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Alcohol, Violence, and the Alcohol Myopia Model: Preliminary Findings and Implications for Prevention

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Abstract

This experiment provided a preliminary test of whether the *Alcohol Myopia Model* (AMM; Steele & Josephs, 1990) would provide a guiding framework for the prevention of alcohol-related violence. The model contends that alcohol has a "myopic" effect on attentional capacity that presumably facilitates violence by focusing attention onto more salient provocative, rather than less salient inhibitory, cues in hostile situations. Participants were 16 intoxicated male social drinkers who completed a laboratory task in which electric shocks were received from, and administered to, a fictitious opponent under the guise of a competitive reaction-time task while they were exposed to either violence-promoting (n = 8) or violence-inhibiting (n = 8) cues. Aggression was operationalized as the intensity and duration of shocks administered by the participant to his "opponent." Despite being equally intoxicated, participants exposed to violence-inhibiting cues were dramatically less aggressive (d = 1.65) than those exposed to the violence-promoting cues. Our data suggest that the AMM holds a great deal of promise to help develop effective prevention interventions for alcohol-related violence.

The fact that there is a significant link between acute alcohol intoxication and violence is no longer in question (e.g., Duke, Giancola, Morris, Holt, & Gunn, 2011). One of the most compelling theories attempting to explain alcohol-related violence is the *Alcohol Myopia Model* (AMM; Steele & Josephs, 1990) which postulates that intoxication impairs controlled effortful cognitive processing dependent on intact attentional capacity. This impairment creates a "myopic" effect on attention that restricts the range of internal and external cues that can be perceived and processed. As a result, remaining attentional resources are allocated to the most salient and easy-to-process cues. In hostile situations, alcohol facilitates violence by narrowing attention on provocative cues because, given their alarming/threatening nature, they are generally more salient than non-provocative or inhibitory cues. As a result of this alcohol myopia, the impact of non-provocative or inhibitory cues is not fully processed, or possibly not even perceived, thus increasing the probability of a violent reaction.

In addition to specifying when alcohol will incite violence, the AMM also makes the counterintuitive prediction that alcohol consumption can actually decrease aggression. The model maintains that if attention is distracted away from provocative cues and diverted toward even more salient inhibitory cues, aggression will be suppressed. In other words, in a

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situation where inhibitory cues are most salient, the alcohol myopia effect will focus remaining attentional resources on those inhibitory cues thus leaving no "space" in working memory to allocate to any less salient provocative cues thus decreasing the likelihood of an aggressive reaction. It is important to note that in such a scenario, the model predicts that alcohol will actually suppress aggression even below that exhibited by a sober individual. Specifically, inasmuch as attentional capacity is unimpaired in sober persons, they can simultaneously allocate their attentional resources to both strong inhibitory cues as well as less salient provocative cues. Theoretically, the result will be a more aggressive response than that seen in their intoxicated counterparts who, due to their narrowed attentional capacity, can only attend to the more salient "attention-grabbing" inhibitory cues.

This assertion is supported by laboratory studies that assessed the effects of alcohol on aggression using a task in which electric shocks were received from, and administered to, a fictitious opponent under the guise of a competitive reaction-time task (Giancola & Corman, 2007; Zeichner, Pihl, Niaura, & Zacchia, 1982). Participants completed the aggression task while being distracted from its provocative cues (i.e., receiving electric shocks) by simultaneously working on emotionally-neutral cognitive tasks (e.g., solving arithmetic problems, completing a working memory task). Although the results of these experiments support the AMM, one can question whether such neutral distracters will function effectively to suppress violence in real-world situations.

Steele and Josephs (1990) explicitly posited the key mechanism of *inhibition conflict* as a determinant of when alcohol will, and will not, facilitate aggression. Inhibition conflict refers to the magnitude of conflict between two opposing response tendencies (Steele & Southwick, 1985). According to these authors (Steele & Josephs, 1990; Steele & Southwick, 1985), a considerable degree of inhibition conflict must be present if alcohol is to engender aggression. For example, in its purest form, the model predicts that absent external inhibitory cues, if equally provoked, both sober and intoxicated persons will behave in an equally aggressive fashion. However, we believe that the AMM overstated this prediction. Even one of the originators of the model, agreed that there exists a certain degree of inhibition that is naturally present in all individuals so that given equally provoking environments, sober persons will be less aggressive than their intoxicated counterparts (Josephs, personal communication, 2008). Recent research, related to the current investigation, confirmed our supposition (Hoaken, Assaad, & Pihl, 1998; Lau & Pihl, 1996).

Previous research has demonstrated that the AMM also generalizes to a number of disinhibited behaviors such as risky sex. This was tested in a series of studies by MacDonald and colleagues who examined the competing forces of sexually compelling versus sexually inhibiting cues on alcohol's effects on risky sexual behavior (MacDonald, Fong, Zanna, & Martineau, 2000). Studies were carried out in laboratory and bar settings using a variety of cues that either encouraged or discouraged sexual behavior. Results demonstrated that cue type moderated the effects of alcohol use on risky sexual behavior. Intoxicated persons given compelling cues reported the greatest intentions toward engaging in risky sex compared with intoxicated persons given inhibiting cues (MacDonald, et al., 2000). Responses from sober persons, regardless of cue type, were intermediate to those of their intoxicated counterparts. In other words, when given inhibiting cues, alcohol significantly reversed intentions toward risky sexual behavior, even below levels seen in sober persons.

Accordingly, the present investigation represents a novel contribution to the research literature in that 1) although Giancola & Corman (2007) found that alcohol suppressed aggression when participants were distracted using a mundane cognitive task, it did not use applications that can be applied in more "real world" settings as was done in the current investigation and 2) this is the first attempt to determine whether our modified

manipulations will be effective when applied to the dependent variable of violence, rather than just risky sex. Giancola, Josephs, Parrott, & Duke (2010) recently expanded the AMM with respect to its utility in preventing intoxicated violence in real-world settings. In accordance with their suggestions, we sought to test an experimental manipulation designed to mimic a more real-world intervention, to the extent possible in a laboratory setting, to prevent alcohol-related violence by exposing intoxicated persons to violence-inhibiting versus violence-promoting cues.

Method

Participants

Participants were 16 male social drinkers between 21 and 30 years of age (*M* = 23.0; *SD* = 2.6) recruited from the greater Lexington, KY area through newspaper advertisements and fliers. Problem drinkers, as defined by those who scored an "8" or more on the *Short Michigan Alcoholism Screening Test (*Selzer, Vinokur, & van Rooijen, 1975), (*M* = .13; *SD* = .50; range = 0 – 2 in the currrent sample) were excluded from participation as were persons with serious psychiatric symptomatology, any medical condition that would contraindicate alcohol consumption or receiving electric shocks, as well as those who tested positive on a breath alcohol concentration (BrAC) or a urine drug screen. The sample consisted of 15 Caucasians and 1 African-American. Participants were paid $15 per hour for their time.

Beverage Administration

Participants received 1g/kg of 95% alcohol mixed at a 1:5 ratio with orange juice over a 20-minute period, and rinsed their mouths with water following beverage consumption. They were told that their beverages contained the equivalent amount of alcohol found in approximately 4 mixed drinks.

Aggression Task and Cue Manipulation

During a 20-minute post-drinking wait time, while the alcohol was being absorbed into their bloodstreams, participants were explained the *Taylor Aggression Paradigm (TAP;* Taylor, 1967), in which they were lead to believe that they would administer/receive electric shocks to/from a male "opponent" under the guise of a competitive reaction-time task carried out on a computer. Prior to beginning the TAP, participants' pain thresholds and tolerances were assessed to determine the intensity parameters for the shocks they would receive. This was accomplished via the administration of short-duration shocks that increased in intensity in a stepwise manner from the lowest available shock setting, which was imperceptible, until the shocks reached a subjectively-reported "painful" level. All shocks were administered through two finger electrodes attached to the index and middle fingers of the non-dominant hand using Velcro laces.

The entire TAP procedure consisted of 34 trials and lasted approximately 15 minutes. Participants were told that they had a choice of 10 different shock intensities to administer at the end of each winning trial for a duration of their choosing. Following a losing trial, they received 1 of 10 shock intensities that lasted 1 second. Shock intensities (including winning and losing trials) were administered in a random pattern. Participants viewed the shocks they selected and received on a "volt meter" and by the illumination of one of 10 "shock lights" [(ranging from 1 (low) to 10 (high)] on the computer screen displaying the reaction-time trials. Aggression was operationalized as the shocks administered by the participants labeled "1" (low) through "10" (high) on a computer keyboard.

Immediately after the participants were explained the TAP, "for entertainment purposes," they watched a video with an audio component, presented on a computer screen (adjacent to the screen used for the TAP), while also being exposed to other visual props designed to either inhibit or promote violent behavior. No mention was made about the auditory and visual props so as to not make participants suspicious about the purpose of their presence. The experimenters behaved in a way that ignored the props in every way thus suggesting that the props were a usual part of the decorative aspects of our laboratory. The TAP began 20 minutes after participants completed their beverages. The violence-inhibiting and violence-promoting stimuli were presented throughout the duration of the TAP. In accordance with the AMM, to be effective, these messages had to be attentionally-salient and easy-to-process. Thus, the violence-inhibiting group watched a video depicting peaceful images (e.g., serene nature scenes, smiling babies, families spending time together, etc.). Peaceful and soothing music was also played during the video. The room in which they watched the video was decorated with posters portraying similar scenes inconsistent with violence (e.g., sad looking baby seals, smiling children, cute animals, etc). In contrast, the violence-promoting group watched violent scenes from popular movies (e.g., *Goodfellas, The Matrix*, etc.) as well as video footage of on-field professional and amateur sporting violence. Harsh and violent sounding music was played during their video. The room was decorated with posters depicting violence (e.g., Al Pacino firing a machine gun in the movie *Scarface*, Muhammad Ali snarling over Sonny Liston after knocking him out, etc). Half of the participants were exposed to the violence-inhibiting cues ($n = 8$) and the other half were exposed to the violence-promoting cues ($n = 8$). Our violence-inhibiting and violence-promoting manipulation was a more elaborate version one used by Ward et al. (2008) in a study that did not use alcohol.

Results

Manipulation Checks and BrACs

During an objective post-TAP interview, all participants (i.e., 100%) reported that they clearly and fully recalled perceiving the videos and wall decorations and that they believed that they competed against a live opponent on the TAP. In another objective interview, all also indicated that the TAP deception manipulation was successful (e.g., they noted that their opponent tried hard to win, they thought the test was a good measure of reaction-time, while others made vulgar verbal remarks and physical gestures toward their opponent, etc.). All participants had BrACs of 0% upon entering the laboratory, a mean BrAC of 0.10% ($SD = 0.02$) prior to the TAP, and a mean of 0.11% ($SD = 0.01$) immediately after the task.

Aggression Data

Shock intensity and duration (in milliseconds) responses were transformed into *z*-scores and then summed. This was done to increase the reliability of the aggression measure as previous research indicates that shock intensity and duration are part of a more general construct of aggression (Carlson, et al., 1989). Scores were then analyzed using an independent groups *t*-test comparing the violence-promoting versus the violence-inhibiting group which revealed that the inhibition manipulation significantly suppressed aggression, $t(14) = 3.30$; $p < .006$; $d = 1.65$ (see Figure 1).

Discussion

This preliminary investigation confirms the basic tenants of the AMM. Despite equal levels of substantial intoxication, and even when tested with a small sample size, persons exposed to violence-inhibiting cues were dramatically less aggressive ($d = 1.65$) than those exposed to violence-promoting cues. This strong effect size clearly demonstrates that this experiment

was not statistically underpowered and is consistent with, and advances the research literature beyond, Giancola and Corman's (2007) research using a neutral distracter. Thus, as predicted by Giancola et al's. (2010) revisitation and expansion of the AMM, our findings show that alcohol, in and of itself, does not cause aggression; it merely "directs" behavior by focusing attention on cues that are most salient in one's environment.

An obvious limitation of this study is the lack of a sober/placebo group. The primary rationale behind this design was to obtain preliminary data in a controlled laboratory setting to provide researchers with the impetus to test more real-world interventions for alcohol-related violence as described by Giancola et al. (2010). Nevertheless, to bolster the methodological strength of our findings, in order to mitigate concerns about the absence of a sober/placebo group, it is important to note that previous research repeatedly demonstrated that sober/placebo groups yielded levels of disinhibited sexual behavior (MacDonald et al., 2000), uncontrolled anxiety (Steele & Josephs, 1988), and aggressive behavior (Giancola & Corman, 2007) that were intermediate to those evinced by intoxicated individuals who were exposed to distracting/inhibiting versus non-distracting/promoting cues. This exact pattern of findings has also been replicated in research examining disinhibited eating behaviors not involving alcohol intoxication (Mann & Ward, 2004). Thus, although a sober/placebo group was not employed in the present investigation, the above studies reliably support the AMM's prediction that by distracting the inebriate away from provocative cues, alcohol can actually decrease disinhibited behaviors even below levels seen in sober persons, which is what likely occurred in the present experiment given the immense disparity between the two groups (d = 1.65). The rationale behind this pattern of findings is that unimpaired sober persons can simultaneously allocate their cognitive resources to both provocative and non-provocative cues, leading to "moderate" levels of aggression. As intoxicated persons have fewer attentional resources/less space in working memory than their sober equivalents, when those resources are distracted away from provocative cues, the result will be less aggression than that seen in their sober counterparts.

However, we cannot discount that a possible priming effect took place. Participants were exposed to their video not only throughout the TAP, but during the task itself. As such, it is possible that their responses were an effect of being primed to behave in an aggressive or non-aggressive manner based on the stimuli to which they were exposed. Another critique that can be leveled against our investigation is that the results may be due, in part, to demand characteristics because the inhibiting and promoting cues may have exposed the true purpose of the study. It is for this reason that the violence-inhibiting group was presented with placid and calming stimuli rather than stimuli that more directly depicted scenes of the negative consequences of actual violent behavior. Nevertheless, in approximately 20 years of conducting such research, the lead author has found that it was extremely rare (< 1%) that participants admitted to being aware of the underlying purpose of his experiments. In fact, a seminal article on this topic by Berkowitz and Donnerstein (1982) noted that *"there is not as much awareness of the research hypothesis in many experiments as the critics have claimed"* (pg. 250). Moreover, a recent meta-analysis demonstrated that people are generally incapable of correctly judging deception in research studies (Bond & DePaulo, 2008). Regardless, even if demand characteristics did play a role in affecting the results, this would be ironically very desirable for practical purposes of creating public health prevention interventions (see below), as participants would have consciously suppressed their urges to act aggressively, thus confirming the central tenant of the AMM (i.e., focusing their limited attentional capacities on inhibitory stimuli that are most salient).

Translating the AMM into Action

So, in order for prevention efforts to be successful, the AMM requires distraction techniques that will break the link between provocative cues and violent reactions (Giancola et al.,

2010). This effect is well illustrated in the present investigation as well as another study where intoxicated bar patrons who received a salient hand stamp that read “AIDS KILLS” were less likely to report intentions to engage in risky sex compared with intoxicated patrons who received a less salient hand stamp that read “SAFE SEX” or one with a picture of smiling face (MacDonald et al., 2000).

Prior to concluding, it should be noted that the AMM is not without its critics (reviewed in Field, Wiers, Christiansen, Fillmore, & Verster, 2010). Mixed findings have been reported when attempting to compare the AMM against an alcohol response inhibition model (Bartholow et al., 2003) and others have shown that alcohol might even lessen one’s ability to attend to information that is supposed to be the focus of attention especially when that information is not particularly salient (Sayette, Reichle, & Schooler, 2009). However, neither of the above studies were designed to assesses aggression. The former (Bartholow et al., 2003), yielded mixed results when comparing models and the information that was to be the focus of attention in the second study (i.e., Sayette et al., 2009), was not especially salient which is a crucial and necessary component of the AMM (Steele & Josephs, 1990). Interestingly, neither of these studies were designed to assess aggressive or socially-disinhibited behaviors.

In conclusion, our results support the AMM in that alcohol can both increase and decrease aggression depending on where one’s attention is focused (Giancola et al., 2010; Steele & Josephs, 1990). Specifically, loading attentional capacity/working memory with inhibitory cues can attenuate violence by allowing behavioral output to be influenced by such cues. In turn, this creates less “cognitive space” to house and process hostile cues.

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Research Highlights

- This experiment provided a preliminary test of whether the *Alcohol Myopia Model* (AMM; Steele & Josephs, 1990) would provide a guiding framework for the prevention of alcohol-related violence.
- Despite being equally intoxicated, participants exposed to violence-inhibiting cues were dramatically less aggressive (d = 1.65) than those exposed to the violence-promoting cues.
- Our data suggest that the AMM holds a great deal of promise to help develop effective prevention interventions for alcohol-related violence.

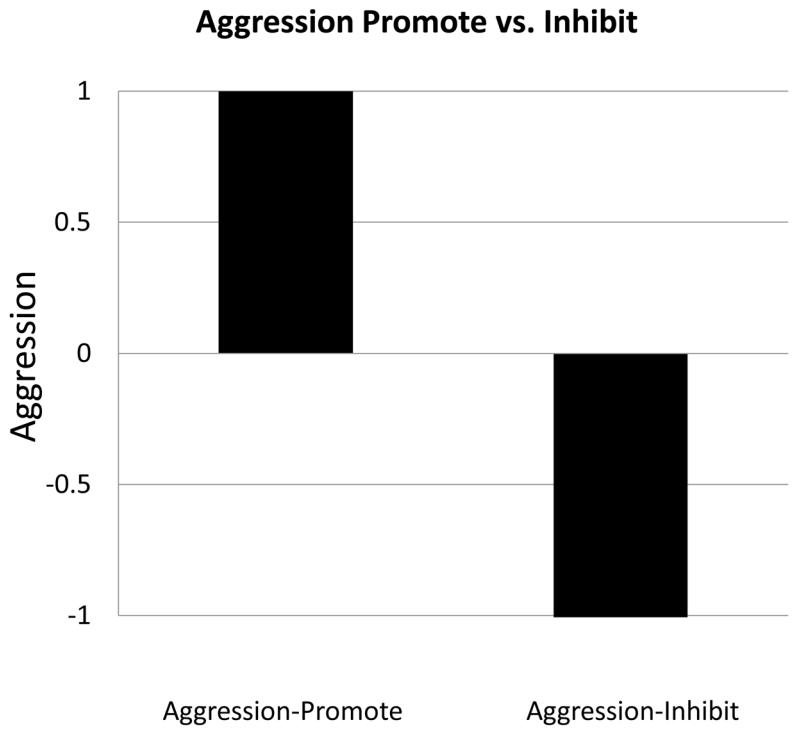

Figure 1.
Aggression levels in the violence-promoting and violence-inhibiting groups. Aggression values represent summed *z*-scores for shock intensity and duration on the *Taylor Aggression Paradigm.*