- Embarrassment
 - “*I’m not that kind of person . . .*”
- Fear
 - “*What will my fiancé/spouse say?*”

- *“How do I explain herpes?”*
- Anger / Revenge
 - *“You’re engaged!!!”*
 - *“You’re married!!!”*
 - *“You knew you had herpes!!!”*
- Post-event Misinformation / Contamination
 - A friend says, *“That’s rape in my book.”*
 - *“If you were that drunk, he shouldn’t have had sex with you!”*
 - *“You need to go talk to SARC!”*

Alcohol Intoxication, Consciousness, Memory and Consent



APPENDIX A: Research Abstracts on Alcohol and Sexual Disinhibition

The effects of alcohol on human sexual behavior.

Authors:

Wilson, G. Terence.

Advances in Substance Abuse, Vol 2, 1981. pp. 1-40.

Abstract:

Discusses the effects on the body, both arousing and suppressing, that are attributed to alcohol in the literature. Uncontrolled, correlational investigations on the effects of alcohol on sexual functioning have included questionnaires, clinical observations (such as the 1966 study by W. H. Masters and V. E. Johnson), and retrospective studies. Correlational studies have concentrated on the connection between alcohol and sex crimes, particularly rape and child molestation. Experimental investigations have included psychophysiological studies of alcohol's effects on male sexuality (measured as penile tumescence, ejaculatory response, and sexual arousal) and on female vaginal response and sexual arousal. Indirect measures of sexuality and the effect of alcohol on sex hormones have also been included in experimental investigations. Two theories of alcohol's effects on sexual behavior are discussed: The social disinhibition theory presumes that alcohol causes changes in social behavior that include increased arousal to sexual stimuli and sexual crimes. In terms of the social learning theory, the effect of alcohol on sexual and other social behavior is governed by several classes of psychological variables. Individual patterns of behavior are acquired and maintained on the basis of differential reinforcement, modeling experiences, and cognitive self-regulatory mechanisms.

Alcohol, sexual arousal, and the transfer of excitation.

McCarty, Dennis., Diamond, William, Kaye, Michael

Journal of Personality and Social Psychology, Vol 42(6), Jun, 1982. pp. 977-988.

Abstract:

Investigations of the alcohol-related disinhibition of responses to deviant sexual stimuli suggest that the pharmacological actions of ethanol have little influence on the disinhibition process. The mere belief that alcohol is consumed is sufficient to induce increased sexual arousal. Studies with conventional stimuli, however, suggest that interactions occur between the pharmacological presence of ethanol and the psychological expectations of its presence. The present article examines the contribution of pharmacological, cognitive, and environmental variables to perceived sexual arousal. Pictures that elicited either a low or moderate level of self-reported sexual arousal were viewed and evaluated by 64 men and 64 women after completing their drinks. The evaluations and arousal measures suggested significant Instruction by Content by Arousal interactions. The strongest perceptions of arousal occurred among Ss who did not know they were drinking alcohol. When Ss were unaware of the alcohol intoxication, the pharmacological excitation induced by alcohol transferred to the perception and evaluation of the slides.

Alcohol and the disinhibition of sexual responsiveness.

Wilson, G. Terence., Niaura, Raymond

Journal of Studies on Alcohol, Vol 45(3), May, 1984. pp. 219-224.

Abstract:

In a balanced placebo design, in which the joint and separate effects of alcohol and expectations of intoxication were investigated, 22 male undergraduates who were social drinkers listened to an erotic audiotape while penile tumescence was continuously recorded. Intoxicated Ss showed significantly shorter latency to onset of tumescence and

to peak level of tumescence than did their sober counterparts. In contrast to previous research, no effect of expectations about drinking was obtained nor were responses related to scores on the Mosher Forced Choice Sex Guilt Scale. Findings indicate a specific effect of alcohol in impairing men's ability to inhibit sexual responsiveness. It appears that the sexual response threshold is lowered but that, once the process of arousal begins, tumescence reaches an average level that is unaffected by a small amount of alcohol.

Perceptions of post drinking female sexuality: Effects of gender, beverage choice, and drink payment.

George, William H., Gournic, Susan J., McAfee, Mary P.

Journal of Applied Social Psychology, Vol 18(15, Pt 1), Dec, 1988. pp. 1295-1317.

Abstract:

In Study 1, 174 undergraduates completed an alcohol expectancy questionnaire to assess expected alcohol effects on either a young man or young woman. The woman was perceived as being more sexual after drinking than was the man. Perceptions were influenced by expected alcohol dosage, Ss' gender, and drinking experience. In Study 2, 176 undergraduates read a vignette depicting a woman having drinks with a man. Ss rated the woman drinking alcohol as significantly more aggressive, impaired, sexually available, likely to engage in foreplay and intercourse, but less attractive than the woman drinking cola. Perceptions of sexual disinhibition were significantly enhanced if the man bought the drinks.

The relationship of sex-related alcohol expectancies to alcohol consumption and sexual behavior.

Leigh, Barbara C..

British Journal of Addiction, Vol 85(7), Jul, 1990. pp. 919-928.

Abstract:

Examined the relationship of beliefs about the effects of alcohol on sex to drinking in sexual situations and to the sexual behaviors and feelings resulting from those situations. 844 adults (aged 18–76 yrs) completed a survey of drinking habits, sexual behavior, sexual attitudes and beliefs, and alcohol expectancies. Ss of different gender and sexual orientation differed in their beliefs about the effects of alcohol on sexual responding. Expectations of sexual enhancement and disinhibition were related to the initiation of sexual activity and to the proportion of sexual encounters that took place while drinking; these expectations also interacted with feelings of guilt about sex to predict the amount drunk in the most recent sexual encounter.

Alcohol, disinhibition, sexual arousal, and deviant sexual behavior.

George, William H. and Norris, Jeanette

Alcohol Health & Research World, Vol 15(2), 1991. Special Issue: Alcohol and sexuality. pp.

Abstract:

Examines the relationship between alcohol consumption and responses to deviant erotica. The relationship between alcohol and sex is complex in part because the individual's responses to alcohol and to sexual stimuli involve complex psychological and physiological processes. Alcohol seems to have the paradoxical effects of enhancing and suppressing sexual responses, with the 2 effects reflecting the 2 processes. There is an inverse relationship between the amount of alcohol consumed and the level of physical sexual arousal. As the concentration of alcohol in the blood increases, sexual arousal diminishes. Alcohol can influence the expression of deviant and nondeviant sexual

behavior. However, this influence is shaped by qualifying conditions, such as dosage, gender, and expectancy.

College students' high-risk sexual behavior following alcohol consumption.

Anderson, Peter B. and Mathieu, Debbie A.

Journal of Sex & Marital Therapy, Vol 22(4), Win 1996. pp. 259-264.

Abstract:

Assessed the relationship of alcohol consumption as a disinhibitor to high-risk sexual behavior. Results are based on survey data from 1,902 students attending 12 colleges. Sexual behaviors occurring after people had 'let themselves drink more than normal in order to make it easier for them to have sex with someone' were assessed. At least once in the past year, 33.2% of the men and 17.4% of the women had met this criterion. In those instances, 76.3% of the men and 77.1% of the women initiated condom use for vaginal intercourse. Results are discussed in relation to partners' compliance following condom initiation and preventing the spread of HIV disease.

Intoxicated sexual risk taking: An expectancy or cognitive impairment explanation?

Fromme, Kim., D'Amico, Elizabeth J., Katz, Elizabeth C.

Journal of Studies on Alcohol, Vol 60(1), Jan, 1999. pp. 54-63.

Abstract:

Examined expectancy and impairment explanations for the association between alcohol consumption and unsafe sexual behaviors. In 2 studies, 296 young adults (mean age 23 yrs), who were administered either alcohol (blood alcohol concentration mean = .08 mg%), placebo, or water, rated the likelihood that potential consequences would result from risky sexual practices and listed potential consequences that could result from having sex without a condom. Results indicate that intoxicated participants reported lower perceptions of risk than those who received placebo or water. Intoxicated participants also listed fewer negative consequences than those who received placebo or water. Participants who expected alcohol to disinhibit their sexual behavior reported stronger post-drinking perceptions of benefit and indicated that they were more likely to engage in risky sexual practices than those who did not expect sexual disinhibition.

College students' self-reported reasons for playing drinking games.

Authors:

Johnson, Thomas J., Hamilton, Scott, Sheets, Virgil L.

Addictive Behaviors, Vol 24(2), Mar-Apr, 1999. pp. 279-286.

Abstract:

Two samples of college students who engage in drinking games completed questions about their drinking behavior, a set of items concerning their reasons for playing drinking games, and various self-report measures of personality. Principal components analysis, using the first sample ($N = 189$) yielded 4 factors: Relaxation and Disinhibition, Fun and Celebration, Conformity, and Sexual Manipulation. A similar factor structure was also obtained in the second sample ($N = 143$). In both samples, Fun and Celebration and Sexual Manipulation reasons were most strongly predictive of frequency of play and quantity of alcohol consumed while playing. In men, Sexual Manipulation reasons for play predicted frequency of taking sexual advantage of others during play. Endorsement of Conformity and Relaxation and Disinhibition reasons were associated with high social anxiety and low assertiveness. Reasons for play predicted consumption, both in drinking-game situations and overall, even after removing variance due to general reasons for

drinking. Psychometric properties of the current measure are less than ideal, but the constructs identified appear to have important implications for prevention.

Alcohol and sexual disinhibition among college students.

Stoner, Susan Ann.

Dissertation Abstracts International: Section B: The Sciences and Engineering, Vol 64(5-B), 2003. pp. 2407.

Abstract:

Alcohol-related sexual risk taking is a problem among American college students. Potential risks of intoxicated sex include sexual assault, STD/HIV transmission, and unplanned pregnancy. However, little is known about how alcohol may engender sexually risky behavior. Alcohol has long been popularly assumed to facilitate sexual expression, but the mechanisms underlying this phenomenon have not been rigorously examined. Current theory suggests that people become more sexual after drinking because they expect such an effect; however, numerous studies have shown that cognitive functioning is impaired at higher doses of alcohol, such that expectancies may not be so influential over behavior. The present study considered several possible mechanism of post-drinking sexual interest: sexual disinhibition, alcohol expectancies, alcohol myopia, and deviance disavowal. The overarching hypotheses were as follows. In sober participants, interest in sexual images would be influenced primarily by traditional (explicit) sexual attitudes. In slightly intoxicated participants, alcohol expectancies would be the primary determinant of sexual interest. In highly intoxicated participants, sexual interest would be influenced primarily by implicit sexual attitudes. One hundred sixty undergraduate men and women participated in the study. Participants completed a number of measures of explicit sexual attitudes. Implicit sexual attitudes were measured using the Implicit Association Test (IAT). Participants were administered no alcohol or a low or high dose of alcohol. Executive cognitive function was measured before and after the beverage administration. After the beverage administration, participants were asked to look at sexually explicit images on a computer screen. The amount of time spent looking at each image ('sexual interest') was measured surreptitiously. In addition, participants rated their reactions to the images. Mood and sexual arousal were measured before and after the image-viewing task. The results suggested a complex interplay among implicit and explicit sexual attitudes and alcohol expectancies in relation to the reactions to the sexual images. Alcohol was associated with higher ratings of arousal to the sexual images. Path analyses suggested that the effects of alcohol and explicit sexual attitudes on interest in sexual material were largely mediated through affective responses, including subjective sexual arousal.

The Drinking-Induced Disinhibition Scale (DIDS): A measure of three types of disinhibiting effects.

Authors:

Leeman, Robert F., Toll, Benjamin A. and Volpicelli, Joseph R.
Addictive Behaviors, Vol 32(6), Jun, 2007. pp. 1200-1219.

Abstract:

Links between trait disinhibition and high-risk drinking are well established. It is also known that alcohol has disinhibiting effects. Nonetheless, there is no measure in the literature devoted exclusively to assessing disinhibiting effects of alcohol. The multidimensional Drinking-Induced Disinhibition Scale (DIDS) was developed as part of Study I, a prospective survey conducted with undergraduates (N = 337). Study II, a cross-sectional survey (N = 260), allowed for a confirmatory factor analysis and further validation of the measure through comparisons with an expectancies scale. The nine-item

DIDS is comprised of three subscales assessing euphoric/social, dysphoric and sexual disinhibition. All three subscales had good internal consistency and adequate test-retest reliability. Convergent and discriminant validity were established in both studies. The subscales had different associations with high-risk drinking: sexual disinhibition predicted heavy episodic drinking; dysphoric disinhibition predicted alcohol-related problems and euphoric/social had associations with both. A cluster analysis revealed four distinct disinhibition profiles (i.e., low effect drinker; high euphoric/social only; high euphoric social and dysphoric; high euphoric/social and sexual), which predicted likelihood of high-risk drinking.

Gender differences in self-reported drinking-induced disinhibition of sexual behaviors.

Hesse, Morten, Tutenges, Sébastien.

Address:

The American Journal on Addictions, Vol 17(4), Jul-Aug, 2008. pp. 293-297.

Abstract:

Sex and drinking go hand-in-hand in Western societies. Men also tend to report more sexual disinhibition under the influence of alcohol and drugs than women. At a vacation resort, we conducted a survey of young men and women regarding self-reported alcohol-related sexual disinhibition (ARSD), and we administered the Drinking-Induced Disinhibition Scale (DIDS). We made several comparisons of behavioral patterns using the ARSD scale of the DIDS for each gender: kissing or having sex vs. no sexual contact, or having sex versus kissing or no contact. In general, men reported more ARSD than women. Men who reported either kissing or having sex the night before reported significantly more ARSD than men not reporting either kissing or having sex. Women who had had sex the night before reported more ARSD than women who had either kissed or not reported any sexual contact on the night before, but women who had kissed did not differ from women who had not had any sexual contact. We suggest that while the DIDS scale of alcohol-related sexual disinhibition is a valid instrument, gender bias exists. In conclusion, the DIDS does measure the constructs that it sets out to measure. However, significant gender differences do exist and appear to go beyond differences in actual behavior in terms of sexual disinhibition. Men and women describe themselves differently when they describe sexual behavior in general, even when they report similar recent behavior, and we suggest that these differences at least partly reflect sexual stereotypes.

Predictors of risky sexual behavior with new and regular partners in a sample of women bar drinkers.

Authors:

Parks, Kathleen A., et al.

Journal of Studies on Alcohol and Drugs, Vol 70(2), Mar, 2009. pp. 197-205.

Abstract:

Objective: We designed the current study to assess the rates of risky sexual behavior among women bar drinkers, as well as differences in predictors of risky sexual behavior, based on partner type—new or regular. Method: We conducted comprehensive, in-person interviews with 241 young women who reported weekly drinking in bars. Several constructs (e.g., individual characteristics, social and sexual behavior, substance use) that we hypothesized would predict risky sexual behavior were assessed in two separate hierarchical regression models for new and regular sexual partners. Results: Rates of risky sexual behavior were significantly higher with regular partners compared with new partners. Increased risky sexual behavior with new partners was significantly associated with having had a riskier regular partner in the past 6 months, lower sexually transmitted disease (STD)/pregnancy

prevention assertiveness, increased expectations of sexual disinhibition when drinking, a greater history of prior sexual risk taking, and more frequent drinking in bars. Increased risky sexual behavior with a regular partner was significantly associated with being older, the use of oral contraceptives, lower assertiveness for STD/pregnancy prevention, a greater history of prior sexual risk taking, and increased drug use. Conclusions: Among young women who regularly drink in bars, sexual risk taking was significantly higher with regular partners than with new partners. The predictors of risky sexual behavior differed based on partner type. These findings have implications for including information about the role of alcohol, drinking context, and drug use, as well as individual difference characteristics and partner type in targeted prevention strategies to reduce sexual risk taking.

The effects of acute ethanol consumption on sexual response and sexual risk-taking intent.

Prause, Nicole., Staley, Cameron and Finn, Peter.

Archives of **Sexual Behavior**, Vol 40(2), Apr, 2011. pp. 373-384.

Abstract:

Two theories of sexual risk taking (disinhibition and alcohol myopia) were tested using genital measures of sexual response and computer measures of sexual risk propensity. A total of 44 men and women completed two sessions comparing responses to erotic films while consuming alcohol (breath alcohol doses were .025 g/kg and .08 g/kg) or juice alone. After consuming alcohol, more sexual arousal was reported in response to neutral films and at a breath alcohol level of .08 g/kg as compared to no alcohol. Genital responses for men and women increased during sexual films, but men did not respond as strongly when breath alcohol level was .08 g/kg. Intentions to have intercourse with a new partner at baseline predicted the level of sexual arousal reported. As self-reported sexual arousal increased in response to sexual films and higher alcohol dose, the intent to engage in intercourse with a new partner increased. Alcohol dose was *not* related to later sexual intercourse intentions. With no direct relationship of alcohol and intercourse intentions, results appear more consistent with a disinhibition model of sexual arousal.

Alcohol drinking patterns in young people: A survey-based study.

Martinotti, Giovanni., et al.

Journal of Health Psychology, Vol 22(14), Dec, 2017. pp. 1889-1896.

Abstract:

Binge drinking represents a major clinical and public health concern. Here, we investigated the prevalence of binge drinking and its related consequences, in a population of young adults. A questionnaire was administered to a sample of 4275 healthy subjects. In the overall sample, the percentage of binge drinkers was 67.6 per cent; among regular alcohol users, 79.5 per cent reported episodes of binge drinking. Among binge drinkers, several serious consequences were identified (staggering and stuttering, amnesia, loss of control, aggressiveness, sexual disinhibition). Raising awareness about the seriousness of binge drinking may help health care providers to identify cases early on and provide appropriate treatments.

Alcohol-related sex expectancies explain the relation between alcohol use and sexting among college students.

Florimbio, Autumn Rae, et al.

Computers in Human Behavior, Vol 88, Nov, 2018. pp. 205-209.

Abstract:

Alcohol use and sexual behavior are prevalent among college students. Sexting, defined as the sending and/or receiving of sexually explicit content via electronic methods, is also

associated with college students' alcohol use. Alcohol-related expectancies (i.e., beliefs one has regarding the cognitive and behavioral effects of alcohol) partially explain the association between alcohol use and sexual behavior. Specifically, college students perceive that alcohol relates to sexual activities through increases in sexual arousal and disinhibition. Based on prior research, the relation between alcohol use and sexting may be explained by alcohol-sex expectancies. We hypothesized that alcohol use and problems would relate to sexting indirectly through sexual drive and sexual affect expectancies. We tested this hypothesis using cross-sectional, self-report methodology in a sample of undergraduate students ($N = 534$). Results indicated that alcohol use and problems related to sexting through sexual drive, but not sexual affect, expectancies. Findings highlight the importance of expectancies in the relationship between alcohol use and the understudied sexual behavior of sexting.

APPENDIX B: Research Abstracts regarding Alcohol-induced Blackouts

The prognostic importance of blackouts in young men.

Anthenelli, Robert M., et. al.

Dept of Veterans Affairs Medical Ctr, Psychiatry Service, San Diego, CA, US

Journal of Studies on Alcohol, Vol 55(3), May, 1994. pp. 290-295.

Abstract:

Evaluated the potential use of a history of blackouts to predict the development of future difficulties with alcohol by following individuals with and without histories of blackouts over an 8–12 yr period. 230 male Ss (aged 18–25 yrs at beginning of study) provided information on drinking and blackouts via an initial questionnaire and follow-up interview. Arrangements were made for a follow-up interview 8–22 yrs after initial contact. Results confirmed the high prevalence of alcohol-related blackouts in healthy young men, with 26% of Ss reporting a history of blackouts by their early 20s. These results indicate that alcohol-induced amnesic episodes are associated with the quantity and frequency of drinking, both relatively early on in the S's drinking career and through the subsequent decade of continued imbibing. However, blackouts are relatively poor predictors of an S's risk for developing either alcohol abuse or dependence.

Psychological consequences of alcohol induced blackout among college students.

Buelow, George, et al.

Journal of Alcohol and Drug Education, Vol 40(3), Spr 1995. pp. 10-20.

Abstract:

Determined the incidence of blackouts among a representative sample of college students who were relatively early in their drinking careers, and measured the impact of blackouts on their psychological lives. 196 students (126 women) completed the Blackout Questionnaire, the Impact of Event Scale, the Brief Michigan Alcoholism Screening Test, and a demographic questionnaire. 48% of Ss had a blackout during their drinking careers. Significant correlations were found among students' alcohol abuse scores, blackout risk taking, and intrusiveness of stressful thoughts about the blackout incident. Further, men were significantly more likely than women to take risks during, and to experience more stressful intrusive thoughts about, the blackout incident.

How much and how fast: Alcohol consumption patterns, drinking-episode affect, and next-day consequences in the daily life of underage heavy drinkers.

Carpenter, Ryan W et al.

Drug and Alcohol Dependence, Vol 218, Jan 1, 2021. ArtID: 108407

Abstract:

Understanding how alcohol consumption patterns are associated with negative and positive outcomes can inform efforts to reduce negative consequences through modification of those patterns. This is important in underage drinkers, many of whom drink heavily despite negative consequences. Most work has focused on the amount of alcohol consumed, but amount provides limited information about consumption patterns compared to rate of consumption, or how fast individuals drink. We therefore examined associations of both amount and rate of consumption with negative and positive outcomes (immediate affective states and next-morning consequences) in daily life. Method: Ninety-five college students aged 18–20 years completed ecological momentary assessment over 28 days. Participants reported number of standard drinks consumed and positive and negative affect hourly within drinking episodes. Estimated blood alcohol concentration (eBAC) values were used to create amount and rate of consumption indicators. Each morning after drinking,

participants reported negative (e.g., blackout, hangover) and positive (e.g., new friend, making others laugh) consequences. Results: Within drinking episodes, multilevel models showed faster consumption was associated with reduced negative affect and both larger amount and faster consumption were associated with greater positive affect. Further, amount and rate were both associated with greater likelihood of a negative consequence the next morning. Rate, but not amount, was associated with more positive consequences. Conclusions: Not only how much but also how fast individuals drink may be important for the positive and negative outcomes they experience. Interventions to reduce negative alcohol-related outcomes should consider not only amount, but also rate of consumption.

Alcohol use and negative consequences among American college students in West Germany.

Cronin, Christopher J., et al.

International Journal of the Addictions, Vol 26(10), Oct, 1991. pp. 1123-1136.

Abstract:

Administered a questionnaire to 216 American college students at an American university in West Germany to examine alcohol consumption and negative consequences due to drinking. As compared with stateside peers (A. D. Berkowitz and H. W. Perkins, 1987), Ss reported a higher frequency and amount of drinking, along with higher rates of negative consequences (e.g., vomiting, blackout). Data are discussed in terms of the relationship between the American collegiate lifestyle of alcohol abuse and life in an alcohol-permissive society (i.e., West Germany) where problem drinking does not develop among native university students

Alcohol's effects on sexual decision making: An integration of alcohol myopia and individual differences.

Cue Davis, Kelly, et al.

Journal of Studies on Alcohol and Drugs, Vol 68(6), Nov, 2007. pp. 843-851.

Abstract:

We conducted an experiment to test the applicability of integrating individual perceptions of unprotected sex consequences with alcohol's myopic effects as an explanatory framework for risky sexual decision making in young heterosexual men and women. Method: Male and female participants (N= 61) rated their perceptions of unprotected sex consequences, received alcoholic (target breath alcohol concentration = .10%) or nonalcoholic drinks, and completed a risky sexual decision-making task that included a quantitative measure of sexual decision-making cue attention. Results: Intoxicated participants were more attentive to impelling cues and reported greater sexual risk intentions than sober participants. Mediation analyses indicated that attention to cues fully mediated the alcohol-sexual risk intention relationship. Moderational analyses revealed that alcohol's focusing effect acts in conjunction with pre-existing individual perceptions to influence cue salience directly and sexual risk intentions indirectly. Conclusions: Findings demonstrate the importance of examining predispositional tendencies when investigating alcohol myopia as a mediating mechanism underlying the alcohol-risky sex relationship.

Is the sum greater than its parts? Variations in substance-related consequences by conjoint alcohol-marijuana use patterns.

Cummings, Courtenay, et al.

Journal of Psychoactive Drugs, Vol 51(4), Sep-Oct, 2019. pp. 351-359.

Abstract:

Alcohol and marijuana are the most commonly used substances for college-attending young adults. This study evaluated differences in substance-specific consequence attribution by alcohol-marijuana use patterns (concurrent alcohol and marijuana [CAM; use of both substances, not at same time] and simultaneous [SAM; use of both, at same time]) as well as alcohol-only (AO). First-year college students with prior alcohol use (N = 610, 50.9% women, 71% White, Mage = 18) completed an online assessment of past-three-month substance use, including SAM, and related consequences. Results indicated that polydrug (SAM and CAM) users reported greater alcohol involvement and earlier alcohol initiation than AO, and polydrug use was associated with more alcohol-related problems, including sexual risk taking and alcohol-related blackouts. When restricted to SAM/CAM users, logistic regressions indicated that SAM users reported an increased incidence in two marijuana-related problems relative to CAM (driving after using and academic difficulties), but lower rates of social problems. SAM users were also less likely to attribute substance-related social problems to alcohol. Overall, findings highlight variations that exist within alcohol-marijuana polydrug users and show areas to consider for intervention development and future research.

Alcoholic blackouts: Phenomenology and legal relevance.

Cunnen, Alan J.

Behavioral Sciences & the Law, Vol 4(1), Win 1986. pp. 73-85.

Abstract:

Suggests that the use of alcoholic amnesia as evidence of incompetence to stand trial or in mitigation of criminal responsibility hinges on the reversibility of amnesia and on the voluntariness of intoxication and of the ensuing blackout. The phenomenology of alcoholic blackouts and the role of alcoholic and nonalcoholic amnesia in criminal law are discussed. It is argued that the voluntary nature of alcohol consumption should not mitigate behavioral consequences in any drinker. The disease model of alcoholism is considered in relation to alcoholics' ability to control their drinking, and social policy regarding the punishment of alcoholics is examined. (PsycINFO Database Record

Genetic epidemiology of liability for alcohol-induced blacking and passing out.

Davis, Christal N., et al.

Alcoholism: Clinical and Experimental Research, Vol 43(6), Jun, 2019. pp. 1103-1112.

Abstract:

Background: Individuals differ in their sensitivity to alcohol's physiological effects, including blacking and passing out. Blackouts are periods of impaired memory formation when an individual engages in activities they later cannot recall, while passing out results in loss of consciousness. Methods: The sample consisted of 3,292 adult twins from the Australian Twin Registry. Univariate twin analyses were conducted to examine the contributions of genetic and environmental influences to blacking and passing out occurrence and susceptibility (accounting for frequency of intoxication). Evidence for shared etiology of susceptibility to blacking and passing out was examined using bivariate twin analyses. Results: Although blacking and passing out were strongly associated (odds ratio (OR) = 4.45, 95% confidence interval (CI): [3.85, 5.14]), the genetic epidemiology was quite different. Genetic (43%) and nonshared environmental (57%) influences contributed to liability for blackout occurrence. For passing out occurrence, there was evidence of sex differences. Among men, genetic (32%) and nonshared environmental (68%) influences contributed, whereas among women, there were shared (29%) and nonshared environmental (72%) influences. After accounting for frequency of intoxication, genetic influences on blackout susceptibility remained significant; in contrast, only

nonshared environmental influences were significant for passing out susceptibility. There was evidence for overlapping genetic and nonshared environmental factors influencing susceptibility to blacking and passing out among men; among women, there were overlapping nonshared environmental influences. Conclusions: Blacking and passing out are 2 common sedative-like effects of heavy drinking, and people differ considerably in their susceptibility to these effects. This study suggests that differences in blackout susceptibility can be explained by genetic factors in both men and women, while differences in susceptibility to pass out after consuming alcohol may be attributable to environmental influences, particularly among women. These environmental factors may include changing social and cultural norms about alcohol use, drinking context, and the type(s) of alcohol consumed.

Alcohol and pharmacologically similar sedatives impair encoding and facilitate consolidation of both recollection and familiarity in episodic memory.

Doss, Manoj K., et al.

Cognitive Neuroscience, Vol 9(3-4), Jul-Oct, 2018. pp. 89-99.

Abstract:

Alcohol and other pharmacologically similar sedatives (i.e., GABAA positive allosteric modulators or PAMs) impair the encoding of new episodic memories but retroactively facilitate the consolidation of recently encoded memories. These effects are consistent for recollection (i.e., the retrieval of details) but some mixed results have been reported for familiarity (i.e., a feeling of knowing a stimulus was presented). Here, with dual-process models, we reanalyzed prior work testing the effects of GABAA PAMs at encoding or consolidation. Contrary to previous conclusions, we show that GABAA PAMs at encoding consistently impair both recollection and familiarity when an independence correction is applied to familiarity-based responses. These findings were further confirmed and extended in a dual-process signal detection analysis of a recent study on the effects of alcohol during encoding or consolidation: Alcohol at encoding impaired both recollection and familiarity, whereas alcohol at consolidation enhanced both recollection and familiarity. These findings speak to the ability of alcohol and other GABAA PAMs to induce ‘blackouts,’ highlighting the importance of dual-process approaches when analyzing drug manipulations at different phases of episodic memory.

Effects of alcohol on sequential information processing: Evidence for temporal myopia.

Fleming, Kimberly A., et al.

Psychology of Addictive Behaviors, Vol 27(1), Mar, 2013. pp. 184-190.

Abstract:

Alcohol Myopia Theory (AMT) posits that alcohol restricts the focus of attention, such that behaviors are determined only by highly salient environmental cues. While AMT is most commonly understood in terms of spatial attention, the present study tested the effects of alcohol in the temporal domain of attention. Seventy-one participants consumed either a placebo beverage or one of two doses of alcohol (0.40g/kg or 0.80g/kg ETOH) before performing an auditory discrimination task while event-related potentials (ERPs) were recorded. Consistent with typical sequential effects, placebo participants showed increased P300 amplitude and slowed behavioral responses when the current target differed from the two-back tone. In contrast, alcohol caused increased P300 and response slowing when the target tone differed from the one-back tone. These findings suggest that alcohol increases the salience of more recently encountered information, consistent with the general tenets of AMT.

A psychometric evaluation of an instrument designed to measure alcohol-induced blackouts.

Fooshee, Sidney Guy.

Dissertation Abstracts International: Section B: The Sciences and Engineering, Vol 58(8-B), Feb,

Abstract:

The Alcohol Blackout Questionnaire is currently the only instrument available for alcohol blackouts research. A psychometric evaluation was conducted on the instrument and suggestions for its revision and improvement are presented. The questionnaire has a six factor structure which accounts for 59.0% of the variance. The first factor was a general blackout factor. The second factor related to thoughts and feelings. The third factor involved high risk behaviors. The fourth factor related to drug use. The fifth factor related to the person who realized they had a problem while the sixth factor addressed people who did not realize they had a problem with alcohol. A step-wise discriminant analysis revealed 19 questions which were the best predictors of alcohol blackouts. Overall the instrument correctly classified 88.28% of the individuals. The blackout group had a classification rate of 91.7% while the nonblackout group had a classification rate of 86.3%. Suggestions are presented concerning the restructuring of the questionnaire. Instructions are presented at the top of every page. The clinical history type questions now appear at the front of the questionnaire and the blackout questions at the end. The rating scales are more concise and easily understood.

Understanding acute alcohol effects on sexual behavior.

George, William H. and Stoner, Susan A.

Annual Review of Sex Research, Vol 11, 2000. pp. 92-124.

Abstract:

Reviews nonexperimental research illustrating the nature of alcohol's association with sexuality. Methodological considerations limiting causal assertions permissible with nonexperimental data are discussed. The authors also review findings from experiments, mostly analogue paradigms, examining the effects of alcohol on genital arousal, sexual risk taking, and sexual assault. In each case, it is observed that alcohol can exert a causal effect on one or more of the constituent responses undergirding these phenomena. It is concluded that alcohol does appear to have a causal impact on many sexuality indices studied in laboratory conditions. Both alcohol expectancy and alcohol myopia models have been applied to explain these causal linkages. Expectancy models seem to account well for postdrinking sexual reactions and perceptions. Overall, myopia analyses seem to offer the most persuasive explanations of postdrinking expressions of sexual risk taking and sexual assault.

Alcoholic 'blackouts': A review and clinical study of 100 alcoholics.

Goodwin, Donald W., et al.

The American Journal of Psychiatry, 126(2), 1969. pp. 191-198.

Abstract:

Numerous publications have cited 'blackouts' as a major prodromal symptom of alcoholism. In contrast, this study, based on a structured interview with 100 hospitalized alcoholics, revealed that more than 1/3 of the Ss had never experienced a blackout and that, among those who had, blackouts generally began well along in the course of alcoholism rather than at an early stage. Blackouts were positively associated with severity and duration of alcoholism, extent and duration of alcohol consumption per drinking episode, capacity for drinking large amounts, 'loss of control,' neglect of meals, gulping drinks, and a history of head trauma. Only 1 patient had experienced blackouts after moderate drinking.

Two species of alcoholic 'blackout.'

Goodwin, Donald W.

The American Journal of Psychiatry, Vol. 127(12), Jun, 1971. pp. 1665-1670.

Abstract:

Administered alcohol to 2 groups of volunteers to study its effects on memory. In study i, 5 alcoholics experienced amnesia after receiving large amounts of alcohol. The amnesia was anterograde, beginning a few minutes after test events occurred and persisting during sobriety on the following day. In study ii, 48 nonalcoholic young men received smaller amounts of alcohol on 1 or both of 2 successive days. Those receiving alcohol on both days recalled test materials better than did those who were intoxicated on the 1st day but not on the 2nd. This 'state-dependent' effect is contrasted with 'amnesia' and possible explanations are explored for both.

Effect of alcohol on short term memory in alcoholics.

Goodwin, Donald W., et al.

The British Journal of Psychiatry, Vol. 122(566), Jan, 1973. pp. 93-94.

Abstract:

Administered moderate amounts of alcohol or placebo to 32 hospitalized male alcoholics to test the effect of alcohol on short-term memory deficit. Ability to recall and recognize test words did not differ for the groups, suggesting that alcoholic blackouts and short-term memory deficits are a threshold rather than a graded phenomenon. In this, they more closely resemble the sudden amnesias that result from head injuries or electric shock.

Alcohol amnesia.

Goodwin, Donald W.

Addiction, Vol 90(3), Mar, 1995. pp. 315-317.

Abstract:

Summarizes studies conducted by the author on alcoholic blackouts and state-dependent learning. Blackouts may be brief periods of amnesia or last for days and weeks; they usually occur late in the alcoholic's drinking career. Blackouts are characterized by a deficit of short-term memory with intact recent and remote memory. Blood alcohol level increases faster in men who experience blackouts.

The morning after the night before: Alcohol-induced blackouts impair next day recall in sober young adults.

Jackson, Judith, et al.

PLoS ONE, Vol 16(5), May 3, 2021. ArtID: e0250827

Abstract:

Binge-drinking in adolescents and young adults is a widespread problem, however, an often unreported consequence of binge-drinking behaviour is an alcohol-induced memory blackout (MBO). An MBO is a transient amnesic event resulting from rapid, excessive alcohol consumption. Here, we examine the short-term impact of an alcohol-induced MBO event (testing < 20 hours after blackout) on memory performance in people who have experienced a high volume of MBOs. In addition, we aimed to test the hypothesis that people who experience a high volume of MBOs may have poorer recall than non-blackout controls in either sober or intoxicated states. Three episodic memory paradigms consisting of free recall, serial recall, and depth of encoding tasks, were conducted by a group of alcohol drinkers who had never experienced a memory blackout, and those who reported at least 9 in the preceding 12-months. Studies were completed sober and after alcohol by all participants, and sober but after blackout by the experimental group. Accuracy of recall

was assessed with linear mixed effects modelling for all experiments and conditions. Recall rate both before and after alcohol consumption was similar between groups, with poorer recall after drinking alcohol by all participants in all three studies. After blackout, MBO participants showed no significant improvement from their intoxicated state in serial recall and depth of encoding tasks, but an improvement in free recall. Further analysis of these findings revealed that 10 out of 23 participants showed significantly impaired performance after blackout during free recall, extending up to 17 participants in serial recall. In general, alcohol reduced recall rate in both blackout and control participants similarly, but recall following MBO remained poor. Our evidence suggests that alcohol-induced blackouts impair memory functioning the next day, and future research should establish the duration of deficits after an acute alcohol-induced blackout episode.

Drinking-induced blackouts among young adults: Results from a national longitudinal study.

Jennison, Karen M. and Johnson, Kenneth A.

International Journal of the Addictions, Vol 29(1), Jan, 1994. pp. 23-51.

Abstract:

Examined amnesia drinking episodes among a national probability sample of 12,686 Ss when they were aged 19–26 yrs in 1984 and again when they were aged 23–30 yrs in 1988. Prospective blackout patterns of early onset, late onset, chronicity, and remission were analyzed using logistic regression statistical models. Results indicate that the relative risk of short-term memory loss while drinking is significantly associated with increased alcohol consumption, age of drinking onset, the number of alcoholic relatives, and, principally, with the individual's capacity to control drinking behavior. It is concluded that the blackout remission rate observed among a substantial proportion (68%) of young adults may not fit the progressive, irreversible model of alcoholism.

Fragmentary blackouts: Their etiology and effect on alcohol expectancies.

Hartzler, Bryan and Fromme, Kim.

Alcoholism: Clinical and Experimental Research, Vol 27(4), Apr, 2003. pp. 628-637.

Abstract:

This alcohol-administration study addressed questions regarding the etiology of fragmentary blackouts (memory loss for intoxicated events that may be recalled with cues) and their effect on alcohol outcome expectancies. A placebo-controlled design addressed the etiology of fragmentary blackouts through assessment of memory formation before and after alcohol consumption. The effect of fragmentary blackouts on prospective beliefs about alcohol was assessed via a self-report outcome expectancy questionnaire and a measure of response latency for alcohol concepts presented after beverage consumption. Although Ss (age range 21 to 30 years) performed similarly on memory indices before consuming beverages, those who reported past fragmentary blackouts and consumed alcohol displayed marked difficulty with recall of a narrative when this was attempted both during intoxication and after detoxification, and with a source memory task presented during intoxication. Further, source recall contributed significantly to the episodic recall both during intoxication and after detoxification, and to positive outcome expectancies of those receiving alcohol. Findings suggest that fragmentary blackouts result from poor retrieval and individual differences in retrieval emerge after alcohol is consumed.

Fragmentary and en bloc blackouts: Similarity and distinction among episodes of alcohol-induced memory loss.

Hartzler, Bryan, et al.

Abstract:

Objective: En bloc and fragmentary blackouts are distinguishable forms of alcohol-induced amnesia. The former are instances of full and permanent memory loss for intoxicated events, whereas the latter are episodes for which retrieval of experiences is facilitated by provision of cues. Beyond this nosological difference, little is known about descriptive dimensions of the two blackout types. The current study assessed their characteristics as reported by a group of heavy drinking young adults. Method: A sample of 136 young adult volunteers (54% male; mean [SD] age = 22.71 [2.23]) were administered a Time-Line Follow-Back assessment, expanded to gather descriptive information about the occurrence and characteristics of en bloc and fragmentary blackouts. Results: Although overall reporting of blackouts by the sample mirrored rates reported in prior research, prevalence and incidence of fragmentary blackouts were more than threefold those of en bloc blackouts. A surprising finding was that the two blackout types exhibited similar range and distribution of corresponding blood alcohol concentrations. Most en bloc blackouts involved concurrent use of illicit substances; polysubstance use was reported for few fragmentary blackouts...

Binge drinking and the young brain: A mini review of the neurobiological underpinnings of alcohol-induced blackout.

Hermens, Daniel F., et al.

Frontiers in Psychology, Vol 9, Jan 19, 2018. ArtID: 12

Abstract:

Binge drinking has significant effects on memory, particularly with regards to the transfer of information to long-term storage. Partial or complete blocking of memory formation is known as blackout. Youth represents a critical period in brain development that is particularly vulnerable to alcohol misuse. Animal models show that the adolescent brain is more vulnerable to the acute and chronic effects of alcohol compared with the adult brain. This mini-review addresses the neurobiological underpinnings of binge drinking and associated memory loss (blackout) in the adolescent and young adult period. Although the extent to which there are pre-existing versus alcohol-induced neurobiological changes remains unclear, it is likely that repetitive binge drinking in youth has detrimental effects on cognitive and social functioning. Given its role in learning and memory, the hippocampus is a critical region with neuroimaging research showing notable changes in this structure associated with alcohol misuse in young people. There is a great need for earlier identification of biological markers associated with alcohol-related brain damage. As a means to assess in vivo neurochemistry, magnetic resonance spectroscopy (MRS) has emerged as a particularly promising technique since changes in neurometabolites often precede gross structural changes. Thus, the current paper addresses how MRS biomarkers of neurotransmission (glutamate, GABA) and oxidative stress (indexed by depleted glutathione) in the hippocampal region of young binge drinkers may underlie propensity for blackouts and other memory impairments. MRS biomarkers may have particular utility in determining the acute versus longer-term effects of binge drinking in young people.

Drinking and alcohol-related harm among New Zealand university students: Findings from a national web-based survey.

Kypri, Kypros, et al.

Alcoholism: Clinical and Experimental Research, Vol 33(2), Feb, 2009. pp. 307-314.

Abstract:

Background: Alcohol-related harm is pervasive among college students in the United States of America and Canada, where a third to half of undergraduates binge drink at least fortnightly. There have been no national studies outside North America. We estimated the prevalence of binge drinking, related harms, and individual risk factors among undergraduates in New Zealand. Methods: A web survey was completed by 2,548 undergraduates (63% response) at 5 of New Zealand's 8 universities. Drinking patterns and alcohol-related problems in the preceding 4 weeks were measured. Drinking diaries for the preceding 7 days were completed. Multivariate analyses were used to identify individual risk factors. Results: A total of 81% of both women and men drank in the previous 4 weeks, 37% reported 1 or more binge episodes in the last week, 14% of women and 15% of men reported 2+ binge episodes in the last week, and 68% scored in the hazardous range (4+) on the AUDIT consumption subscale. A mean of 1.8 (95% confidence interval 1.4, 2.3) distinct alcohol-related risk behaviors or harmful consequences were reported, e.g., 33% had a blackout, 6% had unprotected sex, and 5% said they were physically aggressive toward someone, in the preceding 4 weeks. Drink-driving or being the passenger of a drink-driver in the last 4 weeks was reported by 9% of women and 11% of men. Risk factors for frequent binge drinking included: lower age, earlier age of drinking onset, monthly or more frequent binge drinking in high school, and living in a residential hall or a shared house (relative to living with parents). These correlates were similar to those identified in U.S. and Canadian studies. Conclusions: Strategies are needed to reduce the availability and promotion of alcohol on and around university campuses in New Zealand. Given the high prevalence of binge drinking in high school and its strong association with later binge drinking, strategies aimed at youth drinking are also a priority. In universities, high-risk drinkers should be identified and offered intervention early in their undergraduate careers.

After how many drinks does someone experience acute consequences—Determining thresholds for binge drinking based on two event-level studies.

Labhart, Florian, et al.

Addiction, Vol 113(12), Dec, 2018. pp. 2235-2244.

Abstract:

Background and Aims: The threshold of 4 +/5 + drinks per occasion has been used for decades in alcohol research to distinguish between non-risky versus risky episodic drinking. However, no study has assessed the validity of this threshold using event-level data. This study aimed to determine the optimal thresholds for the detection of five acute alcohol-related consequences (hangover, blackout, risky sex, fights and injury) using data from two event-level studies. Design: An event-level study to assess the ability to use the number of drinks consumed to discriminate between nights with and without consequences using the area under the receiver operating characteristic (AUROC) curve. Optimal thresholds were determined using the Youden Index based on sensitivity and specificity. Separate thresholds were estimated for gender and age groups (16–17 versus 18–25). Setting: Lausanne and Zurich, Switzerland. Participants: Three hundred and sixty-nine participants aged 16–25 years. Measurements: On 3554 weekend nights, participants reported total number of alcoholic drinks consumed the previous night and acute consequences (hangover, blackout, risky sex, fights and injury) Findings: Hangover was the most frequently reported consequence and injury the least for both genders. Throughout age groups and studies, optimal thresholds for any consequence, and for hangover only, were equal to 4+/5+ (40+/50+ g alcohol) while those for blackouts, risky sex, fights and injuries were up to three drinks higher. Adolescents tended to experience consequences more often and at slightly lower drinking levels than did adults. For all consequences but injuries, the optimal thresholds were one to two drinks lower for women than for men.

Conclusions: Event-level data collection techniques appear particularly suitable to estimate thresholds at which acute alcohol-related consequences occur. Binge drinking thresholds of 4+/5+ (women/men) drinks, equivalent to 40+/50+ g pure alcohol, predict the occurrence of consequences accurately in general but are too low to predict severe acute alcohol-related consequences.

Identifying factors that increase the likelihood for alcohol-induced blackouts in the preparty context.

LaBrie, Joseph W., et al.

Substance Use & Misuse, Vol 46(8), May, 2011. pp. 992-1002.

Abstract:

The present study examined risk factors related to 'blacking out' (e.g., temporary periods of memory loss during drinking) during preparty drinking events (i.e., pregaming, predrinking). Participants were students from two universities on the West Coast who reported past month prepartying (N = 2,546) in online surveys administered in the fall of 2008. Among these students, 25% (n = 636) reported blacking out during at least one occasion in which they prepartied in the past month. A logistic regression model underscored that Greek student affiliation, family history of alcohol abuse, frequency of prepartying, and both playing drinking games and consuming shots of liquor while prepartying increased the likelihood of blacking out. Limitations and implications for future research and collegiate prevention strategies are discussed.

The Drinking-Induced Disinhibition Scale (DIDS): A measure of three types of disinhibiting effects.

Leeman, Robert F., et al.

Addictive Behaviors, Vol 32(6), Jun, 2007. pp. 1200-1219.

Abstract:

Links between trait disinhibition and high-risk drinking are well established. It is also known that alcohol has disinhibiting effects. Nonetheless, there is no measure in the literature devoted exclusively to assessing disinhibiting effects of alcohol. The multidimensional Drinking-Induced Disinhibition Scale (DIDS) was developed as part of Study I, a prospective survey conducted with undergraduates (N = 337). Study II, a cross-sectional survey (N = 260), allowed for a confirmatory factor analysis and further validation of the measure through comparisons with an expectancies scale. The nine-item DIDS is comprised of three subscales assessing euphoric/social, dysphoric and sexual disinhibition. All three subscales had good internal consistency and adequate test-retest reliability. Convergent and discriminant validity were established in both studies. The subscales had different associations with high-risk drinking: sexual disinhibition predicted heavy episodic drinking; dysphoric disinhibition predicted alcohol-related problems and euphoric/social had associations with both. A cluster analysis revealed four distinct disinhibition profiles (i.e., low effect drinker; high euphoric/social only; high euphoric social and dysphoric; high euphoric/social and sexual), which predicted likelihood of high-risk drinking.

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The relationship of sex-related alcohol expectancies to alcohol consumption and sexual behavior.

Leigh, Barbara C.

British Journal of Addiction, Vol 85(7), Jul, 1990. pp. 919-928.

Abstract:

Examined the relationship of beliefs about the effects of alcohol on sex to drinking in sexual situations and to the sexual behaviors and feelings resulting from those situations. 844 adults (aged 18–76 yrs) completed a survey of drinking habits, sexual behavior, sexual attitudes and beliefs, and alcohol expectancies. Ss of different gender and sexual orientation differed in their beliefs about the effects of alcohol on sexual responding. Expectations of sexual enhancement and disinhibition were related to the initiation of sexual activity and to the proportion of sexual encounters that took place while drinking; these expectations also interacted with feelings of guilt about sex to predict the amount drunk in the most recent sexual encounter.

ALDH22 is Associated With a Decreased Likelihood of Alcohol-Induced Blackouts in Asian American College Students.

Luczak, Susan E., et al.

Journal of Studies on Alcohol, Vol 67(3), May, 2006. pp. 349-353.

Abstract:

Objective: A recent report found the heritability estimate for alcohol-induced blackouts was 53%. The present study was designed to determine whether possession of two specific genetic variations, an aldehyde dehydrogenase ALDH22 allele and an alcohol dehydrogenase ADH1B2 allele, were associated with lower rates of lifetime blackouts. Method: Asian American college students (N = 403) of Chinese and Korean descent were genotyped at the ALDH2 and ADH1B loci and assessed for lifetime alcohol-induced blackouts and the maximum number of drinks ever consumed in a 24-hour period. Results: Participants who had an ALDH22 allele had approximately one third the risk of having a lifetime blackout of participants without this allele. Rates of experiencing a lifetime blackout did not significantly differ by ADH1B2 status. Possessing an ALDH22 allele was associated with decreased risk of lifetime blackouts even after controlling for maximum number of drinks ever consumed in a 24-hour period and ethnicity. Conclusions: These findings suggest the protective effects of possessing an ALDH22 allele include a lowered risk of experiencing alcohol-induced blackouts.

Alcohol, sexual arousal, and the transfer of excitation.

McCarty, Dennis, et al.

Journal of Personality and Social Psychology, Vol 42(6), Jun, 1982. pp. 977-988.

Abstract:

Investigations of the alcohol-related disinhibition of responses to deviant sexual stimuli suggest that the pharmacological actions of ethanol have little influence on the disinhibition process. The mere belief that alcohol is consumed is sufficient to induce increased sexual arousal. Studies with conventional stimuli, however, suggest that interactions occur between the pharmacological presence of ethanol and the psychological expectations of its presence. The present article examines the contribution of pharmacological, cognitive, and environmental variables to perceived sexual arousal. Pictures that elicited either a low or moderate level of self-reported sexual arousal were viewed and evaluated by 64 men and 64 women after completing their drinks. The evaluations and arousal measures suggested significant Instruction by Content by Arousal interactions. The strongest perceptions of arousal occurred among Ss who did not know they were drinking alcohol. When Ss were unaware of the alcohol intoxication, the pharmacological excitation induced by alcohol transferred to the perception and evaluation of the slides.

Alcohol-induced blackouts and maternal family history of problematic alcohol use.

Marino, Elise N., et al.

Addictive Behaviors, Vol 45, Jun, 2015. pp. 201-206.

Abstract:

Background: Consequences of heavy drinking include alcohol-induced blackouts, which are periods of amnesia for all or part of a drinking event. One risk factor for blackouts is family history of problematic alcohol use (FH +); however, research rarely distinguishes maternal from paternal FH +. The objective of this study was to examine whether maternal or paternal FH + better predicts likelihood of experiencing blackouts than a general measure of overall FH +, and whether gender moderates this association. Method: Participants (N = 1164; 65.4% are female) were first-time college freshmen (age range = 17–19) who participated in a 6-year, 10-assessment, longitudinal study in the United States. Alcohol-induced blackouts, the dependent measure, were dichotomized (yes/no) based on endorsement of memory problems after drinking using a single item during Years 4–6. FH +, captured at baseline, was coded if participants self-reported that their mother, father, or any of their four grandparents were a possible or definite problem drinker. Results: Overall, 773 (66.4%) participants reported experiencing blackouts during Years 4–6. Women were more likely to report blackouts than men; however, compared with women with a maternal FH +, men with a maternal FH + were more than twice as likely to report blackouts. Discussion: **Men appear to be more susceptible than women to the effects of a maternal FH +. Genetic and environmental explanations for this finding are discussed.** In sum, these findings are an important step toward understanding a significant yet understudied negative consequence of heavy alcohol use.

Drinking consequences and subsequent drinking in college students over 4 years.

Martinez, Julia A., et al.

Psychology of Addictive Behaviors, Vol 28(4), Dec, 2014. pp. 1240-1245.

Abstract:

There is some evidence that college student drinkers may continue drinking in the face of adverse consequences. We examined 2 hypotheses: (a) that this seemingly pathological behavior is a phenomenon of university life, occurring with consistency throughout the entirety of college, and (b) that individuals accumulate these consequences over multiple

semesters in college. A sample of 3,720 students from a large Midwestern university was asked to complete surveys the summer before college and every semester thereafter for 4 years. Results showed that certain drinking-related consequences (e.g., blackouts, regretted sexual experiences) consistently predicted continued frequent heavy drinking in the following semester, even after controlling for sex, race, age, and previous-semester frequent heavy drinking (range of odds ratio = 1.17 to 1.45 across semesters, $p < .01$). Such potent consequences may predict subsequent drinking for a number of possible reasons that may be examined and addressed as they would pertain to specific protective behavioral strategy-related and cognitive interventions. Furthermore, consequences were accumulated over multiple semesters by notable proportions of students. For example, 13.8% of students reported blacking out 5 time-points or more—describing a full half or more of their college careers. Experimental studies which aim to modify students' perceptions of norms associated with these consequences may aid in developing interventions to reduce the burden of harm to students. In the broader context, and given the prevalence of students' accumulation of consequences, future study might aim to determine how and in what ways these findings describe either pathological or normative processes.

How do college students subjectively evaluate 'blackouts'?

Merrill, Jennifer E., et al.

Addictive Behaviors, Vol 89, Feb, 2019. pp. 65-69.

Abstract:

Blackouts (i.e., alcohol induced memory impairment) are common among college student drinkers, and they are associated with several additional harms. However, alcohol consequences are not perceived universally as negative by the students who experience them, and little is known regarding students' specific thoughts and feelings about blackouts. We conducted a series of single-gender focus groups (8 groups; 5–8 per group; $n = 50$, 56% female) with college student drinkers. Questions focused on: (a) their subjective evaluations of blackouts and (b) factors influencing those evaluations (i.e., what determines whether a blackout is perceived as a negative/neutral/positive experience). Verbatim transcripts were content analyzed using applied thematic analysis with NVivo software. Evaluations of blackouts were primarily negative, with some notable positive, neutral and mixed reactions. Influences on blackout evaluations included those demonstrated as influential on broader alcohol consequences in prior work (e.g., normative perceptions, social context). However, some contextual influences on evaluations that may be specific to blackouts included pre-blackout events, the objective severity (extent/length) of memory loss, what participants later learned had happened during the blackout, and whether or not they had expected to blackout. Findings provide insight into why some students are not necessarily concerned with blackout experiences.

Event-level correlates of drinking events characterized by alcohol-induced blackouts.

Merrill, Jennifer E., et al.

Alcoholism: Clinical and Experimental Research, Vol 43(12), Dec, 2019. pp. 2599-2606.

Abstract:

Background: Prior research identifies a range of potential predictors of blackouts and suggests that blackouts increase risk for additional negative consequences. However, these studies are based on epidemiological work that allows us to draw conclusions about groups of people but not within-person processes. The present study examined within-person, event-level correlates of blackouts. Methods: Ninety-six heavy drinking college students (52% female) completed 28 days of daily reports of alcohol use and consequences, including blackouts. Thirty-three participants reported 56 blackouts. Hierarchical linear

modeling compared morning reports of drinking events on which participants did versus did not report a blackout, controlling for total drinks at the event. Results: Blackout likelihood increased as a function of total drinks consumed and of crossing thresholds for heavy episodic drinking (4+/5+ drinks for women/men) and high-intensity drinking (8+/10+). Participants reported a higher total number of additional negative consequences on blackout events. Specific consequences that were more likely included embarrassing oneself and hangover. Blackouts were associated with morning ratings of less positive mood and a less favorable drinking event. Motives for drinking and simultaneous use of marijuana were not associated with blackouts. Conclusions: Event-level findings of this study document that events leading to alcohol-induced memory loss are associated with other adverse experiences relative to drinking events that do not result in blackout, and offer potentially motivational levers for preventive interventions.

Recent alcohol-induced blackouts among heavy drinking college students: A qualitative examination of intentions, willingness, and social context.

Merrill, Jennifer E., et al.

Experimental and Clinical Psychopharmacology, Aug 12, 2021.

Abstract (English):

One-third to half of emerging adult drinkers report experiencing alcohol-induced blackouts in the past year, and blackouts increase the risk for negative consequences. Qualitative methods provide valuable tools for scientific inquiry, allowing for in-depth understanding of lived experiences. The goal of the present study was to gain insight into emerging adults' recent blackout experiences. One hundred heavy drinking college students (age 18–20) completed a baseline survey, 28 days of ecological momentary assessment (EMA) of their alcohol use and consequences, and a follow-up interview. A subset of 37 (46% female, 13.5% Hispanic/Latinx, 54% non-Hispanic ethnicity/White race) endorsed a blackout (forgot what they did during or after drinking) and were interviewed regarding their recent blackout experience. A semi-structured interview guide focused on several key questions regarding intentions and/or willingness to black out, how friends reacted to their blackout, and social norms for blacking out. A priori as well as emergent themes were generated from review of coded data. Qualitative themes included: blackouts are often unintentional, heavy drinking young adults express willingness to black out, friends react in a variety of ways to blackouts, and blackouts are perceived as common and acceptable. Data provide insight into the phenomenology of blackouts among college students, revealing that although college students may not intend to, they are often willing to black out. Future qualitative studies on blackouts among non-college-attending emerging adults are warranted. Such work can inform theory and future survey studies to better understand this high-risk behavior.

Distinctions in alcohol-induced memory impairment: A mixed methods study of en bloc versus fragmentary blackouts.

Miller, Mary Beth, et al.

Alcoholism: Clinical and Experimental Research, Vol 42(10), Oct, 2018. pp. 2000-2010.

Abstract:

Background: Blackouts—or memory loss for all or part of a drinking event—are reliable predictors of alcohol-related consequences. Studies suggest a distinction between en bloc (complete memory loss) and fragmentary (off-and-on memory loss) blackouts; however, research has not consistently differentiated between these 2 forms of blackout. This study aimed to validate the distinction between en bloc and fragmentary blackouts among young adults. Methods: Data were collected using qualitative (Study 1) and quantitative (Study

2) research methods. Participants in both studies were college students with a history of alcohol-induced memory impairment. They were recruited using community advertisement (Study 1, N = 50, 56% female) and Qualtrics survey panels (Study 2, N = 350, 56% female). Study 1 participants engaged in 8 focus groups. Discussions were audio-recorded, transcribed verbatim, and coded using applied thematic analysis. Findings guided assessment of en bloc and fragmentary blackout in Study 2. In Study 2, a separate sample of participants completed an online survey assessing drinking behavior, alcohol-induced memory impairment, and theoretical correlates of en bloc and fragmentary blackouts. Results: Study 1 participants differentiated between en bloc and fragmentary blackouts (which they referred to as 'blackouts' and 'brownouts,' respectively) based on duration and extent of memory loss. They indicated that blackouts occur along a continuum, with en bloc 'blackouts' at the extreme. They also stated that the term 'blackout drinking' does not always imply memory loss. Study 2 participants reported higher rates of 'brownouts' (81%) than 'blackouts' (54%). They reported less negative outcome expectancies and attitudes, greater personal approval, higher prevalence estimates, lower self-efficacy, and stronger intentions for 'brownouts' than 'blackouts' ($p < 0.001$). Women perceived 'blackouts/brownouts' as more prevalent than men and reported lower intentions to experience 'blackouts' ($p < 0.005$). Conclusions: Young adults are more permissive of fragmentary than en bloc blackout. En bloc blackouts may be a target for future interventions.

Intentions and motives to experience alcohol-induced blackout among young adults in college.

Miller, Mary Beth

Psychology of Addictive Behaviors, Vol 34(6), Sep, 2020. pp. 690-698.

Abstract:

Blackouts are typically considered a negative consequence of alcohol use. Yet some college students report consuming alcohol with the intention of blacking out. This study examined intentions and motives for blackout drinking among young adults in college. College students with a past-year history of blackout (N = 350, 56% female, 73% White) completed an anonymous online survey. Descriptive statistics were used to examine the incidence of blackout intentions, and individuals who did and did not report future blackout intentions were then compared on drinking patterns, depressive symptoms, social norms, and outcome expectancies. Overall, 135 participants (39%) reported consuming alcohol in the past 30 days with the intention of losing memory of the night's events, and 107 (31%) reported blackout intentions in the next 30 days. When asked (via open text box) to indicate their motives for past blackout intentions, the majority of participants provided responses that fit with coping, social, or enhancement drinking motives. A larger proportion of men than women reported blackout intentions. As a group, those reporting future blackout intentions reported heavier, more frequent, and more problematic drinking, as well as more symptoms of depression and more positive (but not negative) outcome expectancies. A substantial subset of college students reporting a blackout in the past year also endorsed intentions to experience a blackout in the next 30 days. Given strong associations between intentions and subsequent behavior, interventions targeting blackout styles of drinking are warranted. The extent to which 'blackout' drinking motives differ from traditional drinking motives is unclear.

Difference in cognitive function by first onset age of alcohol induced blackout and its duration.

Min, Eun-Jeong, et al.

Abstract:

Objective: Alcohol-induced blackout (blackout) is a typical early symptom of cognitive impairment caused by drinking. However, the first onset age of blackout or the duration after onset of blackout has not been directly compared in previous studies. The purpose of this study was to investigate the differences in cognitive function to the first start age of blackouts and their duration. Methods: Thirty-one male subjects were included in this study. Their age at the first blackout and the duration after the onset of blackout were investigated. Neuropsychological tests were conducted to determine their attention, memory, and executive function. Subjects were divided into three groups according to their age of the first onset blackout (group O1, < 20 years; group O2, 21-39 years; and group O3, > 40 years). Subjects were also divided into three groups by duration after the onset of blackout (P1, < 10 years; P2, 10-29 years; and P3, > 30 years). We then examined differences in neurocognitive function among these groups. Results: O1 tended to have a lower memory score than O2 ($F = 3.28$, $p = 0.053$). Significant differences were observed in attention and executive function between groups P1 and P3 (Digit Span_backward: $F = 6.07$, $p < 0.05$; visual span_forward: $F = 4.19$, $p < 0.05$; executive intelligence quotient: $F = 3.55$, $p < 0.05$). Conclusion: Greater memory impairment was detected in subjects having an earlier age of the first blackout. The longer the duration after the onset of blackout, the more impaired their attention and executive function skills.

The acute effect of alcohol on various memory processes.

Molnár, Márk, et al.

Journal of Psychophysiology, Vol 24(4), 2010. pp. 249-252.

Abstract:

This review surveys relevant and recent data of the pertinent literature regarding the acute effect of alcohol on various kinds of memory processes with special emphasis on working memory. The characteristics of different types of long-term memory (LTM) and short-term memory (STM) processes are summarized with an attempt to relate these to various structures in the brain. LTM is typically impaired by chronic alcohol intake but according to some data a single dose of ethanol may have long lasting effects if administered at a critically important age. **The most commonly seen deleterious acute effect of alcohol to STM appears following large doses of ethanol in conditions of 'binge drinking' causing the 'blackout' phenomenon.** However, with the application of various techniques and well-structured behavioral paradigms it is possible to detect, albeit occasionally, subtle changes of cognitive processes even as a result of a low dose of alcohol. These data may be important for the consideration of legal consequences of low-dose ethanol intake in conditions such as driving, etc.

A case report—alcohol-induced blackouts during sexual intercourse: Legal responsibility?

Neal, Dan E., et al.

International Journal of Offender Therapy and Comparative Criminology, Vol 37(4), Win 1993. pp. 325-329.

Abstract:

Analyzed a criminal rape trial in which neither the man nor the woman claimed any memory of the sex act. Afterward, the woman and the prosecution contended that under such circumstances, a rape had occurred on the theory that the woman was unconscious. The man denied any memory of the sex act, even under hypnosis, and was found not guilty. The acquittal was apparently based on the jury's belief that both the woman and the man

were conscious during intercourse but were unable to recall the sex act due to alcohol-induced blackouts.

Genetic Epidemiology of Alcohol-Induced Blackouts.

Nelson, Elliot C., et al.

Archives of General Psychiatry, Vol 61(3), Mar, 2004. pp. 257-263.

Abstract:

Examines the genetic epidemiology of lifetime blackouts and having had 3 or more blackouts in a year, including analyses controlling for the frequency of intoxication. Members of the young adult Australian Twin Register, a volunteer twin panel born between January 1, 1964, and December 31, 1971, were initially registered with the panel as children by their parents between 1980 and 1982. They underwent structured psychiatric telephone interviews from February 1996 through September 2000. The current sample contains 2324 monozygotic and dizygotic twin pairs (mean [SD] age 29.9 [2.5] years) for whom both twins' responses were coded for blackout questions and for frequency of intoxication. Data on lifetime blackouts and having had 3 or more blackouts in a year were collected within an examination of the genetic epidemiology of alcoholism. A lifetime history of blackouts was reported by 39.3% of women and 52.4% of men; 11.4% of women and 20.9% of men reported having had 3 or more blackouts in a year. The finding of a substantial genetic contribution to liability for alcohol-induced blackouts including a component of genetic loading shared with frequency of intoxication may offer important additional avenues to investigate susceptibility to alcohol-related problems.

The association of alcohol-induced blackouts and grayouts to blood alcohol concentrations.

Perry, Paul J., et al.

Journal of Forensic Sciences, Vol 51(4), Jul, 2006. pp. 896-899.

Abstract:

The primary aim of this study was to investigate the association between measured blood alcohol concentration (BAC) and the presence and degree of amnesia (no amnesia, grayout, or blackout) in actively drinking subjects. A secondary aim was to determine potential factors other than BAC that contribute to the alcohol-induced memory loss. An interview questionnaire was administered to subjects regarding a recent alcohol associated arrest with a documented BAC greater than 0.08 g/dL for either public intoxication, driving under the influence, or under age drinking was administered. Demographic variables collected included drinking history, family history of alcoholism, presence of previous alcohol-related memory loss during a drinking episode, and drinking behavior during the episode. Memory of the drinking episode was evaluated to determine if either an alcohol-induced grayout (partial anterograde amnesia) or blackout (complete anterograde amnesia) occurred. Differences in (1) mean total number of drinks ingested before arrest, (2) gulping of drinks, and (3) BAC at arrest were found for those having blackouts compared with no amnesia; while differences in drinking more than planned were found between the no amnesia and grayout groups. A strong linear relationship between BAC and predicted probability of memory loss, particularly for blackouts was obvious. This finding clinically concludes that subjects with BAC of 310 g/dL or greater have a 0.50 or greater probability of having an alcoholic blackout.

Ethanol forensic toxicology.

Perry, Paul J., et al.

Clinical Sciences Department, Touro University California College of Pharmacy, Vallejo, CA,

Journal of the American Academy of Psychiatry and the Law, Vol 45(4), Dec 1, 2017. pp. 429-438.

Abstract:

Ethanol abuse can lead to negative consequences that oftentimes result in criminal charges and civil lawsuits. When an individual is suspected of driving under the influence, law enforcement agents can determine the extent of intoxication by measuring the blood alcohol concentration (BAC) and performing a standardized field sobriety test. The BAC is dependent on rates of absorption, distribution, and elimination, which are influenced mostly by the dose of ethanol ingested and rate of consumption. Other factors contributing to BAC are gender, body mass and composition, food effects, type of alcohol, and chronic alcohol exposure. Because of individual variability in ethanol pharmacology and toxicology, careful extrapolation and interpretation of the BAC is needed, to justify an arrest and assignment of criminal liability. This review provides a summary of the pharmacokinetic properties of ethanol and the clinical effects of acute intoxication as they relate to common forensic questions. Concerns regarding the extrapolation of BAC and the implications of impaired memory caused by alcohol-induced blackouts are discussed.

Alcohol use disorders and the brain.

Rao, Rahul

Addiction, Vol 115(8), Aug, 2020. pp. 1580-1589.

Abstract:

A diagnosis of alcohol use disorder is associated with a higher risk of dementia, but a dose–response relationship between alcohol intake consumption and cognitive impairment remains unclear. Alcohol is associated with a range of effects on the central nervous system at different doses and acts on a number of receptors. Acute disorders include Wernicke's encephalopathy (WE), traumatic brain injury, blackouts, seizures, stroke and hepatic encephalopathy. The most common manifestations of chronic alcohol consumption are Korsakoff's syndrome (KS) and alcohol-related dementia (ARD). There is limited evidence for benefit from memantine in the treatment of ARD, but stronger evidence for the use of high-dose parenteral thiamine in the progression of neuropsychiatric symptoms for WE. Accumulating evidence exists for pharmacological treatment in the prevention of hepatic encephalopathy. Rehabilitation of people with ARD may take several years, and requires an approach that addresses physical and psychosocial factors.

Alcohol-induced blackout: Phenomenology, biological basis, and gender differences.

Rose, Mark E., et al.

Journal of Addiction Medicine, Vol 4(2), Jun, 2010. pp. 61-73.

Abstract:

Blackouts from acute alcohol ingestion are defined as the inability to recall events that occurred during a drinking episode and are highly prevalent in both alcoholic and nonalcoholic populations. This article reviews the clinical manifestations, epidemiology, risk factors, cognitive impairment, and neurobiology associated with alcohol-induced blackout, with special emphasis on the neurochemical and neurophysiological basis, and gender differences. Two types of blackout have been identified: en bloc, or complete inability to recall events during a time period, and fragmentary, where memory loss is incomplete. The rapidity of rise in blood alcohol concentration is the most robust predictor of blackout. Alcohol impairs different brain functions at different rates, and cognitive and memory performance are differentially impaired by ascending versus descending blood alcohol concentration. Cognitive and memory impairment occurs before motor impairment, possibly explaining how a drinker appearing fully functional can have little

subsequent memory. Blackouts are caused by breakdown in the transfer of short-term memory into long-term storage and subsequent retrieval primarily through dose-dependent disruption of hippocampal CA1 pyramidal cell activity. The exact mechanism is believed to involve potentiation of gamma-aminobutyric acid-alpha-mediated inhibition and interference with excitatory hippocampal N-methyl-D-aspartate receptor activation, resulting in decreased long-term potentiation. Another possible mechanism involves disrupted septohippocampal theta rhythm activity because of enhanced medial septal area gamma-aminobutyric acid-ergic neurotransmission. Women are more susceptible to blackouts and undergo a slower recovery from cognitive impairment than men, due in part to the effect of gender differences in pharmacokinetics and body composition on alcohol bioavailability.

Blackout versus pass out in allegations of alcohol-involved sexual assault: Why knowing the difference matters.

Schneider, Nicole

Journal of Psychiatric Practice, Vol 26(2), Mar, 2020. pp. 141-145.

Abstract:

It is common for not only laypersons but also courts, witnesses, attorneys, and even some experts involved in a criminal sexual assault investigation to confuse the terms 'blackout' and 'pass out' when referring to the memory, consciousness, and other behavioral ramifications of alcohol intoxication. A typical alcohol-involved sexual assault allegation often includes the partial or total absence of memory for events of the alleged incident. The etiology and behavioral presentations of the types of alcohol-induced memory deficiency evidenced are not all created equal and understanding the differences is crucial to understanding the reasonableness of the potential perceptions or misperceptions of an accused. By improving our understanding of these terms, we can assist the legal process with proper and more accurate history gathering and documentation if we become a party to such an investigation.

Altered anterior cingulate neurochemistry in emerging adult binge drinkers with a history of alcohol-induced blackouts.

Silveri, Marisa M., et al.

Alcoholism: Clinical and Experimental Research, Vol 38(4), Apr, 2014. pp. 969-979.

Abstract:

Background: Binge alcohol consumption is associated with multiple neurobiological consequences, including altered neurophysiology, brain structure, and functional activation. Magnetic resonance spectroscopy (MRS) studies have demonstrated neurochemical alterations in the frontal lobe of alcohol users, although most studies focused on older, alcohol-dependent subjects. Methods: In this study, neurochemical data were acquired using MRS at 4.0 Tesla from emerging adults (18 to 24 years old) who were binge alcohol drinkers (BD, n = 23) or light drinkers (LD, n = 31). Since binge drinking is also associated with increased prevalence of experiencing an alcohol-induced blackout, BD were stratified into alcohol-induced blackout (BDBO) and non-blackout (BDN) groups. Results: Overall, BD had significantly lower gamma amino-butyric acid (GABA) and N-acetyl-aspartate (NAA) in the anterior cingulate cortex (ACC) than LD. When stratified by blackout history, BDBO also had lower ACC glutamate (Glu) than LD. No group differences in MRS metabolites were observed in the parietal-occipital cortex. Lower ACC GABA and Glu remained significant after accounting for lower gray matter content in BD, however, NAA differences were no longer evident. In addition, low ACC GABA levels were associated with greater alcohol use consequences, and worse response inhibition and

attention/mental flexibility in BD. Conclusions: These data indicate that binge drinking affects frontal lobe neurochemistry, more so in those who had experienced an alcohol-induced blackout. Characterization of the neurochemical profiles associated with binge alcohol consumption and blackout history may help identify unique risk factors for the later manifestation of alcohol abuse and dependence, in young individuals who are heavy, frequent drinkers, but who do not meet the criteria for alcohol abuse disorders.

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Fun/intoxication pre-drinking motives lead indirectly to more alcohol-related consequences via increased alcohol consumption on a given night.

Authors:

Smit, Koen, et al.

Addictive Behaviors, Vol 114, Mar, 2021. ArtID: 106749

Abstract:

Pre-drinking increases alcohol use on drinking nights, which is associated with various adverse alcohol-related consequences but what motivates people to do so, i.e. the role of pre-drinking motives (PDM) in this link, is unclear. The current study examined a) the association of three PDM factors (fun/intoxication, facilitation, and conviviality) with average night-level alcohol use, b) whether PDM are associated with adverse alcohol-related consequences (hangover, drunk driving, blackout, risky sex, injury, and fights) and c) whether PDM mediates the link between night-level alcohol use and negative consequences. Methods: A sample of 204 young adult nightlife goers (48.8% males, $M_{age} = 19$ $SD = 2.4$) from Switzerland reported PDM at baseline, and subsequently participated in

a 2-month event-level study. Regressions models assessed direct and mediated associations. Results: Fun/intoxication PDM predicted alcohol use in subsequent drinking nights (11.3 nights per participant on average), but not the two other PDM. No direct link between PDM and consequences was found. However, fun/intoxication PDM lead indirectly to more adverse consequences through higher alcohol use. Conclusion: This study shows that predominantly 'fun/intoxication' predrinkers are at increased risk for alcohol consumption and consequences, but not those who predrink for conviviality or facilitation motives. The outcomes thus suggest the importance of specific PDM in preventing alcohol use for instance by tailoring interventions based on individuals' PDM in order to curb drinking and its associated consequences among young adults on weekend nights out.

Memory encoding and retrieval on the ascending and descending limbs of the blood alcohol concentration curve.

Söderlund, Hedvig. Et al.

Psychopharmacology, Vol 182(2), Oct, 2005. pp. 305-317.

Abstract:

Rationale: Little is known about acute effects of alcohol on memory encoding and retrieval on different limbs (ascending and descending) of the blood alcohol concentration (BAC) curve.

Objectives: This extensive experiment was designed to examine alcohol's effects on memory encoding and retrieval throughout a protracted drinking episode.

Methods: In a 9-h session, male participants consumed either alcohol (1 ml/kg) or placebo (n=32/32) over a period of 90 min and learned various materials in different memory tasks before, during, and after consuming the drinks, while their BAC levels were monitored. A week later, in a similar session, they were tested on learned materials before, during, and after drinking. Mood was assessed throughout both sessions.

Results: Alcohol impaired recall of words more than recognition, and cued recall most severely. Perceptual priming and picture recognition were not affected by alcohol. Alcohol impaired encoding in cued recall, recognition of completed word fragments, and free recall regardless of limb, but impaired retrieval in word recognition only during the ascending BAC. Alcohol increased negative mood on the descending limb during the first session, and on the ascending limb during the second session.

Conclusions: Under naturalistic drinking conditions, alcohol's effects on memory depend on task, memory process, and limb of the BAC curve. The differential effects of alcohol on retrieval during the ascending and descending limbs demonstrate the importance of examining the differential effects on the two limbs.

Alcohol-induced retrograde memory impairment in rats: Prevention by caffeine.

Spinetta, Michael J., et al.

Psychopharmacology, Vol 201(3), Dec, 2008. pp. 361-371.

NLM Title Abbreviation:

Abstract:

Rationale: Ethanol and caffeine are two of the most widely consumed drugs in the world, often used in the same setting. Animal models may help to understand the conditions under which incidental memories formed just before ethanol intoxication might be lost or become difficult to retrieve. Objectives: Ethanol-induced retrograde amnesia was investigated using a new odor-recognition test. Materials and methods: Rats thoroughly explored a wood bead taken from the cage of another rat, and habituated to this novel odor (N1) over three trials. Immediately following habituation, rats received saline, 25 mg/kg

pentylentetrazol (a seizure-producing agent known to cause retrograde amnesia) to validate the test, 1.0 g/kg ethanol, or 3.0 g/kg ethanol. The next day, they were presented again with N1 and also a bead from a new rat's cage (N2). Results: Rats receiving saline or the lower dose of ethanol showed overnight memory for N1, indicated by preferential exploration of N2 over N1. Rats receiving pentylentetrazol or the higher dose of ethanol appeared not to remember N1, in that they showed equal exploration of N1 and N2. Caffeine (5 mg/kg), delivered either 1 h after the higher dose of ethanol or 20 min prior to habituation to N1, negated ethanol-induced impairment of memory for N1. A combination of a phosphodiesterase-5 inhibitor and an adenosine A2A antagonist, mimicking two major mechanisms of action of caffeine, likewise prevented the memory impairment, though either drug alone had no such effect. Binge alcohol can induce retrograde, caffeine-reversible disruption of social odor memory storage or recall.

Nuanced relations between simultaneous alcohol and cannabis use motives and negative consequences among college students: The role of multiple product use.

Stevens, Angela K., et al.

Experimental and Clinical Psychopharmacology, Mar 11, 2021.

Abstract (English):

Simultaneous alcohol and marijuana (SAM) use is common, but it exacerbates negative consequences. Individuals use alcohol and cannabis products in different ways and have distinct reasons for use. The present study examines day-level effects of motives on consequences on SAM-use days, accounting for consumption, and tests whether using multiple alcohol (e.g., beer + liquor) and/or cannabis (e.g., concentrate + leaf) products on the same day mediates these relations. College students engaging in SAM use at least once in the past month (N = 281; Mage = 20.17) completed two bursts of 28 consecutive days of data collection. We examined within-person effects of motives (effect-enhancement, social, offered [it was offered], coping) on number of negative consequences and on experiencing hangover, nausea, or blackout; and indirect effects via two concurrent mediators: using multiple alcohol products and multiple cannabis products. Total effect models showed effect-enhancement motives were related to nausea, social motives to number of total consequences and hangover, and coping motives to blackout. Effect-enhancement, social, and offered motives evinced significant indirect effects on consequence outcomes via multiple alcohol, but not cannabis, product use. Coping motives did not exhibit significant indirect effects, and were related to multiple cannabis, but not alcohol, product use, although all other motives were related to both mediators. Findings support recent work demonstrating within-person relations between social motives and negative consequences on SAM-use days. Limiting the number of alcohol products consumed on SAM-use days may be beneficial, particularly for young adults using to enhance intoxication or for social reasons. (PsycInfo Database Record (c) 2021 APA, all rights reserved)

Impact Statement:

This study suggests that college students who consume both alcohol and cannabis for social reasons may be at unique risk for negative consequences. Young adults who use alcohol and cannabis simultaneously to enhance intoxication, for social reasons, or because it was offered may benefit from recommendations to limit the number of alcohol products used on a given day to reduce the occurrence of physiological consequences.

Alcoholic blackouts: Legal implications.

Sweeney, Donal F.

Journal of Substance Abuse Treatment, Vol 7(3), 1990. pp. 155-159.

Abstract:

Presents a definition of alcoholic blackouts, reviews neuroscientific research on memory, and discusses the legal significance of such blackouts. Alcoholic blackouts are defined as the temporary, complete inability to form long-term memory as the result of a high blood alcohol level. This means that a neuron-to-neuron system has been blocked. Since that is the case, such central nervous system (CNS) dysfunction should have legal implications, from the blackout itself and also from the fact that this degree of neural interference in one system is suggestive that other dysfunction may be present. Since long-term memory is not in effect during a blackout, anything said to a person in a blackout state (including advice, warnings, or citations) may never enter the memory. Also, it is questionable whether a person in a blackout can actually have intentions.

Relationship between patterns of alcohol use and negative alcohol-related outcomes among U.S. Air Force recruits.

Taylor, Jennifer E., et al.

Military Medicine, Vol 172(4), Apr, 2007. pp. 379-382.

Abstract:

The negative impact of alcohol use on workplace performance is of significant concern to the U.S. military, given the costs associated with recruiting, hiring, and training personnel. However, little is known about the extent of potential alcohol use problems of recruits. We examined the history of alcohol-related problems among recruits entering the Air Force (N=37,858). **Although the average age of recruits was <21 years, 78% reported consuming alcohol and 49% reported hinging before basic military training. Recruits who drank reported having negative alcohol-related outcomes (NAROs).** In fact, **>95% reported that they or someone else had been injured as a result of their drinking and that a relative, friend, doctor, or other health care worker has been concerned about their drinking.** The remaining NAROs were reported by approximately one-quarter of those who drank. **However, recruits who reported binge drinking were substantially more likely to report more NAROs, such as morning drinking, inability to stop drinking, having others be concerned about their drinking, having blackouts, fighting, having injured or been injured, feeling guilty about their drinking, and wanting to reduce the amount they drink.** Results suggest that alcohol-related problems are common among recruits before basic military training and screening for future problems may be beneficial.

Blackout drinking predicts sexual revictimization in a college sample of binge-drinking women.

Valenstein-Mah, Helen, et al.

Journal of Traumatic Stress, Vol 28(5), Oct, 2015. pp. 484-488.

Abstract:

Sexual victimization is prevalent on U.S. college campuses. Some women experience multiple sexual victimizations with heightened risk among those with prior victimization histories. One risk factor for sexual revictimization is alcohol use. Most research has focused on associations between alcohol consumption and revictimization. The current study's objective was to understand potential mechanisms by which drinking confers risk for revictimization. We hypothesized that specific drinking consequences would predict risk for revictimization above and beyond the quantity of alcohol consumed. There were 162 binge-drinking female students (mean age = 20.21 years, 71.3% White, 36.9% juniors) from the University of Washington who were assessed for baseline victimization

(categorized as childhood vs. adolescent victimization), quantity of alcohol consumed, and drinking consequences experienced, then assessed 30 days later for revictimization. There were 40 (24.6%) women who were revictimized in the following 30 days. Results showed that blackout drinking at baseline predicted incapacitated sexual revictimization among women previously victimized as adolescents, after accounting for quantity of alcohol consumed (OR = 1.79, 95% CI [1.07, 3.01]). Other drinking consequences were not strongly predictive of revictimization. Adolescent sexual victimization was an important predictor of sexual revictimization in college women; blackout drinking may confer unique risk for revictimization.

Alcoholic Blackout for Criminally Relevant Behavior.

van Oorsouw, Kim, et al.

Journal of the American Academy of Psychiatry and the Law, Vol 32(4), 2004. pp. 364-370.

Abstract:

Some criminal suspects claim to have had an alcohol-induced blackout during crimes they have committed. Are alcoholic blackouts a frequently occurring phenomenon, or are they merely used as an excuse to minimize responsibility? Frequency and type of blackout were surveyed retrospectively in two healthy samples (n = 256 and n = 100). Also, a comparison of blood alcohol concentrations was made between people who did and those who did not claim a blackout when stopped in a traffic-control study (n = 100). In the two survey studies, blackouts were reported frequently by the person himself (or herself) and others (67% and 76%, respectively) in contrast to the traffic-control study (14%), in which blackouts were reported only when persons were involved in an accident. These results indicate that although blackouts during serious misbehavior are reported outside the court, both the denial and the claim of alcoholic blackout may serve a strategic function.

Alcoholblack-out voor een delict: Bestaat dat?

Do alcohol blackouts for crime exist?

van Oorsouw, Kim, et al.

Psycholoog, Vol 39(2), Feb, 2004. pp. 59-63.

Abstract:

Sometimes criminal suspects claim to have had an alcoholic blackout for the crime they have committed. The question arises whether alcohol blackouts are indeed a frequently occurring phenomenon or are merely used as an excuse to minimize criminal responsibility. Frequency and type of blackout were surveyed retrospectively in a healthy sample. Also, comparison of blood alcohol concentrations was made for people who did and did not claim blackout when stopped in a traffic-control study. In the survey study, blackouts were reported frequently (67%) in contrast to the traffic-control study (14%), where blackouts were only reported when persons were involved in an accident (85%). These results indicate that both the denial and the claim of blackout may have a strategic background.

Blackouts among male and female youth seeking emergency department care.

Voloshyna, Diana M., et al.

The American Journal of Drug and Alcohol Abuse, Vol 44(1), Jan, 2018. pp. 129-139.

Abstract:

Background: Alcohol-related blackouts are a common consequence of heavy drinking, and these blackouts pose risk for injury and other adverse health outcomes. Objective: To examine the prevalence and correlates of blackouts among underage drinkers. Methods: Youth (ages 14–20) presenting to a suburban Emergency Department (ED) completed screening surveys. Among those reporting past-year alcohol consumption, we examined

past 3-month blackouts in relation to: background characteristics (e.g., demographics, fraternity/sorority involvement), substance use, sexual risk behaviors and incapacitated sexual assault (unaware/unable to consent due to alcohol/drugs), forced sexual assault, positive depression screening, and reason for ED visit (injury vs. medical). Results: In total, 2,300 past-year drinkers participated: 58% female, 75% Caucasian, and mean age = 18.4. Regarding past 3-month blackouts, 72.7% reported none, 19.3% reported monthly or less, and 8% reported monthly or more. Multivariate cumulative logit regression indicated that blackout frequency was positively associated with: college involvement in Greek life, alcohol use severity, prescription drug misuse, marijuana, screening positive for depression, incapacitated sexual assault, and a gender by alcohol use severity interaction. Conclusion: With one-quarter of this clinical sample reporting recent blackouts, as well as the association between blackout frequency and health risk behaviors and other outcomes, findings underscore the need for programs focusing on substance use, depression, and preventing sexual assault. Interventions should also address poly-substance use and drinking motives. Although findings highlight how college students in Greek life may be at high risk for blackouts, many participants not in college also reported blackouts, suggesting that interventions in other settings are also needed.

Characteristics of predrinking and associated risks: A survey in a sample of German high school students.

Wahl, Sonja, et al.

International Journal of Public Health, Vol 58(2), Apr, 2013. pp. 197-205.

Abstract:

Objectives: Finding predictors for predrinking and placing the new phenomenon of predrinking on a greater database. Predrinking is defined as alcohol consumption, alone or with friends, at home or at public places, before going out in the evening to a party or in bars or discotheques. Methods: Data were collected from a representative sample of 757 ninth- and tenth-grade students from 31 high schools located in a south German rural region and a city. Results: Predrinkers, especially those who show this behaviour frequently, were notably more likely to engage in hazardous drinking, and experienced significantly more frequent involvements in fights and alcohol-induced blackouts. They also stated more often that they had the intention of getting drunk when consuming alcohol. Conclusions: Predrinking proves to be a high-risk behaviour, particularly when it occurs at a high frequency. This behaviour has to be seen as part of a new youth culture, which does not seem to be limited to a certain subgroup—with all of the associated risks.

Prevalence and Correlates of Alcohol-Induced Blackouts Among College Students: Results of an E-Mail Survey.

White, Aaron M., et al.

Journal of American College Health, Vol 51(3), Nov, 2002. pp. 117-119, 122-131.

Abstract:

The authors conducted an e-mail survey of 772 college students to learn more about their experiences with blackouts. Approximately half (51%) of those who had ever consumed alcohol reported they had experienced a blackout at some point in their lives, and 40% had experienced 1 in the year before the survey. Among those who drank in the 2 weeks before the survey, nearly 1 in 10 (9.4%) had experienced a blackout during that period. Many later learned that, during the blackout, they had vandalized property, driven an automobile, had sexual intercourse, or engaged in other risky behaviors. Experiencing 3 or more blackouts was associated with a variety of other experiences, including heavier drinking, lower grades, an earlier age of drinking onset, and having others express concerns about their

drinking. The female students who reported blackouts during the 2 weeks before the survey drank far less than male students did during this time period, supporting the use of gender-specific definitions of risky drinking.

The burden of alcohol use: Excessive alcohol consumption and related consequences among college students.

White, Aaron and Hingson, Ralph.

Alcohol Research: Current Reviews, Vol 35(2), 2013. pp. 201-218.

Abstract:

Research shows that multiple factors influence college drinking, from an individual's genetic susceptibility to the positive and negative effects of alcohol, alcohol use during high school, campus norms related to drinking, expectations regarding the benefits and detrimental effects of drinking, penalties for underage drinking, parental attitudes about drinking while at college, whether one is member of a Greek organization or involved in athletics, and conditions within the larger community that determine how accessible and affordable alcohol is. Consequences of college drinking include missed classes and lower grades, injuries, sexual assaults, overdoses, memory blackouts, changes in brain function, lingering cognitive deficits, and death. This article examines recent findings about the causes and consequences of excessive drinking among college students relative to their non-college peers and many of the strategies used to collect and analyze relevant data, as well as the inherent hurdles and limitations of such strategies.

Gender differences in the epidemiology of alcohol use in the United States.

White, Aaron M.

Alcohol Research: Current Reviews, Vol 40(2), 2020. pp. 1-13.

Abstract:

Over the past century, differences in alcohol use and related harms between males and females in the United States have diminished considerably. In general, males still consume more alcohol and experience and cause more alcohol-related injuries and deaths than females do, but the gaps are narrowing. Among adolescents and emerging adults, gaps in drinking have narrowed primarily because alcohol use among males has declined more than alcohol use among females. Among adults, alcohol use is increasing for women but not for men. Rates of alcohol-related emergency department visits, hospitalizations, and deaths all have increased among adults during the past two decades. Consistent with the changing patterns of alcohol use, increases in these outcomes have been larger for women. Recent studies also suggest that females are more susceptible than males to alcohol-induced liver inflammation, cardiovascular disease, memory blackouts, hangovers, and certain cancers. Prevention strategies that address the increases in alcohol consumption and unique health risks for women are needed.

Commentary on: Pressman MR, Caudill DS. Alcohol-induced blackout as a criminal defense or mitigating factor: An evidence-based review and admissibility as scientific evidence. J Forensic Sci 2013;58(4):932–40.

Wigmore, James G.

Journal of Forensic Sciences, Vol 59(1), Jan, 2014. pp. 293.

Abstract:

Comments on an article by Mark R. Pressman and David S. Caudill (see record 2013-24940-013). Pressman and Caudill provided an excellent and detailed review about the questionable scientific nature of alcohol induced blackout as a criminal defense. One other scientifically invalid aspect not specifically discussed in their study was the blood alcohol

concentration (BAC) calculation by the defense expert in their example case. These conditions rarely occur in criminal cases, and in more realistic experiments of prolonged drinking and large amounts of alcohol consumed, the Widmark calculations have been found to overestimate the actual BAC by up to 50%. Thus, even the basis of the defense opinion that a high BAC occurred in the defendant (and caused an alcohol-induced blackout) was highly questionable scientifically.

The effects of alcohol on human sexual behavior.

Wilson, G. Terence

Advances in Substance Abuse, Vol 2, 1981. pp. 1-40.

Abstract:

Discusses the effects on the body, both arousing and suppressing, that are attributed to alcohol in the literature. Uncontrolled, correlational investigations on the effects of alcohol on sexual functioning have included questionnaires, clinical observations (such as the 1966 study by W. H. Masters and V. E. Johnson), and retrospective studies. Correlational studies have concentrated on the connection between alcohol and sex crimes, particularly rape and child molestation. Experimental investigations have included psychophysiological studies of alcohol's effects on male sexuality (measured as penile tumescence, ejaculatory response, and sexual arousal) and on female vaginal response and sexual arousal. Indirect measures of sexuality and the effect of alcohol on sex hormones have also been included in experimental investigations. Two theories of alcohol's effects on sexual behavior are discussed: The social disinhibition theory presumes that alcohol causes changes in social behavior that include increased arousal to sexual stimuli and sexual crimes. In terms of the social learning theory, the effect of alcohol on sexual and other social behavior is governed by several classes of psychological variables. Individual patterns of behavior are acquired and maintained on the basis of differential reinforcement, modeling experiences, and cognitive self-regulatory mechanisms.

Alcohol and the disinhibition of sexual responsiveness.

Wilson, G. Terence, and Niaura, Raymond

Journal of Studies on Alcohol, Vol 45(3), May, 1984. pp. 219-224.

Abstract:

In a balanced placebo design, in which the joint and separate effects of alcohol and expectations of intoxication were investigated, 22 male undergraduates who were social drinkers listened to an erotic audiotape while penile tumescence was continuously recorded. Intoxicated Ss showed significantly shorter latency to onset of tumescence and to peak level of tumescence than did their sober counterparts. In contrast to previous research, no effect of expectations about drinking was obtained nor were responses related to scores on the Mosher Forced Choice Sex Guilt Scale. Findings indicate a specific effect of alcohol in impairing men's ability to inhibit sexual responsiveness. It appears that the sexual response threshold is lowered but that, once the process of arousal begins, tumescence reaches an average level that is unaffected by a small amount of alcohol.

'It just kind of happens': College students' rationalizations for blackout drinking.

Wombacher, Kevin. Et al.

Health Communication, Vol 34(1), Jan, 2019. pp. 1-10.

Abstract:

Nearly half of college students engage in binge drinking, and blackouts (i.e., episodes of periodic memory loss) represent one common consequence of this behavior. Although researchers have begun to understand the extent to which students black out, little is known

about why they do so. We conducted two studies to further our understanding of this risky health behavior. In Study 1, we conducted face-to-face interviews (N = 19) to explore students' blackout experiences. Our findings suggest that students recognize that blacking out is an unhealthy behavior; however, because such a recognition contradicts group norms about alcohol consumption, it causes them to experience dissonance, which they manage via a variety of rationalization strategies. We investigated these findings more systematically through an online survey in Study 2, in which students (N = 254) reported on their own and others' beliefs and behaviors about blacking out. Our results indicate that many of the rationalization strategies students identified in Study 1 were grounded in fallacious reasoning. We discuss the collective implications of these findings for future interventions addressing students' excessive drinking behaviors.

Effects of drinking patterns on prospective memory performance in college students.

Zamroziewicz, Marta, et al.

Neuropsychology, Vol 31(2), Feb, 2017. pp. 191-199.

Abstract:

Objective: Traditional college students are at a critical juncture in the development of prospective memory (PM). Their brains are vulnerable to the effects of alcohol. Method: There were 123 third and fourth year college students, 19–23 years old, who completed the Self-Rating Effects of Alcohol (SREA), Modified Timeline Follow-back (TLFB), Brief Young Adult Alcohol Consequences Scale (BYAACS), and Alcohol Effects Questionnaire (AEQ) once per month on a secure online database, as reported elsewhere (Dager et al., 2013). Data from the 6 months immediately before memory testing were averaged. In a single testing session participants were administered the Mini International Neuropsychiatric Interview–Diagnostic and Statistical Manual for Mental Disorders–Fourth Edition–Text Revision (MINI-DSM–IV–TR), measures of PM (event-based and time-based), and retrospective memory (RM). Based on the average score of six consecutive monthly responses to the SREA, TLFB, and AEQ, students were classified as nondrinkers, light drinkers, or heavy drinkers (as defined previously; Dager et al., 2013). Alcohol-induced amnesia (blackout) was measured with the BYAACS. Results: We found a relationship between these alcohol use classifications and time-based PM, such that participants who were classified as heavier drinkers were more likely to forget to perform the time-based PM task. We also found that self-reported alcohol-induced amnesia (blackouts) during the month immediately preceding memory testing was associated with lower performance on the event-based PM task. Participants' ability to recall the RM tasks suggested the PM items were successfully encoded even when they were not carried out, and we observed no relationship between alcohol use and RM performance. Conclusion: Heavy alcohol use in college students may be related to impairments in PM.

APPENDIX C: Research Abstracts on Alcohol and Memory for Crimes (non-Blackout)

Alcohol, and the effects of alcohol on memory and general cognitive functioning, has been the subject of much research over the years.

Alcohol acts as a general central nervous system depressant, but it affects some areas of the brain more than others. Specifically, it leads to distraction and inattention and significantly inhibits neuronal activity in the hippocampus, which impairs memory encoding since the hippocampus plays an important role in the formation of new declarative memories. Because procedural memory functions more or less automatically, retrieval of procedural memory (“remembering how”) is not as severely impaired by alcohol as retrieval of declarative memory (“remembering what”).

Alcohol particularly impairs the encoding of episodic memory (that part of declarative memory that relates to our personal experiences and specific events in time), especially for certain types of recall, such as cued recall, the recognition of completed word fragments and free recall. A "blackout" is an example of a difficulty in the encoding of episodic memories due to high doses of alcohol. It is caused by a rapid increase in blood alcohol concentration, which in turn distorts the activity of neurons in the hippocampus, thus impairing person's ability to form new episodic memories. Alcohol also severely disrupts the encoding and storage process of new semantic memories (our memory of facts, meanings and acquired knowledge about the external world), although apparently not that of previously learned information.

Alcohol also impairs short-term (working) memory, although mainly by affecting certain mnemonic strategies and executive processes rather than by shrinking the basic holding capacity of working memory or by physically altering the structure of those parts of the brain which are critical for working memory function. Although light to moderate drinking does not appear to impair long-term cognitive functioning significantly (and according to some studies, may actually decrease the risk of cognitive decline), heavy drinking and chronic alcoholism is associated with long-term impairment in sustained attention and working memory function, especially visual working memory.

Serious over-consumption of alcohol, especially in comparison with the intake of other foods, can cause a thiamine deficiency, leading to a much more serious form of amnesia known as Korsakoff's syndrome.

The Human Memory website: http://www.human-memory.net/disorders_alcohol.html

Research Abstracts

Alcohol myopia: Its prized and dangerous effects.

Steele, Claude M., Josephs, Robert A.

American Psychologist, (1990). 45(8), 921–933.

Abstract

This article explains how alcohol makes social responses more extreme, enhances important self-evaluations, and relieves anxiety and depression, effects that underlie both the social destructiveness of alcohol and the reinforcing effects that make it an addictive substance. The theories are based on alcohol's impairment of perception and thought—the myopia it causes—rather than on the ability of alcohol's pharmacology to directly cause specific reactions or on expectations associated with alcohol's use. Three conclusions are offered: (a) Alcohol makes social behaviors more extreme by blocking a form of response conflict. (b) The same process can inflate self-evaluations. (c) Alcohol myopia, in combination with distracting activity, can reliably reduce anxiety and depression in all

drinkers by making it difficult to allocate attention to the thoughts that provoke these states. These theories are discussed in terms of their significance for the prevention and treatment of alcohol abuse.

Alcohol use in male spouse abusers and their female partners

Ola W. Barnett and Ronald W. Fagan

Journal of Family Violence. (March 1993). Volume 8, Issue 1, pp 1–25

Abstract

Patterns of alcohol use of 181 maritally violent and maritally nonviolent men and their female partners differed on subscales of the Quantity-Frequency Index. Two abuser groups (43 uncounseled and 46 counseled) drank significantly greater amounts and for different psychological reasons than two nonabuser groups (50 satisfactorily married and 42 discordant). However, group frequency rates did not vary. The abuser groups had experienced and observed significantly more violence during childhood than the nonabuser groups; further, they reported significantly more current life stress. The female partners of the abusers did not differ in global alcohol use; however, they drank substantially more than their counterparts. They were especially prone to drink in response to battering. About one fourth of the abusers and one fifth of their wives drank frequently during abusive episodes. Stressors and depressors most likely precipitated both drinking and battering, with strain, hostility, and alcohol myopia (altered perception) serving as intervening variables. Results clarify contradictory reports concerning the role of alcohol in family violence.

Alcohol-related sexual assault: a common problem among college students.

Antonia Abbey

Journal of Studies on Alcohol, Supplement, (2002). (s14), 118–128.

Abstract

Objective: This article summarizes research on the role of alcohol in college students' sexual assault experiences. Sexual assault is extremely common among college students. At least half of these sexual assaults involve alcohol consumption by the perpetrator, the victim or both. Methods: Two research literatures were reviewed: the sexual assault literature and the literature that examines alcohol's effects on aggressive and sexual behavior. Results: Research suggests that alcohol consumption by the perpetrator and/or the victim increases the likelihood of acquaintance sexual assault occurring through multiple pathways. Alcohol's psychological, cognitive and motor effects contribute to sexual assault. Conclusions: Although existing research addresses some important questions, there are many gaps. Methodological limitations of past research are noted, and suggestions are made for future research. In addition, recommendations are made for college prevention programs and policy initiatives.

The intoxicated witness: Effects of alcohol on identification accuracy from showups.

Dysart, J. E., Lindsay, R. C. L., MacDonald, T. K., & Wicke, C.

Journal of Applied Psychology, (2002). 87(1), 170–175.

Abstract

The effect of alcohol on identification accuracy is potentially an important topic. This study examined the effects of alcohol consumption on identification accuracy from showups, the identification procedure most likely to be used by police with intoxicated witnesses. The blood alcohol level of people exposed to a target was measured. In the target-present showup condition, blood alcohol level was not significantly related to correct identification rate. In the target-absent showup condition, the higher the blood alcohol level, the more people were likely to make a false identification. Implications for law enforcement and future research directions are discussed.

Collegiate alcohol use and high-risk sexual behavior: A literature review.

Kaly, Perry W. Heesacker, Martin Frost, Hanna M.

Collegiate alcohol use and high-risk sexual behavior: A literature review. (2002). *Journal of College Student Development*, 43(6), 838–850.

Abstract

Studies concerning collegians' alcohol use and high-risk sexual behavior are summarized. Two theories of alcohol use and risky behavior are discussed: disinhibition theory and alcohol myopia theory. Suggestions for future research and implications for student personnel professionals are also provided.

Blind drunk: the effects of alcohol on inattention blindness

Seema L. Clifasefi Melanie K. T. Takarangi Jonah S. Bergman

Applied Cognitive Psychology (July 2006). Vol. 20, Issue 5, pp. 697-704.

Abstract

Alcohol consumption is a major contributor to road accidents. While it is likely that perceptual processing deficits contribute to poorer driving performance among intoxicated individuals, we know little about alcohol's role in particular perceptual processes. For instance, we know that even sober individuals can fail to detect unexpected salient objects that appear in their visual fields, a phenomenon known as inattention blindness (IB; Mack & Rock, 1998). We were interested in whether these visual errors become more or less likely when subjects are under the influence of alcohol or just think that they are drunk. We told half our subjects that they had received alcohol, and half that they had received a placebo. This information was either true or false. Intoxicated subjects (regardless of what they were told) were more likely to show 'blindness' to an unexpected object in their visual field. This finding has practical implications for human performance issues such as driving and eyewitness memory, and theoretical implications for visual cognition.

Alcohol's Effects on Sexual Decision Making: An Integration of Alcohol Myopia and Individual Differences

Kelly Cue Davis Christian S. Hendershot William H. George Jeanette Norris Julia R. Heiman

Journal of Studies on Alcohol and Drugs, 68(6), 843–851 (2007).

Abstract

Objective: We conducted an experiment to test the applicability of integrating individual perceptions of unprotected sex consequences with alcohol's myopic effects as an explanatory framework for risky sexual decision making in young heterosexual men and women. **Method:** Male and female participants (N = 61) rated their perceptions of unprotected sex consequences, received alcoholic (target breath alcohol concentration = .10%) or nonalcoholic drinks, and completed a risky sexual decision-making task that included a quantitative measure of sexual decision-making cue attention. **Results:** Intoxicated participants were more attentive to impelling cues and reported greater sexual risk intentions than sober participants. Mediation analyses indicated that attention to cues fully mediated the alcohol-sexual risk intention relationship. Moderational analyses revealed that alcohol's focusing effect acts in conjunction with pre-existing individual perceptions to influence cue salience directly and sexual risk intentions indirectly. **Conclusions:** Findings demonstrate the importance of examining predispositional tendencies when investigating alcohol myopia as a mediating mechanism underlying the alcohol-risky sex relationship.

Alcohol Myopia Revisited: Clarifying Aggression and Other Acts of Disinhibition Through a Distorted Lens

Peter R. Giancola, Robert A. Josephs, Dominic J. Parrott.

Perspectives on Psychological Science. (May 18, 2010) Vol 5, issue 3, pp. 265-278.

Abstract

The alcohol myopia model (AMM; Steele & Josephs, 1990) is reviewed in light of its unique ability to account for a variety of alcohol and nonalcohol-related disinhibited behaviors, particularly aggression. The AMM posits that alcohol has a narrowing, or a "myopic," effect on one's ability to attend to competing instigatory and inhibitory cues. Disinhibited behavior is presumed to occur when attention is directed toward salient provocative or instigatory cues rather than inhibitory cues. AMM research is reviewed with regard to stress and anxiety, risky sexual behavior, drinking and driving, suicide, disinhibited eating, smoking, and alcohol-related aggression. The AMM is also

expanded by proposing five key mechanisms (i.e., negative affect, angry affect, hostile cognitive rumination, self-awareness, and empathy) that are likely to explain how the model is specifically involved in the alcohol-aggression relation. Finally, a number of public health interventions, extrapolated from the AMM, are proposed to stimulate future research directed at reducing the prevalence of alcohol-related violence.

Alcohol Use and High-Risk Sexual Behavior Among Collegiate Women: A Review of Research on Alcohol Myopia Theory

Jessica A. Griffin MA , M. Renée Umstattd PhD & Stuart L. Usdan PhD

Journal of American College Health. (Oct 2010). Vol 58, Issue 6, pp. 523-532

Abstract

A review of current English literature in the areas of high-risk alcohol use and sexual behavior was conducted from September 2007 to December 2008. Objective: The purpose was to specifically review studies that used alcohol myopia theory (AMT) as the theoretical perspective from which they were evaluated and analyzed. Participants: Collegiate women were the population of interest in the review. Methods: Literature was acquired through searches within the Academic Search Premier and PubMed databases using the keywords “college,” “women,” “risk,” “alcohol,” “sex,” and “alcohol myopia.” Results: Results articulate the high prevalence of negative sexual consequences related to alcohol use among college-aged women and the utility of AMT. Conclusions: Future interventions aimed at decreasing high-risk alcohol and sexual behaviors among college women should incorporate AMT. Continued theory-based research examining the relationship between alcohol use and sexual behavior is needed to inform future interventions and better understand why college women continue to consume high levels of alcohol and engage in risky sexual behaviors despite the threat of negative consequences.

Public house patrons' engagement in hypothetical sexual assault: a test of Alcohol Myopia Theory in a field setting

Heather D. Flowe Jade Stewart Emma R. Sleath Francesca T. Palmer

Aggressive Behavior. (2011). Vol. 37, Issue 6, pp. 547-558.

Abstract

Previous research has found that drinking establishments are often antecedent to sexual aggression outcomes. In this study, male participants were randomly selected from public houses (i.e., “pubs”) and asked to imagine themselves in a hypothetical intimate encounter in which the female in the scenario stops consenting to sexual contact. Participants were given the option to continue making sexual advances up to and including sexual intercourse against the woman's will. It was hypothesized based on Alcohol Myopia Theory that participant blood alcohol concentration (BAC) levels would be associated with hypothetical sexual aggression when stereotypical cues of a woman's sexual availability (revealing clothing and alcohol use) were present in the scenario. Men's engagement in hypothetical sexual aggression was associated with BAC levels, but only when the woman was wearing revealing clothing. The sobriety of the female actor was not associated with sexual aggression. Results indicate that Alcohol Myopia Theory generalizes to a field setting.

Alcohol intoxication and memory for events: A snapshot of alcohol myopia in a real-world drinking scenario

Nadja Schreiber Compo, et. al.

Memory. (2011). Vol. 19, issue 2, pp. 202-210

Abstract

Alcohol typically has a detrimental impact on memory across a variety of encoding and retrieval conditions (e.g., Mintzer, 2007; Ray & Bates, 2006). No research has addressed alcohol's effect on memory for lengthy and interactive events and little has tested alcohol's effect on free recall. In this study 94 participants were randomly assigned to alcohol, placebo, or control groups and consumed drinks in a bar-lab setting while interacting with a “bartender”. Immediately afterwards all participants freely recalled the bar interaction. Consistent with alcohol myopia theory, intoxicated participants only differed from placebo and control groups when recalling peripheral information. Expanding on the original hypervigilance hypothesis, placebo participants showed more conservative reporting behaviour than the alcohol or control groups by providing more uncertain

and “don't know” responses. Thus, alcohol intoxication had confined effects on memory for events, supporting and extending current theories.

Understanding Acute Alcohol Effects on Sexual Behavior

William H. George & Susan A. Stoner

Journal Annual Review of Sex Research (Nov. 2012). Volume 11, 2000 - Issue 1

Abstract

Alcohol has been implicated as having a causal role in a variety of sexual processes and outcomes. We review nonexperimental research illustrating the nature of alcohol's association with sexuality. Methodological considerations limiting causal assertions permissible with nonexperimental data are discussed. We also review findings from experiments, mostly analogue paradigms, examining the effects of alcohol on genital arousal, sexual risk taking, and sexual assault. In each case, it is observed that alcohol can exert a causal effect on one or more of the constituent responses undergirding these phenomena. We conclude that alcohol does appear to have a causal impact on many sexuality indices studied in laboratory conditions. Both alcohol expectancy and alcohol myopia models have been applied to explain these causal linkages. Expectancy models seem to account well for postdrinking sexual reactions and perceptions. Overall, myopia analyses seem to offer the most persuasive explanations of postdrinking expressions of sexual risk taking and sexual assault.

The Effects of Alcohol on Crime-related Memories: A Field Study

van Oorsouw, Kim, Harald Merckelbach

Applied Cognitive Psychology, Vol 26(1), Jan-Feb, 2012 pp. 82-90. Publisher: John Wiley & Sons

Summary

This field study investigated to what extent memory of criminally relevant details is affected at (close to) zero ($M_{BAC} = 0.00\%$), moderate ($M_{BAC} = 0.06\%$), and high ($M_{BAC} = 0.16\%$) levels of alcohol intoxication. Participants ($N = 76$) were approached in bars and were invited to watch a mock crime from a perpetrator perspective. We also measured their blood alcohol concentration levels. After 3–5 days, when participants were sober, they underwent a free and cued recall task about the mock crime. **Compared with sober controls, both moderately and highly intoxicated individuals were less complete when recollecting crime details, recalling up to 33% fewer correct details. Overall, intoxicated participants were less accurate during the cued recall task (i.e. they produced more errors) relative to sober participants.** These accuracy effects were dose-dependent for cued recall of salient features. Implications for police interrogations of defendants are discussed.

Effects of alcohol on sequential information processing: Evidence for temporal myopia.

Fleming, Kimberly A. Bartholow, Bruce D. Sable, Jeffrey Pearson, Melanie Fabiani, Monica Gratton, Gabriele

Psychology of Addictive Behaviors, (2013). 27(1), 184–190.

Abstract

Alcohol Myopia Theory (AMT) posits that alcohol restricts the focus of attention, such that behaviors are determined only by highly salient environmental cues. While AMT is most commonly understood in terms of spatial attention, the present study tested the effects of alcohol in the temporal domain of attention. Seventy-one participants consumed either a placebo beverage or one of two doses of alcohol (0.40g/kg or 0.80g/kg ETOH) before performing an auditory discrimination task while event-related potentials (ERPs) were recorded. Consistent with typical sequential effects, placebo participants showed increased P300 amplitude and slowed behavioral responses when the current target differed from the two-back tone. In contrast, alcohol caused increased P300 and response slowing when the target tone differed from the one-back tone. These findings suggest that alcohol increases the salience of more recently encountered information, consistent with the general tenets of AMT.

Bottled memories: On how alcohol affects eyewitness recall.

Hagsand, Angelica, et al.

Scandinavian Journal of Psychology, Vol 54(3), June, 2013. pp. 188-195.

Abstract:

This study investigated how different doses of alcohol affected eyewitness recall. Participants ($N = 126$) were randomly assigned to three groups with different blood alcohol concentration (BAC), either a control group (mean BAC 0.00%, $N = 42$), a lower alcohol dose group (mean BAC 0.04%, $N = 40$), or a higher alcohol dose group (mean BAC 0.06%, $N = 44$). After consumption, participants witnessed a movie of a mock crime and were interviewed one week later. The main results showed that witnesses with the higher intoxication level recalled fewer details compared to witnesses with the lower intoxication level. The amount of alcohol consumed did not have an impact on the accuracy rate. No sex differences were found. The results are discussed in the light of past research. We conclude that more studies are needed before recommendations can be made to an applied setting.

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

La Rooy, D., Nicol, A., and Terry, P.

Open Journal of Medical Psychology, 02, 03, (107), (2013).

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.

Alcohol intoxicated eyewitnesses' memory of intimate partner violence.

Karlén, Malin Hildebrand, et al.

Psychology, Crime & Law, Vol 21(2), Feb, 2015. pp. 156-171.

Abstract:

Alcohol affects memory in many, and mostly negative, ways. This is a problem in legal contexts as many witnesses are alcohol intoxicated when taking part of the critical event. However, research is sparse regarding how, and under what circumstances, the reports of alcohol intoxicated witnesses differ from those of sober witnesses. This study investigated whether alcohol intoxicated and sober eyewitnesses differ regarding completeness, accuracy, and type of information reported, as well as whether gender influenced these variables. Eighty-seven healthy men ($n = 44$) and women ($n = 43$) received either an alcoholic beverage (0.7 g/kg) or a control (juice) in a laboratory setting before viewing a film picturing intimate partner violence. Ten minutes after viewing the film, they were interviewed. Reports by alcohol intoxicated women were less complete, but as accurate, as sober women's. In contrast, intoxicated and sober men did not differ regarding completeness or accuracy. Furthermore, compared with sober women, intoxicated women reported fewer actions but no difference was found between the groups regarding reported objects. At this moderate dose, alcohol affected women's reports more than men's, which may be because alcohol affects attention and memory consolidation more clearly at a lower dose for women than for men.

Alcohol intoxication impairs memory and increases suggestibility for a mock crime: A field study.

van Oorsouw, K., et al.

Abstract:

Defendants and witnesses are often intoxicated by alcohol. We investigated whether memory and resistance to suggestive cues are undermined at blood alcohol concentrations (BACs) that were (close to) zero ($M_{BAC} = 0.01\%$), moderate ($M_{BAC} = 0.06\%$), or high ($M_{BAC} = 0.16\%$). Participants ($N = 67$) were approached in bars and instructed to commit a mock crime. Immediately after this, their memory and susceptibility to suggestive questions were tested, and these were re-tested during a sober follow-up 3–5 days later. Compared with sober participants, moderate and severe intoxication was associated with lower levels of correctly recalled crime details during both test sessions (i.e. intoxicated and sober). Also, during both sessions, severely intoxicated participants displayed a greater tendency to go along with suggestive cues compared with sober participants. Thus, intoxication impaired memory and increased suggestibility during an immediate interview, and both effects persisted when sober again.

Intoxicated witnesses: Testing the validity of the Alcohol Myopia Theory.

Authors:

Crossland, Deborah, et al.

Applied Cognitive Psychology, Vol 30(2), Mar-Apr, 2016. pp. 270-281.

Abstract:

In an assessment of the Alcohol Myopia Theory (AMT), the effects of alcohol on an eyewitness's recall of high-salience and low-salience details were investigated. In a laboratory, Study 1 participants watched a staged videoed theft whilst either sober (control or placebo), above ($M_{BAC} = 0.09\%$) or below ($M_{BAC} = 0.06\%$) the UK drink-drive limit. A week later, a free recall and recognition tests were completed. Intoxication was not found to reduce recall accuracy using either recall task. In Study 2, whilst on a night out, participants watched the videoed theft with high ($M_{BAC} = 0.14\%$) or low ($M_{BAC} = 0.05\%$) blood alcohol concentrations (BACs). A week later, the free recall and recognition tests were attempted. High BACs were seen to impair recall when memory was assessed through free recall but not with the recognition test. Neither study found the attention narrowing predicted by AMT using either recall technique, although poor recall for low-salience details in all groups may have contributed to this result.

Booze cues and attentional narrowing: Neural correlates of virtual alcohol myopia.

By Gable, Philip A., Mechin, Nicole C., Neal, Lauren B.

Psychology of Addictive Behaviors, Vol 30(3), May 2016, 377-382

Abstract

Exposure to alcohol cues reduces the breadth of attentional scope, called “virtual myopia.” Past researchers have suggested approach motivation as a possible mechanism that underlies this myopia in response to alcohol cues. We expanded on these findings in the current study by identifying the neural underpinnings of the relationship between attentional narrowing, approach motivation, and exposure to alcohol cues. Participants completed 64 trials that consisted of neutral or alcohol-related stimuli followed by a measure of attentional narrowing (i.e., Navons letter task). Electroencephalography (EEG) was recorded during the experiment to assess greater left frontal hemispheric asymmetry, a measure of approach motivation. Results revealed that alcohol cues led to greater “virtual myopia” as measured by narrowed attentional scope. Greater left frontal activation to alcohol cues related to greater myopia, suggesting that approach motivation is associated with virtual myopia. Left frontal activation appears to be a neural correlate of cognitive narrowing related to approach motivation.

The effects of acute alcohol intoxication on the cognitive mechanisms underlying false facial recognition.

Colloff, Melissa F. and Flowe, Heather D.

Psychopharmacology, Vol 233(11), Jun, 2016. pp. 2139-2149.

Abstract:

Rationale: False face recognition rates are sometimes higher when faces are learned while under the influence of alcohol. Alcohol myopia theory (AMT) proposes that acute alcohol intoxication

during face learning causes people to attend to only the most salient features of a face, impairing the encoding of less salient facial features. Yet, there is currently no direct evidence to support this claim.

Objectives: Our objective was to test whether acute alcohol intoxication impairs face learning by causing subjects to attend to a salient (i.e., distinctive) facial feature over other facial features, as per AMT.

Methods: We employed a balanced placebo design ($N = 100$). Subjects in the alcohol group were dosed to achieve a blood alcohol concentration (BAC) of 0.06 %, whereas the no alcohol group consumed tonic water. Alcohol expectancy was controlled. Subjects studied faces with or without a distinctive feature (e.g., scar, piercing). An old-new recognition test followed. Some of the test faces were 'old' (i.e., previously studied), and some were 'new' (i.e., not previously studied). We varied whether the new test faces had a previously studied distinctive feature versus other familiar characteristics.

Results: Intoxicated and sober recognition accuracy was comparable, but subjects in the alcohol group made more positive identifications overall compared to the no alcohol group.

Conclusions: The results are not in keeping with AMT. Rather, a more general cognitive mechanism appears to underlie false face recognition in intoxicated subjects. Specifically, acute alcohol intoxication during face learning results in more liberal choosing, perhaps because of an increased reliance on familiarity.

Alcohol-induced retrograde facilitation renders witnesses of crime less suggestible to misinformation.

Gawrylowicz, Julie., et al.

Psychopharmacology, Vol 234(8), Apr, 2017. pp. 1267-1275.

Abstract:

Rationale: Research has shown that alcohol can have both detrimental and facilitating effects on memory: intoxication can lead to poor memory for information encoded *after* alcohol consumption (anterograde amnesia) and may improve memory for information encoded *before* consumption (retrograde facilitation). This study examined whether alcohol consumed *after* witnessing a crime can render individuals less vulnerable to misleading post-event information (misinformation). Method: Participants watched a simulated crime video. Thereafter, one third of participants expected and received alcohol (alcoholgroup), one third did not expect but received alcohol (reverse placebo), and one third did not expect nor receive alcohol (control). After alcohol consumption, participants were exposed to misinformation embedded in a written narrative about the crime. The following day, participants completed a cued-recall questionnaire about the event. Results: Control participants were more likely to report misinformation compared to the alcohol and reverse placebo group. Conclusion: The findings suggest that we may oversimplify the effect alcohol has on suggestibility and that sometimes alcohol can have beneficial effects on eyewitness memory by protecting against misleading post-event information.

Witnesses stumbling down memory lane: The effects of alcohol intoxication, retention interval, and repeated interviewing.

Hagsand, Angelica V., et al.

Memory, Vol 25(4), Apr, 2017. pp. 531-543.

Abstract:

Intoxicated eyewitnesses are often discredited by investigators and in court, but few studies have examined how alcohol affects witnesses' memory. The primary aim of the present study was to examine how intoxication (alcohol vs. control), retention interval (immediate vs. one week delay), and number of interviews (one vs. two interviews) affect witnesses' memory. The participants ($N = 99$) were randomly assigned to consume either orange juice or alcohol mixed with orange juice, and they all witnessed a filmed mock crime afterwards. The recall took place either (a) immediately and after a one week delay or (b) after a one week delay only. No main effect of alcohol was found on the quantity or quality of the witnesses' statements. Both intoxicated and sober witnesses recalled more details, and were more accurate, during immediate compared to delayed recall. For witnesses interviewed twice, an average of 30% new details were provided in the second compared to the first interview, and these were highly accurate. In sum, contrary to what one can expect,

intoxicated witnesses with a low to moderate blood alcohol concentration (below 0.10%) were reliable witnesses.

Alcohol intoxicated witnesses: Perception of aggression and guilt in intimate partner violence.

Hildebrand Karlén, Malin, et al.

Journal of Interpersonal Violence, Vol 32(22), Nov, 2017. pp. 3448-3474.

Abstract:

Many witnesses to violent crimes are alcohol intoxicated, but research is lacking regarding how alcohol affects their perception of aggression and guilt. This study investigated to what extent alcohol intoxicated eyewitnesses differed from sober witnesses regarding how aggressive and guilty they perceived the involved parts in an intimate partner violence (IPV) situation. Eighty-seven healthy men ($n = 44$) and women ($n = 43$) were randomized to an alcohol group (0.7 g/kg) or a non-alcohol group. In a laboratory setting, alcoholic/non-alcoholic drinks were consumed before viewing a film depicting IPV between a man and a woman. Ten min after viewing, in an interview, the participants rated how aggressive and guilty they perceived the involved parts to be. Alcohol intoxicated participants perceived both parts' physically aggressive behavior as comparatively less severe, but their neutral behavior as more hostile. Sober witnesses perceived the man to be the most guilty part, whereas intoxicated witnesses distributed guilt more evenly. Alcohol had a strong but complex impact on the perception of aggression in IPV (i.e., heightened during the neutral interaction and lowered during physical aggression). These results may be explained by the cognitive consequences of alcohol's anxiety-dampening effects. Regarding the asymmetric difference in perceived guilt, stereotypical expectations of gender-appropriate behavior in an IPV situation may need to be considered.

Interviewing intoxicated witnesses: Memory performance in theory and practice.

Authors:

Hildebrand Karlén, Malin

Scandinavian Journal of Psychology, Nov 20, 2017.

Abstract:

Memory encoding and recall involving complex, effortful cognitive processes are impaired by alcohol primarily due to impairment of a select few, but crucial, cortical areas. This review shows how alcohol affects some, but not all, aspects of eyewitnesses' oral free recall performance. The principal results, so far, are that: a) free recall reports by intoxicated witnesses (at the investigated BAC-levels) may contain less, but as accurate, information as reports by sober witnesses; b) immediate reports given by intoxicated witnesses may yield more information compared to reports by sober witnesses given after a one week delay; c) an immediate interview may enhance both intoxicated and sober witnesses' ability to report information in a later interview; and d) reminiscence seems to occur over repeated interviews and the new information seems to be as accurate as the previously reported information. Based on this, recommendations are given for future research to enhance understanding of the multifaceted impact of alcohol on witnesses' oral free recall of violent crimes.

The impact of own and others' alcohol consumption on social contagion following a collaborative memory task.

Thorley, Craig, and Christiansen, Paul.

Memory, Vol 26(6), Jul, 2018. pp. 727-740.

Abstract:

When one person alters his or her recollection of an event to be consistent with another person's erroneous account of the same event, social contagion has occurred. In two studies, we examined whether alcohol consumption influences the degree to which people engage in social contagion. In Study 1, participants consumed alcohol, an alcohol placebo, or a soft drink and then completed a collaborative recall test with a confederate who consumed a soft drink. In Study 2, participants consumed a soft drink and then completed a collaborative recall test with a confederate they believed had consumed a soft drink or alcohol (but no alcohol was ever consumed). In both studies, the confederate made scripted errors during the collaborative recall test. On post-collaborative

individual recall and recognition tests, participants in both studies engaged in social contagion by including the confederate's errors in their own recollection. In Study 1, the drink participants consumed had no influence on social contagion. In Study 2, participants were less likely to engage in social contagion after collaborating with a confederate who had seemingly consumed alcohol. That same confederate was viewed as less accurate, trustworthy, and credible, which likely made participants less inclined to engage in social contagion.

Do intoxicated witnesses produce poor facial composite images?

Bayless, S. J., Harvey, A. J., Kneller, W., and Frowd, C. D.

Psychopharmacology, Vol 235(10), Oct, 2018. pp. 2991-3003.

Abstract:

Rationale: The effect of alcohol intoxication on witness memory and performance has been the subject of research for some time, however, whether intoxication affects facial composite construction has not been investigated. Objectives: Intoxication was predicted to adversely affect facial composite construction. Methods: Thirty-two participants were allocated to one of four beverage conditions consisting of factorial combinations of alcohol or placebo at face encoding, and later construction. Participants viewed a video of a target person and constructed a composite of this target the following day. The resulting images were presented as a full face composite, or a part face consisting of either internal or external facial features to a second sample of participants who provided likeness ratings as a measure of facial composite quality. Results: Intoxication at face encoding had a detrimental impact on the quality of facial composites produced the following day, suggesting that alcohol impaired the encoding of the target faces. The common finding that external compared to internal features are more accurately represented was demonstrated, even following alcohol at encoding. This finding was moderated by alcohol and target face gender such that alcohol at face encoding resulted in reduced likeness of external features for male composite faces only. Conclusions: Moderate alcohol intoxication impairs the quality of facial composites, adding to existing literature demonstrating little effect of alcohol on line-up studies. The impact of intoxication on face perception mechanisms, and the apparent narrowing of processing to external face areas such as hair, is discussed in the context of alcohol myopia theory.

The devil is not only in the details: Gist and detail elaboration in intoxicated witnesses' reports of interpersonal violence.

Hildebrand Karlén, Malin, et al.

Psychology, Crime & Law, Oct 2, 2018.

Abstract:

The empirical base relating to alcohol's effects on underlying memory mechanisms among witnesses is sparse. Therefore, the effect of alcohol intoxication on memory mechanisms was investigated, as well as how degree of intoxication and interview delay affected gist and detail elaboration in these witnesses' reports. Participants ($n = 136$) were randomized to an alcohol group (men: 0.8 g/kg, women: 0.75 g/kg) ($n = 70$) or a control group ($n = 66$), given juice. After consumption, they witnessed an intimate partner violence-scenario, and performed tasks assessing memory mechanisms. Half of the intoxicated and sober groups were interviewed immediately. The remaining participants were interviewed one week later. Inter alia, intoxication decreased total gist recall and elaboration capacity. In general, high intoxication ($BAC = 0.08-0.15$) made witnesses report fewer gist categories, and also to elaborate them less, but there were differences in gist/detail elaboration between levels of intoxication due to emotional context. Less reported information among intoxicated witnesses was caused both by omitting parts of the scenario and to less detailed elaboration. Emotional context influenced reporting among intoxicated witnesses on a gist and detail level. However, intoxication had less impact on gist/detail-elaboration than did a one week delay before interview, suggesting that witnesses should be interviewed immediately, despite intoxication.

Differential effects of alcohol on associative versus item memory.

Maylor, Elizabeth A., et al.

Applied Cognitive Psychology, Oct 29, 2018.

Abstract:

Summary Alcohol has detrimental effects on a range of cognitive processes, the most prominent being episodic memory. These deficits appear functionally similar to those observed within the normal aging population. We investigated whether an associative memory deficit, as found in older adults, would also be evident in young adults moderately intoxicated by alcohol. Participants were shown unrelated word pairs and then tested on both their item recognition (old/new item?) and associative recognition (intact/recombined pair?). Half the participants were under the influence of alcohol whereas the other half were sober. Alcohol impaired memory performance but significantly more so for associative than for item memory. Moreover, within the alcohol group, the associative memory deficit was significantly related to the amount of alcohol consumed. The findings suggest that not all aspects of episodic memory are equally impaired by alcohol, which may have practical implications for criminal investigations involving eye witnesses who have consumed alcohol.

Does alcohol loosen the tongue? Intoxicated individuals' willingness to report transgressions or criminal behavior carried out by themselves or others.

Mindthoff, Amelia, et al.

Applied Cognitive Psychology, Nov 21, 2018.

Abstract:

Summary Police commonly interview intoxicated suspects. This is concerning when suspects are innocent because intoxication often leads to a higher risk for impulsive decision making and reduces inhibition. However, the manner in which intoxication affects people's reporting of unethical or criminal actions carried out by themselves or others is unknown and was thus addressed in the current study. Participants (N = 116) were randomly assigned to one of six conditions based on a 2 (transgression: self, other) $\times$ 3 (alcohol condition: low-to-moderate intoxication, placebo, sober-control) between-participants design. After drinking their assigned beverages, participants were asked to disclose a transgression. No main effect of alcohol emerged. However, the odds that participants would report a transgression were significantly higher if they were asked to report a personal, rather than someone else's, transgression. Overall, low-to-moderate intoxication did not increase the likelihood of sensitive information disclosure in this initial study, but additional research is needed.

APPENDIX D: Research Abstracts on Alcohol Consumption Estimates

Self-estimation of blood alcohol concentration: A review.

Aston, Elizabeth R., et. al. Addictive Behaviors, Vol 38(4), Apr, 2013. pp. 1944-1951.

Abstract:

This article reviews the history of blood alcohol concentration (BAC) estimation training, which trains drinkers to discriminate distinct BAC levels and thus avoid excessive alcohol consumption. BAC estimation training typically combines education concerning alcohol metabolism with attention to subjective internal cues associated with specific concentrations. Estimation training was originally conceived as a component of controlled drinking programs. **However, dependent drinkers were unsuccessful in BAC estimation, likely due to extreme tolerance. In contrast, moderate drinkers successfully acquired this ability.** A subsequent line of research translated laboratory estimation studies to naturalistic settings by studying large samples of drinkers in their preferred drinking environments. Thus far, naturalistic studies have provided mixed results regarding the most effective form of BAC feedback. BAC estimation training is important because it imparts an ability to perceive individualized impairment that may be present below the legal limit for driving. Consequently, the training can be a useful component for moderate drinkers in drunk driving prevention programs.

Have I had one drink too many? Assessing gender differences in misperceptions of intoxication among college students.

Mallett, Kimberly A., et. al. Journal of Studies on Alcohol and Drugs, Vol 70(6), Nov, 2009. pp. 964-970.

Abstract:

Objective: The present study extends the literature on factors involved in college students' drinking tendencies by examining differences between men and women in their ability to accurately estimate personal intoxication. The study also assessed whether men and women who typically consume large quantities of alcohol when they attend parties have more difficulty accurately assessing intoxication compared with lighter drinkers. Method: The research used the external cueing approach (ECA) of Turrisi and colleagues as the informational paradigm to examine 3,707 college students' gender, typical drinking at parties, and how they relate to perceptions of intoxication. Results: **The study revealed that approximately 20% ($n = 710$) of participants underestimated their blood alcohol concentration using the ECA. Among participants who made underestimation errors, gender differences were observed in that women made significantly more underestimation errors in the scenarios that contained four to five drinks and men made more underestimation errors in the scenarios that contained six to seven drinks. In addition, a three-way interaction revealed that female students who reported typically drinking larger amounts of alcohol in party settings were more likely to make errors when estimating their intoxication for moderately high numbers of drinks (e.g., four to five drinks).** Conclusions: The results are discussed in terms of examining the importance of college student drinking, gender, typical alcohol consumption at a party, and estimation of intoxication. Implications of gender effects in relation to high-risk drinking activities (i.e., pregameing and drinking games) as well as prevention efforts are discussed.

Perceptions of breath alcohol concentration (BrAC) levels among a sample of bar patrons with BrAC values of 0.08% or higher.

Martin, Ryan J., et al.

Psychology of Addictive Behaviors, Vol 30(6), Sep, 2016. pp. 680-685.

Abstract:

Breath alcohol concentration (BrAC) is a commonly used measure of alcohol intoxication. Because of the potential negative consequences of excessive alcohol consumption, it is important to examine how accurately intoxicated individuals can estimate their BrAC values, especially individuals over the legal BrAC driving threshold (i.e., 0.08%). To better understand perceptions of BrAC values among intoxicated individuals, this field study examined actual BrAC values and BrAC range estimates (0.08% and above, 0.02–0.07%, less than 0.02%) among a sample of bar patrons ($N =$

454) with BrAC levels at 0.08% or higher. Bivariate and multivariate analyses were conducted to examine the relationship between actual BrAC values and perceived BrAC levels. We also examined whether the following demographic and drinking variables were associated with underestimating BrAC in this sample: gender, age, race, college student status, plans to get home, and hazardous drinking. Results indicated that the majority (60.4%) of participants underestimated their BrAC (i.e., less than 0.08%) and lower BrAC values correlated with underestimating BrAC ranges ($p < .001$, 95% CI[0.2, 0.6]). Further, females ($p = .001$, 95% CI[1.3, 3.3]) and participants under 21 ($p = .039$, 95% CI = 1.0, 2.6) were significantly more likely to estimate their BrAC to be less than 0.08%, which is concerning given that young (less than 21) intoxicated females are a group at high risk for sexual assault on college campuses.

Accuracy of Self-Reported Drinking: Observational Verification of 'Last Occasion' Drink Estimates of Young Adults

Northcote, J.; Michael Livingston

Alcohol and Alcoholism (2011) 45 (6): 709-713.

Abstract

Aims: As a formative step towards determining the accuracy of self-reported drinking levels commonly used for estimating population alcohol use, the validity of a 'last occasion' self-reporting approach is tested with corresponding field observations of participants' drinking quantity. This study is the first known attempt to validate the accuracy of self-reported alcohol consumption using data from a natural setting. **Methods:** A total of 81 young adults (aged 18–25 years) were purposively selected in Perth, Western Australia. Participants were asked to report the number of alcoholic drinks consumed at nightlife venues 1–2 days after being observed by peer-based researchers on 239 occasions. Complete observation data and self-report estimates were available for 129 sessions, which were fitted with multi-level models assessing the relationship between observed and reported consumption. **Results:** Participants accurately estimated their consumption when engaging in light to moderate drinking (eight or fewer drinks in a single session), with no significant difference between the mean reported consumption and the mean observed consumption. **In contrast, participants underestimated their own consumption by increasing amounts when engaging in heavy drinking of more than eight drinks.** **Conclusion:** It is suggested that recent recall methods in self-report surveys are potentially reasonably accurate measures of actual drinking levels for light to moderate drinkers, but that underestimating of alcohol consumption increases with heavy consumption. Some of the possible reasons for underestimation of heavy drinking are discussed, with both cognitive and socio-cultural factors considered.

College students' estimation and accuracy of other students' drinking and believability of advertisements featured in a social norms campaign.

Park, Hee Sun., et. al. Journal of Health Communication, Vol 16(5), May, 2011. pp. 504-518.

Abstract:

Social norms campaigns, which are based on correcting misperceptions of alcohol consumption, have frequently been applied to reduce college students' alcohol consumption. This study examined estimation and accuracy of normative perceptions for students during everyday drinking occasions. **Students who reported having 4 or fewer drinks underestimated the percentage of other students who had 4 or fewer drinks, while those who drank 5 or more drinks overestimated the percentage of other students who had 5 or more drinks.** Believability of advertisements featured in social norms campaigns also played a crucial role in this process. Those who believed the ad more closely estimated alcohol consumption by their peers while ad believability moderated the relation between drinking behaviors and accuracy.

Examining alcohol and alcohol-free versions of a Simulated Drinking Game Procedure.

Silvestri, Mark M., et. al. Journal of Studies on Alcohol and Drugs, Vol 74(2), Mar, 2013. pp. 329-336.

Abstract:

Objective: Drinking games contribute to heavy drinking on college campuses because the rules often result in rapid alcohol consumption and increased risk of negative consequences. The current

study used the Simulated Drinking Game Procedure (SDGP) to observe and describe drinking game behavior under controlled laboratory conditions. Method: Participants ($N = 40$) age of 21 and older played a laboratory version of beer pong. Participants were randomly assigned to play with either beer or water, and the study examined the differences in consumption, blood alcohol concentration (BAC) estimates, and subjective experiences within and across the beverage conditions. Results: Participants in both beverage conditions viewed the sessions as realistic simulations of actual drinking games. Participants who played with beer consumed more drinks and refused fewer drinks than those served water. Two measures of BAC (calculated formula and breath alcohol device) were correlated with one another and with the amount of alcohol consumed. **BAC estimates based on the formula tended to be higher than readings obtained from the breath alcohol device, and the discrepancies between the two measures were higher among female participants.** Conclusions: The findings suggest that both the alcohol and alcohol-free versions of the SDGP are safe and ecologically valid research tools for examining drinking game behavior. The study highlights the features and limitations of both versions of the SDGP and provides a platform for continued development of the methodology, allowing researchers to address a range of clinically relevant research questions.

Student estimations of peer alcohol consumption: Links between the Social Norms Approach and the Health Promoting University concept.

Stock, Christiane, et. al. Scandinavian Journal of Public Health, Vol 42(15, Suppl), Nov, 2014. pp. 52-59.

Abstract:

Background: The Social Norms Approach, with its focus on positive behaviour and its consensus orientation, is a health promotion intervention of relevance to the context of a Health Promoting University. In particular, the approach could assist with addressing excessive alcohol consumption. Aim: This article aims to discuss the link between the Social Norms Approach and the Health Promoting University, and analyse estimations of peer alcohol consumption among European university students. Methods: A total of 4392 students from universities in six European countries and Turkey were asked to report their own typical alcohol consumption per day and to estimate the same for their peers of same sex. Students were classified as accurate or inaccurate estimators of peer alcohol consumption. Socio-demographic factors and personal alcohol consumption were examined as predictors for an accurate estimation. Results: 72% of male and 51% of female students were identified as having accurate estimations about the amount of alcoholic drinks consumed per day by their peers. Male students, older students, those studying year 3 and above, and Turkish and Danish students were more likely to accurately estimate their peers' alcohol consumption. Independent from these factors, **students' accurate estimation of peers' drinking decreased significantly with increasing personal consumption.** Conclusions: As accurate estimates of peer alcohol consumption appear to affect personal drinking behaviour positively, Social Norms interventions targeted at correcting possible misperceptions about peer alcohol use among students may be a useful health promotion tool in the context of a Health Promoting University.

Who under-reports their alcohol consumption in telephone surveys and by how much? An application of the 'yesterday method' in a national Canadian substance use survey.

Tim Stockwell, et. al. Addiction, Vol. 109, issue 10. Oct. 2014. Pages 1657-1666.

Abstract

Background and Aims

Adjustments for under-reporting in alcohol surveys have been used in epidemiological and policy studies which assume that all drinkers underestimate their consumption equally. This study aims to describe a method of estimating how under-reporting of alcohol consumption might vary by age, gender and consumption level.

Method

The Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) 2008–10 ($n = 43\,371$) asks about beverage-specific 'yesterday' consumption (BSY) and quantity–frequency (QF). Observed drinking frequencies for different age and gender groups were calculated from BSY and used to

correct values of F in QF. Beverage-specific correction factors for quantity (Q) were calculated by comparing consumption estimated from BSY with sales data.

Results

Drinking frequency was underestimated by males ($Z = 24.62$, $P < 0.001$) and females ($Z = 17.46$, $P < 0.001$) in the QF as assessed by comparing with frequency and quantity of yesterday drinking. Spirits consumption was underestimated by 65.94% compared with sales data, wine by 38.35% and beer by 49.02%. After adjusting Q and F values accordingly, regression analysis found alcohol consumption to be underestimated significantly more by younger drinkers (e.g. $82.9 \pm 1.19\%$ for underage drinkers versus $70.38 \pm 1.54\%$ for those 65+, $P < 0.001$) and by low-risk more than high-risk drinkers ($76.25 \pm 0.34\%$ versus $49.22 \pm 3.01\%$, $P < 0.001$). Under-reporting did not differ by gender.

Conclusions

Alcohol consumption surveys can use the beverage-specific ‘yesterday method’ to correct for under-reporting of consumption among subgroups. Alcohol consumption among Canadians appears to be under-reported to an equal degree by men and women. Younger drinkers under-report alcohol consumption to a greater degree than do older drinkers, while low-risk drinkers underestimate more than do medium and high-risk drinkers.

Estimating under- and over-reporting of drinking in national surveys of alcohol consumption: Identification of consistent biases across four English-speaking countries.

Stockwell, Tim., et al. *Addiction*, Vol 111(7), Jul, 2016. pp. 1203-1213.

Abstract:

Background and Aims: Questions about drinking ‘yesterday’ have been used to correct under-reporting of typical alcohol consumption in surveys. We use this method to explore patterns of over- and under-reporting of drinking quantity and frequency by population subgroups in four countries. Design: Multivariate linear regression analyses comparing estimates of typical quantity and frequency of alcohol consumption with and without adjustments using the yesterday method. Setting and Participants: Survey respondents in Australia ($n = 26\,648$), Canada ($n = 43\,371$), USA ($n = 7969$) and England ($n = 8610$). Measurements: Estimates of typical drinking quantities and frequencies over the past year plus quantity of alcohol consumed the previous day. Findings Typical frequency was underestimated by less frequent drinkers in each country. For example, after adjustment for design effects and age, Australian males self-reporting drinking ‘less than once a month’ were estimated to have in fact drunk an average of $14.70 (\pm 0.59)$ days in the past year compared with the standard assumption of 6 days ($t = 50.5$, $P < 0.001$). Drinking quantity ‘yesterday’ was not significantly different overall from self-reported typical quantities during the past year in Canada, the United States and England, but slightly lower in Australia (e.g. 2.66 versus 3.04 drinks, $t = 20.4$, $P < 0.01$ for women). Conclusions: **People who describe themselves as less frequent drinkers appear to under-report their drinking frequency substantially**, but country and subgroup-specific corrections can be estimated. Detailed questions using the yesterday method can help correct under-reporting of quantity of drinking.

APPENDIX E: Generic Affidavit from a Forensic Expert

DEPARTMENT OF THE NAVY GENERAL COURT MARTIAL NAVY AND MARINE CORPS TRIAL JUDICIARY JUDICIAL CIRCUIT

UNITED STATES

v.

SSgt John Doe

**DECLARATION OF
DR. PAUL SIMPSON**

22 January 2020

I, Paul Simpson, Ed.D., declare under penalty of perjury:

1. I am Dr. Paul Simpson, a psychologist specializing in forensic and clinical psychology. I received my doctorate from Northern Arizona University in 1990 and have been a licensed psychologist in the State of Arizona since 1991. I have testified and/or consulted as an expert in approximately 400+ state and federal trials and over 70 courts-martial for the U.S. Airforce, Army, Marines, and Navy. In 1997 I authored a book on memory and suggestibility. I am an instructor for the State Bar of Arizona and have provided trainings on numerous topics, including thirteen presentations on the topic of Eyewitness Memory and twice regarding Alcohol Blackouts and Sexual Assault. For the past six years I have been an instructor for the U.S. Air Force's JAG school at Maxwell AB. This training has been part of their Advanced Sexual Assault Litigation Course (ASALC) and included alcohol blackouts and sexual assault. In addition, I have provided psychology professionals training regarding sexual compulsions / sexual offense in over 300 cities in all 50 states over a span of 11 years.

2. Through my education, training, and legal experience, I have become knowledgeable about the numerous impacts and manifestations that alcohol can have on the human body and related cognitive functioning. I have developed scientifically grounded, evidence-based expertise on the topics of alcohol effects on contextual memory, fragmentary and en bloc blackout history, and the differences between objective and subjective intoxication associated with alcohol consumption.

3. There has been significant research in the field of psychology regarding how memory works and the effects that alcohol has on memory. With my training and experience in the specialized area of alcohol and memory, I am able to assist the defense in exploring dynamics and various phenomena specific to this specialized field of study. This field is highly technical and complex.

4. While in an alcohol-induced blackout, a person maintains the functional capacity to engage in a wide array of complex and goal-directed activities, such as carrying on a conversation, driving, or having sexual intercourse. However, they are not encoding those memories. Thus, memory for parts or the totality of an event is jeopardized. Individuals in the midst of an alcohol-induced blackout remain conscious (as opposed to being passed out or unconscious) while maintaining the functional and behavioral capacity to engage in a wide array of complex, goal-directed behaviors. Thus, their actions are engaged in while in a conscious state. Given that there is no way of knowing that an individual is in the midst of a blackout, their behaviors and actions appear fully volitional and intentional to an observer (and still can be 100% volitional and intentional).

5. The recollection of events (i.e., memory recall) is a reconstructive process. In other words, when an individual is asked to recall an event, it is not as if they go into their brain and pull an exact,

carbon copy recording of what occurred. Rather, memories are recalled as a result of a reconstructive process. It is well-established in the psychological literature that when individuals are asked to describe or explain events or actions they may not readily recall, they may be prone and vulnerable to “filling in the blanks” when constructing their memories. This has been demonstrated in experimental, empirically-validated studies.

6. Alcohol can cause a person to perceive information inaccurately. It can also cause what is referred to as “*alcohol myopia*,” which refers to the phenomena where a person will narrowly focus only on salient immediate stimuli at the expense of other contextual information. When this occurs, much of the contextual information is never encoded and subsequently will not be remembered.

7. *Source misattribution* is a psychological concept in which a person does not accurately link the original source of a memory to what is later recalled and retold to others. There are many potential causes of source misattribution. A basic example would be an eyewitness hearing from the police that a suspect was carrying a gun and later coming to believe that the suspect was carrying a gun without actually having seen a gun. The use of alcohol is likely to increase the risk and vulnerability of a source attribution error. A person in a fragmentary blackout state is particularly prone to making source attribution errors.

8. The concept of *transience of memory* is that memory generally deteriorates and gets worse over time. Research has shown that that a significant percentage of people experience major errors in their memory over the course of time, even for events that could be considered memorable. The memory issues associated with alcohol use can increase the potential for memories to be altered when recalled.

9. *Suggestion* and *suggestibility* refer to the psychological concept that memories can be affected and distorted by suggestion that is external to the individual. A person can suggest or insist that something occurred in a particular way or that an event should be conceptualized in a certain way and that can potentially lead an individual to recall their memories in a new light and cause distortion in their memory to conform with the suggestion. When external suggestion is applied to a situation that occurred when an individual was under the influence of alcohol or in a blackout state, the individual may be even more prone to suggestion because research has shown that individuals who are less certain of events are more prone to suggestion regarding those events.

10. *Hindsight bias* is the concept that a person will restructure their beliefs or understandings about an event in order to conform with information later obtained. There is significant research on the subject of hindsight bias that shows that a memory can be reconstructed to fit that person’s current beliefs or knowledge. The context provided by the new information can restructure that person’s understanding and beliefs about what they remember occurring.

11. *Motivated memory* refers to several different concepts in which a person may consciously or unconsciously have a motivation to distort a memory. Embarrassment, shame, or self-justification are factors that can motivate a person to reconceptualize past events or create inaccurate memories in order to prevent negative feelings and conform with other beliefs that individuals may have about themselves. The memory issues associated with alcohol can make this more likely to occur since an individual’s memory of an event may be incomplete and/or distorted.

12. *Imagination inflation* is a concept in which a person thought about or imagined something occurring which did not actually occur, however, the individual later remembers that thing having occurred. A basic example of this would be someone intending to say something during a conversation but forgetting to say it and later, believing falsely that they actually said that thing during the conversation. The use of alcohol or being in an alcohol-induced blackout state have the potential to increase the risk of this occurring due to other memory issues being experienced by someone in those states.

13. It is important to note that none of these aforementioned psychological concepts operate in a vacuum. Multiple concepts can interact to distort an individual's memory. For example, suggestion, hindsight bias, and motivated memory can all be applicable to a situation and lead a person to have a false and/or inaccurate memory about an event that occurred. Furthermore, alcohol - and the resulting memory issues that accompany its use - exacerbates the likelihood and vulnerability of memory distortions in these situations.

14. Although there is substantial individual variability in the effects of alcohol, knowledge about the person's drinking history and associated tolerance levels allows reasonable assumptions about their levels of cognitive and behavioral impairment at varying levels of intoxication. My research experience and training would allow me to provide scientifically grounded insights into these areas, insights that would be beyond the typical knowledge of a person without medical and/or psychological training.

15. I have discussed the case of United States v. Sergeant John Doe with his defense counsel and they have informed me of the charges and allegations in the case.

16. With regards to the allegation, I have been given the following hypothetical scenario.

a. At a party, A1C Susan Jones drank a large number of alcoholic drinks over the course of 3-4 hours. She remembers the first part of the evening until approximately midnight. A1C Jones states that the next thing she remembers is waking up on a bed to someone performing oral sex on her. She then blacked/passed out again, to wake up later to Sgt Doe having coitus with her. She recalls resisting this and that she then went "back to sleep."

b. Upon awakening the next day, she had vomit in her hair and had urinated in the bed. She did not recall portions of the events of that night, though the following day she got "flashbacks" detailing the abovementioned memories.

c. Following these "flashbacks," she spoke with an individual in her dormitory who told her it was sexual assault. She then went and talked to a SARC counselor, who also described the events as sexual assault and encouraged her to make an unsworn statement.

d. Sgt Doe told investigators he also drank a large amount of alcohol and was unable to recover any memory from that night relating to any sexual encounters with A1C Jones.

17. Based upon the hypothetical in the above paragraph, there are undoubtedly various psychological and cognitive phenomena at play that may have the real potential to distort and inaccurately skew both an individual's memory of an event as well as their perception and characterization of an event. These opinions are based solely on the above hypothetical. Given that, my final opinion is subject to change based upon more complete information and the ability to review all relevant information in this case.

18. I would need 15 hours to review evidence in this case and consult with defense counsel.

19. I am currently available for trial from 2 March to 29 May 2020. My calendar tends to fill out 2-3 months in advance, but I will work to accommodate any request from the trial court.

Executed this 5th day of February 2020.

Paul Simpson, Ed.D.

About Paul Simpson, Ed.D.

- Extensive experience assisting military courts-martial through consultation with legal teams (government and defense), assisting with voir dire of potential members, and expert testimony.
- Has been a course instructor for the Air Force JAG School's Advance Sexual Assault Litigation Course since 2016.
- Has provided CLE trainings for the State Bar of Arizona, Air Force, Marine, and Navy JAG regarding:
 - *Child Sexual Abuse Allegations: What Every Attorney Should Know*
 - *Daubert Standard and Psychological Evaluations: What Every Attorney Should Know*
 - *Memory in the Courtroom: What Every Attorney Should Know*
 - *Mental Health Evaluations in Homicides and Crimes of Violence: What Every Attorney Should Know*
 - *Anatomy of a Psychosexual Evaluation: What Every Attorney Should Know*
 - *Online Sex Offense: What Every Attorney Should Know*
- Has been an instructor for the Arizona Supreme Court in training competency evaluators.
- A former case manager with Child Protective Services, Dr. Simpson has extensive experience working with victims and perpetrators of sex crimes, including over 1000 psychosexual evaluations of adults and juveniles. He is trained and/or certified in the Abel, Affinity 2.5, Look VTM, MEGA, Static 99R/2002R, Stable/Acute 2007, SVR-20, HCR-20, J-SOAP 2, ERASOR, and Limestone plethysmograph.
- A former Arizona officer for the Association for Treatment of Sexual Abusers (ATSA).
- Since 2003 has provided over 300 trainings in all 50 states for professionals on assessing/treating sexual and Internet compulsions.
- Author of *Second Thoughts*, a book that was instrumental in helping expose the false claims and dangers of 'recovered memory therapy.' Throughout the 1990's Dr. Simpson was a leading national educator on *False Memory Syndrome* and trained thousands of counseling professionals on standards of practice. He also served as an expert consultant to the *Arizona Board of Psychologist Examiners*.
- Dr. Simpson has been a guest on *The Joan Rivers Show*, the *Leeza Gibbons Show*, *Parent Talk Radio*, *Focus on the Family*, *Frontline*, and *Fox News*. He has been a professional consultant to a number of national media, including *20/20*, *60 minutes*, *NBC News*, *Nightline*, *The Oprah Winfrey Show*, the *Chicago Tribune*, *Dateline*, *The Today Show*, *Focus on the Family*, and *Vanity Fair* magazine.

Dr. Paul Simpson
Arizona Forensic Services, LLC
(520) 355-1000

doc@psy.law
www.psy.law