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Alcohol and Aggression: Perspectives on Controlled and Uncontrolled Social Information
Processing

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Abstract

This paper reviews the main current social-cognitive explanations of the effects of acute alcohol consumption on aggression: the cognitive disruption model, the attributional model, and model of automaticity. The cognitive disruption model posits that intoxication affects controlled processing arising from the impairment of executive cognitive functions by alcohol's pharmacological properties. The individual consequently focuses on the most salient and proximal situational factors, thereby spoiling self-regulatory processes. According to the attributional model, drinkers expect alcohol to mitigate social sanctions following aggression by shifting blame to alcohol. These explicit expectations represent an extra-pharmacological cause of the alcohol-aggression link. Finally, the model of automaticity implies that alcohol meanings stored in long-term memory and activated in drinking contexts automatically triggers aggressive thoughts and behavior without individual's awareness. The explanation of intoxicated aggression should integrate these co-etiological social cognitive models that take into account pharmacological as well as extrapharmacological consequences of alcohol consumption.

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Introduction

The association between drinking and aggression has been recognized for centuries (Hanson, 1995). Today, alcohol is known as the psychotropic substance most frequently related to aggressive and violent behavior (Boles & Miotto, 2003; Gmel & Rehm, 2003; Parker & Rebhun, 1995; Pernanen, 1991; Fagan, 1990; Zhang, Wieczorek, & Welte, 1997). For example, in a study aggregating more than 9300 criminal cases from 11 countries, Murdoch, Pihl and Ross (1990) showed that sixty-two percent of violent offenders were drinking at the time of commission of the crime or shortly before. In an American nationwide survey, Coleman and Strauss (1983) showed that rates of marital violence were fifteen times greater for husbands who were drunk often compared to those who were never drunk during the past year

In the past 25 years, more systematic and extended research has been undertaken to understand the correlation and the causal process linking alcohol consumption and aggressive behavior. In this paper, we will focus on three current social-cognitive explanations of the effect of acute alcohol consumption on aggression. Despite their important differences, all the models imply that the alcohol-aggression link is mediated by cognitive and emotional states and may be modulated by chronic knowledge structures. The *cognitive disruption model* posits that alcohol intoxication affects controlled, effortful processing resulting from the impairment of executive cognitive functions. According to the *attributional model*, drinkers are using alcohol to mitigate perceived personal responsibility by attributional processes. Finally, the *model of automaticity* imply that alcohol meanings stored in long-term memory potentially automatically triggers aggressive thoughts and behavior without individual's

awareness. According to all these three models, alcohol effects on social behavior cannot be purely reduced to pharmacological consequences of ethanol consumption. This assumption is consistent with a meta-analysis by Hull and Bond (1986) indicating that the mere expectancy of drinking alcohol was significantly related to deviant social behavior. Before examining the three mentioned models, which are mainly based on laboratory experiments, we will shortly explain why experimental designs are indispensable in the study of the alcohol-aggression link.

Experimental methods for studying the alcohol-aggression link

Currently, the links between alcohol and violence are mainly assessed by epidemiological studies. However, the evidence that alcohol is frequently involved in the perpetration of aggressive behavior does not demonstrate that alcohol is causally and/or directly responsible for an individual's aggressive actions. It may be indeed the case that the tendency to get intoxicated and the performance of aggressive behavior are caused by manifold individual or situational variables. In experiments on alcohol and aggression, direct physical aggression is most of the time measured by means of a teacher-learner task (Buss, 1961), a reaction-time task (Taylor, 1967), or a variation of one of these procedures (see Giancola & Chermack, 1998; Tedeschi & Quigley, 1996; 2000). In a typical teacher-learner task, an accomplice of the experimenter pretends to be a research participant. The real participant is asked to teach the bogus participant a concept over a series of trials by providing "feedback" in the form of varying intensities of electric shocks whenever a mistake is made. The amount of electric shocks administered to the target is the dependant variable. In the reaction-time task, the real participant is led to believe that the winner of each trial (reaction-time task) can select some level of electric shock to punish the loser. In reality, the shock

levels are selected in a predetermined sequence of increasing intensity that is independent of actual performance. When the participant loses, he receives shocks; when he wins a trial, he gets a chance to see the level of shock that his opponent has intended for him and to then deliver a shock. Laboratory meta-analytic reviews of experimental studies based on such methodologies have indicated a causal role of alcohol consumption on aggressive behavior for men and women (Bushman & Cooper, 1990; Bushman, 1993; 1997; Chermack & Giancola, 1997; Chermack & Taylor, 1995; Exum, 2006; Hull & Bond, 1986; Ito, Miller, & Pollock, 1996; Lipsey, Wilson, Cohen, & Derzon, 1997; Pedersen, Aviles, & Ito, 2002; Roizen, 1997; Steele & Southwick, 1985). However, it is also acknowledged that the effect of alcohol strongly depends on situational and individual factors and is far from being as straightforward as motor and cognitive impairment generally induced by alcohol consumption (Lipsey et al., 1997, p.278). The clarification of the psychological processes involved in the alcohol aggression link is therefore an important step to understand and prevent intoxicated aggression.

1. Intoxicated aggression and cognitive disruption

In the explanation of alcohol effects on aggression, the idea persists among both researchers and laypersons that they stem directly from the pharmacological properties of the drug (Jellinek, 1960). The concept of alcohol as a general disinhibitor, causing people to « let go » of the inhibitions that would normally constrain their behavior is seemingly consistent with many observable behavior following alcohol consumption, such as self-disclosure (Caudill, Wilson, & Abrams, 1987), flirt (Abbey, Zawaki & Auslan, 2000), unprotected sex (Kingree, Braithwaite, & Woodring, 2000), drinking and driving (Dennis, 1993); exhibitionism (Langstrom & Seto, 2006), risky gambling (Bechara et al., 2001), dating violence (Makepeace, 1987), sexual assault (Abbey et al., 2001), child abuse (Freisthler,

Needell, & Gruenewald, 2005), violent crime (Dunnegan, 1997) and homicide (Shaw, Hunt, & Flynn, 2006). However, the general idea of disinhibition has been largely rejected by most reviewers (Graham, 1980; Giancola, 2000; Parnanen, 1993) and is inconsistent with the compelling assessment that alcohol consumption actually induces conflicting effects. In fact, alcohol can lead to aggressive tactics during negotiation (Schweitzer & Gomberg, 2001) but also to altruism (Steele, Critchlow, & Liu, 1985). It can inflate individuals' egos (Banaji & Steele, 1989) but also leads to depressed feelings (Steele & Josephs, 1988). It facilitates social bonding (Kirchner, Sayette, Kohn, Moreland, & Levine, 2006) but is also linked to social isolation and suicidality (Kendal, 1983). It provokes a minimization of negative consequences of risky behaviors (Fromme, Katz, & d'Amico, 1997) and induces individual (Burian, Liguori, & Robinson, 2002) and group riskier behavior (Sayette, Kirchner, Moreland, Levine, & Travis, 2004) but also stimulates cautious sexual conduct (Testa & Collins, 1997; McDonald, Fong, Zanna, & Martineau, 2000) and reduces cognitive impulsivity (Ortner, MacDonald, & Olmstead, 2003). The Alcohol Myopia Theory (AMT) provides an important resolution of these apparent contradictions.

The Alcohol Myopia Theory (AMT)

According to Steele and Josephs (1990), alcohol causes excessive social behaviors indirectly by restricting cognitive capacity and leading to a psychological myopic state. Alcohol myopia is defined as a « state of shortsightedness in which superficially understood, immediate aspects of experience have a disproportionate influence on behaviors and emotions» (Steele and Josephs, 1990, p. 923). Whereas a sober individual can consider a range of information more or less salient before responding to a social situation, an intoxicated individual will be less concerned with consideration distal in time and place

because he will be captive of an impoverished version of reality in which the breadth, depth, and time line of his understanding will be affected. Various studies show that intoxicated people no longer have the prerequisite processing skills to attend to all of the multiple cues involved in social behavior (Streufert et al., 1993) and apparently seek cognitive closure (Lange, 2002). The attentional impairment being generally more pronounced in people not used to drinking alcohol (Carpenter, 1962), they are accordingly more aggressive following a high dose of alcohol intake than moderate or heavy drinkers (Laplace, Chermack, & Taylor, 1994). According to AMT, aggression is not necessarily the outcome of alcohol consumption if non-aggressive reactions are salient after a provocation. Jeavons and Taylor (1985) demonstrated that provoked intoxicated participants who were provided with a nonaggressive norm regarding shock setting behavior did not differ from their sober counterparts, whereas they behaved in an aggressive manner in the absence of such a norm.

Alcohol myopia theory makes general predictions about how alcohol affects social behavior. Steele and Josephs (1990) posit that individuals' social behaviors are affected by two kinds of cues: those that instigate a behavior (provoking cues) and those that constrain a behavior (inhibitory cues). Situations in which both provoking (e.g. provocation) and inhibitory cues (e.g. fear of the consequences of a fight) are present are referred to as inhibition response conflict, because the inhibitory cue to suppress action operates in opposition to the provoking cue to act. According to alcohol myopia theory, alcohol consumption suppresses inhibitory cues; thus, intoxicated individuals are more likely to act on their provoking cues than are sober individuals. The myopic effect of alcohol can therefore have various aggressive-enhancing effects, for example by lowering level of processing of relevant situational cues that ordinarily serve to mitigate or inhibit aggression such as attributional processes (Ferguson & Rule, 1983). Steele and Southwick (1985) conducted a

meta-analysis of the effects of alcohol consumption on various social behaviors such as aggression and sexual adventurousness and observed that people behaved more extremely under the influence of alcohol only in inhibition conflict situations (see also Curtin & Fairchild, 2003; Fillmore & Vogel-Sprott, 1999; Finn, Justus, Mazas, & Steinmetz, 1999; Mulvihill et al., 1997).

The effect of alcohol myopia is also relevant for any situation where the attention to multiples cues is necessary to elaborate an accurate judgment. Herzog (1999) showed that when asked to focus on the dispositions of others, intoxicated participants tended to exaggerate the extent to which these dispositions were influencing their behaviors. Such an inclination potentially contributes to an hostile information processing pattern induced by alcohol (Ogle & Miller, 2004; Sayette, Wilson & Elias, 1993) which is proximal to aggressive behavior (Crick & Dodge, 1994; Zelli, Dodge & Lochman, 1999). An intoxicated person may therefore not correctly perceive the reasons for other people's behavior, making the actions of others appear more provocative than they would to a sober perceiver. Another inhibiting cue that is also blurred by alcohol consumption is perceived future consequences of one's action (Peterson et al., 1990; Sayette, 1993; Zeichner & Pihl, 1979).

Finally, the decrease of sensitivity to others' facial cues of possible irritation induced by alcohol (Borrill, Rosen, & Summerfield, 1987) can additionally induce aggression. Other studies confirmed the relevance of AMT for explaining human conduct (Morris & Albery, 2001; Murphy, Monahan, & Miller, 1998; Monahan, Lannuti, 2000; Mc Donald, Mc Donald & Zanna, 2000; Mc Donald, Fong & Zanna, 2000) as well as non human behavior (Grant & MacDonald, 2005; Olmstead, Helleman, & Paine, 2006).

Conflict blocking effect of alcohol and self-processes

The conflict-blocking effect underlined by Steele and Josephs (1990) can be applied to self-processes, which are of particular relevance in aggression (Baumeister, Bushman & Campbell, 2000; Bushman & Baumeister, 2002). Banaji and Steele (1989) suggested that alcohol can disinhibit self-evaluative conflicts between the individual's tendency to think positively of oneself along important dimensions (Steele, 1988; Tesser, 1988) as well as automatic egotism patterns (Paulhus & Levitt, 1987) and the opposite tendency which usually requires a conscious override to consider more accurately one's character and skills (Swann et al., 1992). They showed that inebriation inflated evaluation on central dimensions of self for which individuals had acknowledged that there was a discrepancy between their real self and their ideal self. Likewise, Denton and Krebs (1990) showed that intoxicated subjects self-attributed more moral integrity to themselves than to others, which is consistent with the ego-boost idea. In another study, Quigley, Corbett, & Tedeschi, (2002) showed that the link between alcohol consumption and violence was stronger among individuals who wished that others perceive them as tough, powerful and strong, and tended to view alcohol as a cause of aggression. The narrowing effect of alcohol generally directs attention away from self-standards, which may be less salient in many drinking situations. According to Hull (1981), alcohol also disrupts encoding processes fundamental to a state of self-awareness, which involves higher order encoding processes (Hull & Levy, 1979). For example, self-relevant pronouns such as *I*, *me*, *myself*, *my* and *mine* are made less frequently during a speech in alcoholic condition (Hull, Levenson, Young, & Sher, 1983). Moreover, in social drinking contexts, the complexity of moral reasoning of intoxicated participants decreases (Denton & Krebs, 1990). Given that self-awareness lowering is a proximal cause of aggression by decreasing the salience of personal standards of appropriate behavior (Bailey, Leonard, Cranston, & Taylor, 1983 ; Spivey, Prentice-Dunn, 1990; Prentice-Dunn & Spivey, 1986;

Prentice-Dunn & Roger, 1982, Scheier, Fenigstein, & Buss, 1974; see also Postmes & Spears, 2001, for important qualifications of the phenomenon), it is suggested that decreased self-awareness induced by alcohol consumption has effects similar to deindividuation and induces aggression (Pihl & Ross, 1987). A meta-analysis based on 49 independent studies (Ito et al., 1996) showed that differences between sober and intoxicated subjects in terms of aggressive behavior was less pronounced under high self-awareness (induced for example through the presence of a mirror and a video camera in front of the subject) as opposed to low self-awareness. This self-regulation failure is specially interesting because drinking alcohol is one of the most common way of reducing self-awareness (Hull, 1981; Hull, Young & Jouriles, 1986). For instance, Hull and Young (1983) showed that among high self-conscious subjects, those who received failure feedback drank more than those who received success feedback.

The disruption of Executive Cognitive Functioning

Recent neuropsychological studies on the mediator and moderator status of executive cognitive functioning (ECF) are compatible with Steele and Joseph's (1990) hypothesis on alcohol myopia and Hull's (1981) self-awareness model. ECF is a subset of cognitive capacities associated with prefrontal cortex encompassing a variety of higher order cognitive abilities such as attention, abstract reasoning, organisation, mental flexibility, planning, self-monitoring, and the ability to use external feedback to moderate personal behavior (Robert, Robbins, & Weiskranz, 1999). Many studies indicate that ECF is deficient among authors of aggression (Paschall & Fishbein, 2002; Raine et al., 2000; Moffitt, 1993; Stevens, Kaplan & Hesselbrock, 2003) and is disrupted by alcohol consumption (Curtin & Fairchild, 2003; Hoaken, Assaad, & Pihl, 1998; Lau, Pihl, & Peterson, 1995). Direct empirical tests of a mediational model shows that alcohol's pharmacological properties facilitate aggression by

altering executive cognitive functioning (Giancola, 2000; Hoaken et al., 1998; Pihl, Peterson, & Lau, 1990). Moreover, ECF also moderates the alcohol-aggression link: individuals who have a low level of ECF in sober state react more aggressively when they drink alcohol (Giancola, 2000, 2004; Giancola, Parott & Roth, 2006; Lau, Pihl, & Peterson, 1995; Pihl, Assaad & Hoaken, 2003).

The AMT and the related self-awareness perspective are cognitive models explaining how pharmacological properties of alcohol influence information processing. However, in some cases, alcohol may influence cognitive processes and behaviour for reasons that have nothing to do with the psychopharmacological effect of ethanol on the brain. For example, people exposed to sexual stimuli had an increase in self-reported arousal and in penile tumescence if they believed that they had been drinking, whereas alcohol itself had no effect among males and even decreased sexual arousal among women (Abrams & Wilson, 1983). In another study, people drove more recklessly in a driving simulator when led to believe that they had just consumed alcohol (McMillen, Smith, & Wells-Parker, 1989). Many other studies suggest that alcohol may provide an attributional excuse to engage in socially unconventional or prohibited acts. These views are developed in the following sections.

2. Alcohol as excuse: The attributional model

According to the attributional model, the beliefs that individuals hold on alcohol and its expected attributional value for self and others contribute to the alcohol-aggression link. Drinking can thus have consequences that are mediated not by alcohol effects but by the self-fulfillment of expectations about alcohol's effects or by the use of drinking to excuse reprehensible behavior (Critchlow, 1986 ; Marlatt & Rohsenow, 1980; Mc Caghy, 1968;

Lang, 1993). Mc Andrew and Edgerton (1969) especially argued against the notion of alcohol as a pharmacological disinhibitor by showing that there were societies whose members drunken behavior failed to exhibit the unrestrained behavior supposed to follow alcohol consumption. They also highlighted that alcohol's behavioral consequences had undergone marked transformations over historical time and were radically different from one site of socially ordered situations or circumstances to another. The excuse value of alcohol was also underscored. A premise of the attributional perspective is that layperson *expects* alcohol to have specific consequences on oneself and others (see Graham et al, 1998; Quigley & Leonard, 2006). The central construct of *expectation* reflects the representation in memory of an individual's acquired knowledge (information, encoding, schema, script) regarding the consequences of definite behavior in different contexts by direct experience or vicariously (Goldman, Brown, & Christiansen, 1987). In alcoholism, expectancies are viewed as major proximal determinants of drinking behavior and as a mediator of many of the other psychological and pharmacological influences (Goldman, del Boca, & Darkes, 1999; Jones, Corbin, & Fromme, 2001). Questionnaire research on explicit expectancies, conceived as orthogonal dimensions (Leigh, 1989c; Leigh, 1987a, b; 1989a, 1989b; Leigh & Stacy, 1991; 1993; 1998; 2004) or associative networks models (Goldman et al., 1991; Rather, Goldman, & Roehrich, 1992) show that expectations that alcohol expedites aggression are widely prevalent (Critchlow, 1986; Lindman & Lang, 1994; Murdoch & Pihl, 1990; Rohsenow, 1983; Rom & Bullock, 2002; Paglia & Room, 1999; Southwick, Steele, Marlatt, & Lindell, 1981; Kidder & Cohn, 1979), develop in childhood (Kraus, Smith, & Ratner, 1994; Miller, Smith, & Goldman, 1990; Query, Rosenberg, & Tisak, 1998) and show familial transmission (Johnson, Nagoshi, Danko, Honbo, & Chou, 1990). Individual differences are also observed: males and aggressive individuals are more likely to expect aggressive behavior when intoxicated (Brown, Goldman, Inn & Anderson, 1980; Crawford, 1984; Leigh, 1987; Leonard

& Blane, 1988). Interestingly, expectations about the effects of alcohol on aggression also vary according to the type of beverage (Klein & Pittman, 1990; Pihl et al., 1984), which is consistent with several laboratory studies indicating that aggression is more likely following the consumption of distilled rather than brewed beverages (Pihl, Smith & Farrell, 1984; Murdoch & Pihl, 1988a, 1988b).

Attributional studies among non-convicted and convicted

According to the attributional perspective, since alcohol is believed by laypersons to facilitate aggression, transgressing individuals should use intoxication to decrease negative reactions of others by the use of self-serving explanations aimed at reducing personal responsibility and disengaging core components of the self (see Gabor, 1994; Scott & Lyman, 1968; Snyder, Higgins, & Stucky, 1983; Sykes & Matza, 1957). Discourse analysis studies confirm that authors of violence use intoxication as excuses (Abrahamson, 2006; Brisset, 1978; Dobash & Dobash, 1979; Gelles, 1972; Gelles & Strauss, 1979; Scully & Marolla, 1984; Tryggvesson, 2004). However, studies on larger samples provide mixed results. In a study of 197 male incarcerated offenders, Loza and Clements (1991) showed that alcohol abusers assigned significantly more blame to alcohol when compared to alcohol non-abusers. However, in another study of 307 prisoners convicted of serious assault, only 13% considered drinking a causal agent and 28% regarded it as contributory (Mayfield, 1976). In a last study of 158 convicted child molesters, Mc Caghy (1968) found that 32% mentioned drinking in an explanation of why they committed it compared with 49% who did not mention drinking (18% denied the offence). These results suggest that the alcohol excuse is not massively pointed up by convicted. It should be remembered, however, that in these studies the participants were already in jail and had nothing to gain from proposing drunkenness as an excuse (Critchlow,

1983). On the contrary, greater acceptance of responsibility of one's act is a desired outcome of many treatment programs followed by convicted people. For example, Kroner and Mills (2004) showed that such alcohol attributions significantly decreased after a violent offender treatment program. Moreover, offenders know that the use of excuse does not minimize the blame all the time. In the attributional literature, excuses have been regarded as intermediate between aggravating/assertive and mitigating/non-assertive accounts. They may have negative effects because the transgressor appears as someone who does not accept responsibility (Weiner, 2006).

Social and legal sanctions following intoxicated aggression

Studies of informal or legal sanctions following intoxicated transgressions provide further data. Reviews of alcohol use in many primitive societies point out that drunken transgressions involving sex or aggression are not severely punished (Horton, 1943; McAndrew & Edgerton, 1969; Washburne, 1961, quoted by Critchlow, 1983, p.452). The use of intoxication being a permissible legal defence in criminal trials in many places (Coates & Wade, 2004; Lang, 1993; Lang & Sibrel, 1989; Room, 1996, Wilson, 1997), we may expect that alcohol plays a role in the sanction process. Results are nevertheless inconsistent. Husbands accused of intimate violence are more likely to be arrested and prosecuted when intoxicated (Buzawa & Buzawa, 1990; Hoyle, 1998, quoted by Quigley & Leonard, 2002, p. 489). A penal study examining 238 cases of sentencing for first degree murder in California from 1958 to 1966 showed that half of the offenders who had used no alcohol or a light amount received the death penalty, whereas only 30% of offenders who had used a moderate or excessive amount of alcohol were similarly sentenced to death (Note, 1969; Baldus, 1980). In another larger study based on reports of 628 offenders, it was observed that offenders

convicted of minor offences received more lenient sentences if they had used alcohol in conjunction with their crimes than if they did not use alcohol. The opposite was observed for offenders committing serious crimes (Harrell, 1981). Among general population, results do not tend to strongly sustain an excuse function of alcohol: a survey by Sobell and Sobell (1975) indicated that 60% of respondents thought that an intoxicated person was behaviourally responsible and accountable. In a random digit dialing study regarding alcohol expectations among six countries, Room and Bullock (2002) noted that only 11% (France) to 48% (Italy) agreed with the sentence "people who are drunk should not be considered as responsible for their actions as when they are sober". In another study in Ontario, Paglia and Room (1998) showed that 92% felt that people were accountable for any action when drunk.

By and large, these studies do not provide strong support for the idea that alcohol could be perceived as an excuse by laypersons. It has been suggested however that accepting alcohol as an excuse when responding to survey questions might result in desirability bias, at least in cultures emphasizing self-control (Tryggvesson & Bullock, 2006). It may be the case that a less direct questioning could enable other trends to plot. Therefore, between subjects analysis using vignette method appear as an appropriate way of avoiding response bias. Tryggvesson and Bullock (2006) sampled 1004 subjects by random digit dialing and showed that respondents attributed less blame to the perpetrator as a result of his drinking but only under specific circumstances. Several other experimental vignette studies (mainly with convenience samples) confirmed that drunken offenders were frequently assigned less responsibility and blame than sober fellows (Bullock, in press; Critchlow, 1985; Carducci & Mc Neely, 1981; Katz, Arias, & Beach, 1995; McKay & Collins, 1987; Richardson & Campbell, 1980, 1982). However, in other vignette studies, the intoxication of an aggressor has been shown to have no effects or mixed effects on responsibility and/or attribution

depending on other variables. In a study by Wild, Graham and Rehm (1998), intoxication reduced the attribution of blame only among those without criminal history. Another study showed that the perpetrator of an acquaintance rape was considered as less responsible and blameworthy after alcohol consumption but only when he and the victim had equivalent levels of intoxication. When the victim was more intoxicated, the perpetrator's responsibility increased (Stormo, Lang, & Stritzke, 1997; see also Corenblum, 1983; Dent & Arias, 1990; Fischer, 1995; Gustafson, 1991; Kelly & Campbell, 1977; Testa & Leonard, 2001). Finally, in other studies, intoxication increased responsibility and/or blame attributed to an aggressor (Aramburu & Leigh, 1991; Leigh & Aramburu, 1994; Lane & Knowles, 2000; Stewart & Maddren, 1997). Regarding the excuse function of alcohol, our review suggests that whereas individuals associate alcohol consumption and violence, the attribution of responsibility and blame following an hypothetical or real-life intoxicated violence is not necessarily diminished among actors and observers and suggest that important contextual features frequently interact when judging alcohol-related violence. The inconsistencies may originate in the variations in legal and public opinions regarding alcohol (Critchlow, 1983; Wilson, 1997). Acceptance of excuses is mutable and is vulnerable to historical and cultural shifts in societal attitudes about substances (Fagan, 1990).

The moderating status of alcohol expectancies

Another relevant feature of the attributional perspective lies in the moderating status of alcohol expectancies in self-reported violence. In a study based on a probability sample of 1468 participants, Field, Caetano and Nelson (2004) showed that individuals with expectation of aggressive behavior following alcohol consumption, and those who believed that alcohol was an excuse for misbehavior, perpetrated more often intimate partner violence. Whereas

some self-report studies show that the relation between alcohol and aggression is stronger among persons who expect alcohol to increase aggression than among persons who do not hold this belief (Dermen & George, 1989; Leonard & Senchak, 1993), other studies do not support these findings (Norris & Kerr, 1999; Quigley & Leonard, 1999) or provide more complex results (Quigley et al., 2002). Experimental studies also suggest a complex relationship between self-reported expectancies that alcohol leads to violence, dosage set (i.e. the quantity of alcohol subjects believe that they have ingested) and aggression. In a study by Chermack and Taylor (1995), aggressive expectancies affected aggression only in very specific experimental conditions (high provocation) and only for higher levels of aggression. In a subsequent study by Giancola, Godlaski, and Parrott, (2005), subject's expectations that alcohol causes aggression were significantly related to aggression for men who received a placebo beverage under low provocation and for men who received alcohol under high provocation. However, when controlling for dispositional aggressivity, these effects were rendered non-significant.

Studying alcohol's placebo effect

Finally, an important methodology developed to study the effects of expectancy is the Balanced Placebo Design (BPD; Carpenter, 1968; Hull & Bond, 1986; Marlatt & Rohsenow, 1980; Rohsenow & Marlatt, 1981). In the typical study relying on the balanced placebo design, half of the participants receive alcohol, and half receive a non-alcoholic beverage. Within each of these groups, half of the participants are told that they will receive alcohol and half are told that they will receive a non-alcoholic beverage. Available meta-analytic reviews suggest that the effect of the dosage-set on aggression is very limited (Bushman & Cooper, 1990; Bushman, 1993; 1997). However, while logically appropriate to answer the theoretical

question under study, the BPD raises practical issues that may have heavy consequences on research operationalization and results. The validity of the balanced-placebo design assumes that participants accept at face value the alcohol and expectancy manipulations. The use of a BPD thus relies on a manipulation of the taste and smell of beverages such that participants cannot reliably distinguish alcoholic from non-alcoholic beverages on the basis of sensory cues (Marlatt, Demming, & Reid, 1973; Mendelson, Mc Guire, & Mello, 1984), while non-alcoholic beverages may deliver the sensory cues of alcoholic beverages (Glautier, Taylor, & Remington, 1992). Unfortunately, serious doubts have been raised concerning the possibility of efficiently operationalizing the BPD, which has increasingly been the target of methodological criticism (Martin & Sayette, 1993; Ross & Pihl, 1989). In alcohol studies, suspicion in placebo condition, and especially in antiplacebo condition (when alcohol is ingested but is not expected) is often rampant, with rates of suspicion reaching 60% or even 90% in some studies based on BPD (Bradlyn, Strickler, & Maxwell, 1981; Keane, Lisman & Kreutzer, 1980; Lyvers & Maltzman, 1991; Martin, Earleywine, & Finn, 1990). In a recent synthesis of the available quantitative meta-analyses devoted to experiments on alcohol-aggression links, Exum (2006) concluded that “expectancy has a negligible effect on aggression” and that “it is alcohol’s pharmacological properties that explain the bulk of the variance in intoxicated-aggression” (p.141). This conclusion is however qualified by the methodological limitations of the empirical base on which it is grounded (Bushman & Cooper, 1990; Bushman, 1997). In a recent study that carefully minimized the participants usual detection based on interoceptive, gustative, and instructional cues, the differences in the level of aggression observed were determined largely by participants’ expectations about the content of the beverage they consumed, which is not consistent with Exum’s 2006 conclusion (Begue, Subra, Arvers, Muller, Bricout, & Zorman, submitted).

In studies relying on BPD, it may be assumed that the outcomes of dosage-set are considered to be mediated in some way by alcohol expectancies. That is, thinking that one has consumed a certain amount of alcohol activates beliefs about the effects of alcohol, which in turn influences behavior. As suggested by Quigley and Leonard (2006), the availability of an alcohol cue may be expected to trigger the expectancy that alcohol leads to aggression, which should, in turn, activate a more general associative network regarding aggression of which individuals may not be aware. This opens the door to new insights on expectancy effect involving automatic processes. We turn to that new and promising perspective in the next section.

3. Model of automaticity

According to the attributional perspective previously outlined, expectancies operate as an explicit belief that influence the decision-making process. Drinkers simply expect other people to tolerate their antinormative behavior if it can be attributed to alcohol or that alcohol will help them in performing aggressive acts. Recently, research on automaticity in social psychology accumulated growing evidence showing however that there are social phenomena that occur at least partly automatically (Bargh, 1996).

Automatic processes and their relevance for the alcohol-aggression issue

Automaticity refers to a process that is unintentional (the individual does not start the process by an act of will), uncontrollable (the process cannot be stop), efficient (consume a minimal attentional resource), and occurs outside awareness (Bargh, 1994). For instance, social knowledge is automatically (implicitly) activated in memory during the natural course

of perception, and this without people's awareness or intention. Knowledge activation, in turn, shapes and guides people's impressions, judgments, feelings and intentions without people being aware that such influence is occurring (see Bargh & Ferguson, 2000; Bargh & Erin, 2006; Ferguson & Bargh, 2004). Applied to the alcohol aggression-link, the automaticity perspective implies that alcohol cues could implicitly activate alcohol expectancies, which will affect social judgment and behavior in line with these expectancies.

The concept of alcohol expectancy is based on a semantic network model of memory (Collins & Quillian, 1969), which posits that concepts that frequently co-occur (e.g. guns and blood) or share a similar meaning, are stored close together in memory. When a concept is activated, other related concepts also become more accessible through a spreading activation process (Collins & Loftus, 1975). Hence, to the extent that people strongly endorse alcohol related aggression expectancies, concepts of "alcohol" and "aggression" would be linked in memory. In line with neuroassociationist models of memory, the construct of expectation reflects the representation in memory of the acquired knowledge regarding the consequence of alcohol consumption (e.g. Stacy, Leigh, & Weingardt, 1994). The hypothesis arising from memory models of alcohol expectancies is as follows: The mere exposure to alcohol cues will increase accessibility of the aggressive construct, as Berkowitz tested with the weapon effect (Berkowitz & LePage, 1967; Anderson, Benjamin, & Bartholow, 1998).

Alcohol cues and aggression accessibility

In a study, Bartholow and Heinz (2006) assessed whether exposure to alcohol-related images increased the accessibility of aggressive thoughts. After being primed with an alcohol related image, or a neutral image, accessibility of aggressive thoughts was assessed using a

primed lexical decision task. Results showed that alcohol primes, as weapon prime, resulted in a faster reaction time for aggressive words relative to non-aggressive words. More interestingly, priming effects of alcohol prime were identical to priming effects of weapon prime. Recently, this hypothesis has been tested with a representative general population sample, and the results showed the same facilitating effects of alcohol prime and weapon prime on aggressive thought (Subra, Bègue & Delmas, in preparation). Nevertheless, given the fact that expectancies stored in memory reflects direct and vicarious experience, structuration of alcohol expectancies in memory and memory accessibility of alcohol outcomes can be assume to differ according to an individual's drinking experience (Reich & Goldman, 2005; Wiers, van Woerden, Smulders, & de Jong, 2002; De Houwer, Crombez, Koster, De Beul, 2004; Leigh & Stacy, 1998; Stacy et al., 1994).

Context of perception also affects accessibility of aggressive thoughts after exposure to alcohol related cues, which is particularly relevant for alcohol expectancies, given that people hold multiple expectancies simultaneously, and that alcohol outcome expectancies could be antagonist (e.g. sociability and aggression). Wall and colleagues (Wall, McKee, & Hinson, 2000; Wall, McKee, Hinson, & Goldstein, 2001) showed that alcohol outcome expectancies vary between a laboratory and a bar setting, and the speed with which alcohol expectancies are accessed in memory appears to be influenced by environmental context. For example, participants exposed to a bar context expected greater alcohol related stimulation/dominance in comparison to participants tested in laboratory (Reich, Goldman & Noll, 2004).

Alcohol cues and judgment

According to the model of automaticity, the mere presence of aggression cues can alter social perception associated with hostility and aggression. Srull and Wyer (1979, 1980) showed that temporary activation of the concept of aggression had an impact in a next unrelated task of social judgment: The greater the number of aggressive prime to which a given subject was exposed in the first task, the more extreme were his aggressive rating of a target person (see also Bargh and Pietromonaco, 1982). These studies demonstrate that activation of traits concept will influence the interpretation of subsequent relevant behavior. Given the fact that social stimuli are for the most part ambiguous and may be subject to categorization in several ways, classification of a stimulus will depend on the relative accessibility of the relevant categories. So, if aggressive thoughts are activated, for instance by the presence of alcohol related cues, then it is more likely to be used in the interpretation of other's behavior. In line with this explanation, Friedman, McCarty, Forster, and Denzler (2005) tested whether priming with alcohol-related stimuli would influence attractiveness's rating of a female target. Starting with the widely shared expectancy of aphrodisiac properties of alcohol, they hypothesized that individuals primed with alcohol related cues would rate a target in a second experiment as more attractive in comparison to non-primed participants. Findings showed that following exposure to alcohol related words, relative to control words, men with stronger self-reported expectancies that alcohol increases sexual desire rated woman as more sexually attractive. More relevant for our demonstration, in another experiment, Bartholow and Heinz (2006) tested whether alcohol cues could engender an hostile attribution bias. After being primed with alcohol-related pictures, participants had to rate a target in several dimensions. Results showed that exposure to alcohol related stimuli increased hostility rating of the target. Moreover, the individuals whose alcohol-related aggressive expectancies were stronger displayed significantly more hostile perception bias than did individuals whose aggression related alcohol expectancies were weaker. These experiments acknowledge the

impact of alcohol expectancies on judgment and interpretation of social situations. The automatic activation of alcohol expectancies by alcohol cues influences the interpretation of ambiguous stimuli in line with these expectancies (aggressivity, sexual arousal, sociability...). Moreover, effect of priming on judgment is moderated by the endorsement of alcohol expectancies by individuals and explicit beliefs played a non negligible role in the priming effect. Alcohol cues had no impact on perceived hostility for a person who didn't expect that alcohol engenders aggression. Hence, the magnitude of the priming effect depended upon the strength of association between the prime (alcohol) and the particular behavior (aggression).

Can alcohol cues influence behavior ?

The effects of perception of alcohol related cues are not limited to the activation of a general associative network regarding aggression. Such cues also potentially impact behavior. Researchers in the field of social cognition have begun to demonstrate that complex behaviors are also shaped and guided by the knowledge that is incidentally activated during perception. (e.g., Bargh & Chartrand, 1999). For example, participants primed with the trait information rudeness are more likely than non primed participants to interrupt another person in a subsequent conversation than those primed with the concept "polite" (Bargh, Chen, & Burrows, 1996). In the domain of alcohol expectancies, given the fact that aggression is semantically associated with alcohol consumption, an expectancy-consistent behavior could be expected. In a recent study, Friedman McCarty, Bartholow and Hicks (2007) primed participants with alcohol related words (e.g. vodka, beer) versus control words (e.g. water, juice) in the context of a lexical decision task. Then, a computer manipulation failure caused by the experimenter was simulated. The participants were then asked to rate the experimenter in an anonymous incident report. Results showed that alcohol primed participants with

strongest expectancies that alcohol fosters aggression showed greater hostility toward the experimenter. This result, which should stimulate further research, suggests that even without alcohol consumption, fleeting exposure to words associated with alcohol might activate alcohol outcome expectancies, thereby giving potentially rise to expectancy-consistent behavior. This process may be invoked to account for the studies showing that the mere belief of drinking alcohol is sufficient to trigger aggression in laboratory (Lang et al., 1975; Pihl et al., 1981; Rohsenow & Bachorowski, 1984) and in naturalistic settings (Bègue et al., submitted).

Conclusion

In this paper, we reviewed the main current social-cognitive explanations of the effect of alcohol consumption on aggression: the cognitive disruption model, the attributional model, and the model of automaticity. These models share a social cognitive orientation, suggesting that the alcohol-aggression link is mediated by cognitive and emotional states and modulated by chronic knowledge structures. However, each model provides a specific and unparalleled contribution in the explanation of the alcohol-aggression link. According to the first model, the lack of cognitive control and its consequences on perceptual processes and self-enhancement induced by the pharmacological properties of alcohol is the cause of intoxicated aggression. According to the second model, alcohol-related expectancies affect aggressive responding by providing actors with an excuse for behaving in an aggressive fashion. The excuse function of alcohol provided by the drinkers gains its legitimacy through sociocultural settings. Finally, like the attributional model, the model of automaticity underlines the role of knowledge structure (i.e. expectancies) in the alcohol-aggression link. However, the model of automaticity is closer to the cognitive disruption model regarding the unintentionality of the process.

The main current social-cognitive explanations of the effect of acute alcohol consumption on aggression that we have developed are especially relevant to explain acute effects of alcohol, rather than its chronic effects. It has yet to be shown that it is the acute effects of alcohol, that have the largest impact on aggressive behavior (Chermack & Blow, 2002 ; Collins, 1988; Collins & Schlenger, 1988 ; Wiley & Weissner, 1995). In order to explain the effects of chronic alcoholization, other important factors such as nutritional deficit induced by excessive alcohol consumption, sleep deprivation, impairment of neuropsychological functioning, or enhancement of psychopathologic disorders could also be considered as relevant variables.

Despite the acknowledged relationship between alcohol consumption and aggression, alcohol is neither a necessary nor a sufficient cause of aggression. For example, in experimental studies, aggression requires instigative conditions (Taylor, Gammon, & Capasso (1976). The explanation of the alcohol-aggression link also requires the inclusion of additional factors, such as personality. Researchers have suggested that the alcohol-aggression relationships may be stronger in individuals with pre-existing aggressive traits (Giancola, 2002a, Leonard & Blane, 1992). Support for this hypothesis comes from studies that find individuals with high levels of hostility (Leonard & Blane, 1992), trait anger (Giancola, 2002a), dispositional aggressivity (Giancola, 2002b), irritability (Giancola, 2002c), and antisocial personality traits (Moeller et al., 1998) are at heightened risk for intoxicated aggression (see also Norris, George, & Davis, 1999; Quigley, Corbett, & Tedeschi, 2002). The interaction between the chronic self-related meanings of these traits and the three processes we have described should be studied further. Regarding situational factors, the effect of provocation or frustration offers an important co-etiological variable of intoxicated aggression (Ito et al., 1996). Moreover, the contribution of third party (Borden & Taylor, 1973; Luckenbill, 1977; Pernanen, 1991; Taylor & Gammon, 1976; Tedeschi & Felson, 1994;

White & Gruber, 1982) and of the victim has to be underlined. In many cases indeed, the intoxication of the victim is a causal or an aggravating factor of violent interactions (Abbey, Mc Auslan & Ross, 1998; Goldstein, 1985, Virkkunen, 1974). In this respect, the cognitive disruption model appears as an important contribution to understand intoxicated violence when the victim is also inebriated, because the addition of victim's cognitive deficits to perpetrator's distortions may seriously increase the odds of a destructive interaction when a domestic, bar or street altercation involving alcohol occurs.

Throughout our review, we focused on three current social-cognitive explanations of the effect of acute alcohol consumption on aggression. All the models imply that the alcohol-aggression link is mediated by cognitive and emotional states and may be modulated by chronic knowledge structures. They suggest that social psychological processes, which are not reducible to purely pharmacological properties of alcohol effects, play an important role in explaining social behaviour.

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