Alcohol and Aggression

*"Alcohol is also the drug most implicated in sexual assault (Abbey, Wegner, Woerner, Pegram, & Pierce, 2014; Zinzow & Thompson, 2015), suicide (Chachamovich, Ding, & Turecki, 2012), verbal aggression (Sharma & Marimuthu, 2014), and physical aggression toward intimate partners (Foran & O'Leary, 2008), acquaintances, and strangers (Maldonado-Molina, Jennings, & Komro, 2010; Pridemore, 2004). The research supporting the relationship between all forms of aggression and alcohol use is enormous, unequivocal, and dates back to the 1930s (e.g., East, 1939). Alcohol-related intimate partner aggression (Reingle, Jennings, Connell, Businelle, & Chartier, 2014) and sexual assault (with- in or outside of intimate relationships; Abbey et al., 2014) are most prevalent forms of aggression and present a major social problem. These forms of aggression have also received the majority of research interest in the last decade. Additionally, as society becomes increasingly aware of alcohol-related disorders, such as fetal alcohol spectrum disorders, an expanding body of research has investigated the effects of prenatal alcohol exposure on later child development, and compel- ling evidence exists for a causal link between prenatal alcohol exposure and later aggression-related behavior (D'Onofrio et al., 2007).***"**
(Tomlinson, 2016. Recreational drug use and human aggressive behavior: A comprehensive review since 2003. Page 12)

Alcohol and human physical aggression.
Bennett, Richard M., Buss, Arnold H., Carpenter, John A.
Quarterly Journal of Studies on **Alcohol**, 30(4-A), 1969. pp. 870-876.
Abstract:

Each of 16 Ss was told to teach a response pattern to another (accomplice) S by means of various gradations of shock for incorrect answers. The Ss, after the instructions, 1st ingested various amounts of vodka. Results indicate that there was no relationship between use of higher doses of shock and alcohol ingestion.

The effects of alcohol on human physical aggression.
Shuntich, Richard J., Taylor, Stuart P.
Journal of Experimental Research in Personality, Vol. 6(1), Mar, 1972. pp. 34-38.
Abstract:

Assigned 30 male undergraduates (over 21 in age) to alcohol, placebo, and control groups. Ss then competed in a task involving reaction time with a confederate who attempted to give them increasingly intense shocks. The Ss who had ingested .9 ml 100 proof bourbon/kg set significantly higher shock intensities than the Ss in the placebo or no drug control groups. (15 ref.)

Effects of type and dose of alcohol on human physical aggression.
Taylor, Stuart P., Gammon, Charles B.
Journal of Personality and Social Psychology, Vol 32(1), Jul, 1975. pp. 169-175.
Abstract:

40 male undergraduates over 21 yrs of age were provoked following their ingestion of either 1.5 oz (.045 l) or .5 oz (.015 l) of 100 proof bourbon or vodka per 40 lbs (18 kg) of body weight. The expression of physical aggression was related to the quantity of alcohol ingested. The high dose of alcohol appeared to instigate and the low dose to inhibit aggressive responding. This effect was most pronounced in the vodka conditions. Interpersonal judgments were also influenced by the type and dose of alcohol consumed.

The effects of alcohol and delta-9-tetrahydrocannabinol on human physical aggression.
Taylor, Stuart P., et al.

Aggressive Behavior, Vol 2(2), 1976. pp. 153-161.

Abstract:

40 paid male undergraduates were provoked following their ingestion of high or low doses of alcohol, delta-9-tetrahydrocannabinol (THC), or placebo. The aggressive behavior of 10 controls was also assessed. The expression of physical aggression was related to the quantity of alcohol ingested. The high dose of alcohol instigated more intense aggression than the low dose. The high dose of THC, on the other hand, did not increase aggressive behavior but tended to produce a weak suppression effect.

Effects of alcohol and behavior contingencies on human aggression.

Zeichner, Amos., Pihl, R. O.

Journal of Abnormal Psychology, Vol 88(2), Apr, 1979. pp. 153-160.

Abstract:

Determined the mediating effects of alcohol and behavior contingencies on aggression in male social drinkers. 72 18–35 yr old Ss were randomly assigned to 1 of 6 groups in a 3 × 2 factorial design. To control for alcohol and expectation effects, one third of the Ss received alcoholic beverages, one third received placebo drinks, and another third was not administered any beverages. Aggression was assessed by the intensity and duration of shocks administered to a bogus partner in a modification of the Buss aggression procedure. Half of the Ss were exposed to aversive contingencies correlated with their aggressive responses, and half received random aversive contingencies. The inebriated Ss were significantly more aggressive than the sober Ss. The former Ss displayed an equally aggressive pattern under both contingency conditions, whereas the nonintoxicated Ss displayed a differential response pattern affected by the contingency type. These findings are attributed to the disrupting effect of alcohol on information processing and to the mediating effect of contingencies on the nonintoxicated individuals' aggressive behavior.

The effects of alcohol and persuasive social pressure on human physical aggression.

Authors:

Taylor, Stuart P., Sears, James D.

Aggressive Behavior, Vol 14(4), 1988. pp. 237-243.

Abstract:

Gave 18 intoxicated and nonintoxicated male undergraduates the opportunity to administer electric shocks to a nonprovocative opponent within the context of a competitive reaction time (RT) task. Social pressure was used to persuade Ss to administer an electric shock to the passive opponent. The social pressure manipulation significantly increased the intoxicated Ss' use of the highly noxious shock. Nonintoxicated Ss did not evidence an appreciable increase in the use of the intense shock option. It is suggested that the heightened aggressiveness was due to disruptive effects on Ss' cognitive functioning, producing an increased responsiveness to the most salient cues within the immediate situation (e.g., the persuasive communication).

Effects of alcohol on human aggression: An integrative research review.

Bushman, Brad J., Cooper, Harris M.

Psychological Bulletin, Vol 107(3), May, 1990. pp. 341-354.

Abstract:

This review used quantitative and qualitative techniques to integrate the alcohol and aggression literature. The primary purpose of the review was to determine if a causal relation exists between alcohol and aggression. The main meta-analysis included 30 experimental studies that used between-subjects designs, male confederates, and male

subjects who were social drinkers. Studies using the other designs or subject populations were integrated with meta-analytic procedures when possible and summarized descriptively when not. The results of the review indicate that alcohol does indeed cause aggression. However, alcohol effects were moderated by certain methodological parameters.

Effects of alcohol and aggressive disposition on human physical aggression.
Bailey, Debra S., Taylor, Stuart P.
Journal of Research in Personality, Vol 25(3), Sep, 1991. pp. 334-342.
Abstract:

Examined the effect of alcohol on aggressive behavior in 60 intoxicated and nonintoxicated male undergraduates with self-reported high, moderate, and low aggressive dispositions who were given the opportunity to administer electric shocks to an increasingly provocative opponent within the context of a competitive reaction time task. Intoxicated Ss selected higher levels of shock than nonintoxicated Ss under low provocation conditions. The highly intoxicated high and moderate aggressors tended to increase their shock settings more rapidly as a function of the opponent's provocation than the highly intoxicated low aggressors. Even those Ss who reported themselves as nonaggressive initiated attacks against the opponent and aggressed against a nonbelligerent target when intoxicated.

Human physical aggression as a function of alcohol and threat of harm.
Gantner, Anita B., Taylor, Stuart P.
Aggressive Behavior, Vol 18(1), 1992. pp. 29-36.
Abstract:

Investigated the effect of threat of physical harm on the aggressive behavior of intoxicated and nonintoxicated Ss. 40 male undergraduates competed in a reaction time (RT) task in which they could deliver shock to an increasingly provocative opponent. In the threat condition, Ss could be hurt by the opponent (via shock electrode), while in the no-threat condition, Ss could not be hurt by the opponent (the electrode was removed prior to competition). Under conditions of low provocation, intoxicated Ss behaved more aggressively than nonintoxicated Ss in both conditions. However, under conditions of increasing provocation, only the intoxicated Ss in the threatening condition increased their shock settings.

Experimental investigation of alcohol-induced aggression in humans.
Taylor, Stuart P.
Alcohol Health & Research World, Vol 17(2), 1993. Special Issue: Alcohol, aggression, and injury. pp. 108-112.
Abstract:

Demonstrates the efficacy of controlled experimental methods for studying alcohol (AL)-related aggression designed to establish that AL is a potent determinant of aggression. The competitive reaction time (RT) paradigm, which provides the most direct approach for testing AL's role in aggression, is detailed. Studies using this approach have indicated that the level of aggressive responding is related to the quantity of AL ingested and that AL can facilitate intense levels of aggression. AL-induced aggression can be altered by cues that prompt self-reflection, and other drugs (e.g., nicotine, amphetamine) can reduce the impact of AL on aggressive behavior.

Alcohol, drugs and human physical aggression.
Taylor, Stuart P., Chermack, Stephen T.
Journal of Studies on Alcohol, Suppl 11, Sep, 1993. pp. 78-88.
Abstract:

Reviews the research on the relationship between alcohol, drugs, and aggression. Findings indicate that alcohol is a potent antecedent of aggressive behavior. Studies indicate that aggressive behavior is related to the quantity of alcohol ingested, the effect of social pressure to aggress and of intense provocation is enhanced by alcohol, the instigating effect of alcohol depends on the aggressive disposition of the alcohol consumer, the aggressive behavior of the intoxicated person can be regulated by altering cues that affect cognitive processes, and that other depressants increase aggressive responding. A hypothetical model is described that summarizes the experimental findings and provides a vehicle for discussing the major factors and psychological processes involved in alcohol-induced aggression

A biosocial model of the alcohol-aggression relationship.
Pihl, R. O., Peterson, J. B., Lau, M. A.
Journal of Studies on Alcohol, Suppl 11, Sep, 1993. pp. 128-139.
Abstract:

Discusses how 4 of alcohol's dose- and rate-dependent pharmacological properties may increase the likelihood of human aggression. As an anxiolytic, alcohol is capable of reducing the inhibitory effect of fear on manifestation of aggressive behavior. As a psychomotor stimulant, alcohol can potentiate aggressive behavior, once evoked, or lower the threshold for such evocation. Alcohol-related disruption of certain higher order cognitive functions may reduce the inhibitory control generally exercised by previously established knowledge and decrease ability to plan in the face of threat or punishment. Finally, alcohol's ability to increase pain sensitivity may increase the likelihood of defensive aggression. Discussion of the nature and relevance of these pharmacological properties is structured according to a heuristic and synthetic schema, predicated upon consideration of an inhibitory neuropsychological structure.

Human aggression while under the influence of alcohol and other drugs: An integrative research review.
Bushman, Brad J.
Current Directions in Psychological Science, Vol 2(5), Oct, 1993. pp. 148-152.
Abstract:

Examined human aggression while under the influence of alcohol and other CNS depressants, CNS stimulants, opiates, and psychedelics-hallucinogens. The PsycINFO database was searched for the years 1974–1992; additionally, to obtain recently published studies, the contents of issues from 9 journals published between January 1991 and May 1993 were reviewed. Results show that CNS depressants facilitate aggression. Neither the pure pharmacological effects of alcohol nor the pure psychological effects of alcohol are important determinants of aggression. It is possible that both effects must occur together in order for alcohol to cause aggression. Care should be exercised in drawing conclusions about the effects of other drugs on aggression because of the small number of observations involved.

Alcohol link with violence is unproven.
Heath, Dwight B.
Brown University Child & Adolescent Behavior Letter. Feb94, Vol. 10 Issue 2, p1. 2p.

Abstract:

Asserts that there is no support for the idea that alcohol causes agression and violence base on a review of literature. Findings of the specialists who convened at Rutgers University's Center of Alcohol Studies; Social aspects of drinking; Need to teach people how to handle frustrations to avoid violence.

Alcohol and aggression: Effects of personal threat on human aggression and affective arousal.

Zeichner, Amos., Allen, Joseph D., Giancola, Peter R., Lating, Jeffrey M.

Alcoholism: Clinical and Experimental Research, Vol 18(3), Jun, 1994. pp. 657-663.

Abstract:

Assessed the moderating effect of personal threat on alcohol-related aggression and affective arousal. 72 male social drinkers (aged 21–34 yrs) received either alcohol, a placebo, or a nonalcoholic beverage and were exposed to either threatening or nonthreatening personal information; levels of aggression were assessed on a Buss-Taylor aggression machine (S. P. Taylor, 1967). Intoxicated Ss selected significantly higher shock intensities and applied shocks at longer durations than did placebo Ss. Ss exposed to threatening information selected higher shock levels than Ss receiving nonthreatening information. Intoxicated Ss responded more aggressively to negative evaluation, whereas sober Ss appeared equally aggressive to both types of evaluation.

Effects of alcohol and drinking experience on human physical aggression.

Laplace, Arthur C., Chermack, Stephen T., Taylor, Stuart P.

Personality and Social Psychology Bulletin, Vol 20(4), Aug, 1994. pp. 439-444.

Abstract:

60 intoxicated and nonintoxicated male undergraduates with self-reported low, moderate, or high drinking experience were given the opportunity to administer electrical shocks to an opponent in the context of a competitive reaction time (RT) task. Relative to effects in Ss with moderate and high drinking experience, alcohol intoxication enhanced the aggressive behavior of the low-drinking experience Ss.

The role of alcohol in sexual aggression.

Seto, Michael C. and Barbaree, Howard E.

Clinical Psychology Review, Vol 15(6), 1995. pp. 545-566.

Abstract:

Reviews the experimental literature on the effects of alcohol on aggression and sexual arousal to rape as analogs of sexual aggression in order to elucidate alcohol's causal effect. The balanced placebo design as it is used in experimental alcohol research is described, and methodological concerns and limitations relating to the design are discussed. An overview of the literature on alcohol-related beliefs and expectancies is presented with a summary of the findings on the effects of alcohol administration on aggression, sexual arousability, and sexual arousal specifically to depictions of rape. A disinhibition model is described that proposes hypotheses regarding the link between alcohol and sexual aggression.

Acute effect of altered tryptophan levels and alcohol on aggression in normal human males.

Authors:

Pihl, Robert O., et al.

Psychopharmacology, Vol 119(4), Jun, 1995. pp. 353-360.

Abstract:

90 normal human male Ss received amino acid mixtures designed to raise or lower tryptophan availability, and thus to raise or lower brain serotonin synthesis. Ss also received alcoholic or non-alcoholic drinks and were tested in the Taylor Competitive Reaction Time Task in which they competed against a (non-existent) partner in a reaction time (RT) task. The magnitude of electric shocks that the Ss were willing to give to their bogus partner was used as a measure of aggression. Lowered tryptophan levels and ingestion of alcohol were associated with increased aggression. Results support the idea that low serotonin levels may be involved in the etiology of aggression and suggest that Ss with low brain serotonin levels may be particularly susceptible to alcohol-induced violence.

Alcohol and human physical aggression: Pharmacological versus expectancy effects.
Authors:
Chermack, Stephen T., Taylor, Stuart P.
Journal of Studies on Alcohol, Vol 56(4), Jul, 1995. pp. 449-456.
Abstract:

Examined 2 explanatory models of the alcohol–aggression relationship: The pharmacological perspective, and the expectancy perspective. 40 Ss (aged 21 yrs and older) were interviewed regarding their alcohol expectancies, and then divided into 2 groups, on the basis of the 2 models. The Ss were randomly assigned to one of the two dose conditions: Active-placebo, or high dose of alcohol. The Ss were given the opportunity to behave in an aggressive manner within the context of a competitive RT task. Results indicate that high doses of alcohol resulted in significantly higher levels of aggression, than the active-placebo dose, regardless of the Ss expectancies. Intense levels of aggression were facilitated by the expectancy, during conditions of high provocation. It was concluded that the pharmacological effects of alcohol are important to explain the relationship between alcohol ingestion and aggression.

Effects of provocation on emotions and aggression in males.
Chermack, Stephen T., Berman, Mitchell, Taylor, Stuart P.
Aggressive Behavior, Vol 23(1), 1997. pp. 1-10.
Abstract:

Examined the effects of provocation on emotions and human physical aggression using a competitive reaction time (RT) paradigm. 54 male undergraduates participated in the competitive task with a fictitious opponent. Participants were assigned to 2 conditions, low-constant provocation and increasing provocation. Aggression was defined as the intensity of electric shocks participants selected for the opponent to receive. Negative emotions (threat, harm) and positive emotions (benefit, challenge) were assessed at 4 times during the experimental task. Results revealed that both aggressive responding and harm emotions differed as a function of the opponent's level of provocation. There was little compelling evidence that emotions served as an important intervening variable in the relationship between provocation and aggression.

The relation between alcohol and aggression: An integrated biopsychosocial conceptualization.
Chermack, Stephen T., Giancola, Peter R.
Clinical Psychology Review, Vol 17(6), Sep, 1997. Special Issue: Biopsychosocial Conceptualizations of **HumanAggression**. pp. 621-649.
Abstract:

Reviews research findings and theoretical perspectives on the relation between acute alcohol consumption and aggressive behavior. The influence of both situational and individual difference variables on the alcohol–aggression relation is discussed and the strengths and weaknesses of various methodological approaches are highlighted. An integrated heuristic framework involving both distal and proximal risk factors for problems with alcohol and violence, which include biological, psychological, interpersonal, and contextual influences is outlined. It is recommended that researchers attempt to measure variables from a variety of domains in order to obtain a better understanding of this complex phenomenon. Furthermore, it is emphasized that there is a clear need to further implement and assess primary and secondary prevention efforts and to design integrated and flexible approaches for individuals with alcohol and violence problems.

The biphasic effects of alcohol on human physical aggression.
Authors:
Giancola, Peter R., Zeichner, Amos
Journal of Abnormal Psychology, Vol 106(4), Nov, 1997. pp. 598-607.
Abstract:

The authors assessed the biphasic effects of alcohol on human physical aggression. Sixty male social drinkers were assigned to 1 of 4 groups: alcohol ascending limb (AAL), alcohol descending limb (ADL), or 1 of 2 sober control groups. Aggression was assessed in the AAL and ADL groups at respective ascending or descending blood alcohol concentrations (BAC) of 0.08%. Each participant in the control groups was respectively yoked with a participant in either the AAL or the ADL group to control for the longer period of time needed to reach a BAC of 0.08% on the descending limb compared with the ascending limb (i.e., passage of time effect). The authors measured aggression using a modified version of the Taylor aggression paradigm (S. Taylor, 1967), in which electric shocks are received from and administered to a fictitious opponent during a competitive task. The AAL group was more aggressive than the ADL group. There were no differences between the ADL group and the control groups, which suggests that alcohol does not appear to increase aggression on the descending limb. The control groups did not differ in aggression, thus ruling out a passage of time effect.

A framework for applying explanations of alcohol-related aggression to naturally occurring...
Graham, Kathryn, Wells, Samantha, West, Paulette
Contemporary Drug Problems. Winter97, Vol. 24 Issue 4, p625. 42p.
Abstract:

Presents a paper which provides a framework for the description of alcohol-related aggression, and its relevance to behavioral problems associated with alcohol abuse. What theoretical and empirical literature suggest about alcohol-related aggression; Characterization of explanations for this type of aggression; Psychological effects of alcohol use; Identification of various health and social conditions associated with alcohol use.

Alcohol-Induced Stimulation and Sedation: Relation to Physical Aggression.
Giancola, Peter R., et al.
Journal of General Psychology. Oct98, Vol. 125 Issue 4, p297. 8p.
Abstract:

Presents information on a study which examined the relation between the stimulating and sedating effects of acute alcohol consumption on human physical aggression. How the agression among drinkers was measured; Methodology; Results of the study.

Psychological experimentation on alcohol-induced human aggression.
Authors:
Pedersen, William C., et al.
Aggression and Violent Behavior, Vol 7(3), May-Jun, 2002. pp. 293-312.
Abstract:

This paper provides an overview of recent research on alcohol and aggression. The authors examine major experimental laboratory paradigms used in research on the social factors and psychological processes that elicit aggression among healthy persons under conditions of acute alcohol intoxication and sobriety. Issues concerning the validity of such experimental research in relation to violence in everyday life are discussed along with empirical evidence that attests to the importance of experimentation for an understanding of alcohol-induced violence. The theoretical roles of provocation and frustration as cues that elicit alcohol-induced aggression are also considered. The authors conclude with a presentation of a newly developed experimental laboratory procedure that can reliably produce disjunctively escalated aggressive responding--the triggered displaced aggression paradigm (TDAP)--and discuss its potential for revealing more about the mechanisms involved in alcohol-induced aggression.

Violence Related Injuries in the Emergency Room: Alcohol, Depression, and Conduct Problems.
Borges, G., et al.
Substance Use & Misuse; May2004, Vol. 39 Issue 6, p911-930, 20p, 4 Charts
Abstract (English):

OBJECTIVE: The aim of this study was to obtain epidemiological measures of the association between alcohol consumption and emergency room (ER) attendance due to violence, compared to the general population in the city of Pachuca, Mexico, during October–November, 1996 and June–July, 1997.

METHOD: The study was a population-based case-control design. Intervention and Measurements: Data consisted of an interviewer-administered questionnaire, collected on a 24-h basis, during the entire week.

Setting and PARTICIPANTS: Cases were 127 patients (78% male) admitted to the ER because of an injury that was the result of violence (being in a fight or being attacked by someone). A sample of residents from Pachuca (n = 920) was the comparison group.

RESULTS: Patients reporting drinking within 6 h compared to nondrinkers were more likely to suffer a violence-related injury [34.0 (17.5–66.2)] and alcohol dependent patients were more likely to be involved in a violence-related injury [7.4 (3.5–15.6)] compared to noncurrent drinkers. When both alcohol prior and alcohol dependence were considered simultaneously in multiple models among current drinkers, patients with violence-related injuries were more likely to report alcohol prior but not to be positive for alcohol dependence. Depressive symptoms, but not conduct problem behavior, were also associated with violent injury in simultaneous regressions that included alcohol variables.

CONCLUSIONS: In the city of Pachuca, Mexico, a large relationship between drinking prior to the event and violence-related injury, regardless of alcohol dependence, was found. Depression was also related to violence, suggesting the need for more comprehensive intervention with these patients.

Executive Functioning and Alcohol-Related Aggression.
Giancola, Peter R.
Journal of Abnormal Psychology, Vol 113(4), Nov, 2004. pp. 541-555.
Abstract:

The primary goal of this investigation was to determine whether executive functioning (EF) would moderate the alcohol-aggression relation. Participants were 310 (152 men and 158 women) healthy social drinkers between 21 and 35 years of age. EF as well as non-EF skills were measured with 13 validated neuropsychological tests. Following the consumption of either an alcoholic or a placebo beverage, participants were tested on a modified version of the Taylor Aggression Paradigm (S. Taylor, 1967), in which mild electric shocks were received from, and administered to, a fictitious opponent. Aggressive behavior was operationalized as the shock intensities administered to the fictitious opponent. EF was negatively related to aggressive behavior for men, regardless of beverage group, even when controlling for non-EF skills. Furthermore, alcohol increased aggression only for men with lower EF scores. Finally, the mere belief that alcohol was consumed suppressed aggression for women but not for men.

Liquid Courage or Liquid Fear: Alcohol Intoxication and Anxiety Facilitate Physical Aggression.
Parrott, Dominic J., et al.
Substance Use & Misuse; May2012, Vol. 47 Issue 7, p774-786, 13p
Abstract (English):

Participants were 138 male social drinkers between 18 and 30 years of age from a university community in the southeastern United States in 2000. Trait and state anxiety was measured using the Trait Anxiety Inventory and the Facial Action Coding System, respectively. Participants consumed an alcoholic or nonalcoholic control beverage and completed a shock-based aggression task. Regression analysis indicated that alcohol-facilitated elevations in anxiety mediated the relation between alcohol consumption and aggression and that trait anxiety and physical provocation moderated this effect. Implications and limitations of this study are noted and future research directions are suggested.

Neural correlates of impulsive aggressive behavior in subjects with a history of alcohol dependence.
Authors:
Kose, Samet., et al.
Behavioral Neuroscience, Vol 129(2), Apr, 2015. pp. 183-196.
Abstract:

Alcohol-related aggression is a complex and problematic phenomenon with profound public health consequences. We examined neural correlates potentially moderating the relationship between human aggressive behavior and chronic alcoholuse. Thirteen subjects meeting DSM–IV criteria for past alcohol-dependence in remission (AD) and 13 matched healthy controls (CONT) participated in an fMRI study adapted from a laboratory model of human aggressive behavior (Point Subtraction Aggression Paradigm, or PSAP). Blood oxygen level dependent (BOLD) activation was measured during bouts of operationally

defined aggressive behavior, during postprovocation periods, and during monetary-reinforced behavior. Whole brain voxelwise random-effects analyses found group differences in brain regions relevant to chronic alcohol use and aggressive behavior (e.g., emotional and behavioral control). Behaviorally, AD subjects responded on both the aggressive response and monetary response options at significantly higher rates than CONT. Whole brain voxelwise random-effects analyses revealed significant group differences in response to provocation (monetary subtractions), with CONT subjects showing greater activation in frontal and prefrontal cortex, thalamus, and hippocampus. Collapsing data across all subjects, regression analyses of postprovocation brain activation on aggressive response rate revealed significant positive regression slopes in precentral gyrus and parietal cortex; and significant negative regression slopes in orbitofrontal cortex, prefrontal cortex, caudate, thalamus, and middle temporal gyrus. In these collapsed analyses, response to provocation and aggressive behavior were associated with activation in brain regions subserving inhibitory and emotional control, sensorimotor integration, and goal directed motor activity.

Neural and behavioral correlates of alcohol-induced aggression under provocation.
Authors:
Gan, Gabriela., et al.
Neuropsychopharmacology, Vol 40(13), Dec, 2015. pp. 2886-2896.
Abstract:

Although alcohol consumption is linked to increased aggression, its neural correlates have not directly been studied in humans so far. Based on a comprehensive neurobiological model of alcohol-induced aggression, we hypothesized that alcohol-induced aggression would go along with increased amygdala and ventral striatum reactivity and impaired functioning of the prefrontal cortex (PFC) under alcohol. We measured neural and behavioral correlates of alcohol-induced aggression in a provoking vs non-provoking condition with a variant of the Taylor aggression paradigm (TAP) allowing to differentiate between reactive (provoked) and proactive (unprovoked) aggression. In a placebo-controlled cross-over design with moderate alcohol intoxication (~0.6 g/kg), 35 young healthy adults performed the TAP during functional magnetic resonance imaging (fMRI). Analyses revealed that provoking vs non-provoking conditions and alcohol vs placebo increased aggression and decreased brain responses in the anterior cingulate cortex/dorso-medial PFC (provoking < non-provoking) and the ventral striatum (alcohol < placebo) across our healthy sample. Interestingly, alcohol specifically increased proactive (unprovoked) but not reactive (provoked) aggression (alcohol × provocation interaction). However, investigation of inter-individual differences revealed (1) that pronounced alcohol-induced proactive aggression was linked to higher levels of aggression under placebo, and (2) that pronounced alcohol-induced reactive aggression was related to increased amygdala and ventral striatum reactivity under alcohol, providing evidence for their role in human alcohol-induced reactive aggression. Our findings suggest that in healthy young adults a liability for alcohol-induced aggression in a non-provoking context might depend on overall high levels of aggression, but on alcohol-induced increased striatal and amygdala reactivity when triggered by provocation.

Recreational drug use and human aggressive behavior: A comprehensive review since 2003.
Authors:
Tomlinson, Monica F., Brown, Matthew, Hoaken, Peter N. S..
Aggression and Violent Behavior, Vol 27, Mar-Apr, 2016. pp. 9-29.

Abstract:

Hundreds of studies have evaluated why drugs and aggression readily coexist and what static and transient physiological, environmental, and individual difference factors influence this relationship. While this literature is rapidly growing, there have been no comprehensive reviews on this relationship in the last decade. The present review summarizes the literature on the link between human aggressive behavior and alcohol, hallucinogens and psychedelics, methamphetamines, opioids, psychostimulants, anabolic-androgenic steroids, designer drugs, and depressants since 2003. Overall, studies show an unequivocal, causal, relationship between aggressive behavior and alcohol. Recent studies also find a positive relationship between cannabis use and aggressive behavior, although personality factors may mediate this relationship during intoxication. While research finds both cocaine and heroin to be strongly associated with aggressive behavior, this relationship is likely accounted for by third variable factors, such as personality traits and environmental influences. Studies also show increasing evidence that methamphetamines are associated with aggressive behavior during drug elimination and withdrawal. There is overwhelming experimental research suggesting that hallucinogens reduce aggressive behavior. Lastly, the relationship between morphine, codeine, designer drugs, and anabolic-androgenic steroids, ketamine, γ-Hydroxybutyric acid or GHB and human aggression remains sparse and inconclusive. Policy implications are briefly discussed.

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(Tomlinson, 2016. Recreational drug use and human aggressive behavior: A comprehensive review since 2003. Page 12)

Effects of alcohol on human aggression.

Parrott, Dominic J., Eckhardt, Christopher I.

Current Opinion in Psychology, Vol 19, Feb, 2018. pp. 1-5.

Abstract:

There is little debate that alcohol is a contributing cause of aggressive behavior. The extreme complexity of this relation, however, has been the focus of extensive theory and research. And, likely due to this complexity, evidence-based programs to prevent or reduce alcohol-facilitated aggression are quite limited. We integrate I^3 Theory and Alcohol Myopia Theory to provide a framework that (1) organizes the myriad instigatory and inhibitory factors that moderate the effect of alcohol on aggression, and (2) highlights the mechanisms by which alcohol facilitates aggression among at-risk individuals. This integrative framework provides the basis for understanding the appropriate targets for

prevention and intervention efforts and may serve as a catalyst for future research that seeks to inform intervention development.

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Recreational drug use and human aggressive behavior:
A comprehensive review since 2003.
Tomlinson, 2016. Page 12-16

3. Alcohol

We begin with alcohol, not only because it is currently the most widely used and abused psychoactive substance worldwide (Behl et al., 2014; Julien, 2003) but because the history of alcohol use among humans dates back as far as 8000 BCE, or over 10,000 years ago (Centre for Addiction and Mental Health, 2012a). Alcohol is produced through fermentation or distillation processes using various fruits, vegetables, or grains. Fermented alcoholic beverages, which are lower in alcohol content, often come in the form of beer or wine. Distilled beverages, which are much higher in alcohol content, often come in the form of "spirits" (e.g., vodka, whisky, or rum; Centre for Addiction and Mental Health, 2012a). Individuals often consume alcohol due to its pleasant side effects, including increased confidence and feelings of relaxation, inhibition, analgesia, and elation. The consumption of large quantities of alcohol can be highly toxic, however, as the toxic chemical, acetaldehyde, is created as individuals' livers process alcohol. Acetaldehyde toxicity can cause headaches, nausea, shakiness, diarrhea, or in extreme circumstances, short-term unconsciousness, memory-loss, or comas (Centre for Addiction and Mental Health, 2012a).

Alcohol is also the drug most implicated in sexual assault (Abbey, Wegner, Woerner, Pegram, & Pierce, 2014; Zinzow & Thompson, 2015), suicide (Chachamovich, Ding, & Turecki, 2012), verbal aggression (Sharma &Marimuthu, 2014), and physical aggression toward intimate partners (Foran & O'Leary, 2008), acquaintances, and strangers (Maldonado-Molina, Jennings, & Komro, 2010; Pridemore, 2004). The research supporting the relationship between all forms of aggression and alcohol use is enormous, unequivocal, and dates back to the 1930s (e.g., East, 1939). Alcohol-related intimate partner aggression (Reingle, Jennings, Connell, Businelle, & Chartier, 2014) and sexual assault (within or outside of intimate relationships; Abbey et al., 2014) are most prevalent forms of aggression and present a major social problem. These forms of aggression have also received the majority of research interest in the last decade. Additionally, as society becomes increasingly aware of alcohol-related disorders, such as fetal alcohol spectrum disorders, an expanding body of research has investigated the effects of prenatal alcohol exposure on later child development, and compelling evidence exists for a causal link between prenatal alcohol exposure and later aggression-related behavior (D'Onofrio et al., 2007).

In general, the research assessing alcohol's relationship with aggression has a long and complicated history. While there is no doubt that alcohol and aggression readily and pervasively coexist, there is some controversy as to what the major mediators and moderators of this relationship are, or whether the link itself is causal in some cases (Bushman & Cooper, 1990; D'Onofrio et al., 2007). Studies investigating whether alcohol and aggression can be causally linked have put forth several hypotheses. For example, some researchers propose that the direct physiological effects of alcohol confer an increased vulnerability to aggressive behavior by impairing impulse control, reducing pain sensitivity, and increasing the expectancies associated with the alcohol aggression relationship (Bushman & Cooper, 1990; Hoaken & Stewart, 2003; Kachadourian, Homish, Quigley, & Leonard, 2012). Interestingly, however, these variables have not been found to increase

aggressive behavior in isolation (Bushman & Cooper, 1990; LeMarquand, Benkelfat, Pihl, Palmour, & Young, 1999). Thus, there are likely several factors influencing this, possibly causal, relationship. The following section will elaborate on the hypotheses that have been suggested, and will outline recent developments in the literature on the relationship between alcohol and prenatal alcohol exposure, physical aggression, sexual aggression, and intimate partner aggression. Subsumed within the section on physical aggression, we will discuss how this relationship may be mediated by age.

(skipping **3.1. Prenatal alcohol exposure and aggression)**

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3.2. Alcohol use and general aggression in adolescence and adulthood

Laboratory studies have consistently found alcohol consumption to dose-dependently (Wells, Mihic, Tremblay, Graham, & Demers, 2008) increase levels of physical aggression among men (Gussler-Burkhardt & Giancola, 2005). Results have been mixed as to whether this effect holds constant for women (Gussler-Burkhardt & Giancola, 2005; Hoaken & Stewart, 2003; Quinn, Stappenbeck, & Fromme, 2013). Some have suggested that this failure to generalize findings to women has been due to challenges in operationalizing physical aggression within the confines of a laboratory. Studies have suggested that commonly used behavioral measures, such as the Taylor Aggression Paradigm (Taylor, 1967), may more accurately map on to the way men physically aggress compared to the way that women do (Giancola & Parrott, 2008; Quinn et al., 2013).

To remedy this issue, studies have sought to study this relationship in naturalistic settings, and most of these studies have used adult, rather than adolescent, samples. Recent data suggests that being intoxicated in more social situations, such as a party, a college or university residence, a fraternity, or in public with a partner, increases the likelihood of aggression among young adults (Wells et al., 2008). This positive correlation was dose-dependent, such that increased levels of intoxication were associated with increased levels of aggression (Neal & Fromme, 2007; Wells et al., 2008). To replicate and expand on these findings, a naturalistic, longitudinal, event-level examination of the relationship between alcohol and aggression was conducted (Quinn et al., 2013). Results demonstrated that, over 4 years, there was a significant positive relationship between alcohol consumption and physical aggression. Specifically, data showed that within-person increases in blood alcohol content were associated with an increased probability of physically aggressing. Quinn et al. (2013) found a 6% increased likelihood of acting aggressively with every .01% increase in blood alcohol content. This finding is in keeping with the meta-analytic results previously cited that suggest a direct relationship between increases in alcohol consumption and aggression. This study demonstrated that the relationship between alcohol consumption and physical aggression was stronger for men than women, thus replicating the findings of laboratory studies.

To be sure, while a large proportion of adolescents and adults consume alcohol, the perpetration of physical aggression is relatively rare. Therefore, studies have sought to better understand what dispositional, cognitive, or environmental mediators impact this relationship from adolescence to adulthood. Recent longitudinal data collected from adolescents from13 to 18 years old suggested that aggressive behavior among male adolescents was increased when alcohol consumption was greater than usual for each individual (White, Fite, Pardini, Mun, & Loeber, 2013). Importantly, these results were found most significant among male adolescents with positive attitudes toward physically aggressive behavior and who were from high-risk neighborhoods (White et al., 2013).

Taken together, the extant literature demonstrates that alcohol has a causal role in the elicitation of aggressive behavior and that this relationship is likely moderated by individual difference and contextual factors. This relationship is most prominently demonstrated in men, whereas the literature within women remains unclear. Given the extensive and relatively consistent research on alcohol use and aggressive behavior in general, relatively little research has been conducted on this topic over the last 10 years. Rather, studies have begun to more closely examine this relationship in specific contexts, such as in intimate relationships. As social awareness of the high prevalence rates of physical and verbal aggression in intimate relationships proliferates, research in this area continues to flourish.

3.3. Alcohol use and aggression in intimate relationships

The research on intimate partner aggression includes studies examining verbal and physical aggression, which includes sexual aggression. Often, psychological and verbal aggression are operationalized in similar ways in the intimate partner literature, both involving one partner's use of threats, verbal manipulation, insults, and swearing toward the other partner (Kachadourian, Taft, O'Farrell, Doron-Lamarca, &Murphy, 2012). In this context, physical aggression is most often operationalized, as one partner intentionally inflicting unwanted bodily harm toward his or her partner to such an extent that it jeopardizes the partner's bodily integrity. Sexual aggression is one partner forcing or manipulating his or her partner into any unwanted sexual activity (Kachadourian, Homish, et al., 2012). A discussion of the relationship between alcohol consumption and physical and verbal aggression in intimate relationships will be presented and followed by a discussion on alcohol consumption and intimate partner sexual aggression more specifically.

It is important to note that the majority of individuals who drink heavily or suffer from alcohol use disorders do not perpetrate aggression toward their partners. Furthermore, among those who do, physical intimate partner aggression is the least common form of aggression (Schumacher, Homish, Leonard, Quigley, & Kearns-Bodkin, 2008). That being said, intimate partner aggression is a major social problem as it is the leading cause of non-fatal bodily harm to adolescent and adult women in society today (Foran & O'Leary, 2008; Reyes, Foshee, Bauer, & Ennett, 2014). In a given year in the United States, about 12% of married or cohabitating men perpetrate physical intimate partner aggression against their spouses (Foran & O'Leary, 2008). It is important to note that women can also be perpetrators of physical aggression toward their partners (Centre for Addiction and Mental Health, 2012a). Some studies suggest that women are actually more likely to commit a physically aggressive act toward their spouse than men are (Schumacher et al., 2008).While likely more common, men often inflict more physical injury than women do (Whitaker, Haileyesus, Swahn, & Saltzman, 2007). Thus, male-to-female physical aggression is often more severe (Heru, 2007) and may be more likely to result in a hospital visit or a police report. Further, individuals who suffer from alcohol use disorders are more likely to perpetrate intimate partner aggression compared to those who do not meet criteria for a disorder (Foran & O'Leary, 2008).

In instances where neither partner has an alcohol use disorder, physical and verbal aggression toward intimate partners has been shown to be strongly associated with the perpetrator's alcohol consumption in the preceding four hours (Testa & Derrick, 2014). When couples were asked to self-report incidences of both alcohol consumption and incidences of intimate partner aggression over the course of two months, results indicated that alcohol consumption (but not the amount of alcohol consumed) was associated with increased perpetration of physical and verbal aggression (Testa & Derrick, 2014). Importantly, men and women were equally likely to be aggressive subsequent to consuming alcohol (Testa & Derrick, 2014). Among adolescents, this relationship

was found in acutely intoxicated males only, perhaps suggesting a more direct pharmacological impact of alcohol on aggression in younger populations (Reyes et al., 2014).

To better understand the complexities of the relationship between alcohol consumption and aggression, studies have examined the longitudinal moderators that influence this relationship. Among newly married couples, studies have shown that factors such as high trait hostility, poor coping skills, frequent daily hassles, and volume of alcohol consumption were all moderators of the alcohol-aggression relationship in the first 4 years of marriage (Schumacher et al., 2008).While excessive drinking is a strong cross-sectional moderator, it did not surface as a unique longitudinal predictor of intimate partner aggression. A more recent study found an association between dispositional hostility, heavy alcohol consumption, and physical intimate partner aggression among both women and men in their first 4 years of marriage, although the frequency of incidences was relatively low (e.g., severe intimate partner aggression was operationalized as four or more incidences of physical aggression toward a partner in 1 year; Kachadourian, Taft, et al., 2012).

Studies have also analyzed the relationship between context specific mediators of intimate partner aggression and the frequency and volume of alcohol consumption (Mair, Cunradi, Gruenewald, Todd, & Remer, 2013). First, important sex differences have been found. There is evidence suggesting that when male partners frequently drink alcohol at social gatherings outside of the home, they are more likely to perpetrate physical intimate partner aggression toward their female partners. Similarly, if female partners consume alcohol in public places, their male partners are more likely to perpetrate aggression against them. On the other hand, when female partners frequently consume alcohol at home, they are more likely to perpetrate physical aggression toward their male partners (Mair et al., 2013). The relationship between alcohol consumption and aggression is dependent on the volume of alcohol consumed, such that increases in the female partners' alcohol consumption is positively correlated with her likelihood of perpetrating aggression against her male partner (Mair et al., 2013). Of note, drinking with guests in the home appears to mediate the alcohol-aggression relationship, decreasing the likelihood that a female partner will aggress against her male partner. No studies to the authors' knowledge have explored the alcohol-aggression relationship in same sex couples.

In sum, the relationship between alcohol use and physical or verbal aggression in intimate relationships is complex; however, there do seem to be personality characteristics (such as dispositional hostility) and environmental factors that mediate and moderate this relationship.

Male-to-female intimate partner aggression is more likely to occur when either partner has consumed alcohol in a public venue, whereas female-to-male intimate partner aggression is more likely to occur when the female partner has consumed alcohol at home. Further, it appears that alcohol consumed in the context of hosting guests decreases the likelihood of intimate partner aggression. The authors of this study suggest that hosting guests implies increased social ties, which may be a protective factor for intimate partner violence, thus reducing the chances of intimate partner aggression during periods of alcohol consumption (Mair et al., 2013).

3.4. Alcohol use and sexual aggression

Sexual aggression is common and frequently involves the consumption of alcohol. Studies report that alcohol consumption either by the perpetrator, the victim, or both, is implicated in one half to two thirds of sexual aggression cases (Ullman, 2003). Often, the victim is female and an intimate partner or acquaintance of the perpetrator, who is often male (Abbey et al., 2014; Hines & Saudino, 2003). While these sex differences do appear to be the norm, one study found no sex differences among victims of sexual aggression (Hines & Saudino, 2003). Racial differences in sexual

aggression cases have also been found. Studies have suggested that African American individuals are more likely to perpetrate and be victims of sexual aggression than Caucasian American individuals (Gross, Winslett, Roberts, & Gohm, 2006). In this study, African American women reported more incidences of unwanted sexual intercourse resulting from their partners using physical force, emotional pressure, or perceiving their partner as being too aroused to stop his advances, compared to Caucasian American women (Gross et al., 2006).

The majority of sexual aggression cases occur among younger populations, such as among college and university students (Gross et al., 2006; Locke & Mahalik, 2005). In one study, college students reported that 84.4% of sexual aggression victims were assaulted within their first four semesters of college (Gross et al., 2006). Further, alcohol related sexual assaults among college and university students were found to be more aggressive and more likely to culminate in unwanted vaginal penetration compared to sexual assaults that do not involve alcohol consumption in the same populations (Abbey, Clinton-Sherrod, McAuslan, Zawacki, & Buck, 2003). Studies assessing the situations under which sexual aggression is more likely have found that a large proportion of sexual assaults occur during or after parties, especially when drinking games are involved (Johnson & Stahl, 2004). Unfortunately, the majority of sexual aggression cases are not reported to the appropriate authorities (Abbey et al., 2014; Gross et al., 2006), thus current prevalence estimates of sexual aggression are unknown. The high prevalence of sexual assault in society today has sparked warranted concern and propelled a proliferation of research on the nature of this robust association, especially among young adults.

The relationship between the perpetrator's alcohol consumption and sexual aggression appears to be an inverted U-shaped curve (Abbey et al., 2003). Studies have found that severity of individuals' perpetration of sexual aggression increases from low to moderate levels of intoxication and then decreases at higher levels of intoxication (Abbey et al., 2003). This finding may be related to studies suggesting that, as levels of intoxication increase, perpetrators are more likely to use physical force during acts of sexual aggression (Abbey, Parkhill, Jacques- Tiura,& Saenz, 2009). This may be especially true in cases where the victim attempts to resist the unwanted sexual advances (Abbey et al., 2009). In situations where the perpetrator's level of intoxication peaks, however (often around a blood alcohol concentration of 0.2 mg/L), the perpetrator usually becomes so incapacitated that he or she does not have the motor control (or the same ability to maintain an erection, for males) to coordinate or complete a sexually aggressive act (Abbey et al., 2014). Thus, under circumstances where the perpetrator is severely intoxicated, the probability of sexual aggression is dramatically reduced.

Although the majority of research assesses male perpetrators of sexual aggression, there is growing research on perpetration by women. In one study, almost 10% of 248women reported having used sexually aggressive strategies to coerce a man into sexual activities (Krahé, Waizenhöfer, &Möller, 2003). The most commonly endorsed act of sexual aggression was taking advantage of a man in an incapacitated state (5.6%) followed by verbal pressure (3.2%) and physical force (2%; Krahé et al., 2003). When factors related to the sexual assault were analyzed, high levels of sexual activity, peer pressure, and childhood sexual abuse were all implicated as risk factors for the perpetration of sexual aggression by women (Krahé et al., 2003).

The relationship between alcohol consumption and victimization is less clear. There is evidence to support that victims at low to moderate levels of intoxication may be particularly sensitive to threatening cues associated with sexual aggression and may be more likely to respond to sexual force with resistance and escape, thus reducing the likelihood that a sexually aggressive act is completed (Abbey et al., 2003). In contrast, there is also evidence to support that women at low to

moderate levels of intoxication are more likely to consent to their dating partner's sexual advances and are more likely to respond passively to sexual behavior than sober individuals in the same situations (Davis, George, & Norris, 2004). Research also strongly supports that when the victim is at significantly higher levels of intoxication, or incapacitated due to intoxication, the risk of a completed sexual assault is dramatically increased (Abbey et al., 2003; Devries et al., 2014).

There is now a general consensus that alcohol has a causal effect on sexual aggression (Krahé et al., 2003). Studies have repeatedly shown that individuals are at a significantly increased risk of perpetrating sexual aggression while intoxicated above and beyond many of the third variable factors that have been proposed (Abbey, 2011; Felson & Burchfield, 2004). Studies have also suggested that alcohol has a situational causal effect on victimization, with individuals most at risk for sexual aggression when they are acutely intoxicated (Felson & Burchfield, 2004). Further, research has consistently shown that acute alcohol intoxication is likely the strongest predictor of both perpetration and victimization of sexual aggression in college populations (Felson & Burchfield, 2004; Kaysen, Neighbors, Martell, Fossos, & Larimer, 2006; Parks & Fals-Stewart, 2004; Testa & Livingston, 2009). Data show that individuals who have alcohol use disorders and a history of sexual aggression are no more likely than individuals without such disorders to perpetrate sexual aggression when they are sober (Fals-Stewart, 2003). Therefore, while multiple factors may moderate the relationship between alcohol and sexual aggression, there is a direct causal pathway connecting alcohol use and aggression.

Several studies have sought to parse apart this causal relationship and have offered compelling hypotheses. There is evidence suggesting that alcohol has a causal relationship with sexual aggression by altering both the perpetrators' and victims' cognitive abilities (Abbey et al., 2003). This concept is called the Alcohol Myopia Model (Abbey et al., 2014) and refers to alcohol's effect on individuals' ability to process social information, thus increasing the probability that individuals engage in antisocial acts (Giancola, Josephs, Parrott, & Duke, 2010) or consent to unwanted sexual contact (Abbey et al., 2014). Research supporting this model suggests that alcohol directly impedes individuals' abilities to engage in complex cognitive processing and, instead, focuses individuals' attention on salient cues in the environment (Noel, Maisto, Johnson, & Jackson, 2009). In this way, the consumption of alcohol may heighten a perpetrator's awareness of his or her sexual desires and impede his or her ability to make appropriate decisions concerning how to act upon those desires and what the distal consequences might be (Abbey et al., 2003; Giancola et al., 2010).

More recent studies have attempted to replace the Alcohol Myopia Model (Steele & Josephs, 1990) with the Disinhibition Model (Steele & Josephs, 1990). This model states that alcohol more directly hinders individuals' ability to inhibit their desires, rather than their cognitive abilities to process information (Noel et al., 2009). A recent study showed that, when participants were given low (blood alcohol level between 0.01% mg/L to 0.049% mg/L) or moderate amounts of alcohol (blood alcohol level between 0.049%mg/L to 0.18% mg/L) and explicitly directed toward anti-force cues (such as cues about women's rights, and allusions to a rape crisis center), they were more likely than sober participants to ignore those cues and endorse sexually aggressive behavior (Noel et al., 2009). Even when these participants were explicitly asked to determine whether the perpetrator's actions were his fault or the victim's fault, the intoxicated individuals were less likely to find the perpetrator to be at fault than sober participants were (Noel et al., 2009). Thus, there is more evidence to support that intoxicated individuals readily accept sexually aggressive behavior than sober individuals do, and that this is not a result of a reduced ability to attend to social cues.

Recent cognitive research added support to the finding that intoxicated individuals are more likely to accept sexually aggressive behavior by showing that acute alcohol intoxication disrupts

intentional inhibitory control (Abroms, Gottlob, & Fillmore, 2006). This was evidenced by intoxicated participants' deficits in intentionally inhibiting a reflexive eye movement toward the sudden appearance of a visual stimulus on a computer screen when instructed not to look at the visual stimulus (Abroms et al., 2006). It is also important to note that studies have consistently reported a proximal rather than distal relationship between alcohol consumption and sexual aggression (Fals-Stewart, 2003; Felson & Burchfield, 2004). That is, while many psychological factors (e.g., beliefs about rape) may mediate the relationship between alcohol use and sexual aggression these factors do not appear to confer a vulnerability to sexual aggression in the absence of acute alcohol intoxication.

The Disinhibition Model may also explain why individuals who have negative gender-based attitudes are more likely to perpetrate sexual aggression when intoxicated than when they are not intoxicated. For example, multiple studies have shown that individuals that adhere to a more stereotypical male gender role ideology have been consistently found to both abuse alcohol and be perpetrators of sexual aggression (Carr & VanDeusen, 2004). Individuals who endorsed male dominance rather than gender equality were also more likely to feel comfortable in situations where women were being mistreated, consume pornography, accept confrontation as normal in their heterosexual relationship, and be accepting of rape myths (Loh, Gidycz, Lobo, & Luthra, 2005). Individuals who have reported past alcohol-related sexual coercions were also more likely to hold rape-supportive attitudes than those without a history of sexual aggression (Carr & VanDeusen, 2004). Thus, it is possible that alcohol consumption impairs individuals' ability to suppress these beliefs and increases their chances of acting in accordance with them. In this way, negative beliefs about women may moderate the relationship between alcohol consumption and sexual aggression.

Such gender-related attitudes may also explain why athletic affiliation (Locke & Mahalik, 2005) and fraternity membership (Murnen & Kohlman, 2007) have been implicated as risk factors for sexual aggression. A recent meta-analysis revealed that individuals who play in team sports and/or are members of fraternities are at a moderately increased risk for endorsing beliefs related to masculine norms (Murnen & Kohlman, 2007). Specifically, men participating in “stereotypically male” lifestyles were more likely to endorse having power over women, being homophobic, enjoying dominance over others, being violent, and taking risks (Locke & Mahalik, 2005). The individuals who more highly endorsed these attitudes were also more likely to endorse rape myths and report past sexually aggressive behavior (Locke & Mahalik, 2005). Previous studies have also found that athletic lifestyles are highly tied to misogyny, sexism, and sexual aggression (Forbes, Adams-Curtis, Pakalka, &White, 2006).

Individuals' attitudes toward alcohol and their expectations surrounding intoxication have also been implicated as mediators in the alcohol-sexual aggression relationship. Studies have shown that individuals associated alcohol with increased sexual arousal and improved sexual performance (Abbey, Zawacki, Buck, Clinton, & McAuslan, 2004). In situations where drinking is common, such as during parties, men are more likely to see women as promiscuous and sexually available, compared to situations where alcohol is not involved (Abbey et al., 2004). Therefore, these beliefs about intoxication may interact with many of the other variables implicated in the relationship between alcohol and sexual aggression.

Overall, it appears that alcohol and sexual aggression are causally linked through alcohol's influence on individuals' capability to inhibit their behavior. Given that alcohol has been found to increase individuals' sexual desire (Abbey et al., 2004), it is unsurprising that reduced inhibition would add to the probability of a sexually aggressive act, especially in individuals with

misogynistic attitudes. Further, this relationship appears to be moderated by factors such as negative attitudes toward women, “stereotypically male” lifestyles, including fraternity membership and sports affiliation, as well as preconceived beliefs about alcohol's effect on women's sexual availability and promiscuity. While alcohol remains the most widely consumed drug in the world, cannabis and other hallucinogens are quickly catching up in popularity.

(Tomlinson, 2016. Recreational drug use and human aggressive behavior: A comprehensive review since 2003. Page 12)