



## Hostile interpretation training for individuals with alcohol use disorder and elevated trait anger: A controlled trial of a web-based intervention



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### ABSTRACT

High trait anger is associated with more severe alcohol use problems, and alcohol has been found to facilitate aggressive behavior among individuals with high trait anger. Treatments focused on a sample with alcohol use disorder with elevated anger could reduce alcohol use problems, as well as violence and aggression. We sought to examine the efficacy of interpretation bias modification for hostility (IBM-H) in a sample with high trait anger and alcohol use disorder (AUD). Fifty-eight individuals with AUD and elevated trait anger were randomly assigned to eight web-based sessions (two per week) of IBM-H or a healthy video control condition (HVC). Measures of interpretation bias, anger, and alcohol use were administered at pre- and post-treatment and at one-month follow-up. IBM-H led to greater improvements in interpretation bias compared to HVC at post and follow-up. IBM-H also led to greater reductions in trait anger than HVC, though this was an indirect effect mediated by changes in interpretation bias. Further, IBM-H led to lower anger expression than HVC; this was a direct (non-mediated) effect. Lastly, both conditions reported decreases in alcohol use and consequences following treatment, though there were no significant differences between them. These findings provide initial support for the utility of IBM-H as a brief non-confrontational intervention for AUD with elevated trait anger. Limitations and future research directions are discussed.

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Alcohol use disorder (AUD) represents a significant public health problem that has been linked to multiple negative outcomes, including suicide, car accidents, domestic violence, financial costs, and occupational impairment (Boschloo, Van den Brink, Penninx, Wall, & Hasin, 2012; Hasin, Stinson, Ogburn, & Grant, 2007; Hayward, Zubrick, & Silburn, 1992; Scott, Schafer, & Greenfield, 1999). Recent surveys put the lifetime prevalence of DSM-5 AUD at 29%, making it among the most prevalent psychiatric disorders; rates of AUD appear to have increased over the last two decades (Grant et al., 2015). Only a minority (19.8%) of individuals meeting lifetime criteria for AUD receive treatment for the

condition (Grant et al., 2015). Further, among those receiving medication and/or behavioral treatment, relapse to heavy drinking rates are typically above 70% (Anton et al., 2006).

Evidence suggests negative affect plays an important role in the development and maintenance of AUD. Individuals with AUDs frequently meet criteria for a co-occurring psychiatric disorder (Grant et al., 2015; Kessler et al., 1997). Further, AUDs typically follow rather than precede the occurrence of mood and anxiety disorders (Kessler et al., 1997).

Individuals with emotional disturbances may be prone to drink excessively as a means of coping with negative affect. Indeed, research has shown relations between psychiatric disturbances and greater coping-motivated drinking (Stewart, Mitchell, Wright, & Loba, 2004). Further, coping-focused alcohol use motives may be important in the development of alcohol use problems. For example, one large-scale prospective study found that reports of

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alcohol to self-medicate mood symptoms was uniquely associated with the development and persistence of alcohol dependence, even after controlling for demographics, psychiatric comorbidity, and treatment history (Crum et al., 2013).

AUD has been linked to problems of anger and aggression (Kessler et al., 2006). Greater trait anger is associated with greater alcohol use and intoxication, as well as greater symptoms of alcohol dependency (Leibsohn, Oetting, & Deffenbacher, 1994). Drinking to cope with anger was also strongly related to greater alcohol dependence symptoms and accounted for the relationship between trait anger and alcohol use problems in one study (Okey & Cogle, 2016).

Alcohol use may increase aggression in some individuals. Specifically, a relationship between alcohol intoxication and increased aggressive behavior has been found among those with high trait anger, though it was absent among those with low trait anger (Eckhardt, 2007; Giancola, 2002; Giancola, Saucier, & Gussler-Burkhardt, 2003). These findings suggest anger may be an important treatment target for both reducing problematic alcohol use and preventing alcohol-facilitated aggression.

Cognitive models of anger propose that individuals prone to anger are more likely to interpret ambiguous situations as hostile (Wilkowski & Robinson, 2008). In the absence of additional cues that would suggest no harmful motives, processing biases can lead people to infer hostile intent to the action of others. For example, if someone bumps into an anger-prone individual, he or she is likely to attribute the action to aggressive motives, which results in the experience of anger.

Recently, several researchers have focused on developing computerized interpretation bias modification (IBM) programs to alter the interpretation biases that are theorized to cause and maintain depression and anxiety disorders. The first studies of this kind were conducted by Mathews and Mackintosh (2000), who influenced anxiety in response to a stressor by experimentally inducing benign or anxious interpretations of ambiguous events. Subsequent studies used similar methods to reduce disorder-specific negative/threat interpretations, in favor of positive/benign interpretations; these techniques further yielded reductions in symptoms of social anxiety (Amir & Taylor, 2012; Beard & Amir, 2008; Bowler et al., 2012), generalized anxiety disorder (Hayes, Hirsch, Krebs, & Mathews, 2010), trait anxiety (Mathews, Ridgeway, Cook, & Yiend, 2007; Salemink, van den Hout, & Kindt, 2009), and body dysmorphic disorder (Summers & Cogle, 2016).

Some researchers have examined IBM protocols for anger-relevant outcomes. IBM that focuses on the hostile interpretation bias may be particularly helpful for anger-prone individuals, as these interventions are brief and non-confrontational. One study found a single-session computerized IBM program was effective in reducing hostile interpretation biases as well as reactivity to an interpersonal insult (Hawkins & Cogle, 2013). Additionally, a multisession IBM intervention administered via flashcards was effective (relative to a test-retest control condition) in reducing hostile interpretation biases, anger, and aggression in a sample of children high in aggression (Vassilopoulos, Brouzos, & Andreou, 2015). In a separate line of work, researchers were able to successfully modify biases in emotion recognition (increased perceptions of ambiguous faces as happier and less angry), which led to decreased anger and aggression (Penton-Voak et al., 2013), as well as irritability (Stoddard et al., 2016).

Computerized IBM protocols have significant potential as easily disseminated strategies to reduce the overall burden of mental illness (Kazdin & Blase, 2011), though conflicting findings and important gaps have appeared in this literature. First, IBM

consistently reduces negative interpretation biases, though it has failed to reduce symptoms or emotional vulnerability in some studies (Menne-Lothmann et al., 2014). This may be attributable, in part, to the relatively low dosage of treatment that is often included in research. Several studies have evaluated a small number of IBM sessions (one to four), which may be inadequate for achieving symptom improvement. It is also likely that IBM is more effective for some clinical samples or subgroups of clinical samples than others. To date, IBM has mostly been tested in anxious and depressed samples (Cristea, Kok, & Cuijpers, 2015). More research is needed to examine the efficacy of IBM across different populations and symptom profiles. Lastly, controlled multi-session evaluations of IBM have typically compared it to waitlist (Salemink et al., 2009; Vassilopoulos, Banerjee, & Prantzalou, 2009) or a neutral/sham condition matched for task similarity (Amir & Taylor, 2012; Lang, Blackwell, Harmer, Davison, & Holmes, 2012; Micco, Henin, & Hirshfeld-Becker, 2014; Salemink, Kindt, Rienties, & Van Den Hout, 2014; Summers & Cogle, 2016; Yiend et al., 2014). However, evidence suggests these control conditions are perceived as less credible. For example, a recent treatment study for body dysmorphic disorder found that, at post-treatment, no participants in the control/neutral scenarios condition believed they had received an active treatment, while 47% in the IBM condition believed they were in the active treatment group (Summers & Cogle, 2016). In a study of cognitive bias modification for depression, researchers found that individuals assigned to a mixed valence sham condition reported lower perceived treatment credibility and expectancy compared to those administered the active treatment (at a statistical trend, with a moderate effect size; Watkins, Baeyens, & Read, 2009). IBM paradigms have been criticized for their susceptibility to demand characteristics (Cristea et al., 2015). Thus, it is important that IBM be compared to an active treatment control condition, which would be a more rigorous test of its efficacy and would help rule out expectancy effects.

A web-based IBM program focusing on the hostile interpretation bias (IBM-H) may be particularly useful for individuals with AUD and elevated trait anger. The impact of IBM-H on hostile interpretation bias could potentially lead to broad improvements in anger, aggression, and problematic alcohol use. It could also effectively reach a population that rarely presents for treatment (Grant et al., 2015). Further, given that alcohol has been found to facilitate aggressive behavior among high trait anger individuals, an anger-focused treatment for individuals with co-occurring anger and alcohol use problems could be an especially useful strategy for violence prevention.

In the current study, we evaluated a novel eight-session IBM-H protocol consisting of two sessions per week delivered over the course of four weeks. Individuals with elevated trait anger and AUD of at least moderate severity were administered a brief psycho-education on anger and its role in alcohol use problems and were then randomly assigned to IBM-H or a credible healthy videos control (HVC) condition consisting of videos about healthy habits (matched for time). Assessments were administered at pre- and post-treatment, and at one-month follow-up. All procedures and assessments were administered online (with the exception of the telephone-administered diagnostic interview).

We hypothesized that relative to HVC, IBM-H would lead to greater improvements in hostile interpretation bias (decreases in hostile and increases in benign bias) at post-treatment and follow-up. We also predicted that IBM-H would lead to greater reductions in trait anger and anger expression at post-treatment and follow-up, compared to HVC. Lastly, we predicted that the effects of condition on alcohol use problems (drinking to cope with anger, drinking

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