

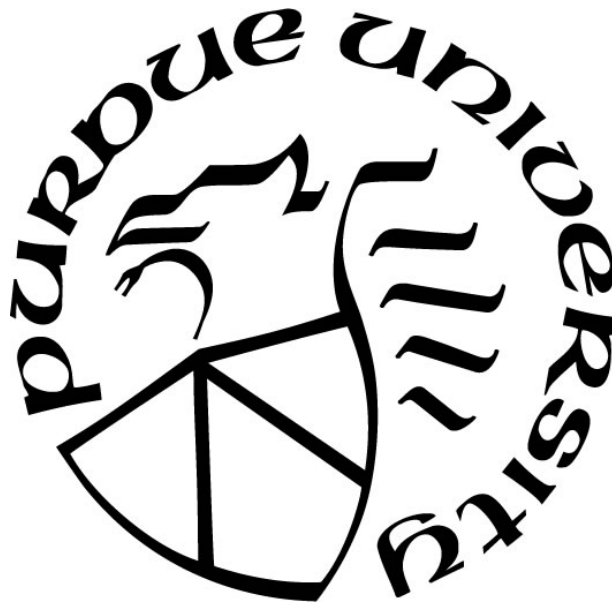
**TRAIT ANGER, HEAVY DRINKING, AND INTIMATE PARTNER
AGGRESSION: THE ROLE OF EXPERIENTIAL AVOIDANCE**

by
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Dedicated to Shirley E. Gully and Michael J. Gully, without whom a life in which I earned a graduate degree would not have been possible.

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I am so grateful for the contributions and support of my mentor, Christopher I. Eckhardt, and my committee members, Sean P. Lane and Susan C. South. Their efforts made this a better project and me a better scientist.

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ABSTRACT

Purpose: Prior research has demonstrated significant associations among anger, heavy drinking, and intimate partner aggression (IPA). However, less is known about *how* anger and heavy drinking relate, to predict IPA perpetration. The present research examined whether trait anger relates to IPA perpetration indirectly through heavy drinking, and whether the association of anger to heavy drinking is moderated by experiential avoidance (EA)—or an individual’s tendency to avoid distressing internal experiences—such that the indirect association of anger to heavy drinking is stronger among those high in EA relative to those low in EA. **Methods:** 538 participants recruited from a Midwestern University and Mechanical Turk completed questionnaires about anger, heavy drinking, EA, and IPA perpetration. A moderated mediation model examining the associations among variables was tested using the PROCESS macro for SPSS. **Results:** Trait anger predicted IPA perpetration through its relation to heavy drinking. However, EA did not moderate the association of anger to heavy drinking to predict IPA perpetration. Exploratory analyses suggested that while EA does not moderate the association among anger and quantity/frequency of drinking to predict IPA perpetration, it does moderate the association among anger and AUDIT scores (e.g., problematic alcohol use), as well as the association of heavy drinking to IPA perpetration. **Conclusions:** Contrary to preregistered hypotheses, results suggest that EA does not moderate the association of anger experience to heavy drinking. Rather, exploratory analyses suggest that EA may relate to IPA perpetration among individuals already prone to externalizing behaviors.

INTRODUCTION

Intimate partner aggression (IPA) is a prevalent (Brieding et al., 2014) and consequential (Black et al., 2011) public health concern. Given this, research examining the mechanisms by which IPA occurs, and how they may meaningfully inform efforts at IPA prevention and intervention, is needed. One empirically supported risk factor for IPA perpetration is high trait anger (Birkley & Eckhardt, 2015), such that frequent anger experiences increase the likelihood of partner aggression (Crane & Eckhardt, 2013; Sprunger, Eckhardt, & Parrott, 2015). Another documented risk factor for IPA perpetration is heavy drinking, which may make individuals less likely to resist an urge to aggress (Crane, Testa, Derrick, & Leonard, 2007; Sprunger et al., 2015). Although studies suggest that high trait anger and heavy drinking are individual risk factors for IPA (Schumacher, Feldbau, Smith Slep, & Heyman, 2001), researchers have not examined how these two risk factors relate and through this relationship, may predict IPA perpetration. In the current study, I propose to examine the interrelations among trait anger, heavy drinking, and experiential avoidance (EA; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996)—i.e., an individual's trait-like tendency to avoid distressing internal experiences—to predict IPA perpetration.

This proposed model of EA's association with IPA perpetration rests on multiple theories that suggest an association between EA and anger dysregulation, and EA and problematic alcohol use. Berkowitz's (2012) cognitive-neoassociation model suggests that anger comprises distressing internal experiences that motivate aggressive behavior through cognitive and motor prototypes. In specifying the construct of experiential avoidance, however, Hayes and colleagues (1996) maintain that distressing internal experiences may motivate behaviors to avoid these internal experiences. Other theories suggest that those who attempt to avoid internal distress may be more likely to behave aggressively (Langer & Lawrence, 2009). Similar models, such as the *tension-reduction hypothesis* (Greely & Oie, 1999), posit that substances may ostensibly help people avoid distressing experiences in the short term, although avoidance strategies generally fail in the long run. The present research synthesizes these theories by proposing a conceptual model wherein frequent anger experiences relate to problematic alcohol use to predict IPA perpetration, especially for individuals who may be likely to use alcohol as a means of avoiding this distress. In the

following sections, I review these constructs as well as the empirical and theoretical work suggesting their associations in greater detail.

Experiential Avoidance

EA comprises two factors: (1) the tendency to avoid distressing internal events, and (2) related actions to alter these internal experiences or the events that lead to them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). The concept of EA is centered on the assumption that the way in which one relates to emotions is an important aspect of the association between emotions and behavioral outcomes (Langer & Lawrence, 2009). Therefore, it is suggested that the subjective experience and expression of negative affect are separable processes, both of which may be important for predicting how an emotion may lead to a behavior. Early support for this basic assumption came by way of physiological experiments involving carbon dioxide challenges (e.g., Feldner, Zvolensky, Eifert, & Spira, 2003) or exposure to painful stimuli (e.g., Zettle et al., 2003). Findings consistently supported the conclusion that individuals high in EA reported higher subjective private events (e.g., panic sensations) than those low in EA, although both groups scored the same on objective measures of reactions (e.g., physiological measures). Therefore, individuals high in EA may not differ from those low in EA in the frequency or intensity of negative affect but in their reaction to negative affect-inducing events.

EA is related to, but distinct from, theoretically similar constructs such as distress intolerance (Bardeen & Fergus, 2016), alexithymia, anxiety sensitivity, emotional nonacceptance, and emotional flooding (Malik, Heyman, & Smith Slep, 2019). Broadly, EA is considered a dispositional *process* variable that may mediate the association of these related constructs to outcomes. For example, EA has been shown to be a stronger mediator of the association of anxiety sensitivity to coping motives for drinking than alexithymic coping, suggesting that alexithymia may be subsumed under the broader EA construct (Stewart, Zvolensky, & Eifert, 2002). Further, recent research suggests that EA may belong to a broader category of emotional responding—comprising related constructs of mindfulness, emotional nonacceptance, experiential avoidance, and anxiety sensitivity—that reflects one’s emotional, cognitive, and behavioral responses to one’s emotions (Clifton, Seehus, Parent, Pichler, & Fondacaro, 2019). In this model, EA differs from mindfulness in that it encompasses cognitive evaluation and/or cognitive, emotional and behavioral responses to negative emotions. Further, EA differs from emotional nonacceptance in

that EA can be a purely behavioral response without cognitive evaluation; EA differs from anxiety sensitivity in that EA reflects avoidance from many internal and external aversive states, while anxiety sensitivity narrowly reflects fearful reactions to feelings of anxiety.

EA has been shown to mediate the association of a variety of risk factors, such as anxiety sensitivity or maladaptive coping, to psychological disorders such as depression, PTSD, and generalized anxiety disorder (Kashdan, Barrios, Forsyth, & Steger, 2006; Orcutt, Pickett, & Pope, 2005; Tull & Gratz, 2008). EA is therefore also considered a “functional” construct because it is theorized to be a pathway by which risk relates to behavioral or psychological outcomes (Hayes et al., 1996). On the other hand, the inverse of EA—referred to in the literature as either low EA or “psychological flexibility” (PF)—has been linked to such prosocial outcomes as positive job performance (Bond & Bunce, 2003) and better management of chronic pain (McCracken, 1998). Hence, PF is theorized to be a pathway by which subjective well-being is achieved (Hayes et al., 1996; Kashdan & Rottenberg, 2010). However, it is noteworthy that the literature examining EA’s relation to various outcomes is largely cross-sectional and therefore, mediation effects should be interpreted with caution.

Researchers suggest that individuals who frequently attempt to escape or avoid distressing internal experiences may be more likely to behave aggressively (Lawrence & Langer, 2009). Browning and Dutton (1986) theorized that IPA perpetrators may use physical violence both as a relief from physiological tension and as a tactic to create emotional distance between their partners and themselves. Moreover, Schweinle and Ickes (2007) proposed that IPA perpetrators’ hostile attributions may be an attempt to avoid identifying with more identity-inconsistent emotions. Some research appears to support these theories of aggression as a means of escaping distress. For example, Jacupcak (2003) found that fear of emotion (negative or positive) was related to self-reported IPA perpetration, and Simonetti, Scott, and Murphy (2000) found that perpetrators of IPA tend to dissociate in response to distress.

In the first study of EA’s direct link to IPA, Shorey and colleagues (2014) found that higher levels of EA were associated with greater frequency of psychological and physical IPA perpetration and sexual coercion among college-age men in dating relationships. Moreover, when examining differences among IPA perpetrators and non-perpetrators, they found that perpetrators of psychological aggression and sexual coercion had higher levels of EA relative to non-perpetrators. Finally, EA predicted unique variance in psychological aggression and sexual

coercion, but not physical aggression, after adjusting for other risk factors, such as relationship commitment and alcohol use. The researchers concluded that their findings provide evidence for the usefulness of targeting EA in interventions for IPA perpetration.

While Shorey and colleagues (2014) provided preliminary support for EA's association with IPA perpetration, methodological concerns limit the conclusions we can draw from the study. First, the researchers used the Acceptance and Action Questionnaire—II (AAQ-II; Bond et al., 2011) to measure EA; however, recent research suggests that EA as measured by the AAQ-II is indistinguishable from the construct of neuroticism (Rocheffort, Baldwin, & Chmielewski, 2018). As a result, it is difficult to know whether IPA perpetration is associated with the construct of neuroticism or EA. Alternative measures are available that do not confound the measurement of EA with neuroticism, such as the Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gamez, Chmielewski, Kotov, Ruggero, & Watson, 2011). Additionally, Shorey and colleagues' sample included only men, which limits the generalizability of the study.

Of interest to the present research, Shorey and colleagues (2014) also statistically adjusted for other known risk factors for IPA perpetration, such as alcohol use and relationship commitment, when examining the relation of EA to partner aggression. In contrast, the proposed study will examine the association among various risk factors in order to better understand the mechanisms through which alcohol use and EA interactively confer risk for IPA. To this end, the present research proposes to test a moderated mediation model predicting IPA perpetration, wherein heavy drinking mediates the association between trait anger and IPA perpetration, especially among individuals high in EA. In the following sections, I justify this proposed model by illustrating the theoretical and empirical relations among these constructs.

Anger and EA

Anger is a multidimensional construct, comprising emotional, cognitive, and behavioral facets (Spielberger, Kraser, & Solomon, 1988). In the present research, I focus on trait anger, or the dispositional tendency to experience frequent episodes of state anger. As measured presently, trait anger comprises all three of the facets listed above, reflecting that one may attempt to avoid emotion and/or cognition through avoidant behavioral strategies. Anger experiences motivate behaviors designed to confront the source of anger (Carver & Harmon-Jones, 2009). Berkowitz's (2012) cognitive-neoassociation theory of aggression emphasizes that anger expressions can be

automatic and non-conscious. Similar to Hayes and colleagues (1996), Berkowitz also notes that the experience of negative affect (e.g., anger) is distressing for individuals. While Berkowitz argues that this distress activates aggressive motor impulses and cognitive prototypes, Hayes and colleagues postulate that the distress associated with frequent anger experiences may lead to attempts to avoid these internal events.

However, little research exists regarding associations between trait anger and EA. Using ecological momentary assessment (EMA), Wenze and colleagues (2018) recently examined how EA related to state anger and found that anger experience did not predict EA nor did EA predict anger experience. While this preliminary evidence suggests that EA may not relate to anger linearly, there remains no prior research that examines how EA may affect the association between anger and problematic alcohol use. EA may not relate directly to anger, however it may affect how anger relates to heavy drinking; those high in EA may demonstrate an especially strong association between anger experience and heavy drinking.

Heavy Drinking and EA

Heavy drinking may serve as a disinhibitor, making it less likely that intoxicated individuals will resist an urge to aggress (Eckhardt, 2007). The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines heavy drinking as consuming more than four drinks on any day or 14 per week for men, or more than three drinks on any day or seven per week for women (“Drinking levels defined”). One in four individuals who qualifies as a heavy-drinker would already meet criteria for an alcohol use disorder (AUD), while others place themselves at risk for developing an AUD and a host of other problems; alcohol misuse was the 5th leading risk factor for early disability and death in 2010, globally (World Health Organization, 2014). In addition to these other consequences, we know that excessive alcohol use is associated with IPA perpetration (Leonard & Quigley, 2017). Cross-sectional research has revealed higher rates of alcohol consumption among perpetrators of IPA (McKinney, Caetano, Rodriguez, & Okoro, 2010), and intervention studies have found that reduced alcohol consumption is related to reduced IPA perpetration (Kelly & Halford, 2006; O’Farrell et al., 2003).

It has often been asserted that individuals may “self-medicate” or “numb” emotional distress through the use of substances (Chawla & Ostafin, 2007). Theories posit that substance use may be a maladaptive coping mechanism (Chaney, 1989); stress reducer (Powers, 1987); way of

controlling or eliminating unwanted internal experiences (Wilson, Hayes, & Byrd, 2000); or way to regulate negative affect (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Greely & Oei, 1999). While consuming alcohol may be an effective coping mechanism for negative affect in the short-term, it can contribute to a negative reinforcement pattern that leads to maladaptive levels of alcohol use in the long-term (Stasiewicz & Maesto, 1993). Research further suggests a bidirectional relationship between heavy drinking and emotion regulation strategies, such that a heavy drinking episode may predict decreased efforts to use other emotion regulation strategies (e.g., problem-solving) the following day (Weiss, Bold, Sullivan, Armeli, & Tennen, 2017). While evidence suggests that individuals consume more alcohol following anger provocation (Rabinovitz, 2014), researchers have not examined whether anger experience motivates alcohol use designed to escape or regulate negative affect.

Indirect support for the theory that substances may help individuals avoid internal distress comes from studies that demonstrate an association between EA and substance-related behaviors. For example, Stewart, Zvolensky, and Eifert (2002) found that EA was associated with motivations for drinking in a sample of young adults, over and above anxiety sensitivity and alexithymia. More recently, Shorey and colleagues (2017) demonstrated that EA was associated with alcohol and drug cravings over and above distress tolerance among a sample of individuals in treatment for substance use disorders. However, Westrup (1999) found that EA did not meaningfully differentiate between a sample of individuals relapsing into problematic alcohol use from individuals who weren't relapsing, unless EA was added to a model that also accounted for negative life events. This study proposes to address this ambiguity by specifying how EA may interact with other variables to functionally predict IPA perpetration.

The Present Research

The current study examines associations among anger, alcohol use, and EA as predictors of self-reported IPA using a moderated mediation model, whereby frequent anger experience predicts IPA perpetration through problematic alcohol use more strongly for those high in EA relative to those low in EA. Conceptually, this model is built upon the hypothesis that individuals high in EA may be likely to use alcohol as a maladaptive means of avoiding the distressing internal aspects of anger arousal; thus, a stronger direct association between trait anger and alcohol use, as well as stronger indirect association between trait anger and IPA perpetration via problematic

alcohol use, may exist for those high in EA relative to those low in EA. Although EA may also moderate the association of heavy drinking to IPA perpetration, the present research tests EA's potential to moderate the relation of trait anger to heavy drinking, specifically, in order to test this conceptual model of EA's relation to IPA perpetration. While prior research has indicated EA's association with both problematic alcohol use and IPA perpetration, the functional model of EA's relation to both of these behaviors is not well-understood. The present research invokes a functional relationship between EA and IPA perpetration by suggesting that it moderates the association of two well-documented risk factors for IPA perpetration—trait anger and problematic alcohol use—to increase the likelihood of IPA perpetration for individuals high in EA. While interesting, significant moderation of the relationship between heavy drinking and IPA perpetration would not indicate how EA may functionally relate anger and heavy drinking to predict IPA perpetration; rather, it would suggest that being high in all three variables increases risk for IPA perpetration. To build on prior research (Shorey et al., 2014), this study will include a well-powered, mixed-gender sample; use the MEAQ (Gamez et al., 2011) to measure EA; and measure and control for neuroticism in analyses.

Hypotheses

I hypothesize that (1) trait anger will be positively associated with self-reports of problematic alcohol use; (2) problematic alcohol use will be positively associated with self-reported IPA perpetration; (3) EA will moderate the association between trait anger and problematic alcohol use, such that the association between trait anger and problematic alcohol use will be stronger among participants high in EA relative to participants low in EA; and (4) the indirect effect of trait anger on IPA perpetration through problematic alcohol use will be moderated by EA, such that the indirect effect of trait anger on IPA perpetration via problematic alcohol use will be stronger among participants high in EA relative to participants low in EA¹.

¹ All hypotheses and planned analyses were preregistered with the Open Science Foundation (OSF). See Appendix B.

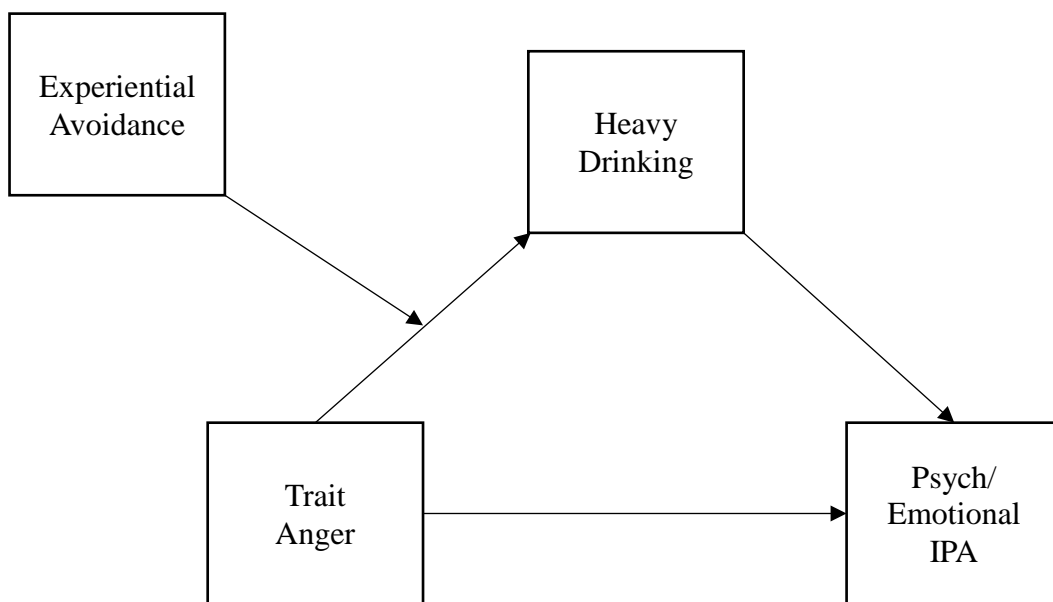


Figure 1. Proposed model of moderated mediation.

METHOD

Participants

Power analyses indicated that a sample size of 600 participants would be needed to test the overall proposed moderated mediation effect presuming 85 percent power to detect a small-to-moderate effect size ($d = .25$ to $.30$; Preacher, Rucker, & Hayes, 2007). Approximately half of all participants were recruited using Amazon.com's Mechanical Turk (MTurk; $N = 299$). The other half of the total sample was recruited via a midwestern University's research participation system ($N = 239$). The collection of two samples allowed for a large overall sample, and also the ability to cross-validate results from one sample with another sample. Given that the survey took one to one and a half hours to complete, college students received 3 research credits towards their department research requirements for their participation in the study, while MTurk participants who submitted valid data were paid \$3.50 for their participation. All participants were required to have been in a relationship and to have consumed alcohol in the past year per the study description; any participants who reported not currently being in a relationship or not consuming alcohol in the past year had their data rejected. Based on a pilot sample ($N = 50$), it was determined that participants were taking approximately an hour and 11 minutes to complete the survey. Therefore, participants must have taken 30 minutes or longer to complete the survey in order for their data to be considered valid.

Three other methods were used to examine validity: eight attention checks and two subscales—Infrequency and Virtue subscales—from the Elemental Psychopathy Assessment—Short Form (EPA-SF 88; Lynam, Sherman, Samuel, Miller, & Widiger, 2013). Each of these subscales comprised eight items and assessed whether respondents were endorsing items that would suggest they were selecting infrequent responses and therefore randomly responding (e.g., “I have sailed over the Atlantic Ocean in a hot air balloon.”) or responding in a socially desirable way (e.g., “I have never told a lie.”), respectively. Attention checks required that respondents select a certain answer (e.g., “Please select *strongly disagree*.”). If participants incorrectly answered four or more of the eight items comprising any of these validity scales, their data were determined to be invalid and therefore the participant was neither compensated nor kept in the final dataset.

Four hundred fifty-four MTurk workers completed the survey. Of this, 299 respondents were found to have provided valid data. Twenty-five MTurk workers failed the infrequency check; nineteen workers failed the virtue check; nineteen workers failed the attention check; and 85 workers took less than 30 minutes to complete the survey. Thirty-four MTurk workers reported not consuming alcohol in the past year, while 28 reported not currently being in a relationship. 306 college students completed the survey. Of this, 239 responses were found to be valid. No college students failed the infrequency or virtue checks; seven failed the attention check; and thirteen took less than 30 minutes to complete the survey. Thirty-nine students reported not being in a relationship in the past year, while 20 students reported not consuming alcohol in the past year. Demographic characteristics of the overall sample ($N = 538$), as well as the MTurk and college student sample can be found in Table 1.

Procedure

The study protocol involved completing questionnaires that had been programmed into Qualtrics (Qualtrics, Provo, UT) and were either posted to the University research participation system, completed in a laboratory on campus, or posted to MTurk. Administration of questionnaires was counterbalanced to reduce order effects. Prior to completing questionnaires, participants signed an electronic consent form. After completing questionnaires, participants were debriefed and given the option to save their debriefing form. College students were then credited for their participation. MTurk participants had their data reviewed for validity and all participants who provided valid data were compensated.

Measures

All participants were administered the following measures²:

² The following additional measures were collected for exploratory purposes; these measures were not tested in any of the analyses reported herein: Acceptance and Action Questionnaire for Substance Abuse (AAQ-SA; Luoma, Drake, Hayes, & Kohlenberg, 2011); Multidimensional Psychological Inflexibility Inventory (MPFI; Rolfs, Rogge, & Wilson, 2018); The Anger Discomfort Scale (ADS; Sharkin & Gelso, 1991); Anger Rumination Scale (ARS; Sukhodolsky, Golub, & Cromwell, 2001); Alcohol Use Disorders Identification Test (AUDIT; Babor, de la Fuente, Saunders, Grant, 1992); Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988); Depression and Anxiety Stress Scales (DASS-42; Parkitny & McAuley, 2010); Buss-Perry Aggression Questionnaire (Buss & Perry, 1992); Distress Tolerance Scale (Simons & Gaher, 2005); Drinking Motives Questionnaire (DMQ-R; Cooper, 1994); Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).

The Big Five Personality Inventory

The neuroticism subscale of the Big Five Personality Inventory (BFI; John & Srivastava, 1999) was used to measure neuroticism. The subscale comprises eight questions that assess peoples' tendency towards negative emotion. Participants were asked to rate the degree to which they agreed or disagreed with statements concerning themselves on a 5-point scale (1 = strongly disagree and 5 = strongly agree). Example items include: "I see myself as someone who can be moody" and "I see myself as someone who gets nervous easily." Participants' responses to BFI items were averaged to give each participant a neuroticism score. The BFI demonstrated good reliability in the overall sample ($\alpha = .85$), the MTurk sample ($\alpha = .87$), and in the college sample ($\alpha = .81$).

Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gamez et al., 2011)

Experiential avoidance was measured using the MEAQ. The MEAQ is a 62-item measure that evaluates EA on a 6-point scale (1 = strongly disagree and 6 = strongly agree). The MEAQ contains 6 subscales: Behavioral Avoidance, Distress Aversion, Procrastination, Distraction and Suppression, Repression and Denial, and Distress Endurance. Example items include: "I won't do something if I think it will make me uncomfortable," and "I feel disconnected from my emotions." Subscales are computed by adding the items of each subscale and the total MEAQ score is computed by adding subscales; the whole Distress Endurance subscale is reverse-scored prior to being added to the total equation. The MEAQ demonstrated excellent reliability in the overall sample ($\alpha = .93$), the MTurk sample ($\alpha = .96$), and the college sample ($\alpha = .91$).

Recommended Alcohol Questions: 6 Question Set

The 6-question-set of recommended questions for assessing alcohol use and related-issues from the National on Alcohol Abuse and Alcoholism (NIAAA, 2003) was used to measure heavy drinking. Participants were asked to answer questions concerning the frequency of drinking in the past year; the number of drinks consumed on an average drinking day; maximum number of drinks consumed in a 24 hour period in the past year; how frequently the maximum number of drinks consumed in a 24 hour period occurred in a year; binge drinking; and the maximum number of drinks consumed in a lifetime. For the present research, all 6 items were z-scored and combined

to create a composite variable of heavy drinking per Lane and Sher (2015). The six items comprising the heavy drinking composite demonstrated good reliability in the overall sample ($\alpha = .83$), the MTurk sample ($\alpha = .82$), and the college sample ($\alpha = .86$).

State-Trait Anger Expression Inventory – 2nd edition

Trait anger was measured using the Trait Anger subscale (TAS) of the State-Trait Anger Expression Inventory – 2nd edition (Spielberger, 1999). The TAS is a 10-item measure that evaluates trait anger on a 4-point scale (1 = not at all and 4 = very much so). Example items include: “I get angry when I’m slowed down by others’ mistakes” and “I fly off the handle.” The TAS is scored by summing participants’ responses across the 10 items comprising the scale. The TAS demonstrated good reliability in the overall sample ($\alpha = .86$), the MTurk sample ($\alpha = .88$), and acceptable reliability in the college student sample ($\alpha = .78$).

Conflict Tactics Scale-2 (CTS2; Straus, Hamby, Boney-McCoy, Sugarman, 1996).

IPA perpetration was measured using the CTS2. The CTS2 is a 78-item scale that provides measures of physical, psychological, and sexual aggression perpetration and victimization within an individual’s intimate relationship in the past year. Additionally, the CTS2 measures the use of negotiation and reasoning to deal with partner conflicts. Respondents are asked to indicate how often in the past year their partners have done various actions (0 = never in the past year, 1 = once in the past year, 2 = twice in the past year, 3 = 3-5 times in the past year, 4 = 6-10 times in the past year, 5 = 11-20 times in the past year, and 6 = more than 20 times in the past year). Respondents then indicate how often in the past year they have done these same actions. Items include: “Have you called your partner fat or ugly?” and “Have you slammed your partner against a wall?”. Frequency scores were computed and then z-scored so that a person’s score on the CTS2 could be combined with his/her score on the MMEA (described below) to create a composite dependent variable of psychological/emotional IPA perpetration. The psychological IPA perpetration subscale of the CTS2 demonstrated good reliability in the overall sample ($\alpha = .80$), acceptable reliability in the MTurk sample ($\alpha = .79$), and acceptable reliability in the college sample ($\alpha = .78$). Additionally, the physical IPA perpetration subscale demonstrated excellent reliability in the overall sample ($\alpha = .91$), the MTurk sample ($\alpha = .91$), and good reliability in the college sample

($\alpha = .84$). Overall IPA perpetration (not including sexual IPA perpetration) also demonstrated excellent reliability in the overall sample ($\alpha = .92$), the MTurk sample ($\alpha = .92$), and good reliability in the college sample ($\alpha = .88$).

Multidimensional Measure of Emotional Abuse (MMEA; Murphy & Hoover, 1999).

Emotional IPA perpetration was measured using the MMEA. The MMEA is a 28-item scale that measures restrictive engulfment, hostile withdrawal, denigration, and dominance/intimidation³. Participants are required to indicate how often they or their partner have engaged in emotionally abusive behaviors in the past 6 months (1 = once, 2 = twice, 3 = 3-4 times, 4 = 6-10 times, 5 = 11-20 times, 6 = more than 20 times, and 7 = never in the past 6 months but it has happened before, and (0) this has never happened before). In the present research, the MMEA was adapted to match the timeframe of the CTS2 and therefore, participants were asked to indicate whether they engaged in emotionally abusive behaviors in the past 12 months. Example items include: “Secretly searched through the other person’s items” and “Tried to make the other person feel guilty for not spending enough time together.” Frequency scores for perpetration were computed and then z-scored so that a person’s score on the MMEA could be combined with his/her score on the psychological aggression perpetration of the CTS2 to create a composite dependent variable of psychological/emotional IPA perpetration. The MMEA demonstrated excellent reliability in the overall sample ($\alpha = .96$), excellent reliability in the MTurk sample ($\alpha = .96$), and good reliability in the college student sample ($\alpha = .85$).

Data Analytic Strategy

Correlations among trait anger, EA, heavy drinking, and IPA perpetration in the overall sample were examined using SPSS (Version 25; IBM Corp., 2017). The following assumptions for running a mediation model (Baron & Kenny, 1986) were met: trait anger (e.g., the independent variable) was significantly related to heavy drinking (e.g., the mediator); trait anger was significantly related to IPA perpetration (e.g., the dependent variable); and heavy drinking was

³ Item 8 on the MMEA was missing from the scale I used to program my survey (Thompson, Basile, Hertz, & Sitterle, 2006). Thus, the total scale and denigration subscale are missing 1 item. Nonetheless, the total scale demonstrated excellent reliability (reported above), as did the denigration subscale, $\alpha = .90$.

significantly related to IPA perpetration. I also examined the correlations among EA, trait anger, and heavy drinking to ensure that EA related to both trait anger and heavy drinking.

With the aforementioned assumptions met, I used PROCESS (Process macro; model 7; Hayes, 2013) to test the relations among trait anger (mean-centered), EA (mean-centered), heavy drinking (z-scored), and psychological IPA perpetration (z-scored; *See Figure 1*). Specifically, I tested whether high trait anger exerts an indirect effect on psychological IPA perpetration through heavy drinking; whether this indirect effect accounted for significant variance over and above a direct relation of trait anger to IPA perpetration (e.g., statistically mediates); and whether the relation of trait anger to psychological IPA perpetration through heavy drinking was moderated by EA, such that a stronger association among these variables was demonstrated among those high in EA relative to those low in EA. Missing data was deleted in a case-wise fashion, such that if participants did not complete one item of any scale, their total or average score for that scale would not be computed and therefore, they would not be included in analyses⁴.

This model was first tested in the overall sample (e.g., combined MTurk and college student sample) so as to test the model in a diverse, well-powered sample, and because I did not hypothesize that the associations among the variables should differ between the two samples. The model was then tested in the two samples separately to cross-validate the model in two different samples.

⁴ Ten imputed datasets using the variables in both the confirmatory and exploratory analyses were created to test the effect of missing data on results. Confirmatory and exploratory models were run on the imputed datasets and then aggregated into a single set of results for each model to account for variance inflation. A comparison of the results in the imputed data and raw data revealed no differences in patterns of significance or interpretations and thus, nonimputed data is reported herein.

RESULTS

Preliminary Analyses

Descriptive analyses and bivariate correlations were conducted in SPSS 25 and can be found in Tables 2 and 3. Trait anger and EA were both significantly related to the mediator, heavy drinking. All predictor variables (e.g., trait anger, EA, and heavy drinking) were significantly related to the dependent variables, physical and psychological IPA perpetration. Thus, all assumptions for running a mediation model were met. As mentioned previously, separate analyses were conducted with physical and psychological IPA perpetration as the dependent variables; the model wherein physical IPA perpetration is the dependent variable is treated as exploratory and reported in an exploratory analyses section.

T-tests revealed significant gender differences for physical IPA perpetration, $t(517) = 3.17$, $p = .002$, such that men reported perpetrating significantly more prior year physical IPA perpetration ($M = 14.82$, $SD = 27.10$) than women ($M = 8.16$, $SD = 20.25$). Further, they revealed significant gender differences for heavy drinking behavior, $t(517) = 5.58$, $p < .001$, such that men reported significantly more heavy drinking ($M = 1.03$, $SD = 4.43$) than women ($M = -1.04$, $SD = 4.01$). Because of these differences, gender (1 = male, 2 = female) was included as a covariate in confirmatory and exploratory analyses. In line with a central aim of this study—to measure the effects of EA over and above neuroticism—mean-centered neuroticism scores were also included as a covariate in all models.

Table 1. Participant Demographics

Variables	Overall Sample <i>M (SD), N (%)</i>	MTurk Sample <i>M (SD), N (%)</i>	College Sample <i>M (SD), N (%)</i>
Age	27.22 (9.98)	33.73 (9.11)	19.10 (1.18)
Gender			
Male	271 (50.40)	174 (58.20)	97 (40.60)
Female	264 (49.1)	122 (40.80)	142 (59.40)
Sexual Orientation			
Heterosexual	485 (90.15)	266 (89)	219 (92)
Bisexual	27 (5.02)	13 (5)	14 (6)
Same-sex	26 (4.83)	20 (6)	6 (2)
Education	15.06 (2.79)	15.74 (3.34)	14.23 (1.52)
Race			
Am Indian/Alaska Native	13 (2.40)	11 (3.70)	2 (.80)
Asian/Asian American	159 (29.60)	118 (39.50)	41 (17.20)
Black/African American	20 (3.7)	15 (5)	5 (2.10)
Hawaiian/Pacific Islander	4 (.70)	1 (.30)	3 (1.3)
White/Caucasian	370 (68.80)	165 (55.20)	205 (85.80)
Ethnicity			
Hispanic/Latino	75 (13.90)	55 (18.40)	20 (8.40)
Non-Hispanic/Latino	463 (86.10)	244 (81.60)	219 (91.60)
Relationship Status			
Married	150 (27.9)	150 (50)	—
Dating, living w/partner	115 (21.60)	94 (31)	22 (9.20)
Dating, not living w/partner	272 (50.60)	55 (18)	217 (90.80)
Length of Relationship	47.06 (70.69)	69.42 (87.36)	18.86 (16.15)
Annual Income			
\$0-\$49,999	193 (35.90)	138 (46.20)	55 (23.00)
\$50,000-\$99,999	169 (31.40)	118 (39.50)	51 (21.30)
\$100,000-\$149,999	96 (17.80)	32 (10.70)	64 (26.80)

Table 1 continued

Variables	Overall Sample <i>M (SD), N (%)</i>	MTurk Sample <i>M (SD), N (%)</i>	College Sample <i>M (SD), N (%)</i>
\$150,000-\$199,999	37 (6.90)	9 (3.00)	28 (11.70)
\$200,000+	42 (7.80)	2 (.70)	40 (16.70)

Note. $N = 538$, College Sample $N = 239$, MTurk $N = 299$, M = mean, SD = standard deviation.

Table 2. Descriptive Statistics

Variables	Overall Sample <i>M (SD)</i>	MTurk Sample <i>M (SD)</i>	College Sample <i>M (SD)</i>
Psychological IPA ⁵	14.09 (19.83)	18.85 (21.11)	8.34 (16.46)
Emotional IPA Perp	78.78 (123.85)	123.39 (149.33)	23.83 (36.53)
Physical IPA Perp	11.52 (24.13)	18.38 (27.84)	3.05 (14.68)
EA	204.38 (36.86)	207.87 (41.33)	200.19 (30.19)
Heavy Drinking ⁶			
Drink 12/mos	5.80 (1.96)	5.31 (1.88)	6.42 (1.90)
Drinks per day	7.38 (2.05)	7.09 (2.35)	7.70 (1.49)
Largest # drinks/day	6.20 (1.94)	6.43 (1.98)	5.58 (1.77)
# of times	6.67 (1.78)	6.00 (1.95)	7.55 (1.01)
Freq of binge drink	6.99 (2.09)	6.64 (2.29)	7.42 (1.70)
Largest drinks/year	5.51 (1.89)	5.53 (1.89)	5.45 (1.89)
Trait Anger	18.76 (5.37)	20.16 (6.00)	17.05 (3.87)

Note. $N = 538$, College Sample $N = 239$, MTurk $N = 299$, M = mean, SD = standard deviation.

⁵ Psychological and emotional IPA perpetration was computed by z-scoring and summing psychological IPA (as measured by CTS2) and emotional IPA (as measured by the MMEA). Means and standard deviations are reported, separately, for these constructs, here, and reflect frequency in the past year.

⁶ Heavy drinking was computed by z-scoring the individual drinking items and summing them. The means and standard deviations are reported for the individual items. Higher means reflect greater drinking behaviors (on a scale of 1-10) but means do not reflect mean drinks, mean drinking occasions, etc.

Table 3. Correlations Among IPA Perpetration, Trait Anger, Heavy Drinking and EA in the Overall Sample

Measure	1	2	3	4
Trait Anger	—			
Heavy Drinking	.36**	—		
EA	.48**	.20**	—	
Psychological IPA perp	.58**	.49**	.36**	—
Physical IPA perp	.52**	.47**	.29**	.81**

** $p < .001$.

Table 4. Correlations Among IPA Perpetration, Trait Anger, Heavy Drinking, and EA in the MTurk Sample

Measure	1	2	3	4
Trait Anger	—			
Heavy Drinking	.44**	—		
EA	.56**	.25**	—	
Psychological IPA perp	.62**	.60**	.42**	—
Physical IPA perp	.58**	.58**	.37**	.82**

** $p < .001$.

Table 5. Correlations Among IPA Perpetration, Trait Anger, Heavy Drinking, and EA in the College Sample

Measure	1	2	3	4
Trait Anger	—			
Heavy Drinking	.06	—		
EA	.25**	.05	—	
Psychological IPA perp	.21**	.06	.14*	—
Physical IPA perp	.14*	.10	-.01	.58**

* $p < .05$. ** $p < .001$.

Confirmatory Analyses

Moderation of the Mediator

The first analysis tested the effect of EA (moderator) on the effect of trait anger (IV) on heavy drinking (mediator), controlling for gender and neuroticism. The overall model was significant, $F(5, 441) = 18.37, p < .001, R^2 = .17; MSE = 15.08$. The main effect of trait anger ($B = .24, SE = .04, 95\% \text{ CI } [.16, .33], p < .001$) was significant, providing evidence for hypothesis one: trait anger was positively associated with self-reports of higher problematic alcohol use. The main effect of EA was not significant ($B = .01, SE = .01, 95\% \text{ CI } [-.001, -.02], p = .08$). The interaction between trait anger and EA did not predict heavy drinking ($B = <.001, SE = .001, 95\% \text{ CI } [-.002, .002], p = .82, \Delta R^2 = .001$), thus providing lack of support for hypothesis three: EA did not moderate the effect of trait anger on heavy drinking.

Direct Effects on Psychological IPA

The second analysis tested the direct effects of trait anger (IV) and heavy drinking (mediator) on psychological IPA perpetration, controlling for gender and neuroticism. The overall model was significant $F(4, 442) = 76.34, p < .001, R^2 = .41; MSE = 1.91$. The main effect of trait anger on psychological IPA perpetration was significant ($B = .16, SE = .01, 95\% \text{ CI } [.13, .19], p < .001$). Further, the main effect of heavy drinking on psychological IPA perpetration was significant, ($B = .14, SE = .04, 95\% \text{ CI } [.11, .17], p < .001$), providing evidence for hypothesis two: problematic alcohol use was positively associated with psychological IPA perpetration.

Indirect Effects and Moderated Mediation of Psychological IPA

The third analysis tested whether trait anger (IV) predicted psychological IPA perpetration through heavy drinking (mediator), and whether this association varied as a function of level of EA (moderator). The index of moderated mediation—or the slope of the line relating the indirect effect to the moderator—was not significant ($B = .000, SE = .0001, 95\% \text{ CI } [-.0002, .0003]$). Results indicated that the indirect effect of trait anger on psychological IPA perpetration through heavy drinking was significant at low ($-1 \text{ SD}; B = .03, SE = .01, 95\% \text{ CI } [.01, .05]$), moderate

(mean; $B = .03$, $SE = .01$, 95% CI [.02, .05]), and high (+1 SD; $B = .03$, $SE = .01$, 95% CI [.02, .05]) levels of EA. The index of moderated mediation further suggested that the indirect effect of trait anger on psychological IPA perpetration did not vary as a function of level of EA. Thus, hypothesis four was not supported: the indirect effect of trait anger on IPA perpetration through heavy drinking was not moderated by EA.

The same model was run in both the MTurk and college student samples, separately. All variables were restandardized and mean-centered on each sample's respective mean. The results of the model in the MTurk sample were almost identical to that of the overall sample. However, most associations fell to nonsignificance in the college sample⁷. Notably, heavy drinking (mediator) was not significantly correlated to trait anger (independent variable), EA (moderator), or psychological IPA perpetration. Hence, the assumptions for running a mediation model were not met in the college sample. Accordingly, all associations but the association of trait anger to psychological IPA perpetration were insignificant. Results from these analyses can be found in Appendix C. In order to maximize power, all exploratory analyses reported below were conducted with the full sample.

Exploratory Analyses

Three exploratory analyses were conducted. Given previous theories and research (Shorey et al., 2014), it was important to consider that EA may predict physical IPA in addition to psychological/relational IPA and therefore, exploratory analysis 1 tested a moderated mediation model with physical IPA serving as the dependent variable. Further, although I did not preregister this hypothesis, it was theoretically possible that EA would moderate the b path, rather than the a path. Hence, exploratory analysis 2 examined a moderated mediation model in which the b path, rather than the a path, was moderated by EA. Finally, the Alcohol Use Identification Test (AUDIT; Babor, de la Fuente, Saunders, & Grant, 1992) assesses drinking-related consequences (e.g., injuring one's self or others as a result of drinking), as well as drinking frequency and thus, tends to capture problematic alcohol use in addition to heavy drinking. Exploratory analysis 3 assessed

⁷ Descriptive analyses demonstrated that psychological IPA perpetration was significantly skewed in the college sample, skewness = 4.27. Psychological IPA perpetration data in the MTurk and overall samples also demonstrated skew but at an acceptable level for inferential statistics, skewness = 1.27 and 1.98, respectively. Thus, analyses using the college sample are difficult to interpret and skew may account for differential findings between the college and MTurk samples.

whether the finding that EA did not moderate the association between trait anger and heavy drinking in confirmatory analyses would vary depending on whether one used heavy drinking or problematic alcohol use (e.g., AUDIT total scores) as the mediator.

Exploratory analysis 1 demonstrated similar results to that of confirmatory analyses. The main effect of trait anger on heavy drinking was significant ($B = .26$, $SE = .04$, 95% CI [.17, .34], $p < .001$), while the main effect of EA on heavy drinking was not significant ($B = .01$, $SE = .01$, 95% CI [-.003, .02], $p = .15$). The interaction between trait anger and EA did not predict heavy drinking ($B = -.0002$, $SE = .001$, 95% CI [-.002, .002], $p = .86$, $\Delta R^2 = .0001$). Additionally, the main effects of trait anger ($B = 1.95$, $SE = .20$, 95% CI [1.55, 2.34], $p < .001$) and heavy drinking ($B = 1.75$, $SE = .23$, 95% CI [1.30, 2.21], $p < .001$) on physical IPA perpetration were significant. Results further revealed that the index of moderated mediation was not significant ($B = -.0003$, $SE = .0001$, 95% CI [-.0038, .0033]), therefore indicating that the indirect effect of trait anger on physical IPA perpetration did not vary as a function of level of EA. The indirect effect of trait anger on physical IPA perpetration through heavy drinking was significant at low (-1 SD; $B = .46$, $SE = .15$, 95% CI [.20, .77]), moderate (mean; $B = .45$, $SE = .12$, 95% CI [.24, .70]), and high (+1 SD; $B = .44$, $SE = .12$, 95% CI [.24, .70]) levels of EA.

Exploratory analysis 2 demonstrated that while EA did not moderate the a path, EA did moderate the b path of the moderated mediation model. The main effect of trait anger on heavy drinking was significant, $B = .26$, $SE = .04$, 95% CI [.17, .34], $p < .001$. The main effects of trait anger ($B = .13$, $SE = .01$, 95% CI [.10, .16], $p < .001$), EA ($B = .001$, $SE = .002$, 95% CI [.004, .02], $p = .001$), and heavy drinking ($B = .12$, $SE = .02$, 95% CI [.09, .16], $p < .001$) on psychological IPA perpetration were significant. Further, the interaction between heavy drinking and EA was significant, $B = .003$, $SE = .001$, 95% CI [.002, .003], $p < .001$, $\Delta R^2 = .04$. Specifically, the relationship between heavy drinking and IPA perpetration strengthened from moderate (mean; $B = .13$, $SE = .02$, $p < .001$, 95% CI [.10, .16]) to high levels of EA (+1 SD; $B = .21$, $SE = .02$, $p < .001$, 95% CI [.17, .25]). Low levels of EA (-1 SD) did not moderate the association of heavy drinking to IPA perpetration, $B = .04$, $SE = .02$, $p = .13$, 95% CI [-.01, .08]. The index of moderated mediation was also significant, $B = .001$, $SE = .0002$, 95% CI [.0003, .0011], which suggested that EA also moderated the effect of trait anger on IPA perpetration through heavy drinking. Specifically, the association between trait anger and psychological IPA perpetration through heavy drinking strengthened from moderate (mean; $B = .03$, $SE = .01$, 95% CI [.02, .05]), to high (+ 1

SD; $B = .06$, $SE = .01$, 95% CI [.03, .08]) levels of EA. At low levels of EA, heavy drinking was not associated with IPA, -1 SD; $B = .01$, $SE = .01$, 95% CI [-.004, .03], suggesting that at low levels of EA, heavy drinking did not mediate the association between anger and IPA.

Exploratory analysis 3 demonstrated that while EA did not moderate the association of trait anger to heavy drinking, it did moderate the association of trait anger to problematic alcohol use as measured by the AUDIT. The main effects of trait anger ($B = .54$, $SE = .06$, 95% CI [.41, .66], $p < .001$) and EA ($B = .04$, $SE = .01$, 95% CI [.03, .06], $p < .001$) on problematic alcohol use were significant. Further, the interaction between trait anger and EA was also significant, $B = .004$, $SE = .001$, 95% CI [.002, .007], $p = .001$, $\Delta R^2 = .02$. Specifically, the association between trait anger and heavy drinking strengthened from low (-1 SD; $B = .38$, $SE = .09$, 95% CI [.20, .56]), to moderate (mean; $B = .54$, $SE = .06$, 95% CI [.42, .67]), to high (+ 1 SD; $B = .69$, $SE = .06$, 95% CI [.57, .82]) levels of EA. Additionally, the main effects of trait anger ($B = .11$, $SE = .01$, 95% CI [.08, .14], $p < .001$) and problematic alcohol use ($B = .12$, $SE = .01$, 95% CI [.10, .14], $p < .001$) on psychological IPA perpetration were significant. The index of moderated mediation was significant ($B = .0005$, $SE = .0002$, 95% CI [.0001, .0010]), therefore indicating that the indirect association of trait anger to psychological IPA perpetration through problematic alcohol use varied as a function of EA. Specifically, results indicated that the indirect effect of trait anger on psychological IPA perpetration through problematic alcohol use strengthened from low (-1 SD; $B = .05$, $SE = .01$, 95% CI [.02, .07]), to moderate (mean; $B = .07$, $SE = .01$, 95% CI [.04, .09]), to high (+1 SD; $B = .08$, $SE = .02$, 95% CI [.06, .12]) levels of EA.

DISCUSSION

The present research examined associations among trait anger, heavy drinking, EA, and IPA perpetration. An MTurk and college student sample completed measures of these variables and a moderated mediation model was tested with EA hypothesized to moderate the association between trait anger and heavy drinking in the prediction of psychological and emotional IPA perpetration. This research built upon past research (Shorey et al., 2014) by proposing and testing a conceptual model of EA's relation to IPA perpetration, and distinguishing EA's effects on aggression from neuroticism's (Rochefort, Baldwin, & Chmielewski, 2018) by controlling for neuroticism in all analyses and using the MEAQ (Gamez et al., 2011) to measure EA. Results aligned with hypotheses, such that trait anger predicted IPA perpetration both directly and through its relation to heavy drinking. However, results diverged from predictions by suggesting that EA does not moderate the association of trait anger to heavy drinking and, therefore, does not predict IPA perpetration through this association. In the remaining sections, specific findings and their theoretical implications will be reviewed.

Hypotheses one and two were supported in the overall sample and the MTurk sample. Trait anger was significantly related to heavy drinking, and heavy drinking was significantly related to IPA perpetration. Further, trait anger was significantly associated with psychological and emotional IPA perpetration both directly and indirectly via heavy drinking. Hypotheses three and four were not supported in either the overall or MTurk samples. EA did not moderate the association of trait anger to heavy drinking nor the relation of trait anger to psychological and emotional IPA perpetration through heavy drinking. An analysis using this model to predict physical IPA perpetration, rather than psychological and emotional IPA perpetration, revealed similar results. No hypotheses were supported in the college sample.

Taken together, the results of the present study confirm prior research by suggesting that both trait anger and heavy drinking are risk factors for IPA perpetration (Birkley & Eckhardt, 2015; Leonard & Quigley, 2017). Further, the results build upon prior research (Birkley & Eckhardt, 2015) by suggesting that trait anger both directly and indirectly predicts IPA perpetration through heavy drinking. Given that the present research was cross-sectional, I cannot draw any conclusions about mediation nor rule out the idea that those who perpetrate IPA (e.g., an externalizing behavior) are also more likely to be high in trait anger and engage in heavy drinking (e.g., other externalizing

symptoms and behaviors). Instead, these results may inform future research by suggesting that IPA perpetration is an externalizing problem made more likely by greater externalizing symptoms. The finding that EA did not moderate the association between trait anger and heavy drinking nor the association of trait anger to IPA perpetration through heavy drinking further supports the hypothesis that IPA perpetration is an externalizing problem. EA tends to be associated with internalizing disorders that involve a high level of internal discomfort or distress (e.g., anxiety; Feldner, Zvolensky, Eifert, & Spira, 2003). It remains unclear whether anger experience would motivate EA or that EA would correlate with either anger or heavy drinking given that the latter variables have been traditionally conceptualized as externalizing symptoms/behaviors.

Nonetheless, it is notable that exploratory analyses suggested that EA may be associated with IPA perpetration in the presence of other interacting variables (e.g., trait anger and heavy drinking) or in the case of more problematic alcohol use. Exploratory analysis 2 demonstrated that although EA did not moderate the association of trait anger to heavy drinking, it did moderate the association of heavy drinking to IPA perpetration through trait anger, such that the association was stronger among those high in EA relative to those moderate in EA. This finding indicates that frequent anger experience may motivate drinking for individuals regardless of level of EA but only those high in EA will then be more likely to perpetrate IPA perpetration. Thus, those low in EA may “effectively” cope with anger experience through drinking, whereas heavy drinking for those high in EA and trait anger may further lower the threshold for impulsive, aggressive acts.

Exploratory analysis 3 further suggested that while EA does not moderate the association between trait anger and heavy drinking nor the association of trait anger to IPA perpetration through heavy drinking, EA may moderate the association of trait anger to more problematic alcohol use (e.g., higher AUDIT scores) and the association of trait anger to IPA perpetration through problematic alcohol use. Specifically, the association between trait anger and problematic alcohol use was stronger for those high in EA relative to those moderate in EA and stronger for those moderate in EA relative to those low in EA, as was the association between trait anger and IPA perpetration through problematic alcohol use. This suggests that heavy drinking may not be a means to escape anger experience, but that drinking-to-escape may occur for individuals who are already demonstrating more problematic use of alcohol. Alternatively, AUDIT scores may be more indicative of externalizing symptoms/behavior than quantity and frequency measures of alcohol

use and thus, exploratory analysis 3 may also suggest that EA relates to IPA perpetration for those who are already prone to externalizing behaviors.

Limitations

The results of the present study should be interpreted in light of several limitations related to sampling and design. Both participant groups were samples of convenience rather than groups recruited because of clinically-significant problems related to trait anger, heavy drinking, or IPA perpetration. Of particular note, there was low reporting of IPA perpetration in both the MTurk and college samples and the data were fairly skewed. The inclusion of two different participant groups allowed for a more diverse sample in terms of some variables, such as age and relationship type, but not in terms of other variables, such as race. The inclusion of two samples also allowed for an examination of whether the model demonstrated invariance across samples. The differences in results observed between the MTurk and college samples may be explained by differing reports of IPA and heavy drinking in these samples. Specifically, there were higher rates of psychological IPA perpetration and heavy drinking in the MTurk sample than in the college sample (see Table 2), and most measures demonstrated slightly more reliability in the MTurk sample. It is also notable that the mean age of college students was 19 years of age, which is below the legal drinking age in the US. Because of this, the college students may have had less access to alcohol than those in the MTurk sample and therefore, less opportunity (and time) to develop maladaptive coping mechanisms that involve alcohol use. It may also be that the proposed model *should* theoretically differ in these two samples and that associations among anger, EA, and alcohol use are only predictive of IPA perpetration at a more clinical level of problematic alcohol use. The results of exploratory analysis 3 support this idea. Nonetheless, it is important to consider that the model did not perform similarly in the two samples and that the MTurk sample may be driving the effects reported for the overall sample. A high-powered replication in both samples could clarify questions of invariance.

Further, a secondary power simulation conducted in MPlus (Muthen & Muthen, 2012) suggested that with a sample of 600 participants, the present research was underpowered to detect the proposed moderated effects (See Appendix A). Thus, both significant and insignificant results need to be evaluated in light of these power concerns. It is also notable that a lack of literature examining the moderator's (e.g., EA) association to the independent variables in the present model

made power simulations difficult to conduct, and therefore, the results of reported power simulations should also be considered tentative. Finally, the cross-sectional nature of the current study limited the ability to draw conclusions about causality. Future research should better identify *how* negative affect may motivate EA through drinking and *for whom* this process may occur (e.g., individuals high in externalizing psychopathology or individuals with an alcohol use disorder [AUD]).

Conclusions

The present research demonstrates that trait anger and heavy drinking are risk factors for IPA perpetration, although not in emerging adults who may be reporting low rates of IPA perpetration. Further, this study builds upon prior research by suggesting that frequent anger experience predicts IPA perpetration directly, but also through its relation to heavy drinking. Contrary to the theory and hypotheses proposed in preregistration, the present research suggests that EA does not moderate the association of anger experience to heavy drinking. Rather, exploratory analyses suggested that EA may be associated with other externalizing variables, such as anger and problematic alcohol use, and confer risk for IPA perpetration through this association.

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APPENDIX A

Power Analysis

Once data collection had begun, a secondary power analysis was conducted in MPlus (Muthen & Muthen, 2012) to estimate how powered the present study was to detect all possible associations in the proposed moderated mediation model.

Based on effect sizes reported in the literature, I estimated that the direct effect of anger on IPV perpetration would be .48 (e.g., c path; Birkley & Eckhardt, 2015); the effect of heavy drinking on IPV perpetration would range from .15 to .22 depending on gender (e.g., b path; Cafferky et al., 2016; Foran & O'Leary, 2008); the effect of EA on IPA perpetration would be .33 (e.g., main effect of moderator on the dependent variable; Shorey et al., 2014); that the effect of anger on heavy drinking would be .61 (e.g., a path; Barrett, Mills, & Teeson, 2007); and the effect of EA on heavy drinking would be .46 (e.g., main effect of moderator on mediator; Levin, MacLane, Daflos, Seely, Hayes...& Pistorello, 2014). No previous studies have examined whether EA moderates the association of anger to IPA perpetration or aggression (e.g., moderation of c path), whether EA moderates the association of heavy drinking to IPA perpetration or aggression (e.g., moderation of b path), nor whether EA moderates the association of anger to heavy drinking (e.g., moderation of a path). For these paths, I estimated the strength of the associations using a recent dataset collected by our lab (Cafferky, Mendez, Anderson, & Stith, 2016); this dataset contained measures of EA, heavy drinking, anger, and IPA perpetration. Based on correlations I ran using this dataset, I estimated that the effect of EA on the association of anger to IPA perpetration would be .09 (e.g., moderation of c path); that the effect of EA on the association of heavy drinking to IPA perpetration would be .49 (e.g., moderation of b path); and that the effect of EA on the association of anger to heavy drinking would be .10 (e.g., moderation of a path).

The results of this power analysis (*See Figure 2*) revealed that with a sample of 600 participants, I would be 100% powered to detect an association between anger and IPA perpetration (e.g., c path); 98% powered to detect an association between heavy drinking and IPA perpetration (e.g., b path); 35% powered to detect an association between EA and IPA perpetration (e.g., main effect of moderator on the dependent variable); 85% powered to detect EA's moderation of the association between heavy drinking and IPA perpetration (e.g., moderation of

the b path); 100% powered to detect an association between trait anger and heavy drinking (e.g., a path); 78% powered to detect an association between EA and heavy drinking (e.g., main effect of moderator on mediator); 54% powered to detect EA's moderation of the association between trait anger and heavy drinking (e.g., moderation of the a path) and 47% powered to detect EA's moderation of trait anger and IPA perpetration (e.g., moderation of the c path).

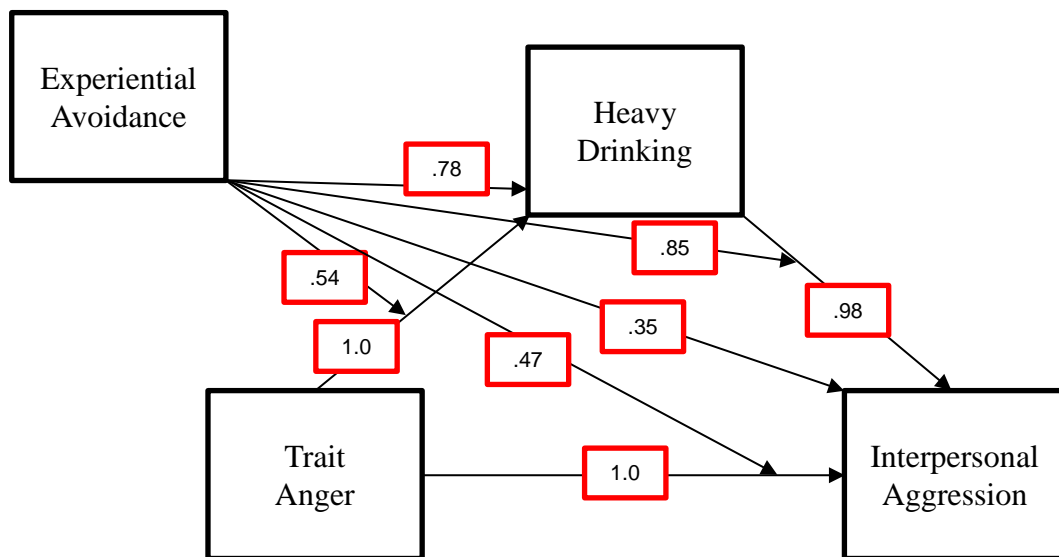


Figure 2. Results of power analysis.

APPENDIX B

OSF Preregistration (registered 4/15/2019, embargoed until 3/30/2021)

1) What's the main question being asked or hypothesis being tested in this study?

(1) Whether experiential avoidance (EA) moderates the association between trait anger and problematic alcohol use, such that the association between trait anger and problematic alcohol use is stronger among participants high in EA relative to participants low in EA; and (2) Whether this moderated path is predictive of psychological/emotional IPA, such that the indirect effect of trait anger on psychological/emotional IPA perpetration via problematic alcohol use is stronger among participants high in EA relative to participants low in EA.

2) Describe the key dependent variable(s) specifying how they will be measured.

I plan to analyze two types of intimate partner aggression as my dependent variable(s): physical and psychological/relational IPA perpetration. The latter type will be a combination of the psychological perpetration subscale of the CTS-2 and the MMEA perpetration scale. Physical IPA perpetration will be measured using the physical perpetration subscale of the CTS-2. I will not include items that measure sexual coercion in either DV composites.

Previous theories and research regarding EA and physical IPA indicate that it is important to consider that EA may predict physical IPA, in addition to psychological/relational IPA. However, I expect low reporting of physical IPA perpetration given the sample of participants I'll be recruiting. Hence, I will treat the model wherein the dependent variable is physical IPA perpetration as exploratory; the main research question (documented above) concerns psychological/emotional IPA perpetration.

3) How many and which conditions will participants be assigned to?

There are no conditions in the present research; all participants will complete all questionnaires. The independent variables will be variables indicating whether respondents are higher or lower in EA, and the degree to which they have engaged in problematic alcohol use.

4) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

I will use SPSS (Version 25; IBM Corp., 2017) to examine the correlations among trait anger, EA, heavy drinking, and IPA perpetration. I will make sure the following assumptions for

running a mediation model are met: trait anger (e.g., the independent variable) is significantly related to heavy drinking (e.g., the mediator); trait anger is significantly related to IPA perpetration (e.g., the dependent variable); and heavy drinking is significantly related to IPA perpetration. I will also examine the correlations among EA, trait anger, and heavy drinking to ensure that EA relates to both trait anger and heavy drinking.

If the aforementioned assumptions are met, I will use PROCESS (Process macro; model 7; Hayes, 2013) to test my proposed model of the relations among trait anger, EA, heavy drinking, and IPA perpetration. Through this modeling, I will test whether high trait anger exerts an indirect effect on IPA perpetration through heavy drinking; whether this indirect effect accounts for significant variance over and above a direct relation of trait anger to IPA perpetration (e.g., statistically mediates); and whether the relation of trait anger to IPA perpetration through heavy drinking is moderated by EA, such that a stronger relationship among these variables is demonstrated among those high in EA relative to those low in EA.

I will run two models: one with psychological/emotional IPA perpetration as the DV (main research question), and the other with physical IPA perpetration as the DV (exploratory analysis).

5) Any secondary analyses?

Previous theories and research regarding EA and physical IPA indicate that it is important to consider that EA may predict physical IPA, in addition to psychological/relational IPA. However, I expect low reporting of physical IPA perpetration given the sample of participants I'll be recruiting. Hence, I will treat the model wherein the dependent variable is physical IPA perpetration as exploratory; the main research question (documented above) concerns psychological/emotional IPA perpetration.

6) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

To determine the sample size needed to run a well-powered moderated mediation model, I consulted Preacher, Rucker, and Hayes (2007), which outlines suggested sample sizes for moderated mediation analyses. Based on their simulations and recommendations, as well as prior effect sizes reported in the alcohol, anger, IPA, and EA literatures, I plan to recruit a total of 600 participants. Approximately half of all participants ($N = 300$) will be recruited via a college pool. The other half of these participants ($N = 300$) will be recruited via Mechanical Turk.

7) Anything else you would like to pre-register? (e.g., data exclusions, variables collected for exploratory purposes, unusual analyses planned?)

All participants must have been in a relationship at the time of completing the survey and have consumed at least one beverage containing alcohol in the past year. All participants who don't meet these qualifications will not be included in analyses. Three validity scales were also included in the survey: attention check (8 questions), virtue check (8 questions), and an infrequency check (8 questions). Any respondents who fail any of these scales (answered 4 or more of the questions on any of these scales incorrectly) will not be included in analyses. Finally, any participants who spent less than 30 minutes completing the survey (average completion time for first 50 respondents = 71 minutes), will not be included in analyses (because they were likely not attending to/being thoughtful in responses).

Other variables are being collected for exploratory purposes.

I plan to create a composite score across the 6 recommended questions from NIAAA to measure problematic alcohol use (an independent variable in the model). I will keep the AUDIT in my list of measures as a measure that taps into "drinking consequences," and may be useful for future exploratory analyses. However, items from the AUDIT will not be included in the composite IV for the current proposed model.

8) Have any data been collected for this study already?

Yes. Data collection of the college student sample and MTurk sample is ongoing. The only analyses that have been run on already collected data is (1) a descriptive analysis of the mean time it was taking respondents to complete the survey (N = 50 of earliest respondents); this was important for determining an inclusion/exclusion cut-off for including data of participants who may or may not have been attending to the survey. And (2) validity checks on MTurk data to determine whether to keep or reject data; this involved calculating virtue, infrequency, and attention scores for participants, as well as examining their responses to whether they were in a relationship, consumed alcohol in the past year, and how long it took for them to complete the survey.

APPENDIX C

Preliminary Analyses in the MTurk Sample

Bivariate correlations were conducted in SPSS 25 and can be found in Table 4. Trait anger and EA were both significantly related to the mediator, heavy drinking. All predictor variables (e.g., trait anger, EA, and heavy drinking) were significantly related to the dependent variable: psychological IPA perpetration. Thus, all assumptions for running a mediation model were met.

Confirmatory Analyses in MTurk Sample

Moderation of the Mediator

The first analysis tested the moderating effect of EA (moderator) on the effect of trait anger (IV) on heavy drinking (mediator), controlling for gender and neuroticism. The overall model was significant, $F(5, 2291) = 12.74, p < .001, R^2 = .22; MSE = 14.75$. The main effect of trait anger ($B = .31, SE = .06, 95\% CI [.19, .43], p < .001$) was significant, providing evidence for hypothesis one: trait anger was positively associated with self-reports of higher problematic alcohol use. The main effect of EA was not significant ($B = .01, SE = .001, 95\% CI [-.01, .03], p = .22$). The interaction between trait anger and EA did not predict heavy drinking ($B = -.001, SE = .001, 95\% CI [-.003, .002], p = .58, \Delta R^2 = .001$), thus providing a lack of evidence for hypothesis three: EA did not moderate the effect of trait anger on heavy drinking.

Direct Effects on Psychological IPA

The second analysis tested the direct effects of trait anger (IV) and heavy drinking (mediator) on psychological IPA perpetration, controlling for gender and neuroticism. The overall model was significant $F(4, 230) = 63.73, p < .001, R^2 = .53; MSE = 1.66$. The main effects of trait anger on psychological IPA perpetration was significant ($B = .14, SE = .02, 95\% CI [.11, .18], p < .001$). Further, the main effect of heavy drinking on psychological IPA perpetration was significant, ($B = .19, SE = .02, 95\% CI [.14, .23], p < .001$), providing evidence for hypothesis two: problematic alcohol use was positively associated with psychological IPA perpetration.

Indirect Effects and Moderated Mediation of Psychological IPA

The third analysis tested whether trait anger (IV) predicted psychological IPA perpetration through heavy drinking (mediator), and whether this association varied as a function of level of EA (moderator). The index of moderated mediation—or the slope of the line relating the indirect effect to the moderator—was not significant ($B = -.0001$, $SE = .0002$, 95% CI $[-.0005, .0003]$). Results indicated that the indirect effect of trait anger on psychological IPA perpetration through heavy drinking was significant at low (-1 SD; $B = .06$, $SE = .02$, 95% CI $[.03, .10]$), moderate (mean; $B = .06$, $SE = .01$, 95% CI $[.03, .09]$), and high ($+1$ SD; $B = .05$, $SE = .01$, 95% CI $[.03, .09]$) levels of EA. The index of moderated mediation further suggests that the indirect effect of trait anger on psychological IPA perpetration did not vary as a function of level of EA. Thus, hypothesis four was not supported: the indirect effect of trait anger on IPA perpetration through heavy drinking was not moderated by EA.

Preliminary Analyses in the College Sample

Bivariate correlations were conducted in SPSS 25 and can be found in Table 5. EA was significantly related to the mediator—heavy drinking—while trait anger was not. Further, not all predictor variables were related to the dependent variable—psychological IPA perpetration. Trait anger and EA were significantly related to psychological IPA perpetration but heavy drinking was not. Thus, the assumptions for running a mediation model were not met.

Confirmatory Analyses in College Sample

Moderation of the Mediator

The first analysis tested the moderating effect of EA (moderator) on the effect of trait anger (IV) on heavy drinking (mediator), controlling for gender and neuroticism. The overall model was significant, $F(5, 206) = 3.83$, $p = .002$, $R^2 = .09$; $MSE = 17.30$. The main effect of trait anger ($B = .08$, $SE = .07$, 95% CI $[-.07, .24]$, $p = .28$) was not significant, providing evidence contrary to hypothesis one: trait anger was not associated with self-reports of higher problematic alcohol use. The main effect of EA was not significant ($B = -.001$, $SE = .01$, 95% CI $[-.02, .02]$, $p = .89$). The interaction between trait anger and EA did not predict heavy drinking ($B = -.002$, $SE = .003$, 95%

CI [-.01, .003], $p = .37$, $\Delta R^2 = .004$), thus providing a lack of evidence for hypothesis three: EA did not moderate the effect of trait anger on heavy drinking.

Direct Effects on Psychological IPA

The second analysis tested the direct effects of trait anger (IV) and heavy drinking (mediator) on psychological IPA perpetration, controlling for gender and neuroticism. The overall model was significant $F(4, 207) = 3.39$, $p = .01$, $R^2 = .06$; $MSE = 2.90$. The main effects of trait anger on psychological IPA perpetration was significant ($B = .07$, $SE = .03$, 95% CI [.01, .13], $p = .02$). Further, the main effect of heavy drinking on psychological IPA perpetration was not significant, ($B = .02$, $SE = .03$, 95% CI [-.03, .08], $p = .42$), providing a lack of evidence for hypothesis two: problematic alcohol use was not associated with psychological IPA perpetration.

Indirect Effects and Moderated Mediation of Psychological IPA

The third analysis tested whether trait anger (IV) predicted psychological IPA perpetration through heavy drinking (mediator), and whether this association varied as a function of level of EA (moderator). The index of moderated mediation—or the slope of the line relating the indirect effect to the moderator—was not significant ($B = -.0001$, $SE = .0001$, 95% CI [-.0003, .0001]). Results indicated that the indirect effect of trait anger on psychological IPA perpetration through heavy drinking was not significant at low (-1 SD; $B = .003$, $SE = .01$, 95% CI [-.01, .02]), moderate (mean; $B = .001$, $SE = .003$, 95% CI [-.004, .01]), or high (+1 SD; $B = .001$, $SE = .003$, 95% CI [-.01, .01]) levels of EA.