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Failure to Consider Future Consequences Increases the Effects of Alcohol on Aggression

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Abstract

The failure to consider the future consequences of one's behavior is a major risk factor for aggression. Aggressive people tend to act first, and think later. Some people focus on the —here and now rather than on the future, a tendency measured by the *Consideration of Future Consequences (CFC) scale* (Strathman, Gleicher, Boninger, & Edwards, 1994). Alcohol intoxication is a neuro-biological variable that produces similar effects. Participants in the present experiment completed the *CFC* scale and then consumed either an alcohol or a placebo beverage. Next, they competed against a same-sex ostensible partner on an interpersonally adversarial competitive task in which the winner could administer electric shocks to the loser (the aggression measure). As expected, aggression was highest in intoxicated persons with low *CFC* scores. Being unconcerned about the future consequences of one's actions, in conjunction with acute alcohol intoxication, combine in a pernicious manner to increase aggression.

Keywords

Consideration of Future Consequences; alcohol; aggression

> "Refrain from asking what is going to happen tomorrow, and everyday that fortune grants you, count as gain."
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> — Horace (65–8 BC)
>
> "Tomorrow will give us something to think about"
>
> —Marcus Tullius Cicero (106–43 BC)

These two Ancient Roman scholars offer very different advice about considering the future. Horace advises us to forget about the future and focus only on today. This attitude is captured in *Carpe diem* (i.e., —seize the day), a phrase Horace used in a Latin poem. In

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contrast, Cicero advises us to think about our actions today because they will have consequences for tomorrow. There are individual differences in the tendency to focus on the here-and-now versus the future. Situation factors can also influence how much people focus on the here-and-now. The present research uses the General Aggression Model to investigate how these individual difference and situational variables influence aggressive behavior, alone and in combination.

General Aggression Model

The *General Aggression Model* proposes that two types of input variables can influence aggression: personal and situational (Anderson & Bushman, 2002; Figure 1). Personal variables include anything the individual brings to the situation (e.g., gender, genetic predispositions, personality traits, attitudes, beliefs, values). The present research focuses on one key personal variable —stable individual differences in the tendency to consider future consequences. Situational variables include all external factors that can influence aggression (e.g., alcohol, aggressive cues, frustration, provocation, violent media, hot temperatures). The present research focuses on one key situational variable —alcohol consumption. We chose to focus on these two variables because both are related to consideration of future consequences, and both are biologically related to prefrontal cortex functioning (Bechara, Damasio, Damasio, & Anderson, 1994; Fukui, Murai, Fukuyama, Hayashi, & Hanakawa, 2005; Giancola et al., 2000).

In the model, personal and situational factors influence one's internal state, such as aggressive thoughts, angry feelings, physiological arousal levels, and brain activity such as the ability to regulate one's behavior, including controlling impulses and responses to threatening or anxiety-provoking cues (e.g., Gilman et al., 2008; Passamonti, Fera, Magariello, Cerasa, Gioia, & Muglia, 2006). These internal states are all interconnected.

If people have the cognitive resources available, they may use higher-order cognitive processes to further analyze their situation. For example, they might think about how they feel, make causal attributions for what led them to feel this way, and consider the consequences of acting on their feelings. Individuals who tend to think about the potential future consequences of their actions may be more likely than others to engage in thoughtful, effortful reappraisal of situational events (Anderson & Wood, 2005). Situational variables may also influence appraisal and decision processes. For example, intoxicated individuals may be less likely than sober individuals to engage in higher-order cognitive processing because alcohol disrupt the ability to engage in forethought (Giancola, 2000). Decisions and appraisals influence whether people behave in a thoughtful, nonaggressive manner or in an impulsive, aggressive manner.

Consideration of Future Consequences

The *Consideration of Future Consequences* (CFC) scale (Strathman et al., 1994) is a valid and reliable measure of stable differences in the extent to which individuals focus on the future consequences of their current behavior. It contains 12 items (e.g. —*I consider how things might be in the future, and try to influence those things with my day to day behavior*; —*I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years*).

One puzzling aspect of aggression is that it occurs despite apparent harmful consequences (Huesmann & Eron, 1989). One possible explanation of this puzzle is that individuals focus on the immediate beneficial consequences of their aggression (e.g., winning an argument), while disregarding the future harmful consequences (e.g., damaging a relationship; Joireman, Anderson, & Strathman, 2003). Previous research has shown that scores on the

CFC scale are negatively related to trait aggressiveness and to hypothetical aggression in scenarios (Joireman et al., 2003). The present study examines actual (rather than hypothetical) aggression.

Alcohol

It is well known that people who consume alcohol focus on the here-and-now rather than on the future. Alcohol myopia theory proposes that alcohol has a —myopic effect on attention (Steele & Josephs, 1990; Giancola, et al., 2010). That is, alcohol causes people to focus their attention on the most salient features of a situation, and to ignore more peripheral features. Because the present is more salient than the future, intoxicated individuals should be more likely than sober individuals to focus on the present and ignore the future consequences of their actions.

Alcohol myopia theory can explain why alcohol increases aggression. In a hostile situation (e.g., barroom altercation), the most salient features are provocative cues. Thus, when people are in an alcohol-induced —myopic state, the most probable response will be an aggressive one. Intoxicated provoked people fail to notice less salient non-provocative cues in such a situation. Interestingly, if non-provocative cues are made more salient than provocative cues, alcohol *decreases* aggression (Giancola & Corman, 2007; Gallagher & Parrott, in press).

Joint Effects of Alcohol and Consideration of Future Consequences on Aggression

Previous research indicates that people who fail to consider future consequences tend to be characteristically aggressive (Joireman, Anderson & Strathman, 2003). Other research shows that alcohol has a myopic effect that causes people to focus attention on the most salient features of the situation, such as the here-and-now (e.g., Steele & Josephs, 1990). Research also clearly shows that alcohol increases aggression (e.g., Bushman & Cooper, 1990). However, no previous research has linked these three lines of research. The General Aggression Model predicts that personal and situational variables can influence behavior alone, and interaction with each other. In the present research we expect a main effect for alcohol intoxication (i.e., intoxicated people will behave more aggressively than sober people), a main effect for Consideration of Future Consequences (i.e., a negative relationship between CFC scores and aggression levels), and an interaction between the two. Specifically, we propose that low CFC individuals are more vulnerable to the myopia-inducing effect of alcohol due to already preexisting limitations in their CFC, an aspect of executive functioning that is governed by the prefrontal cortex. Previous research has shown that individuals with executive functioning deficits are more likely to become aggressive when intoxicated because they are less able to inhibit their aggressive impulses (e.g., Giancola 2000, 2004). In contrast, high CFC individuals should be less aggressive even when they are intoxicated because they have they have more prefrontal cortex resources than others do, that help keep them from being excessively affected by alcohol myopia and allow them to inhibit their aggressive impulses. Thus, we predicted the highest levels of aggression among intoxicated, low CFC individuals.

Method

Participants

Participants were 495 healthy adult social drinkers (46% men; M_{age}=23.11, SD=2.96; 87% Caucasian, 10% African-American, 1% Hispanic, 2% other), who were recruited through

newspaper advertisements and were paid $75. Social drinking was defined as consuming at least 3–4 drinks per occasion at least twice per month.

We excluded participants who reported any past or present drug-, alcohol-, or psychiatric-related problems. Participants with a positive breath alcohol concentration (BrAC) test or with a positive urine pregnancy or drug test were also excluded. Women were not tested within one week of beginning of menstruation because research has shown that hormonal variations associated with menstruation can affect aggression (Volavka, 1995).

Procedure

Participants fasted from alcohol for 24 hours, from caffeinated beverages the day of the study, and from food for 4 hours. Participants were told that the researchers were studying the effects of alcohol and personality on reaction time in a competitive situation. First, participants completed the *CFC* scale (Strathman et al., 1994). Items were scored using a 5-point scale (1=*extremely uncharacteristic*, 2=*somewhat uncharacteristic*, 3=*uncertain*, 4=*somewhat characteristic*, 5=*extremely characteristic*), and then summed (Cronbach α =. 81). Higher scores indicate a greater tendency to consider future consequences

Next, men and women were divided evenly into alcohol and placebo beverage groups. Due to gender differences in body fat composition and alcohol metabolism (Watson, Watson, & Batt, 1981), men received 1g/kg of 95% alcohol USP mixed at a 1:5 ratio with Tropicana orange juice, whereas women received 0.90g/kg of alcohol. The placebo beverages contained 4 mls of alcohol in the juice and 4 mls layered on top of the juice. In addition, the rims of the glasses were sprayed with alcohol just prior to being served. All participants were told that they would consume the equivalent of 3–4 mixed drinks. Participants were given 20 minutes to consume their beverages.

Next, participants' pain threshold to electric shock was assessed using two finger electrodes. The experimenter gradually increased the level of shock until it became —painful. Shocks ranged from —Level 1 (labeled —Low) to —Level 10 (labeled —High). Level 10 was the level described as —painful, Level 9 was 95% of the —painful level, Level 8 was 90% of the —painful level, and so on. Because different people have different pain thresholds to shock, we wanted to make sure that no participant received a level that exceeded his or her pain threshold.

To measure aggression, participants competed against a same-sex ostensible opponent to determine who could respond more quickly, with the winner delivering an electric shock to the loser (Taylor, 1967). All participants were told that their partner was intoxicated. Winners could also control the duration of the losers' suffering by varying shock duration. The task consisted of 34 trials. After each trial, shock intensities set by the participant and the —opponent were displayed on the computer screen. Participants won half of the trials (randomly determined). The —opponent increased shock intensities and durations across trials. Basically, within the ethical limits of the laboratory, participants controlled a weapon that could be used to give their partner electrical shocks. This task has excellent construct validity and has been used for decades as a laboratory measure of aggression for both men and women (e.g., Giancola & Zeichner, 1995). The experimenter who measured aggression was blind to beverage condition.

Breath alcohol concentration (BrAC) levels were measured using the Alco-Sensor IV breath analyzer (Intoximeters Inc., St. Louis, MO), at baseline, immediately before, and immediately after the aggression task. Participants blew into a small device that gives a reading. Because the aggression-potentiating effects of alcohol are more likely to occur on the ascending limb of the BrAC curve, and because a BrAC of at least 0.08% is effective in

eliciting aggression, participants in the alcohol group began the aggression task at an approximate BrAC of 0.09% (see Giancola & Zeichner, 1997). To enhance the effectiveness of the placebo manipulation, participants in the placebo group began the aggression task approximately 2 minutes following beverage consumption (e.g., Martin & Sayette, 1993).

All participants were asked whether they believed they had consumed alcohol (*No* or *Yes*). They also rated how drunk they were (0=*not drunk at all* to 11=*more drunk than I have ever been*), both before and after the aggression task. A debriefing followed, which included a probe for suspicion. No participants expressed suspicion regarding the purpose of the study. Individuals who received alcohol remained in the laboratory until their BrAC dropped to 0.04%.

Results

Preliminary Analyses

Placebo checks—All participants indicated that they drank alcohol, although participants who drank the alcohol beverage reported feeling more drunk both before (M=4.7, SD=1.8 vs. M=1.8, SD=1.4) and after (M=5.1, SD=2.1 vs. M=1.9, SD=1.5) the aggression task, t's(491)= 20.37 and 19.78, respectively, p's<.001.

BrAC levels—All participants had BrACs of 0% upon entering the laboratory. Participants in the alcohol group had a mean BrAC of 0.095% (SD=0.011) just before and a mean BrAC of 0.105% (SD=0.015) just after aggression, indicating BrACs were rising. Participants in the placebo group had a mean BrAC of 0.015% (SD=0.009) just before and a mean BrAC of 0.007% (SD=0.007) just after aggression was measured.

Primary Analyses

Shock intensities and durations were standardized and summed across the 34 trials to obtain a more reliable aggression measure. Data were analyzed using hierarchical regression analysis (Aiken & West, 1991).[1] Beverage (1=alcohol, 0=placebo) and gender (1=male, 0=female) were dummy coded. Interactions were constructed as products of first-order variables. First-order variables were entered in Step 1, two-way interactions in Step 2, and the three-way interaction in Step 3.

In Step 1 (R^2=0.16, p<.001), participants who drank an alcoholic beverage were more aggressive than participants who drank a placebo beverage, b=0.52, t(491)=5.21, p<.001. CFC scores were negatively related to aggression, b=−0.38, t(491)=−4.39, p<.001. Men were also more aggressive than women b=0.61, t(491)=6.06, p<.001. In Step 2 (ΔR^2=0.01, p=.054), only the predicted interaction between beverage content and CFC was significant, b=−0.37, t(488)=2.12, p<0.05. In Step 3 (ΔR^2<0.01, p=.24), the three-way interaction was nonsignificant.

Because the other interactions at Step 2 were neither significant nor necessary to estimate the third, we re-estimated a more parsimonious model that included only the interaction between beverage content and CFC, along with first-order effects from Step 1. The predicted two-way interaction remained significant, b=−0.40, t(490)=−2.30, p<.05, ΔR^2=0.01. This interaction was probed using the Johnson-Neyman (1936) technique (see Bauer & Curran, 2005; Hayes & Matthes, 2009). This technique avoids the need to arbitrarily define "low,"

[1]We did not mean center variables. The myth that lower-order variables must be mean centered or standardized prior to construction of products in order to test interactions has been repeatedly debunked (e.g., Echambadi & Hess, 2007; Irwin & McClelland, 2001; Kromrey & Foster-Johnson, 1998; Whisman & McClelland, 2005). In a comparable analysis in which we mean centered, the results were identical.

"moderate," and "high" CFC values. Instead, it identifies the regions of the CFC continuum where the effect of alcohol (relative to placebo) on aggression is statistically significant and where it is not. As can be seen in Figure 2, for CFC scores below 4.094, participants who consumed an alcoholic beverage were significantly more aggressive than those who consumed a placebo beverage.

Importantly, ratings of how drunk participants felt did not interact with CFC to influence aggression (*p*s>.4). Thus, the effects are not due simply to alcohol-related expectancies.

Discussion

The present research replicates previous research by showing that intoxicated individuals are more aggressive than sober individuals, and that Consideration of future Consequences is negatively related to aggression— but actual rather than self-reported aggressive behavior. More importantly, the present research extends previous research by showing that the combination of alcohol consumption and Consideration of Future Consequences had a greater effect on aggression than either variable acting alone. These findings are consistent with alcohol myopia theory (Steele & Josephs, 1990). Intoxicated individuals focus on the most salient cues in the situation, which were provocative in nature in the present experiment (i.e., participants were being shocked by an ostensible opponent). When intoxicated, individuals who tend to ignore future consequences were more aggressive than those who considered future consequences. Low CFC individuals already focus on the here-and-now, and the myopic effects of alcohol exaggerated that tendency.

Limitations and Future Research

The General Aggression Model (e.g., Anderson & Bushman, 2001) proposes that both alcohol consumption and CFC are input variables that can influence appraisal and decision processes. Furthermore, the ability to consider future consequences and using such forethought to influence current behavior involves a number of executive functioning processes. Our findings are consistent with neuroimaging findings indicating a relationship between executive functioning processes, cues signaling threat, and activity in brain regions such as the prefrontal cortex and the amygdala involved in behavioral and emotion regulation and threat/fear processing (Eippert et al, 2007). However, the present investigation did not directly examine these processes directly as potential mediators.

Another line of research suggests interesting directions for future research. The brain's activities rely almost exclusively on glucose for energy. Self-control takes a lot of energy, and acts of self-control deplete relatively large amounts of glucose. Alcohol reduces glucose throughout the brain and body and also impairs many forms of self-control (Gailliot & Baumeister, 2007), including the self-control needed to restrain aggressive impulses. Indeed, previous research has shown that when self-control is depleted by a demanding task, the likelihood of aggression increases afterwards (Dewall, Baumeister, Stillman, & Gailliot, 2007). Previous research has also shown that low CFC individuals become more depleted of cognitive resources than others after engaging in demanding tasks (Joireman, Balliet, Sprott, Spangenberg, & Shultz, 2008). Thus, ego depletion offers another explanation for why alcohol is more likely to increase aggression in low CFC individuals than in others.

Conclusions

By far, the most aggressive participants in the present study were intoxicated individuals who tended to ignore future consequences. Individuals who considered future consequences tended to be nonaggressive, regardless of whether they are intoxicated or sober. Intoxicated

individuals would therefore do well to remember the advice from Cicero: —Tomorrow will give us something to think about.

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Highlights

Previous research indicates that people who fail to consider future consequences tend to be characteristically aggressive (Joireman, Anderson & Strathman, 2003). Other research shows that alcohol has a myopic effect that causes people to focus attention on the most salient features of the situation, such as the "here and now," and ignore less salient cues, such as what might happen in the future (e.g., Steele & Josephs, 1990). Research also clearly shows that alcohol increases aggression (e.g., Bushman & Cooper, 1990). However, no previous research has linked these three lines of research. The present investigation significantly advances past work by testing whether individual differences in the tendency to consider future consequences moderates the well-established link between alcohol and aggression.

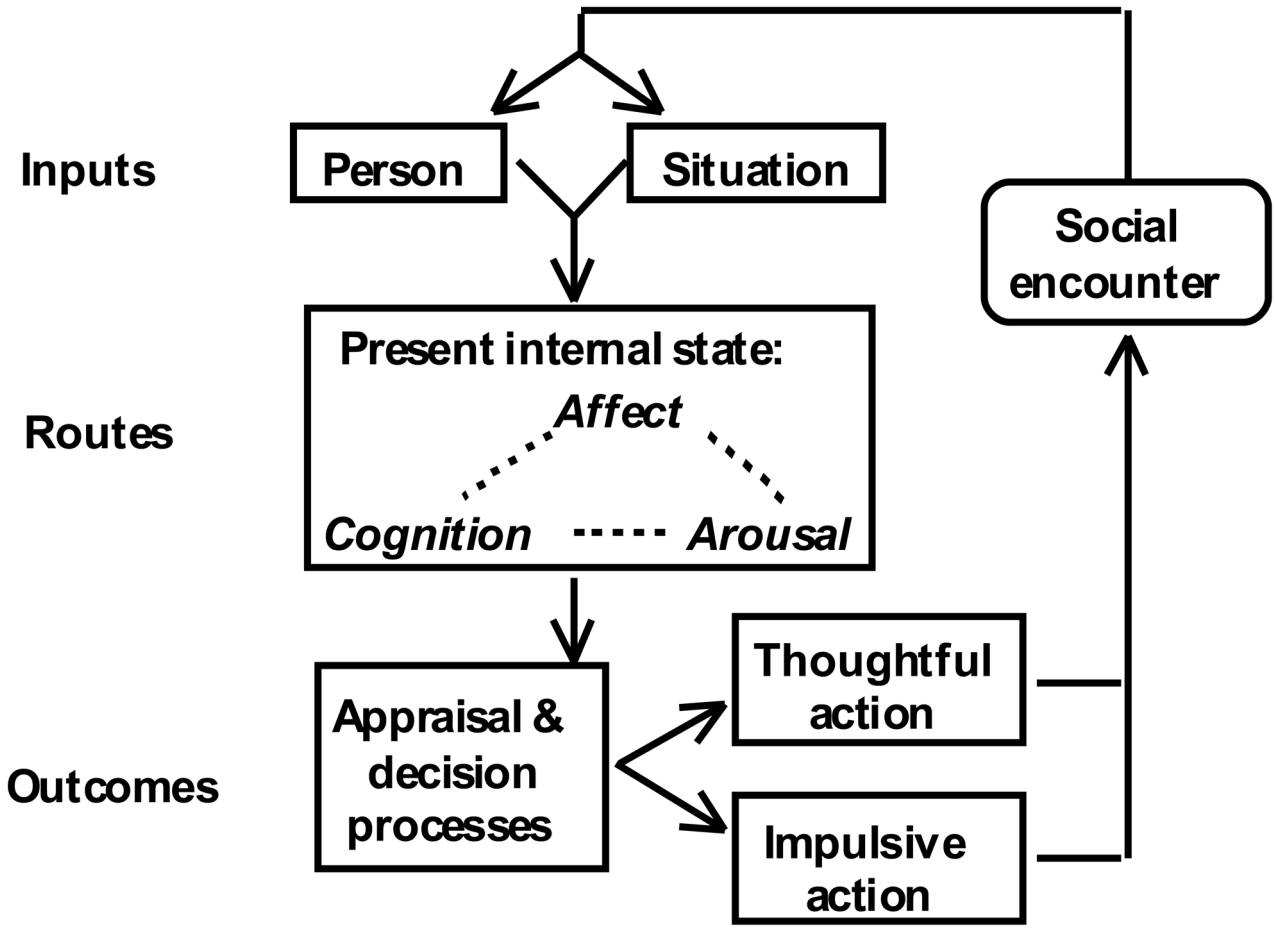

Figure 1.
The General Aggression Model (Anderson & Bushman, 2001).

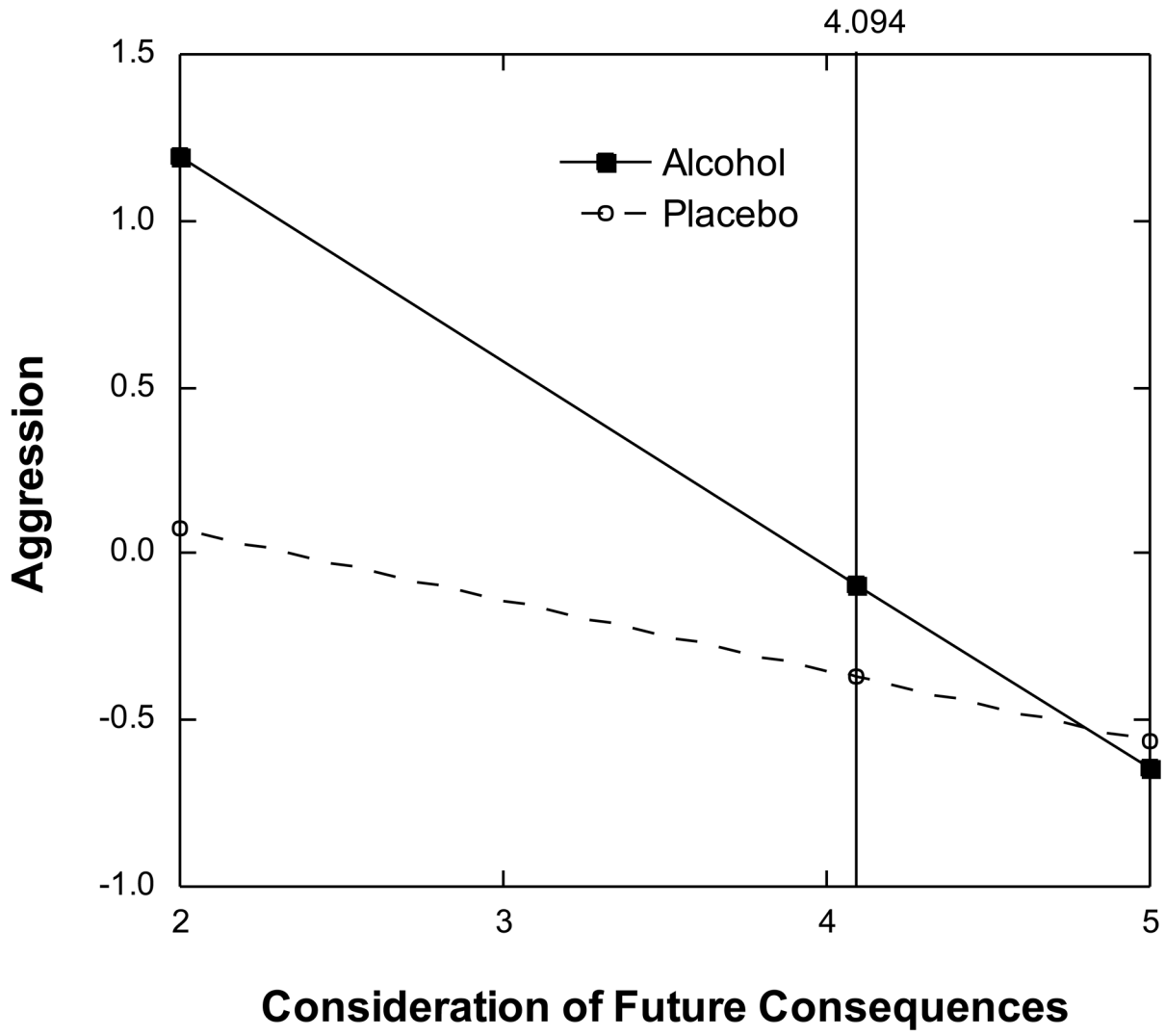

Figure 2.
Relationship between the personality trait Consideration of Future Consequences and aggression for participants who consumed either an alcohol or a placebo beverage. For CFC scores below 4.094, participants who consumed an alcoholic beverage were more aggressive than those who consumed a placebo beverage.