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INTERPERSONAL AGGRESSION PERPETRATION:  
STATIC AND EMOTION REGULATION RISK FACTORS

by

Jillian Panuzio

A DISSERTATION

Presented to the Faculty of  
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INTERPERSONAL AGGRESSION PERPETRATION:  
STATIC AND EMOTION REGULATION RISK FACTORS

Advisor: David DiLillo

Intimate partner aggression (IPA) is a serious public health problem for both men and women in the United States. With aspirations of alleviating the significant negative effects of IPA, a substantial body of literature has been devoted to uncovering risk factors for IPA perpetration. Much of this research has focused on static, or relatively stable, factors that may influence IPA, such as life stress, distress tolerance, rumination, and jealousy. However, considering situational variables that influence individuals more proximally to aggressive acts, in conjunction with these static factors, may provide more precise prediction of partner aggression. Current theoretical and empirical work suggests that emotion regulation strategies, particularly expressive suppression and cognitive reappraisal, may be key situational processes in IPA perpetration. In light of this research, this study proposes the following hypotheses: each static risk factor (life stress, distress tolerance, rumination, jealousy) will be related to interpersonal aggression perpetration, expressive suppression will be related to greater aggression perpetration than will cognitive reappraisal, and emotion regulation strategy usage will moderate the association between the static risk factors and aggression. To examine these questions, the present investigation employed an experimental design in which participants were assigned to use specific strategies to regulate negative emotions induced by a frustrating computer task. Participants then took part in an analogue aggression task involving the allocation of hot sauce to a purported other participant, followed by a self-report assessment of propensity to perpetrate IPA. Findings showed that

reduced distress tolerance and increased jealousy were associated with increased IPA propensity for both men and women. Greater rumination was also related to higher past-year IPA perpetration and increased IPA propensity for men. Participants allocated marginally significantly more hot sauce if they were assigned to suppress their emotions in response to the frustrating computer task than if they were assigned to reappraise their emotions. Emotion regulation strategy use generally did not moderate relationships between static factors and forms of IPA perpetration. The implications of these findings as well as future directions for research are discussed; clinical implications with regard to IPA perpetration intervention are highlighted.

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## Interpersonal Aggression Perpetration: Static and Emotion Regulation Risk Factors

Intimate partner aggression (IPA) can be characterized as a national epidemic, resulting in more than 21 million physical and mental health care visits per annum (National Center for Injury Prevention and Control, 2003). These alarming numbers, along with the millions of individuals directly and indirectly affected by IPA, underscore the need for a comprehensive understanding of factors that contribute to this phenomenon. To date, theoretical writings and empirical research have emphasized a variety of static factors, consisting of relatively enduring, stable constructs that may increase the risk of IPA. Within this realm, life stress, distress tolerance, rumination, and jealousy have been implicated as important contributors to aggressive behavior. Although research on these static factors has been informative, this knowledge alone has not provided a sufficiently comprehensive explanation of IPA perpetration. A more complete understanding is likely to come from additional consideration of *situational* antecedents to IPA perpetration—those factors that occur in the immediate context of aggression and have the potential to moderate the influence of more static risk factors. Although existing work addressing situational antecedents has focused on factors in the behavioral and cognitive realms, emotion regulatory processes are also likely to influence the occurrence of IPA perpetration. The proposed study addresses this possibility by examining the role of two specific emotion regulation strategies, expressive suppression and cognitive reappraisal, in moderating the relationship between known static risk factors (i.e., life stress, distress tolerance, rumination, jealousy) and IPA perpetration.

### **IPA Perpetration: Definition and Scope of the Problem**

IPA is defined as physical acts occurring between current or former spouses or dating partners that include behaviors such as hitting, kicking, and pushing (Centers for Disease

Control and Prevention [CDC], 2006). Though other terms have been used to describe this phenomenon (e.g., intimate partner violence), IPA refers to a broad range of physical behaviors encompassing relatively lower level behaviors (e.g., slapping), as well as more severe acts that are likely to result in serious injury or death (e.g., use of a gun; see Anderson & Bushman, 2002 for a discussion of the use of the terms “aggression” versus “violence”).

As noted, IPA is a serious public health problem that affects an alarming number of individuals nationwide. Population studies estimate that rates of past-year IPA perpetration range from 12% to 30% among both men and women (Caetano, Cunradi, Schafer, & Clark, 2000; Smith, Thornton, DeVelis, Earp, & Coker, 2002; Straus & Gelles, 1990). College students represent a population particularly at risk for IPA. Prevalence rates of IPA among undergraduate dating couples range from approximately 20% to 50%, percentages that are slightly higher than those documented in the general population (Cogan & Fennell, 2007; Forke, Myers, Catalozzi, & Schwartz, 2008; Nabors, 2010; Raiford, Wingood, & DiClemente, 2007; Straus, 2004). Not surprisingly, given the high frequency of this behavior, IPA is associated with great economic costs, including an estimated \$2.3 to \$7.0 billion in medical costs and \$1 billion in lost work productivity each year (Brown, Finkelstein, & Mercy, 2008; CDC, 2003). IPA between dating partners is also linked to a host of adverse psychological and physical consequences, including depression, anxiety, substance abuse, somatization, and bodily injuries, for both male and female college students (Amar & Gennaro, 2005; Bagner, Storch, & Preston, 2007; Clements, Ogle, & Sabourin, 2005; Kaura & Lohman, 2007). A meta-analysis of 82 independent samples of over 64,000 individuals suggested that men and women perpetrate IPA at similar rates (Archer, 2002). Some researchers have drawn attention to limitations in studies supporting this gender symmetry in

IPA perpetration, suggesting that typical measurement approaches have not adequately considered the context and consequences of partner aggression (e.g., whether female aggression occurs in self-defense; Anderson, 2002; Arias & Corso, 2005; Harned, 2001; Kimmel, 2002). Nevertheless, researchers agree that it is important to systematically investigate both men and women's aggression within intimate relationships (Holtzworth-Munroe, 2005; Johnson, 2006; Straus, 2011; Winstok, 2011).

### **Relationships Between Static Risk Factors and IPA Perpetration**

In light of the high frequency and negative sequelae of IPA, researchers have focused on elucidating risk factors for the occurrence of this form of aggressive behavior. These efforts have resulted in a number of models that are useful in delineating constructs that may contribute to IPA perpetration (e.g., Bell & Naugle, 2008; Finkel, 2007; Flynn & Graham, 2010; O'Leary, Slep, & O'Leary, 2007; Stith, Smith, Penn, Ward, & Tritt, 2004). Most of this research has focused on the domain of static risk factors that "...exist within the temporal proximity to the target behavior, but remain relatively stable over time and can be present when the target behavior is either absent or present" (Bell & Naugle, 2008, p. 8). Within this literature examining these more enduring conditions, four interrelated variables have emerged as particularly potent predictors of IPA perpetration. These factors are: life stress, distress tolerance, rumination, and jealousy.

**Life stress.** Life stress reflects both positive and negative events (e.g., marriage, unemployment) that result in change and require some degree of adaptation. Although the actual length of the stressor may be short (e.g., being fired from a job), the impact of an event—and multiple events in combination—may extend substantially beyond the duration of the experience. Many investigations have found that both men and women are more likely to

perpetrate general aggression and IPA during times when they are experiencing high levels of life stress (Cano & Vivian, 2001, 2003; Cunradi, Ames, & Moore, 2008; Freeman & Roca, 2001; Frye & Karney, 2006; Gershon, Barocas, Canton, Li, & Vlahov, 2009; Langer, Lawrence, & Barry, 2008; Sprague, Verona, Kalkhoff, & Kilmer, 2011). A meta-analysis synthesizing these findings yielded a moderate effect size ( $r = .26$ ) quantifying the relationship between life stress and IPA perpetration (Stith et al., 2004). Stith and colleagues point out that the experience of life stressors requires great emotional, cognitive, and social resources, leaving individuals with few available means to deal with interpartner conflict; thus, individuals under high levels of stress may default to ineffectual resolution strategies such as IPA. In support of this assertion by Stith et al. (2004), a recent study demonstrated that low levels of life stress may buffer the impact of personality characteristics that demand considerable intrapersonal resources (i.e., neuroticism) on IPA perpetration (Hellmuth & McNulty, 2008).

**Distress tolerance.** Although life stress may contribute to aggression, the way individuals respond to such stressors also is likely to play an important role. One way that this responding is reflected is in the construct of distress tolerance, which is defined as the degree of one's ability to endure and accept negative internal states in response to external stressors (Leyro, Zvolensky, Bernstein, 2010; Linehan, 1993). Previous research has linked elements of poor distress tolerance (e.g., emotional nonacceptance) with IPA perpetration (Gratz & Roemer, 2004). Distress tolerance is relatively stable (Simons & Gaher, 2005) and appears to contribute to a variety of behaviors that, like IPA perpetration, may be subsumed under the category of impulsivity. For example, poor distress tolerance is associated with alcohol problems, self-harm, and immediate gambling and smoking relapse for both men and

women (Brown, Lejuez, Kahler, & Strong, 2002; Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005; Daughters et al., 2005; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006; Nock & Mendes, 2008; Simons & Gaher, 2005; see Leyro et al., 2010 for review). Despite the mounting evidence suggesting a potential relationship between poor distress tolerance and aggressive behavior, the role of this static factor in increasing risk for IPA perpetration has not been examined directly to date.

**Rumination.** In addition to distress tolerance, rumination is another response to stressful events that may contribute to aggression. Involving a pattern of repetitive, negative thoughts, rumination has been defined as “a class of conscious thoughts that revolve around a common instrumental theme and that recur in the absence of immediate environmental demands requiring the thoughts” (Martin & Tesser, 1996, p. 12). Trigger displaced aggression theory (Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Miller, Pederson, Earleywine, & Pollack, 2003) offers one explanation for how rumination may contribute to IPA perpetration. This theory states that rumination following a stressful event maintains the negative thoughts and emotions that are closely linked to aggression. Rumination potentiates acts of IPA by maintaining this negative state for an ongoing period of time, providing an extended window for triggers unrelated to the initial aggravating event to provoke aggressive behavior. Trait rumination, as well as receiving instructions to ruminate about an annoyance, has been associated with increased aggressive behavior in several laboratory studies among both male and female participants (Bushman, 2002; Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Caprara et al., 1987; Verona, 2005). In one such study, trait rumination was positively correlated with the intensity and duration of shocks purportedly given to an “employee” (i.e., a confederate; Verona, 2005). Further, an investigation focusing on



rumination about one's intimate relationship found that this process was linked to greater self-reported aggression against objects during relationship conflict (e.g., slamming doors, hitting or throwing objects; Carson & Cupach, 2000). As noted, rumination may prime individuals for aggressive behavior through the repeated accession of angry and aggressive thoughts that often stem from venting or perseverating on negative emotions (e.g., Bushman, 2002). Supporting this notion, a meta-analysis found that rumination was a significant predictor of aggressive behavior, but only in frustrating or provoking situations (Bettencourt, Talley, Benjamin, & Valentine, 2006). Specific findings have shown that among individuals high in trait rumination, those who undergo a negative affect-inducing provocation display more aggression than those who are unprovoked (Collins & Bell, 1997). Also examining the relationship between affect and rumination, Bushman and colleagues (2005) found that negative affect was related to aggression only among participants instructed to ruminate about a situation. These studies linking rumination to various forms of interpersonal aggression provide preliminary evidence suggesting that rumination may be an important factor in predicting IPA perpetration.

**Jealousy.** For individuals in intimate relationships, rumination may take the form of repetitive thoughts about threats to the relationship—real or imagined—that give rise to feelings of jealousy. Evolutionary psychological perspectives define jealousy as an emotional response designed to protect valued relationships from loss (Buss, Larsen, Western, & Semmelroth, 1992). Elaborating on the evolutionary function of jealousy in intimate relationships, research consistently suggests that men exhibit greater jealousy regarding sexual infidelity, while women display greater jealousy regarding emotional infidelity (see Kaighobadi, Shackelford & Goetz, 2009 for review). Once exhibited, jealousy is a strong

correlate of aggressive behavior for both men and women (Archer & Webb, 2006; Holtzworth-Munroe et al., 1997; O’Leary et al., 2007; Wigman, Graham-Kevan, & Archer, 2008). Highlighting a possible direct link from jealousy to aggression, undergraduates who started an experimental task with an endearing confederate who later chose to work with another confederate displayed significantly more aggressive behavior on an analogue aggression task than participants in a non-jealousy including control condition (DeSteno, Valdesolo, & Bartlett, 2006). Collectively, these investigations provide convincing evidence suggesting a link between jealousy and IPA.

### **Emotion, Emotion Regulation, and Aggressive Behavior: Theoretical and Empirical Work**

Research focusing on static risk factors for IPA has been extremely informative in elucidating predisposing conditions, such as those discussed above, that set the stage for aggression toward a partner. However, more precise predictive models are likely to result from the additional consideration of situational factors that are relatively context-dependent, variable, and proximate to the aggressive acts (Bell & Naugle, 2008; Bogat, Levendosky, & von Eye, 2005; Finkel, 2007; Holtzworth-Munroe & Meehan, 2004; Wilkinson & Hamerschlag, 2005). Stable, predisposing risk factors may translate into aggressive behavior in the presence of situational factors that prompt or impede aggression, while the same static factors, in conditions absent of similar situational variables, may not give rise to aggression (see Finkel, 2007). Indeed, models of IPA that have included both static and situational risk factors evidence greater predictive ability than models including static factors alone (Riggs & O’Leary, 1989, 1996; White, Merrill, & Koss, 2001).

Research on situational antecedents of aggression points to several factors important to understanding IPA perpetration. In the behavioral realm, alcohol intoxication has been found to enhance risk for IPA perpetration (see Klostermann & Fals-Stewart, 2006 for review), while at the cognitive level, anger-related cognitive distortions (Eckhardt & Jamison, 2002; Eckhardt, Jamison, & Watts, 2002) and social information processing deficits (see Holtzworth-Munroe, 1992 for review) are mechanisms that may lead to increased aggression. In addition to these behavioral and cognitive mechanisms, it is likely that immediate *emotional* processes exert an influence on IPA perpetration. However, to date, research on such factors only has examined links between enduring levels of specific emotions (e.g., anger, jealousy) and IPA perpetration (e.g., O’Leary et al., 2007). Beyond the experience of *trait* emotional tendencies, a number of theorists have postulated that *state* negative affect directly contributes to aggressive behavior (Anderson & Bushman, 2002; Bell & Baron, 1990; Berkowitz, 1989, 1990, 1994). For example, in his influential Cognitive Neoassociationist (CN) model, Berkowitz (1989, 1990) posits a central role of negative affect in the etiology of aggressive behavior, maintaining that the two are connected to internal networks containing “fight” associations. When an individual experiences negative affect following a stressor, this joint emotion-aggression network is activated, setting in motion “fight” responses and increasing propensity for aggressive behavior. Importantly, this theory implies that a stressful event does not have to evoke anger to lead to aggression, but rather may result in aggressive behavior through associations with increased global negative affect. According to this model, then, global negative affect serves as the mechanism through which stressful events lead to aggression. Another tenet of the CN model is that the experience of more prolonged and/or intense negative affect potentiates aggressive behavior by increasing

the likelihood that the emotion-aggression networks will be activated. Providing empirical support for the CN model are a number of empirical investigations that have demonstrated direct links between negative affect following stressors and aggressive behavior (e.g., Pedersen, 2006; Story, Karney, Lawrence, & Bradbury, 2004; Verona & Curtin, 2006). In one such study, participants imitated shocks to a purported confederate more quickly when they experienced a negative affect-inducing stressor (i.e., an air blast to the neck) than when they did not experience the stressor (Verona, Patrick, & Lang, 2002).

Although the CN model has great utility for describing the relationship between negative affect and aggression, it does not offer an explanation for the lack of universality in this linkage. Individual differences in aggression not explained by the CN model suggest the possibility of additional processes that serve to govern the relationship between negative affect and aggressive behavior. Indeed, in later revisions of the CN model, Berkowitz (1994) noted that, “if higher order cognitive processes are engaged that restrain these more primitive associations, then the aggressive behavior may not be emitted” (p. 2). According to this notion, a more comprehensive understanding of IPA might emerge from considering the mechanisms that account for individual differences in the association between negative affect and behavior.

Consistent with Berkowitz’s (1994) assertion, one type of higher order cognitive process—the *regulation* of emotions—is a promising candidate for a mechanism that may moderate the affect-aggression relationship. Indeed, Gross (1998b, 2002; Gross & Barrett, 2011) has suggested that negative affect is not the sole mechanism that leads to subsequent behavior. Rather, he notes that it is these emotions *in conjunction with* the way one addresses them that call forth specific response tendencies (i.e., coordinated sets of behavioral,

experiential, and physiological responses) that determine how individuals proceed. These responses, known as *emotion regulation*, refer to “the process by which we influence which emotions we have, when we have them, and how we experience and express them” (Gross, 2002, p. 275). The two most commonly studied emotion regulatory strategies are expressive suppression and cognitive reappraisal. Expressive suppression involves inhibiting emotional expression when an emotion is stimulated, while cognitive reappraisal is the process of construing an emotion-invoking situation in a non-emotional way (Gross, 1998b). These strategies are said to impact the emotional experience at different points along the continuum of emotional processing. Specifically, suppression is response-focused and influences emotional response tendencies after they have been activated. Alternatively, reappraisal is antecedent-focused and influences emotional response tendencies before an emotion has been fully activated (Gross, 1998b, 2002).

In a series of studies instructing participants to use either suppression or reappraisal in response to a stressor, as well as investigations examining self-reported emotion regulation strategy use, Gross and colleagues have consistently found that suppression is associated with a host of maladaptive outcomes, whereas reappraisal is linked to more positive consequences, for both men and women (see Gross, 2002 for review). Specifically, suppression is associated with broad deficits in interpersonal functioning, including decreased memory for objective conversation details, increased memory for in-conversation emotional reactions, poorer social partner rapport, less social sharing of emotions, more discomfort with relationship closeness, lower levels of relationship intimacy, less received social support, lower satisfaction with social relationships, and increased partner blood pressure (Butler et al., 2003; Gross & John, 2003; Richards, Butler, & Gross, 2003;

Srivastava, Tamir, McGonigal, John, & Gross, 2009). These investigations also reveal that reappraisal is linked with improved functioning in each of these social areas. Likewise, in the emotional realm, suppression has been associated with less expression but greater experience of emotions (Ehring, Tuschen-Caffier, Schnulle, Fisher, & Gross, 2010; Dalgleish, Yiend, Schweizer, & Dunn, 2009; Gross, 1998a; Gross & John, 2003; Harris, 2001) and may ultimately contribute to increased negative emotions long-term (John & Gross, 2004). Conversely, reappraisal has been connected to less negative emotion experience and increased mood repair success (John & Gross, 2004; Mauss, Cook, Cheng, & Gross, 2007). With respect to cognitive impacts of these strategies, suppression has been associated with memory deficits (Bonanno, Papa, O'Neill, Westphal, & Goifman, 2004; Richards & Gross, 2000), while reappraisal has been linked to improved memory (Richards et al, 2003; Richards & Gross, 2000). Finally, in the physiological realm, the use of suppression is associated with poorer autonomic functioning and slower prefrontal cortex responding while the use of reappraisal has been linked to superior outcomes in these areas (Butler et al., 2003; Goldin, McRae, Ramel, & Gross, 2008; Gross & Levenson, 1997; Harris, 2001; Hofmann, Heering, Sawyer, & Asnaani, 2009; Mauss et al., 2007).

### **The Use of Suppression and Reappraisal: Implications for IPA Perpetration**

Interestingly, the very same social, emotional, cognitive, and physiological processes that characterize the differences between suppression and reappraisal are among those implicated in the link between emotion regulation strategy use and IPA perpetration. In the social realm, for example, evidence overwhelmingly suggests that suppression is linked to social relationship difficulties in multiple domains, such as increased social anxiety, greater disruptions in communication, lower social support, lesser intimacy, and lower social

satisfaction (Butler et al., 2003; McLean, Miller, & Hope, 2007; Srivastava et al., 2009). These findings may have important implications for aggressive behavior, as poor intimate relationship quality is one of the most robust risk factors for IPA perpetration (see Stith et al., 2004). Thus, suppression may be associated with globally lower-functioning relationships characterized by relationship conflict and limited success in resolving such conflicts situationally, potentially increasing the likelihood of IPA perpetration. In contrast, reappraisal is linked to more adaptive social functioning, which likely is indicative of less interpartner conflict and, accordingly, fewer situations where IPA may arise.

Findings that individuals who use suppression spend more time in the throes of negative emotions (e.g., Gross, 1998a) have important implications for IPA perpetration. Indeed, according to the CN model, when negative affect is robust and lasting, emotion-aggression networks are more likely to be strongly activated. Empirically, emotional inexpressivity, a hallmark feature of suppression, has been found to uniquely predict aggression perpetration (Tull, Jakupcak, Paulson, & Gratz, 2007). On the other hand, reappraisal has been linked to less experience of negative emotion and improved ability to self-soothe negative mood (e.g., John & Gross, 2004), which may lessen the likelihood that these emotion-aggression networks will be activated, leading to decreased IPA perpetration.

Linkages between suppression use and decreased memory for event details (e.g., Richards & Gross, 2000) suggest that this strategy requires extensive cognitive resources, to maintain a constant focus on monitoring and dampening emotional expression required of suppression use (Bonanno et al., 2004; Gross, 2002). The cognitive demands of suppression may leave few resources for engaging in other tasks, such as social problem solving, a deficit that has been linked to IPA perpetration (Boyle & Vivian, 1996; Feldman & Ridley, 2000;

Fite et al., 2008; Holtzworth-Munroe, 1992). Thus, when faced with common stressors (e.g., relationship conflict) individuals who suppress may default to a maladaptive problem solving approach, such as IPA, in the absence of the resources to generate a more socially skilled solution. Conversely, reappraisal does not require these continual cognitive efforts, likely leaving problem solving abilities intact and lessening the likelihood that aggression will be employed in response to difficulties. The use of reappraisal may facilitate problem solving and decision making in a particular moment by reducing negative affect to allow effective brainstorming and planning to occur (see Aldao & Nolen-Hoeksema, 2010; Fladung, Baron, Gunst, & Kiefer, 2010; Heilman, Crisan, Houser, Miclea, Miu, 2010).

Finally, findings demonstrating that increased physiological arousal accompanies both suppression (e.g., Butler et al., 2003) and aggressive behavior (Anderson & Bushman, 2002; Bell & Baron, 1990; Lindsay & Anderson, 2000) suggest that this strategy may be associated with greater IPA perpetration through increased physiological reactivity.

Specifically, the dampened autonomic nervous system and prefrontal cortex functioning characteristic of individuals using suppression may contribute to aggressive behavior in the moment, as these same physiological processes underlie, and may potentiate, aggressive behavior (Patrick & Verona, 2007). In contrast, reappraisal, which is associated with less physiological activation (e.g., Mauss et al., 2007), may be negatively related to IPA perpetration.

### **Moderating IPA Perpetration: Interactions Between Static Risk Factors and Emotion Regulation**

The theoretical and empirical evidence described above suggests direct relationships between a set of interrelated static factors (life stress, distress tolerance, rumination, and



jealousy) and IPA perpetration, as well as between situational factors (suppression and reappraisal use) and aggressive acts. There is additional support for the possibility that these static and situational factors interact to impact aggression. The combination of these factors may be especially potent in predicting partner aggressive behavior. Delineated below are rationales for ways in which suppression and reappraisal may moderate the influence of the static factors on IPA perpetration.

**Life stress.** The experience of life stress often generates increased negative affect (Colder, 2001; Moberly & Watkins, 2008). Thus, the manner in which an individual regulates stress-related negative emotions may have implications for aggressive behavior. Specifically, propensity towards IPA perpetration during high-stress periods may be even greater when an individual employs suppression to address negative emotions. Indeed, studies suggest that greater stress may impede effective regulation of emotions (Connelly & Denney, 2007), which may involve more reliance on suppression and/or less use of reappraisal. When suppression is used to address negative stress-related emotions, individuals may be less able to control those emotions, thereby increasing the possibility of emotion-aggression network activation. Individuals using reappraisal may not evidence these difficulties given their use of a strategy that may help to keep stressor-related negative emotions in check. Consistent with this view, women experiencing high levels of stress who also showed high ability to engage in reappraisal report less depression than women with similar levels of stress who demonstrated less reappraisal skill (Troy, Wilhelm, Shallcross, & Mauss, 2010).

**Distress tolerance.** Distress tolerance also may interact with poor emotion regulation to potentiate aggression. Specifically, low distress tolerance, like suppression, is linked to

increased negative affect (Simons, Gaher, Oliver, Bush, & Palmer, 2005), suggesting individuals with low distress tolerance who use suppression may be especially vulnerable to negative emotions and thus more likely to experience activation of emotion-aggression networks. Poor distress tolerance is also associated with deficits in social problem solving (Linehan, 1993; Nock & Mendes, 2008), which has been suggested as a causal mechanism in IPA perpetration (e.g., Holtzworth-Munroe, 1992). Thus, individuals who lack the ability to endure and manage negative stress-related emotions and also engage in suppression have a high risk for IPA perpetration. Conversely, individuals high in distress tolerance who use reappraisal may evidence less aggressive behavior because they are able to address negative emotions by viewing a difficult situation in a less negative way at its onset. Demonstrating this possibility, undergraduate students with moderate or higher state anger who were asked to reappraise anger were able to endure a frustrating task significantly longer than those who were asked to suppress or accept this emotion (Szasz, Szentagotai, Hofmann, 2011). The use of reappraisal is also linked to greater acceptance of ambiguity, a form of distress tolerance (Yurtsever, 2008), and prior work suggests that increased comfort with ambiguous stimuli may be associated with lesser aggressive behavior (DeWall, Twenge, Gitter, & Baumeister, 2009).

**Rumination.** In light of the increased negative affect that accompanies rumination (Bushman, 2002; Verona, 2005; Miller et al., 2003), it is not surprising that rumination appears to play a powerful role in determining aggressive behavior when negative affect is high (Bushman et al., 2005; Collins & Bell, 1997). As noted, negative affect facilitates the expression of aggression in the presence of rumination. Thus, the presence of both rumination and suppression may potentiate the effects of each of these processes on IPA

perpetration. Like suppression, rumination may exacerbate negative affect, thus raising the probability of affect-aggression network activation. Again like suppression, rumination is a process that requires great cognitive resources. Thus, when occurring together, the repetitive, intrusive thoughts associated with high trait rumination in combination with suppression of negative affect may place extreme demands on effective problem solving and management of conflicts, increasing the risk of aggressive responding. In the only known investigation to examine suppression and rumination simultaneously, Moore, Zoellner, and Mollenholt (2008) found that rumination partially mediated the positive association between suppression and various forms of psychological distress, again suggesting that there may be similar mechanisms in place for rumination and suppression. Conversely, high trait rumination in the presence of reappraisal should result in relatively more effective efforts to down-regulate negative affect leading to aggression. Indeed, when individuals who have a greater tendency to ruminate are instructed to reappraise, they appear to experience reductions in focus on their own negative thoughts and emotions (Ray et al., 2005).

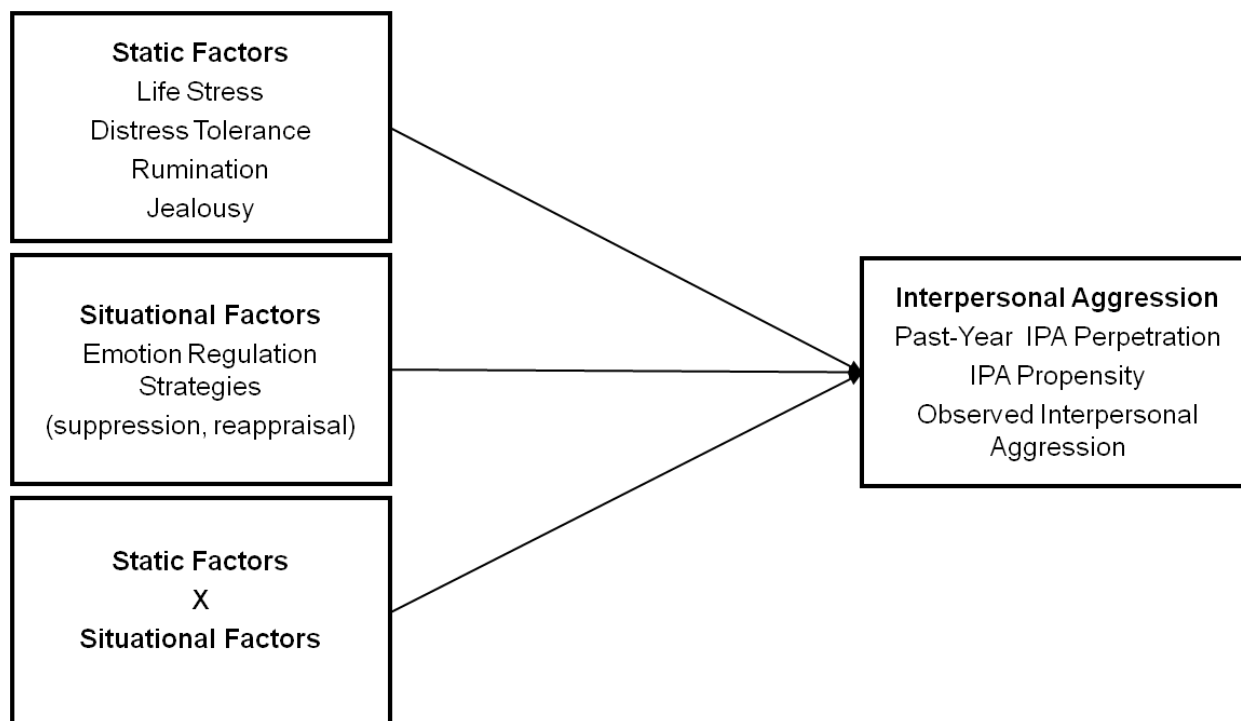
**Jealousy.** Beyond its general association with IPA perpetration, jealousy may interact with the emotion regulation strategies to moderate aggressive behavior. Although suppression may *increase* negative affect, jealousy itself is usually experienced as a state of strong negative affect (Berscheid & Ammazzalorso, 2004), prompting attempts to down-regulate these responses. Partially explaining the negative affectual component of jealousy is its strong ruminative component (Carson & Cupach, 2000; Schutzwahl, 2006), which serves to fuel negative feelings via the repeated accession of thoughts of relationship security. Because of its ruminative nature, jealousy and its associated negative emotions are likely to be maintained through continual thoughts of perceived or actual threats (Carson & Cupach,

2000). When jealousy is met with the use of suppression, risk for IPA perpetration may be heightened, as the ongoing presence of intense jealousy and related negative affect may be exceptionally likely to activate the affect-aggression network. Conversely, jealousy that is combated with attempts to reappraise likely will result in more efficient use of emotion regulatory resources and thus reduce the likelihood of IPA occurrence. For example, if an individual high in trait jealousy attempts to construe a jealousy-eliciting situation in a neutral light when faced with this event, he or she may experience reduced negative affect, subsequently reducing the likelihood of elevating jealousy and the risk of IPA perpetration.

### **Summary and Aims of the Proposed Study**

The literature synthesized above suggests the conceptual model underlying the aims of this project (see Figure 1). Based on research suggesting that both static and situational variables contribute to risk for IPA perpetration (e.g., Bell & Naugle, 2008; Riggs & O’Leary, 1996), direct associations between both static (see top box) and situational (see middle box) risk factors for IPA will be examined. Specifically, four interrelated static factors will be investigated in light of existing research suggesting that increased life stress, decreased distress tolerance, increased rumination, and increased jealousy will be associated with increased aggression (e.g., Bettencourt et al., 2006; Frye & Karney, 2006; O’Leary et al., 2007; Simons et al., 2005). With regard to situational factors, the role of the emotion regulation strategies of suppression and reappraisal following induced negative affect in increasing or decreasing aggression will be explored. Consistent with ideas presented in past theoretical and empirical work (e.g., Gross, 1998b, 2002), suppression is expected to be associated with greater, while reappraisal is expected to be associated with lesser, aggressive behavior. Static and situational variables are expected to interact in predicting aggression

(see bottom box). The use of expressive suppression is expected to potentiate the impact of the static risk factors on aggression, while use of cognitive reappraisal is expected to attenuate these effects. Aggression will be assessed via a self-report measure of past IPA perpetration, an *in vivo* measure of IPA propensity, and an *in vivo* measure of observed interpersonal aggression (see right-hand box).



*Figure 1.* Conceptual model describing hypothesized interrelationships among constructs of interest in the present study.

The conceptual model presented above is supported by two separate but complimentary theoretical frameworks. The CN model provides a basic structure for the affect-aggression relationship, while the integration of emotion regulation theory provides an explanation for individual differences in this association. Within the broader aggression framework, literature suggests that relatively static factors such as life stress, distress tolerance, rumination, and jealousy set the stage for aggression, while situational factors like

emotion regulation strategy use are likely to modify those effects, augmenting or decreasing the risk for aggressive behavior in the moment. In light of the prior theoretical and empirical literature supporting these propositions, the following aims and associated hypotheses are proposed.

**Aim 1: Investigate the relationship between static risk factors and interpersonal aggression perpetration.** The first aim of this study is addressed by Hypothesis 1: Increased life stress, decreased distress tolerance, increased rumination, and increased jealousy will be associated with greater interpersonal aggression perpetration.

**Aim 2: Investigate the relationship between emotion regulation strategy use and interpersonal aggression perpetration.** Aim 2 of this investigation will be examined with Hypothesis 2: Participants instructed to use suppression will demonstrate increased interpersonal aggression compared to participants using reappraisal, whereas participants instructed to use reappraisal will demonstrate decreased interpersonal aggression compared to participants using suppression.

**Aim 3: Examine the interaction between static risk factors and emotion regulation strategy use in predicting interpersonal aggression perpetration.** This aim will be addressed by Hypothesis 3: Associations between increased life stress, decreased distress tolerance, increased rumination, and increased jealousy and increased interpersonal aggression will be *enhanced* by the use of suppression, whereas reappraisal will *attenuate* associations between increased life stress, decreased distress tolerance, increased rumination, and increased jealousy and increased interpersonal aggression.

## Method

### Design Overview

This investigation employed a between-subjects design to examine the role of static (life stress, distress tolerance, rumination, and jealousy) and situational (emotion regulation strategy use) risk factors in contributing to aggression perpetration. The static variables, along with habitual emotion regulation strategy use and history of IPA perpetration, were assessed via self-report questionnaires. *In vivo* emotion regulation strategy was experimentally manipulated during a laboratory task designed to generate negative affect. Specifically, participants were randomly assigned to use suppression or reappraisal in response to a frustrating computer task—the Modified Paced Auditory Serial Addition Task (PASAT; Lejuez, Kahler, & Brown, 2003). Randomizing participants to either suppress or reappraise in response to the PASAT increases internal validity and allows for the inference of causal relationships between emotion regulatory processes and aggression outcomes.

Regarding the generation of negative affect, the PASAT was selected because it confers several benefits over other procedures. In particular, this task raises participant distress in multiple (i.e., behavioral, cognitive, and physiological) domains, as opposed to the one or two areas impacted by other potential tasks (Lejuez et al., 2003). Further, the PASAT requires active engagement, limiting the possibility that participants can extricate their attention from an unpleasant mood induction, such as a negative film. In addition, while films have limited success in inducing anger (Rottenberg, Ray, & Gross, 2007), which is a significant component of negative affect and is linked to aggression, the PASAT has been shown to increase this specific emotion (Brown et al., 2002; Lejuez et al., 2003).

The outcome of interest in the present study is intimate partner aggression perpetration. To maximize the ability to examine this outcome, IPA was assessed via two means: a self-report measure of past-year IPA perpetration (Revised Conflict Tactics Scale;

CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) and a self-report measure of *in vivo* likelihood to engage in IPA following the PASAT task (i.e., IPA propensity; Proximal Antecedents to Violent Episodes scale; PAVE; Babcock, Costa, Green, & Eckhardt, 2004). In addition to being easy to administer, both questionnaires possess strong psychometric properties, and the CTS2 is the most widely used measure of IPA. Nevertheless, self-report measures of IPA are potentially limited by social desirability bias and memory limitations (Bell & Naugle, 2007; Fals-Stewart, Golden, & Schumacher, 2003). Though it is not possible to replicate IPA in the laboratory, paradigms for assessing general interpersonal aggression *in vivo* can address the limitations of self-report IPA perpetration assessment. Employed here is one such procedure—the hot sauce allocation task (Lieberman, Solomon, Greenberg, & McGregor, 1999). In this task, participants are asked to allot a self-selected amount of hot sauce, ostensibly to be consumed by another participant (in reality, there is no other participant); the weight of the designated hot sauce serves as a proxy for aggression perpetration. This task has been used as an analogue measure of aggression in a number of empirical investigations and offers several advantages over self-report assessments of aggression (Ritter & Eslea, 2005). Laboratory tasks typically are not subject to social desirability effects given their reduced face validity. Further, observational assessment of aggression is not affected by the memory and recall biases that plague self-reports of such acts. Employing both self-report and observational measures allows for the most comprehensive assessment of aggressive behavior, while capitalizing on the strengths of both methodologies.

Given the multiple methods of assessment of interpersonal aggression, the use of terminology bears note. The CTS2 and PAVE are IPA-specific measures and will be referred



to as such when mentioned alone. However, the hot sauce allocation task is not specific to intimate partners and will be referred to as interpersonal aggression. Collectively, all three tasks fall under the larger umbrella of interpersonal aggression perpetration.

### **Participants**

Participants were 197 undergraduate students (99 men, 98 women) who had been in an intimate relationship for one month or longer. Almost all participants identified as heterosexual (96.0%), while 2.0% identified as bisexual and 2.0% identified as homosexual. Both males and females were included, as college students of both genders have been found to perpetrate IPA at similar rates (e.g., Straus & Ramirez, 2007). Regarding race/ethnicity, 171 (86.8%) participants identified as European American, 14 (7.1%) identified as Asian or Asian American, 12 (6.1%) identified as Latino or Hispanic, 6 (3.0%) identified as African American or Black, 3 (1.5%) identified as Native Hawaiian or Pacific Islander, 1 (0.5%) identified as American Indian or Alaskan Native, and 3 (1.5%) identified as “other”. Mean participant age was 20.55 ( $SD = 3.55$ ; range 18-51 years). Participants were distributed across year in school, with 81 (41.1%) freshman, 42 (21.3%) sophomores, 40 (20.3%) juniors, 33 (16.8%) seniors, and 1 (0.5%) graduate student. Approximately two-thirds (67.5%) of participants reported that they were living with roommates, and 10.2% of participants reported that they were living with their partners. Other living situations included living alone (9.1%), living with parents (9.1%), living with other family members (3.1%), and living in other situations (1.0%).

The majority of participants reported that they were single and never married (92.4%), while 4.1% were married, 3.0% were engaged to be married, and 0.5% were separated or divorced. Participants reported that they had been in a relationship for a

minimum of two months, and the mean relationship length was 21.06 months ( $SD = 36.26$ ; range 2 – 366 months). Most participants (91.9%) reported communicating with their partner more than once per day, while 5.4% reported communicating with their partner once per day, and 2.7% reported communication 4-6 times per week. Of all participants, 29.7% reported that they were in a relationship that they characterized as “long distance,” while the remaining 70.3% stated that they were not in a long distance relationship. Participants in a long distance relationship reported living apart from their partner for an average of 11.45 months ( $SD = 11.34$ , range 0 – 48 months) and living an average of 497.69 miles away from their partner ( $Mdn = 180.00$ ;  $SD = 1037.15$ , range 35 – 7000). The majority of male participants reported that their relationships were with female partners (97.6%); similarly, the majority of female participants reported that their relationships were with male partners (98.8%).

### Measures

Three classes of measures were employed to assess: a) static risk factors, b) mood and emotion regulation strategy variables, and c) aggression variables. All questionnaires are included in Appendix A. This study employed multimodal assessment through the use of self-report and laboratory tasks.

### Assessment of Static Risk Factors

**Life stress.** Life stress was measured using the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978), a 57-item self-report measure that assesses a range of positive and negative stressful life events (see Appendix A). Respondents endorse events that they have experienced a) 0 to 6 months and b) 7 to 12 months prior to questionnaire completion. For each positively endorsed item, respondents indicate the extent to which the

event had a positive or negative impact on their life on a scale ranging from -3 (strongly negative) to +3 (strongly positive). The LES was supplemented with items from the 54-question College Chronic Life Stress Survey (CCLSS; Towbes & Cohen, 1996), which contains stressors unique to undergraduate students. Prior work has established the test-retest reliability and construct validity of both measures among multiple samples of undergraduate students (Sarason et al., 1978; Short, 2002; Towbes & Cohen, 1996). The internal consistency reliability for the combined LES and CCLSS in the present study was .80.

**Distress tolerance.** Distress tolerance was assessed via the Distress Tolerance Scale (DTS; Simons & Gaher, 2005; see Appendix A). The DTS is a 14-item self-report measure designed to assess the perceived ability to withstand negative emotions. Responses are given on a scale ranging from 1 (strongly agree) to 5 (strongly disagree). The measure includes four subscales: tolerance (ability to tolerate emotions), appraisal (evaluation of emotion-laden situations), absorption (attention demanded by and functional impairment associated with negative affect), and regulation (ability to regulate emotions). The DTS has excellent internal consistency reliability, strong test-retest reliability, and good convergent and discriminant validity among college students (Simons & Gaher, 2005; Simons et al., 2005). Internal consistency for the DTS in the present study was .87.

**Rumination.** Rumination was measured using the Rumination and Reflection Questionnaire Rumination subscale (RRQ; Trapnell & Campbell, 1999; see Appendix A). This subscale includes 12 items designed to assess general ruminative tendencies. Respondents indicate their level of agreement with each item on a scale from 1 (strongly disagree) to 5 (strongly agree). The RRQ has excellent psychometric properties, including convergent and discriminant validity and internal consistency reliability, among

undergraduate and clinical populations (Borders, Barnwell, & Earleywine, 2007; Joireman, Parrott, Hammersla, 2002; Trapnell & Campbell, 1999). The internal consistency of the RRQ in the present study was .90.

**Jealousy.** Jealousy was assessed using the Interpersonal Jealousy Scale (IJS; Mathes & Severa, 1981; see Appendix A). The IJS is a 27-item measure that yields a single score reflecting overall trait jealousy. Responses are given on a scale ranging from 1 (absolutely false/disagree completely) to 9 (absolutely true/agree completely). The IJS has strong internal consistency reliability and convergent validity (Dutton, van Ginkel, & Landolt, 1996; Rotenberg, Shewchuk, & Kimberly, 2001). Internal consistency for the IJS in the present study was .90.

#### **Assessment of Mood and Emotion Regulation Strategy Variables**

These measures are aimed at assessing habitual methods of responding to negative emotions, as well as *in vivo* experiences of specific emotions and use of randomly assigned strategies in response to the negative mood induction.

**Habitual use of emotion regulation strategies.** Habitual emotion regulation strategies use was assessed with the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), a 10-item self-report measure designed to assess habitual use of suppression and reappraisal (see Appendix A). Respondents indicate the degree to which they agree with each item on a scale from 1 (strongly disagree) to 7 (strongly agree). The ERQ, which was developed among undergraduate students, has good internal consistency and test-retest reliability, as well as strong convergent and discriminant validity in this population (Gross & John, 2003; John & Gross, 2004). The internal consistency reliability estimate for the ERQ in the present study was .75 for suppression and .80 for reappraisal.

***In vivo* emotion regulation.** Participants' use of their assigned emotion regulation strategy was assessed using a measure based on the ERQ (Gross & John, 2003). Like the ERQ, this six-item measure (Egloff, Schmukle, Burns, & Schwerdtfeger, 2006; see Appendix A) consists of two subscales: suppression (e.g., *During the situation, I showed my emotions*) and reappraisal (e.g., *I tried to see the situation as positive as possible*). Respondents indicate the degree to which they used each strategy on a scale from 0 (not at all) to 5 (extremely). The authors reporting good internal consistency, test-retest reliability, and excellent validity with an undergraduate sample (Egloff et al., 2006). However, internal consistency coefficients in the present study were .72 and .20 for suppression and reappraisal, respectively. The unexpectedly low alpha produced by the reappraisal subscale was explored by examining the intercorrelations among the three subscale items (Item 1: *I tried to see the computer task as positive as possible*; Item 2: *I viewed the computer task as a challenge*; Item 3: *I thought of the computer task in a way that made me stay calm*). The correlations between these items were as follows: Items 1 and 2:  $r = .34$ , Items 1 and 3:  $r = .07$ , and Items 2 and 3:  $r = .13$ .

### **Assessment of Interpersonal Aggression**

**History of IPA perpetration.** History of IPA was assessed via the 12-item Physical Assault subscale from the Revised Conflict Tactics Scale (CTS2; Straus et al., 1996; see Appendix A). Participants indicate the frequency at which they perpetrated each behavior against an intimate partner in a) the past year, and b) the past month using a scale ranging from 1 (never) to 8 (more than 20 times). The CTS2 is the most widely used measure of IPA (Langhinrichsen-Rohling, 2005) and has adequate reliability and good construct validity (Newton, Connelly, & Landsverk, 2001; Straus et al., 1996). Because the acts assessed by the

CTS2 are not necessarily interdependent (e.g., less and more severe acts do not necessarily go hand-in-hand), traditional indices of internal consistency, including coefficient alpha, are not applicable for this measure.

***In vivo* IPA propensity.** IPA propensity was assessed with the Proximal Antecedents to Violent Episodes scale (PAVE; Babcock et al., 2004; see Appendix A). The PAVE is a 20-item measure of responses to situations that may result in IPA perpetration. Responses are given on a scale from 1 (not at all likely) to 6 (extremely likely). For this study, the instructions for the PAVE were modified to assess how likely the respondent would be to perpetrate IPA if each incident described in the measure occurred at the time of questionnaire completion. This measure has excellent internal consistency reliability, as well as strong convergent and discriminant validity (Babcock et al., 2004). The internal consistency reliability estimate for the PAVE in the present study was .96.

***In vivo* interpersonal aggression.** *In vivo* interpersonal aggression was assessed using the hot sauce allocation task (Lieberman et al., 1999), an analogue measure of aggressive behavior. In accordance with procedures outlined by Lieberman and colleagues (1999), participants were asked to assist with another study on taste preferences. Participants were provided with information that a purported “participant” who does not like spicy foods will consume the hot sauce. The gender of this target participant was identified on this information sheet as well. As part of the task, the study research assistant asked participants to place a quantity of hot sauce into a cup and then to cover the cup with a lid and place it on a shelf. Participants were informed that “any amount of hot sauce is fine” and to “put in as much or as little as you want.” Participants were reminded that the other “participant” will subsequently consume the entire quantity of hot sauce. The weight of the distributed hot

sauce serves as the dependent variable. The hot sauce allocation task has been used as an analogue measure of aggression in a number of empirical investigations, mainly among undergraduate students (see Ritter & Eslea, 2005 for review). In support of its convergent validity, hot sauce allocation amounts have been positively correlated with measures of hostility and physical assault (McGregor et al., 1998). In addition, a number of participants noted during one study's debriefing that they "intended to cause discomfort to the participant" when choosing the amount of hot sauce to allocate. The ecological validity of this task is supported by a number of real world incidents (Buckholtz, 2004; Latina, 2008; Lehman, 2007; Rock, 2007) in which hot sauce has been used aggressively (e.g., punishing a child by forcing hot sauce consumption).

Several factors led to the decision to use this task as a measure of aggression. For instance, hot sauce provided as part of the task is not easily interpreted as competitive, instructive, or retaliatory behavior, whereas behavioral responses in other common aggression paradigms (e.g., reaction-time aggression tasks, teacher-learner tasks) may be attributed to mechanisms other than aggressive intent. Further, responses to this task are likely not derived from experimental demands, as the instructions provide clear options permitting a range of responses, including non-aggressive action. In most other aggression paradigms, taking part in the experiment requires some form of aggressive behavior.

### **Procedures**

All procedures were approved by the University of Nebraska – Lincoln Institutional Review Board (see approval letter in Appendix B).

**Recruitment.** Participants were recruited for a study of students in relationships via a participant management web site (Experimetrix) that links students in undergraduate

Psychology courses that offer credit for research participation and research study investigators. The study was described as “a research study about life experiences, emotions, and problem solving.” The web site also informed potential participants that they would complete questionnaires and a computer task as part of their involvement, which would take up to 1.5 hours. Students received three credits for completing this study, consistent with the university policy of one credit per half hour of average study participation time. Figure 2 provides a flow chart detailing the order of study procedures.

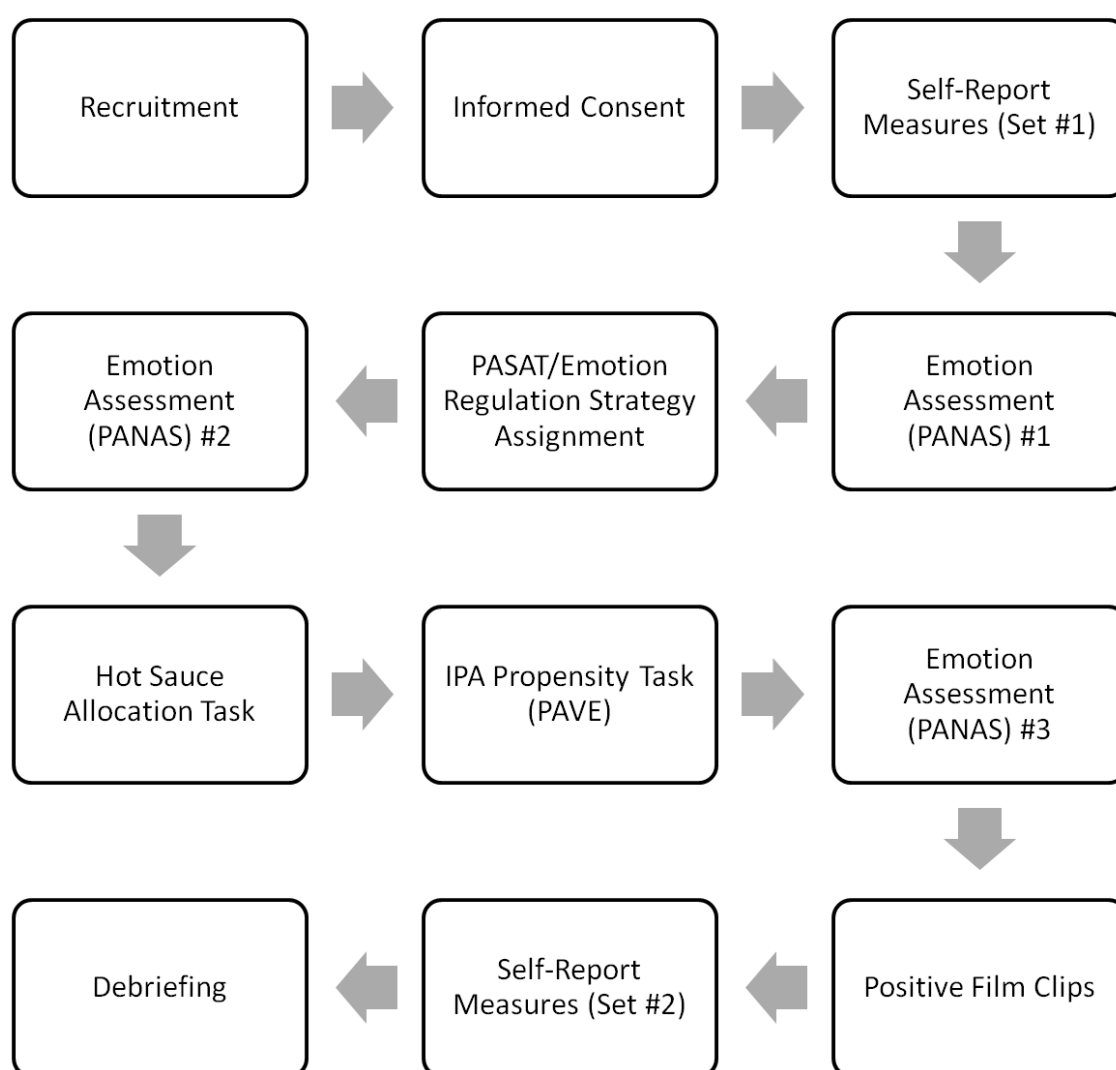


Figure 2. Flow chart describing the procedures of the present study.



**Informed consent and self-report measures.** All participants were provided verbal information about the study, then read and signed an informed consent form (see Appendix C). Individuals who provided written consent then completed self-report questionnaires assessing static risk factors, habitual emotion regulation strategy use, and history of IPA perpetration via computer. These measures were presented in a randomized order.

**Mood induction.** After completing the questionnaires, participants began the mood induction task sequence. The first step in this process involved random assignment of participants to one of two emotion regulation strategy conditions (suppression or reappraisal) to be used in response to the negative mood induction. Random assignment was stratified by gender to facilitate the examination of gender differences. Specifically, among male participants ( $n = 99$ ), 49 were assigned to the suppression condition and 50 were assigned to the reappraisal condition. Among female participants ( $n = 98$ ), 49 were assigned to each of the emotion regulation strategy conditions. Participants in the suppression condition received instructions to try their best not to let any emotions or feelings that they have while doing the task show and to act in a way so that someone watching them would not know that they were feeling anything at all. Those in the reappraisal condition received instructions to think of the positive aspects of the task, to view it as a game or a challenge, and to think of it in a less negative way (see Appendix D for complete instructions). A digital video camera was present during the mood induction, and participants were informed that they were being recorded so that study staff can see how they respond to the task (however, these recordings were not saved, nor were participants actually viewed during the procedure).

Negative mood was induced via the Modified Paced Auditory Serial Addition Task (PASAT; Lejuez et al., 2003). The PASAT is a computer task in which participants solve a

series of simple addition problems. For each correct response, points are awarded; for each incorrect response or non-response, participants hear an explosion sound, and the score does not change. Latencies between problems become increasingly shorter until participants find it nearly impossible to respond correctly within the allotted time. Multiple investigations attest to college students' ability to adhere to similar instructions (Butler et al., 2003; Gross, 1998a; Gross & Levenson, 1993; Richards et al., 2003).

The PASAT has been used in a number of studies to induce negative mood among a variety of populations, including undergraduate students (e.g., Daughters et al., 2005; Feldner, Leen-Feldner, Zvolensky, & Lejuez, 2006; Gratz et al., 2006; Lejuez et al., 2003). The completion of the PASAT has been found to induce moderate, short-term (i.e., 5 to 10 minutes) levels of emotional distress (Brown et al., 2002; Lejuez et al., 2003). Further, participants rate the task as distressing (3.7 on a 5.0 scale, ranging from not at all to extremely; Gratz et al., 2006). After completing the PASAT, all participants were given negative feedback about their performance (i.e., told that they scored in the bottom 20<sup>th</sup> percentile), to reinforce negative mood consistently.

Two checks were employed to ensure that: a) the mood manipulation (described above) was successful in inducing negative mood, and; b) participants adhered to the emotion regulation strategy instructions. Regarding the mood manipulation, participants completed a modified version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix A) immediately pre- and post-mood induction, as well as immediately after the final aggression assessment, to assess the expected increase in negative affect resulting from the task. The PANAS is a 20-item self-report measure designed to assess both positive and negative aspects of current mood; twelve key items were used for

the present assessments. Respondents rate how strongly they are currently experiencing each emotion on a scale ranging from 0 (very slightly or not at all) to 4 (extremely). The PANAS has been used widely among undergraduate populations, and multiple investigations attest to its validity and reliability (Crawford & Henry, 2004; Watson et al., 1988). Internal consistency reliability estimates ranged from .78 to .90 for negative emotions and .78 to .90 for positive emotions across assessment periods. For the second manipulation check, consistent with procedures used by Gross (1998a), three items were used to assess success of the emotion regulation manipulation (see Appendix A). These questions inquire about spontaneous use of suppression and reappraisal and, as such, assess emotional reacting, trying not to feel an emotion, and feeling but hiding emotions during the computer task.

***In vivo* aggression.** Immediately following the PASAT, participants completed the hot sauce allocation task, which involves the allocation of a self-selected amount of hot sauce for a “participant in another study” (i.e., a confederate) to consume. The gender of the purported target participant was counterbalanced to create four groups (i.e., male participants/male targets, male participants/female targets, female participants/male targets, female participants/female targets). This measure is expected to be influenced by negative affect; thus, it was administered following the mood induction. Following the completion of the hot sauce allocation task, participants completed the PAVE (IPA propensity) questionnaire and another PANAS via computer. The completion of the PAVE following the mood induction allows for the assessment of *in vivo* IPA propensity following negative affect induction.

**Participant debriefing.** Following this and in order to address any residual distress, participants watched two film clips that have been found to increase feelings of contentment

(Gross & Levenson, 1995). One clip depicts seagulls and the other clip depicts ocean waves. All participants were verbally debriefed about the full purposes of the study, provided with a debriefing sheet (see Appendix E) that explains the study and provides contact information for psychological services, offered an opportunity to ask questions about the study and to speak with the study investigator about any concerns, provided with referrals, and thanked for their participation. Prior to their departure, all participants were asked to rate their distress as a result of the study on a scale from 1 (*no distress*) to 5 (*extreme distress*). Procedures were established for any participant endorsing a rating of 3 or higher to speak with the study investigator about her/his concerns; however, this did not occur with any participant. The mean distress rating was 1.25 ( $SD = 0.46$ ).

### **Data Analysis Strategy**

**Statistical power.** To estimate the sample size needed to detect hypothesized effects, power analyses were conducted using Cohen's (1988) guidelines for effect sizes in conjunction with G\*Power Version 3.0 (Faul, Erdfelder, Lang, & Buchner, 2007). G\*Power is a computer software program designed to compute necessary sample size for common statistical analyses. Based on prior studies (e.g., Bushman et al., 2005; Gratz & Roemer, 2004; O'Leary et al., 2007; Richards et al., 2003; Stith et al., 2004) examining the associations between the static and situational factors employed in the proposed study (life stress, distress tolerance, rumination, jealousy, and emotion regulation strategy use) and aggressive behavior, medium effect sizes of approximately  $r = .25$  can be expected for these relationships. Further, medium effect sizes of approximately  $F^2 = .15$  may be expected for the hypothesized interactions (static factors x situational factors). Using these effect size assumptions with 80% power and a 5% chance of Type I error, G\*Power 3 indicated that an

overall sample size of  $N = 82$  would be needed to detect these hypothesized effects. To facilitate the testing of gender differences, this estimated sample size will be doubled to 164. The sample recruited for this study exceeded the size that was estimated to be required to reveal the expected effects.

**Preliminary analyses.** All data were checked for data entry errors and outliers. Descriptive analyses were conducted to examine sample characteristics on demographic and other study variables. Scores on all study variables were compared by gender using independent sample  $t$ -tests.

**Manipulation checks.** To explore if the PASAT produced a significant increase in negative emotion, pre- and post-PASAT PANAS scores were compared using a repeated measures ANOVA. This analysis was conducted a) for the entire sample, b) for both genders, and c) for each emotion regulation strategy condition. Further, to determine if participants followed the emotion regulation strategy instructions, responses to the *in vivo* strategy use questions were compared across the two randomly assigned groups using independent sample  $t$ -tests.

**Aim 1 analyses.** Hypothesis 1 states that greater life stress, lesser distress tolerance, greater rumination, and greater jealousy will be associated with greater interpersonal aggression perpetration. To test this hypothesis, correlations were computed between participants' scores on each of the static factors (assessed via the LES, DTS, RRQ, and IJS) and scores on all of the aggression-related variables (assessed via the CTS2, the PAVE, and the hot sauce allocation task). Although existing models have not suggested systematic differences in risk factors for men and women (e.g., O'Leary et al., 2007; Riggs & O'Leary, 1996; White et al., 2001), gender differences in these correlations were tested by computing

each of the correlations listed above for men and women separately; any significant correlations were tested to see if they are significantly different using Fisher's Z-test. Consistent with guidelines provided by Wilkinson and the Task Force on Statistical Inference (1999), both significance tests ( $p$ -values) and 95% confidence intervals will be computed to clarify any group differences.

**Aim 2 analyses.** Hypothesis 2 states that participants instructed to use suppression will demonstrate the greater interpersonal aggression (as assessed by the PAVE and the hot sauce paradigm) than those using reappraisal. To test these hypotheses, four between-groups Analysis of Variance (ANOVA) were conducted (two for men, two for women). Emotion regulation strategy assignment group (suppression or reappraisal) served as the independent variable; PAVE scores and hot sauce weights from the hot sauce allocation task served as the dependent variables. Results from these models were used to compare mean differences on aggression scores for each of the two emotion regulation strategy assignment groups.

**Aim 3 analyses.** Hypothesis 3 states that emotion regulation will moderate associations between static risk factors and aggression such that the effects of increased life stress, decreased distress tolerance, increased rumination, and increased jealousy on interpersonal aggression will be *enhanced* by the use of suppression. Hypothesis 3 further states that emotion regulation will moderate associations between static risk factors and aggression such that the effects of increased life stress, decreased distress tolerance, increased rumination, and increased jealousy on interpersonal aggression will be *attenuated* by the use of reappraisal. All of the static variables (assessed by the LES, DTS, RRQ, and IJS) were centered prior to analysis. Then, eight multiple regression analyses were conducted (one for each of the four static variables, with each of the two *in vivo* aggression variables).

In each of these regressions, the emotion regulation strategy variable, the centered version of the static factor, and the interaction term, were entered as the independent variables, and PAVE scores or hot sauce paradigm scores were entered as the dependent variable. The model's  $F$ -test statistic and corresponding  $p$ -significance value were examined to determine if the independent variables collectively account for a significant portion of the variance in aggression scores. Further, each model's  $R^2$  was examined to determine the amount of variance predicted by the independent variables. For each coefficient,  $b$ ,  $SE$ ,  $t$ , and  $p$  were examined to determine variable significance in the overall model.

## Results

### Preliminary Analyses and Descriptives

All data were checked for data entry errors and outliers. Static variables and emotion variables were all normally distributed and did not display excess skew or kurtosis. However, all aggression variables had non-normal distributions and were log-transformed to reduce skewness and kurtosis. A conservative approach was employed in which data from any participant who expressed suspicion about study hypotheses were excluded from related analyses. Thus, data from 2 participants (both male) were excluded from analyses including questionnaire data due to evidence that they provided invalid responses (i.e., they finished the questionnaire batteries in approximately one-quarter of the average time that it took most participants to finish). The PASAT and related emotional response data of ten participants (8 men, 2 women) were excluded due to their reports during the debriefing that they were aware of the purpose of the computer task (i.e., to increase negative affect). Lastly, hot sauce allocation data from 16 participants (12 men and 4 women) were excluded due to reports of suspicion or awareness of task purpose. Descriptive statistics were computed for all study

variables and are presented in Table 1. To compare male and female participants' scores on all study variables, independent sample *t*-tests were conducted and are also presented in Table 1.

**Static variables.** Both men and women reported experiencing a similar number of stressful life events during the past year. Male participants endorsed an average of 14.38 different events, while female participants endorsed an average of 15.01 events. However, when considering the total perceived valence of these events, men reported average ratings that were significantly less negative than women's ratings. Participants' reports suggest that when considering all life events experienced in the prior year, men view positive and negative events as "balancing out," while women perceive a stronger impact of negative experiences. Men reported significantly higher mean distress tolerance ratings than women, though both were consistent with scores reported by university students and community individuals in other studies (Leyro, Bernstein, Vujanovic, McLeish, & Zvolensky, 2011; Simons & Gaher, 2005). Men also reported higher scores on three of the four subscales: tolerance, absorption, appraisal, and reappraisal. Men's levels of appraisal were marginally significantly greater ( $p = .06$ ) than women's levels on this self-report measure. Male participants' scores were consistent with average responses indicating "mild disagreement" with statements indicating distress intolerance, while female participants' scores were consistent with average responses indicating "mild agreement" with statements indicating distress intolerance. Levels of rumination did not differ by gender and were consistent with or slightly lower than those reported in studies of other undergraduate students using the same methodology (Silvia & Phillips, 2011; Trapnell & Campbell, 1999). Participants' average responses were consistent with moderate agreement on questionnaire statements.



Men and women also did not significantly differ in their reports of jealousy. However, men's reports were slightly lower than rates reported in another study of undergraduates using this measure but higher than scores reported by samples of community men (Holtzworth-Munroe, Stuart, & Hutchinson, 1997; Mathes, Phillips, Showran, & Dick, 1982). Women's reported jealousy was slightly higher than those reported by undergraduate students (Mathes et al., 1982), but slightly lower than a sample of community women (Barr & Caciatore, 2007).

**Emotion variables.** Men reported significantly greater habitual use of suppression than did women. However, there were no gender differences in participants' habitual use of reappraisal. Reported mean levels of trait suppression and reappraisal, as well as the pattern of gender differences found, were consistent with levels reported in other studies of undergraduates (Gross & John, 2003; Magar, Phillips, & Hosie, 2008). Paired sample *t*-tests revealed that both male participants,  $t(96) = 10.65, p < .001$ , and female participants,  $t(97) = 10.16, p < .001$ , reported using more reappraisal strategies on average than suppression strategies. Participants reported on their current positive and negative emotions three times during the study: prior to completing the PASAT (i.e., pre-PASAT), immediately following completing the PASAT and the hot sauce allocation task (i.e., post-PASAT), and immediately following completely the PAVE questionnaire (i.e., post-PAVE). Men reported significantly greater positive affect than women at the pre-PASAT, post-PASAT, and post-PAVE, assessments. There were no significant differences in negative affect ratings across genders at any assessment point. Male and female participants also did not differ in their use of suppression and reappraisal during the PASAT task as assessed by the *in vivo* emotion regulation strategy questionnaire (Egloff et al., 2006). Reported use of suppression and reappraisal were consistent with trait-level use of these emotion regulation strategies, as well

as *in vivo* use of suppression and reappraisal by undergraduates during other experimental tasks (Egloff et al., 2006).

**Aggression variables.** The prevalence rates of self-reported male- and female-perpetrated IPA during the year prior to assessment were 26.3% ( $n = 26$ ) and 21.4% ( $n = 22$ ), respectively. These rates fall toward the lower end of the range of prevalence rates documented among undergraduate students (i.e., 20% to 50%; Cogan & Fennell, 2007; Forke et al., 2008; Nabors, 2010; Raiford et al., 2007; Straus, 2004). Frequency of IPA perpetration in the prior year averaged 1.20 acts ( $SD = 3.71$ ) for male participants and 1.25 acts ( $SD = 3.83$ ) for female participants. The reported frequency of IPA perpetration is slightly lower than the number of acts reported yearly in study of other undergraduate students (Graves, Sechrist, White, & Paradise, 2005; Kaura & Allen, 2004). Male participants reported significantly lower IPA perpetration propensity following the PASAT than female participants. Male participants allocated an average of 23.87 grams ( $SD = 26.22$ ) of hot sauce to the purported target participant, while female participants allocated an average of 13.38 grams ( $SD = 9.16$ ) of hot sauce, a difference that was statistically significant.

Table 1

*Descriptives for Study Variables*

Variable	Men		Women		Difference
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t(df)</i>
Static Variables					
Life events	14.38	6.48	15.01	6.58	0.67(192)
Life events-valence	-0.28	60.47	-18.56	56.65	2.17(192)*
Distress tolerance	3.70	0.67	3.43	0.70	2.79(193)**

Distress tolerance-tolerance	3.57	0.97	3.28	0.90	2.15(193)*
Distress tolerance-absorption	3.77	0.85	3.35	0.99	3.14(193)**
Distress tolerance-appraisal	3.94	0.67	3.75	0.76	1.91(193)
Distress tolerance-regulation	3.29	0.92	3.02	0.89	2.09(193)*
Rumination	3.16	0.71	3.35	0.68	-1.93(193)
Jealousy	124.67	29.33	131.66	30.69	-1.63(193)
Emotion Variables					
Trait suppression	3.68	1.05	3.32	1.16	2.22(193)*
Trait reappraisal	4.95	0.78	4.94	0.92	0.07(193)
Positive Emotions Pre-PASAT	17.04	3.30	15.92	3.44	2.02(183)*
Negative Emotions Pre-PASAT	8.69	2.78	8.78	2.83	-0.05(183)
Positive Emotions Post-PASAT	14.05	4.75	12.02	4.34	2.92(183)**
Negative Emotions Post-PASAT	11.47	5.00	11.91	5.48	-0.55(183)
Positive Emotions Post-PAVE	15.97	4.20	13.73	4.66	3.26(183)**
Negative Emotions Post-PAVE	10.01	4.62	10.23	4.39	-0.51(183)
<i>In-vivo</i> suppression	3.29	0.99	3.21	1.10	0.50(183)
<i>In-vivo</i> reappraisal	4.37	0.74	4.16	0.71	1.95(183)
Aggression Variables					
Past-year IPA perpetration	1.20	3.71	1.24	3.83	0.30(193)
IPA propensity	30.27	13.98	36.70	16.72	-3.36(193)**
Observed interpersonal aggression	23.87	26.22	13.38	9.16	3.35(179)**

*Note.* PASAT = Paced Auditory Serial Addition Task, IPA = intimate partner aggression. Aggression scores are not log-transformed in this table for descriptive purposes.

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

### **Manipulation Checks**

To ensure that the PASAT produced the desired increase in negative emotion and decrease in positive emotion, and that these emotion changes were maintained through PAVE questionnaire completion, pre-PASAT PANAS, post-PASAT PANAS, and post-PAVE PANAS scores were compared using repeated measures ANOVA. These analyses were conducted across: a) the entire sample, b) both genders, and c) each emotion regulation strategy condition. The results of these analyses are presented in Table 2. The pattern of results obtained from ANOVA analyses examining emotion ratings was consistent across all analyses. Participants reported the highest negative affect at the post-PASAT assessment, and significantly lower negative affect at the post-PAVE assessment. Negative affect ratings at the pre-PASAT assessment were significantly lower than those reported at both the post-PASAT and post-PAVE assessments. Participants reported the lowest positive affect at the post-PASAT assessment, and significantly higher positive at the post-PAVE assessment. Positive affect ratings at the pre-PASAT assessment were significantly higher than those reported at both the post-PASAT and post-PAVE assessments. Overall, these results provide consistent evidence that the PASAT task produced both significant increases in negative affect and decreases in positive affect that were sustained through experimental tasks.

To evaluate whether participants followed the emotion regulation strategy instructions, responses to the *in vivo* use of emotion regulation strategies questions were compared across the two randomly assigned groups: participants who were assigned to

suppress their emotions versus participants who were assigned to reappraise their emotions. Independent sample *t*-tests showed that participants in the suppression condition ( $M = 3.57$ ,  $SD = 0.99$ ) reported significantly greater use of suppression during the PASAT than participants assigned to reappraise ( $M = 2.93$ ,  $SD = 1.00$ ),  $t(193) = -4.33$ ,  $p < .001$ , suggesting that the suppression instructions were aptly followed. Further supporting the strength of this manipulation, participants in the suppression condition also reported greater agreement with the statements, “during the computer task, I tried not to feel anything at all;” suppression group:  $M = 6.67$ ,  $SD = 1.83$ ; reappraisal group:  $M = 4.85$ ,  $SD = 1.64$ ;  $t(193) = -7.30$ ,  $p < .001$ , and “during the computer task, I felt emotions but tried to hide them;” suppression group:  $M = 6.99$ ,  $SD = 1.68$ ; reappraisal group:  $M = 4.38$ ,  $SD = 1.64$ ;  $t(193) = -10.51$ ,  $p < .001$ , than participants assigned to the reappraisal condition. On the other hand, participants assigned to suppress ( $M = 4.30$ ,  $SD = 0.70$ ) and participants assigned to reappraise ( $M = 4.21$ ,  $SD = 0.76$ ) did not differ in their self-reported use of reappraisal during the PASAT,  $t(193) = -0.67$ , *ns*. However, participants in the reappraisal condition ( $M = 5.20$ ,  $SD = 2.27$ ) reported greater agreement with the statement “during the computer task, I reacted completely spontaneously,”  $t(193) = 3.60$ ,  $p < .001$ , than participants in the suppression condition ( $M = 4.05$ ,  $SD = 2.19$ ). Overall, the manipulation checks show strong evidence that participants in the suppression condition used this strategy during the PASAT. Manipulation check results supporting the use of reappraisal for participants in the reappraisal condition is mixed, with one measure indicating that participants assigned to the this condition used greater strategies reflective of reappraisal, and the other showing that participants assigned to reappraise and those assigned to suppress did not differ in their use of these two forms of emotion regulation.

Table 2

*Differences in PANAS Ratings By Assessment Period*

Affect Rating	Time 1		Time 2		Time 3		<i>F</i> (df)	<i>p</i>	Fisher's LSD
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<b>Total Sample</b>									
Positive	16.43	3.44	12.98	4.60	14.79	4.57	F(2, 368) = 128.87	<.001	1 > 2, 3; 2 < 3
Negative	8.73	2.84	11.68	5.12	10.09	4.24	F(2, 168) = 60.82	<.001	1, 3 < 2; 1 < 3
<b>Men Only</b>									
Positive	16.96	3.37	13.99	4.64	15.90	4.17	F(2, 176) = 88.02	<.001	1 > 2, 3; 2 < 3
Negative	8.72	2.87	11.46	4.66	9.92	4.02	F(2, 176) = 26.75	<.001	1, 3 < 2; 1 < 3
<b>Women Only</b>									
Positive	15.94	3.46	12.05	4.38	13.76	4.70	F(2, 190) = 48.17	<.001	1 > 2, 3; 2 < 3
Negative	8.74	2.83	11.88	5.53	10.24	4.44	F(2, 190) = 33.88	<.001	1, 3 < 2; 1 < 3
<b>Suppression Only</b>									
Positive	16.47	3.67	12.76	4.86	14.69	4.90	F(2, 186) = 53.90	<.001	1 > 2, 3; 2 < 3
Negative	8.62	2.40	11.64	4.50	9.92	3.75	F(2, 186) = 23.82	<.001	1, 3 < 2; 1 < 3
<b>Reappraisal Only</b>									
Positive	16.38	3.23	13.20	4.35	14.88	4.25	F(2, 180) = 69.45	<.001	1 > 2, 3; 2 < 3
Negative	8.84	3.22	11.71	5.68	10.25	4.68	F(2, 180) = 0.91	<.001	1, 3 < 2; 1 < 3

Note. Time 1 = Pre-PASAT, Time 2 = Post-PASAT, Time 3 = Post-PAVE, LSD = least significant difference.

### **Aim 1: Relationship between static risk factors and aggression perpetration**

Hypothesis 1 states that increased life stress, decreased distress tolerance, increased rumination, and increased jealousy will be associated with greater aggression. To test this hypothesis, bivariate correlations between life stress, distress tolerance, rumination, and jealousy (assessed via the LES, DTS, RRQ, and IJS) and aggression (assessed via the CTS2, the PAVE, and the hot sauce allocation task) were computed. These analyses were conducted separately for men and women to allow for gender comparisons. Correlations between men's reports on static variables and aggression variables are presented below the diagonal in Table 3; analogous correlations for women are presented above the diagonal.

For men, consistent with hypotheses, greater experience of total life events,  $r(96) = .21, p < .05, 95\% \text{ CI } 0.01 \text{ to } 0.40$ , and greater rumination,  $r(97) = .26, p < .05, 95\% \text{ CI } 0.06 \text{ to } 0.44$ , were associated with greater past-year IPA perpetration. Also consistent with hypotheses, greater rumination,  $r(97) = .23, p < .05, 95\% \text{ CI } .03 \text{ to } 0.41$ , and greater jealousy,  $r(97) = .33, p < .01, 95\% \text{ CI } .14 \text{ to } 0.50$ , were associated with greater IPA propensity. Further consistent with Hypothesis 1, greater distress tolerance was correlated with lesser IPA propensity,  $r(97) = -0.31, p < .01, 95\% \text{ CI } -0.48 \text{ to } -0.12$ . Greater levels of the other three forms of distress tolerance (tolerance, absorption, and appraisal) were associated with lesser IPA propensity,  $r(97) = -0.28, p < .01, \text{ CI } -0.45 \text{ to } -0.09$ ;  $r(97) = -0.27, p < 0.01, \text{ CI } -0.45 \text{ to } -0.08$ ;  $r(97) = -0.29, p < .01, \text{ CI } -0.46 \text{ to } -0.10$ , respectively. For women, consistent with hypotheses, greater jealousy,  $r(98) = .24, p < .05, 95\% \text{ CI } 0.04 \text{ to } 0.42$ , and was associated with greater past-year IPA perpetration. However, counter to expectations, lesser perceived negative valence of life events,  $r(98) = -.26, p < .05, 95\% \text{ CI } -0.43 \text{ to } -0.06$ , was associated with greater past-year IPA perpetration. Also consistent with hypotheses, lesser distress

tolerance,  $r(98) = -0.26, p < .05, 95\% \text{ CI } -0.43 \text{ to } -0.06$ , and greater jealousy,  $r(98) = .40, p < .001, 95\% \text{ CI } 0.22 \text{ to } 0.56$ , were associated with greater IPA propensity. Another form of distress tolerance, greater regulation of emotions while distressed, was associated with lesser past-year IPA perpetration,  $r(98) = -0.20, p < .05, 95\% \text{ CI } -0.38 \text{ to } -0.01$ . Greater levels of the other three forms of distress tolerance (tolerance, absorption, and appraisal) were associated with lesser IPA propensity,  $r(98) = -0.26, p < .05, \text{ CI } -0.44 \text{ to } -0.07$ ;  $r(98) = -0.23, p < 0.05, \text{ CI } -0.41 \text{ to } -0.03$ ;  $r(98) = -0.21, p < .05, \text{ CI } -0.39 \text{ to } -0.01$ , respectively. There were no significant correlations between any of the static variables and increased interpersonal aggression as assessed by hot sauce allocation weight. Gender differences in each set of bivariate correlations were tested using Fisher's Z-test; however, no significant differences were found.

Given significant differences in hot sauce allocation according to target gender, correlations between variables of interest and hot sauce allocation weights were also run for men and women by the gender of the target participant (i.e., male participants with male targets, male participants with female targets, female participants with male targets, female participants with female targets). There were no significant correlations between any of the static variables and hot sauce allocation weight for any of the four participant gender-target gender groupings.



Table 3

*Bivariate Correlations Among Study Variables for Male and Female Participants*

Variable	1	2	3	4	5	6	7	8
1. Life events	--	-.18	-.16	.17	.07	.16	-.08	-.11
2. Life events-valence	-.01	--	.16	-.27**	-.27**	-.26**	-.10	.07
3. Distress tolerance	.09	.28**	--	-.58**	-.45**	.16	-.26*	.04
4. Rumination	-.00	-.25*	-.49***	--	.50**	.08	.14	-.02
5. Jealousy	-.15	-.20	-.27**	.44***	--	.24*	.40**	.05
6. Past year IPA	.21*	-.09	.03	.26*	.02	--	.31**	.04
7. IPA propensity	-.09	-.06	-.31**	.23*	.33**	.30**	--	-.02
8. Observed interpersonal aggression	-.08	.04	.10	.01	.09	.13	.03	--

*Note.* Intercorrelations for male participants are presented below the diagonal, and intercorrelations for female participants are presented above the diagonal. IPA = intimate partner aggression.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

## **Aim 2: Relationship between emotion regulation strategy use and interpersonal aggression perpetration**

Hypothesis 2 states that participants instructed to use suppression will demonstrate greater interpersonal aggression (as assessed by the PAVE and the hot sauce paradigm) than those using reappraisal. Hypothesis 2b states that participants instructed to use reappraisal will demonstrate lesser interpersonal aggression than those using suppression. To test these hypotheses, four between-groups Analyses of Variance (ANOVA) were conducted (two for men, two for women). Emotion regulation strategy assignment group (suppression or reappraisal) served as the independent variable. Contrary to hypotheses, there were no mean differences between emotion regulation strategy groups on responses to the PAVE for men or for women. As shown in Table 4, consistent with hypotheses, men who were assigned to suppress ( $n = 45$ ) allocated a marginally significant ( $p = .06$ ) greater amount of hot sauce than participants assigned to reappraise ( $n = 42$ ). Contrary to hypotheses, women who were assigned to suppress ( $n = 46$ ) and women who were assigned to reappraise ( $n = 48$ ) did not differ in their amount of hot sauce allocation.

Table 4

### *Group Differences in Interpersonal Aggression by Emotion Regulation Strategy Condition*

Form of aggression	Suppression		Reappraisal		Difference	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F(df)</i>	<i>p</i>
Men						
IPA propensity	3.35	0.32	3.33	0.36	0.11(1, 95)	.74
Observed interpersonal aggression	18.44	15.45	28.94	32.66	3.59(1, 85)	.06
Women						
IPA propensity	3.51	0.38	3.53	0.41	0.07(1, 96)	.80

Observed interpersonal aggression	14.42	10.87	12.39	7.13	1.15(1, 92)	.29
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*Note.* IPA = intimate partner aggression.

To examine differences in hot sauce allocation by gender of the target participant, two 2 (male target versus female target) x 2 (reappraisal versus suppression) ANOVAs were run, one for male participants and one for female participants. Results from these analyses are presented in Tables 5 and 6. Male participants allocated significantly more hot sauce when they thought the target participant was male ( $n = 43$ ,  $M = 27.90$ ,  $SD = 28.54$ ) rather than female ( $n = 42$ ,  $M = 17.27$ ,  $SD = 14.36$ ). There were no differences in hot sauce allocation for female participants by emotion regulation strategy condition or by target gender.

Table 5

*Group Differences in Observed Interpersonal Aggression by Gender of Target and Emotion Regulation Strategy Condition for Male Participants*

	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>df</i>	<i>p</i>
Emotion Regulation Condition	1484.53	1484.53	2.33	1	.13
Target Gender	2606.97	2606.97	4.08	1	.05
Interaction (Condition x Target Gender)	1027.95	1027.95	1.61	1	.21
Error	53007.45	638.64	--	83	--
Total	108679.29	--	--	87	--

*Note.* SS = sum of squares. MS = mean square error.

Table 6

*Group Differences in Observed Interpersonal Aggression by Gender of Target and Emotion Regulation Strategy Condition for Female Participants*

	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>df</i>	<i>p</i>
Emotion Regulation Condition	89.03	89.03	1.05	1	.31

Target Gender	11.48	11.48	0.14	1	.71
Interaction (Condition x Target Gender)	35.85	35.85	0.42	1	.52
Error	7662.86	85.14	--	90	--
Total	24644.30	--	--	94	--

*Note.* SS = sum of squares. MS = mean square error.

### **Aim 3: Interactions between static risk factors and emotion regulation strategy use in predicting aggression**

Hypothesis 3 states that emotion regulation strategy use will moderate associations between static risk factors and aggression such that the effects of increased life stress, decreased distress tolerance, increased rumination, and increased jealousy on interpersonal aggression will be *enhanced* by the use of suppression and *attenuated* by the use of reappraisal. All of the static variables (assessed by the LES, DTS, RRQ, and IJS) were centered prior to analysis. Four interaction terms, between the emotion regulation strategy condition variable and each centered static variable, were computed. Then, eight multiple regression equations were conducted (one for each of the four static variables, with each of the two aggression variables). In each of these regressions, the emotion regulation strategy variable, the centered version of the static factor, and the interaction term, were entered as the independent variables, and PAVE scores or hot sauce paradigm scores were entered as the dependent variable.

Tables 7 and 8 present the results for the above-described analyses for male participants, and Tables 9 and 10 present the results for female participants. Of 20 potential interactions tested, one was significant and graphed in Figure 3 below. Several static variables were significant predictors of aggression variables. For men, consistent with hypotheses, greater distress tolerance, including higher scores on the tolerance and appraisal

subscales, predicted lesser IPA propensity. Greater jealousy also predicted greater IPA propensity. Counter to hypotheses, higher levels of distress tolerance predicted greater hot sauce allocation. For women, consistent with hypotheses, greater jealousy was predictive of greater IPA propensity. With one exception, there were no significant interactions between static variables and emotion regulation strategy condition in predicting either PAVE or hot sauce scores for men or women. As depicted in Figure 3, the relationship between women's total reported life events and IPA propensity was moderated by emotion regulation strategy condition. Specifically, women who were assigned to suppress stress-related emotions reported greater IPA propensity as they reported a greater number of life events, while women who were assigned to reappraise reported lesser IPA propensity as they reported a greater number of life events,  $B = -0.03$ ,  $SE = 0.01$ ,  $t(94) = -2.09$ ,  $p < .05$ .

Table 7

*Multiple Regression Analyses Predicting Men's IPA Propensity*

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Life events	-0.01	0.01	-1.44	.15
ER strategy condition	-0.01	0.08	-0.16	.87
Life events x ER strategy condition	0.01	0.01	1.01	.31
$R^2 = .03$ , $F(3, 80) = 0.69$ , <i>ns</i>				
Life events valence	-0.00	0.00	-1.13	.26
ER strategy condition	-0.01	0.08	-0.07	.94
Life events valence x ER strategy condition	0.00	0.00	0.91	.37
$R^2 = .02$ , $F(3, 80) = 0.44$ , <i>ns</i>				
Distress tolerance	-0.18	0.07	-2.49	.02*
ER strategy condition	-0.01	0.07	-0.13	.90

Distress tolerance x ER strategy condition	0.00	0.11	0.00	.99
$R^2 = .09, F(3, 81) = 3.76, p < .01$				
Rumination	0.07	0.08	0.94	.35
ER strategy condition	0.02	0.07	0.20	.84
Rumination x ER strategy condition	0.10	0.11	0.93	.36
$R^2 = .07, F(3, 81) = 2.07, ns$				
Jealousy	0.00	0.00	2.91	.00****
ER strategy condition	-0.01	0.07	-0.11	.91
Jealousy x ER strategy condition	-0.00	0.00	-0.28	.78
$R^2 = .13, F(3, 81) = 4.11, p < .01$				

Note. ER = emotion regulation.

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

Table 8

*Multiple Regression Analyses Predicting Men's Observed Interpersonal Aggression*

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Life events	-0.49	0.55	-0.90	.37
ER strategy condition	-9.00	5.04	-1.78	.08
Life events x ER strategy condition	0.36	0.77	0.46	.64
$R^2 = .05, F(3, 80) = 1.30, ns$				
Life events valence	0.07	0.06	1.24	.22
ER strategy condition	-8.95	5.02	-1.78	.08
Life events valence x ER strategy condition	-0.10	0.08	-1.24	.22
$R^2 = .06, F(3, 80) = 1.62, ns$				
Distress tolerance	5.75	3.51	7.58	.00****
ER strategy condition	-8.19	5.00	-1.64	.11

Distress tolerance x ER strategy condition	-5.21	7.59	-0.69	.49
$R^2 = .05, F(3, 81) = 1.35, ns$				
Rumination	-1.86	5.31	-0.35	.73
ER strategy condition	-8.37	5.05	-1.66	.10
Rumination x ER strategy condition	3.01	7.38	0.41	.68
$R^2 = .03, F(3, 81) = 0.97, ns$				
Jealousy	0.13	0.11	1.12	.27
ER strategy condition	-8.42	5.00	-1.69	.10
Jealousy x ER strategy condition	-0.14	0.18	-0.76	.45
$R^2 = .05, F(3, 81) = 1.35, ns$				

Note. ER = emotion regulation.

\*\*\*  $p < .001$ .

Table 9

*Multiple Regression Analyses Predicting Women's IPA Propensity*

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Life events	0.00	0.01	0.64	.52
ER strategy condition	0.02	0.08	0.24	.81
Life events x ER strategy condition	-0.03	0.01	-2.09	.04*
$R^2 = .05, F(3, 95) = 1.69, ns$				
Life events valence	-0.00	0.00	-0.21	.83
ER strategy condition	0.01	0.08	0.10	.93
Life events valence x ER strategy condition	-0.00	0.00	-0.71	.48
$R^2 = .02, F(3, 94) = 0.51, ns$				
Distress tolerance	-0.08	0.08	-1.01	.32
ER strategy condition	0.02	0.08	0.30	.77

Distress tolerance x ER strategy condition	-0.13	0.11	-1.20	.23
$R^2 = .08, F(3, 94) = 2.79, p < .05$				
Rumination	0.02	0.08	0.30	.77
ER strategy condition	0.01	0.08	0.17	.86
Rumination x ER strategy condition	0.14	0.12	1.13	.26
$R^2 = .03, F(3, 94) = 1.05, ns$				
Jealousy	0.01	0.00	2.95	.00***
ER strategy condition	0.02	0.08	0.22	.83
Jealousy x ER strategy condition	-0.00	0.00	-0.12	.90
$R^2 = .16, F(3, 94) = 6.03, p < .001$				

*Note.* ER = emotion regulation.

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

Table 10

*Multiple Regression Analyses Predicting Women's Observed Interpersonal Aggression*

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Life events	-0.24	0.18	-1.28	.20
ER strategy condition	-2.06	1.89	-1.09	.28
Life events x ER strategy condition	0.21	0.30	0.71	.48
$R^2 = .03, F(3, 90) = 0.93, ns$				
Life events valence	0.01	0.02	0.39	.70
ER strategy condition	-1.86	1.93	-0.96	.34
Life events valence x ER strategy condition	-0.00	0.03	-0.02	.99
$R^2 = .02, F(3, 90) = 0.47, ns$				
Distress tolerance	1.84	2.01	0.92	.36
ER strategy condition	-2.01	1.90	-1.06	.29



Distress tolerance x ER strategy condition	-2.60	2.78	0.94	.35
$R^2 = .02, F(3, 90) = 0.71, ns$				
Rumination	-1.66	1.85	-0.90	.37
ER strategy condition	-2.04	1.90	-1.07	.29
Rumination x ER strategy condition	3.61	2.83	1.28	.21
$R^2 = .03, F(3, 90) = 0.93, ns$				
Jealousy	0.02	0.05	0.37	.72
ER strategy condition	-2.03	1.91	-1.07	.29
Jealousy x ER strategy condition	-0.00	0.06	-0.08	.90
$R^2 = .01, F(3, 90) = 0.45, ns$				

Note. ER = emotion regulation.

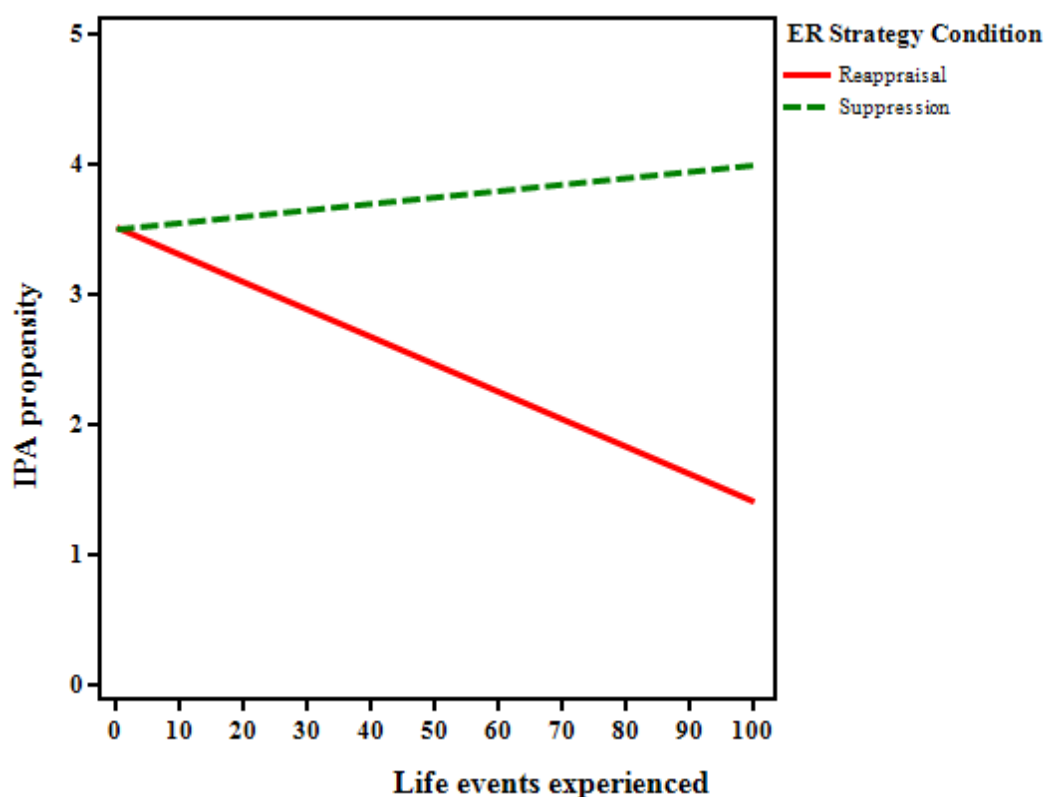


Figure 3. Interaction between stressful life events and emotion regulation strategy condition in predicting IPA propensity for female participants.

## Exploratory Analyses

This study's finding that men allocated significantly different amounts of hot sauce based on the gender of the target raised the possibility that the predictors of observed interpersonal aggression may differ based on the gender of the target individual. To examine this question, multiple regression analyses conducted under Aim 3 with hot sauce allocation weights serving as the dependent variable were repeated, adding target gender as an additional predictor. Results from these analyses are presented in Tables 11 – 12. Of 20 potential interactions of interest, two were significant and are graphed in Figures 4 and 5 below. For male participants, being assigned to a male target predicted greater hot sauce allocation in most models. Also for men, emotion regulation strategy condition was a fairly consistent significant (or marginally significant) predictor of hot sauce allocation such that participants assigned to the suppression condition allocated more hot sauce than participants allocated to the reappraisal condition. Lastly, one interaction effect was noted for male participants: men in the suppression condition allocated greater amounts of hot sauce as their reported negative valence of life events increased; men in the reappraisal condition did not differ in their hot sauce allocation based on their perceived valence of life stress (see Figure 4). Contrary to hypotheses, for female participants who thought they were providing hot sauce to male targets, greater ability to tolerate distress was predictive of greater hot sauce allocated. As depicted in Figure 5, distress tolerance also interacted with emotion regulation strategy condition such that women in the suppression condition allocated greater hot sauce to male targets if they had greater levels of distress tolerance. Conversely, women in the reappraisal condition allocated greater hot sauce to male targets if they had lesser levels of distress tolerance.

Table 11

*Multiple Regression Analyses Predicting Men's Observed Interpersonal Aggression from Static Factors and Target Gender*

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Target gender	-18.93	7.88	-2.40	.02*
Life events	-0.62	0.69	-0.90	.37
ER strategy condition	-16.31	7.88	-2.07	.04*
Target gender x Life events	0.21	1.23	0.17	.86
Life events experienced x ER strategy condition	0.54	1.11	0.49	.63
Target gender x ER strategy condition	14.68	11.24	1.31	.20
Target gender x Life events experienced x ER strategy condition	-0.35	1.73	-0.21	.84
$R^2 = 0.13, F(7, 78) = 1.60, ns$				
Target gender	-18.71	8.25	-2.27	.03*
Life events valence	0.16	0.70	2.17	.03*
ER strategy condition	-16.71	7.76	-2.15	.03*
Target gender x Life events valence	-0.16	0.15	-1.11	.27
Life events valence x ER strategy condition	-0.26	0.12	-2.19	.03*
Target gender x ER strategy condition	15.10	11.36	1.33	.19
Target gender x Life events valence x ER strategy condition	0.30	0.19	1.54	.13
$R^2 = 0.19, F(7, 77) = 2.54, p < .05$				
Target gender	-18.38	7.70	-2.39	.02*
Distress tolerance	13.80	6.38	2.16	.03*
ER strategy condition	-15.83	7.65	-2.07	.04*
Target gender x Distress tolerance	-15.76	12.67	-1.24	.22
Distress tolerance x ER strategy condition	-15.45	10.62	-1.45	.15

Target gender x ER strategy condition	14.37	11.00	1.31	.20
Target gender x Distress tolerance x ER strategy condition	20.18	17.64	1.14	.26
$R^2 = 0.16, F(7, 79) = 2.07, p = .06$				
Target gender	-18.05	8.89	-2.03	.05*
Rumination	3.51	7.31	0.48	.63
ER strategy condition	-15.35	8.05	-1.91	.06
Target gender x Rumination	-4.88	14.29	-0.34	.73
Rumination x ER strategy condition	-0.83	11.92	-0.70	.94
Target gender x ER strategy condition	13.47	12.10	1.11	.27
Target gender x Rumination x ER strategy condition	3.09	18.60	0.17	.87
$R^2 = 0.11, F(7, 79) = 1.36, ns$				
Target gender	-17.96	7.90	-2.27	.03*
Jealousy	0.06	0.15	0.42	.68
ER strategy condition	-14.86	7.95	-1.87	.07
Target gender x Jealousy	-0.03	0.27	-0.12	.91
Jealousy x ER strategy condition	-0.16	0.29	-0.57	.57
Target gender x ER strategy condition	13.38	11.35	1.18	.24
Target gender x Jealousy x ER strategy condition	0.17	0.43	0.40	.69
$R^2 = 0.11, F(7, 79) = 1.36, ns$				

Note. ER = emotion regulation.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 12

*Multiple Regression Analyses Predicting Women's Observed Interpersonal Aggression from Static Factors and Target Gender*

Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
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Target gender	-1.89	2.74	-0.69	.49
Life events experienced	-0.50	0.28	-1.80	.08
ER strategy condition	-3.17	2.70	-1.18	.24
Target gender x Life events experienced	0.48	0.37	1.29	.20
Life events experienced x ER strategy condition	0.52	0.46	1.14	.26
Target gender x ER strategy condition	2.39	3.86	0.62	.54
Target gender x Life events experienced x ER strategy condition	-0.55	0.61	-0.91	.37
$R^2 = 0.05, F(7, 86) = 0.70, ns$				
Target gender	-2.19	2.85	-0.77	.44
Life events valence	0.01	0.05	0.31	.76
ER strategy condition	-3.19	2.71	-1.18	.24
Target gender x Life events valence	-0.00	0.05	-0.03	.97
Life events valence x ER strategy condition	-0.02	0.06	-0.35	.73
Target gender x ER strategy condition	3.17	3.98	0.80	.43
Target gender x Life events valence x ER strategy condition	0.03	0.07	0.47	.64
$R^2 = 0.03, F(7, 86) = 0.35, ns$				
Target gender	-1.46	2.69	-0.54	.59
Distress tolerance	7.65	3.05	2.51	.01*
ER strategy condition	-2.52	2.62	-0.96	.34
Target gender x Distress tolerance	-10.32	4.02	-2.57	.01*
Distress tolerance x ER strategy condition	-9.69	3.96	-2.45	.02*
Target gender x ER strategy condition	2.02	3.75	0.54	.59
Target gender x Distress tolerance x ER strategy condition	13.23	5.52	2.40	.02*
$R^2 = 0.10, F(7, 86) = 1.40, ns$				

Target gender	-1.91	2.76	-0.69	.49
Rumination	-3.30	2.58	-1.28	.20
ER strategy condition	-3.51	2.69	-1.30	.20
Target gender x Rumination	3.27	3.75	0.87	.39
Rumination x ER strategy condition	7.49	4.27	1.76	.08
Target gender x ER strategy condition	2.80	3.86	0.73	.47
Target gender x Rumination x ER strategy condition	-6.99	5.80	-1.21	.23
$R^2 = 0.05, F(7, 86) = 0.69, ns$				
Target gender	-1.85	2.84	-0.65	.52
Jealousy	-0.01	0.08	-0.07	.95
ER strategy condition	-3.21	2.78	-1.15	.25
Target gender x Jealousy	0.03	0.11	0.27	.79
Jealousy x ER strategy condition	0.00	0.11	0.03	.98
Target gender x ER strategy condition	2.45	3.96	0.62	.54
Target gender x Jealousy x ER strategy condition	-0.00	0.14	-0.02	.99
$R^2 = 0.02, F(7, 86) = 0.28, ns$				

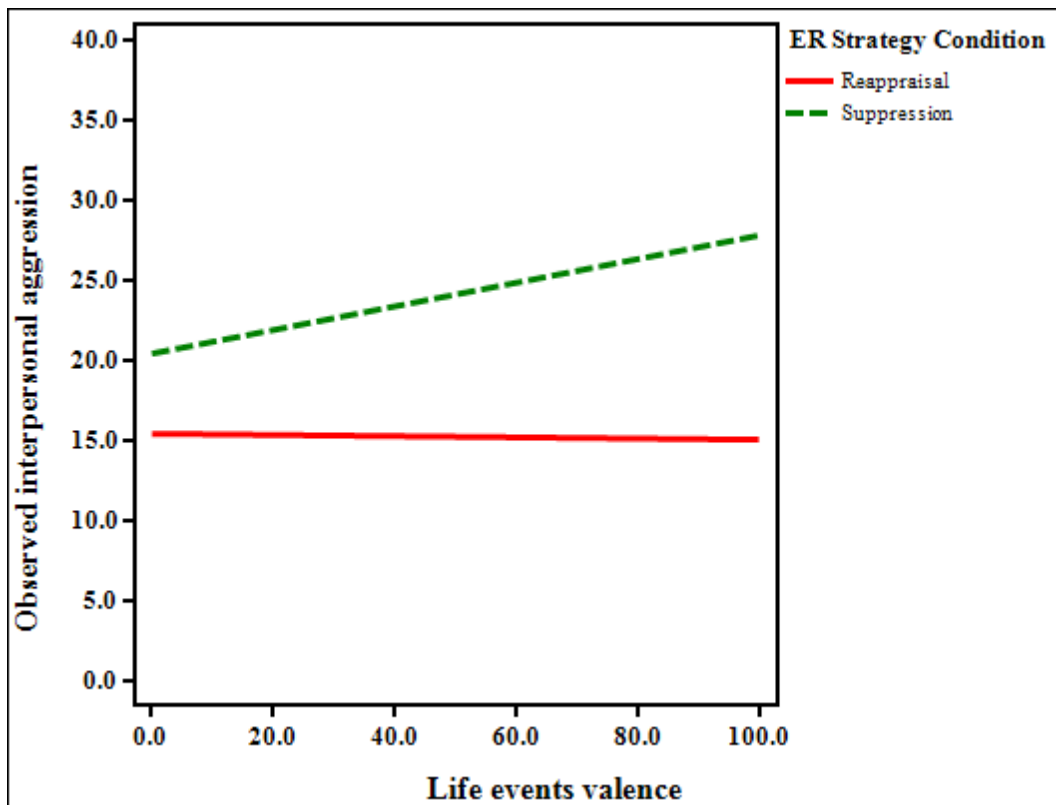


Figure 4. Interaction between life events valence and emotion regulation strategy condition in predicting observed interpersonal aggression for male participants.

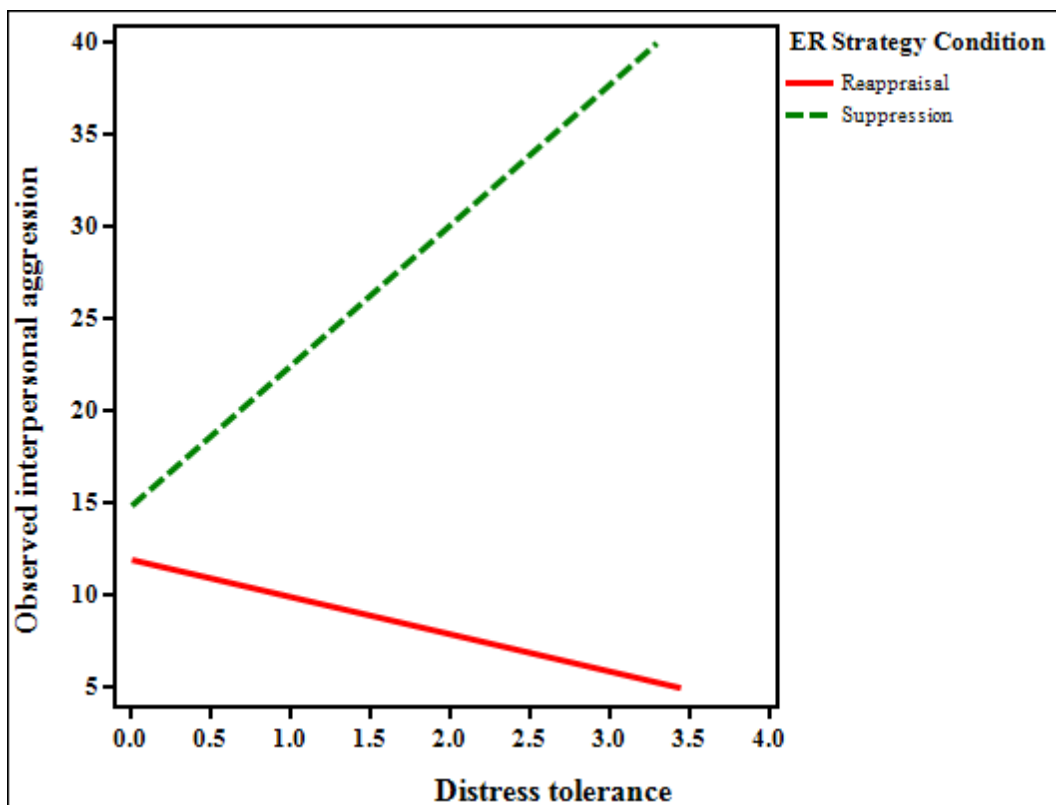


Figure 5. Interaction between distress tolerance and emotion regulation strategy condition in predicting observed interpersonal aggression for female participants with male targets.

### Discussion

The present study had three primary aims within the overarching goal of examining static and emotion regulatory risk factors for IPA and interpersonal aggression. The first study aim was to investigate the relationship between several static risk factors, including life stress, distress tolerance, rumination, and jealousy, and IPA and interpersonal aggression. The second aim was to investigate the relationship between emotion regulation strategy use, specifically expressive suppression and cognitive reappraisal, and aggression. The final aim was to examine the interaction between these static risk factors and emotion regulation strategies in predicting aggressive behavior. Below, general findings related to each of these



aims, limitations for the current study, directions for future research, and clinical implications of the present findings are discussed.

### **Descriptive Findings**

Prior to reviewing results related to study hypotheses, a brief review of descriptive findings is warranted. Levels of all static variables (life events, distress tolerance, rumination, and jealousy) were generally consistent with rates reported in other samples of undergraduate students (e.g., Mathes et al., 1982; Silvia & Phillips, 2011, Simons & Gaher, 2005; Towbes & Cohen, 1996), suggesting that there were no notable anomalies in the overall rates of these variables as compared to other similar groups. However, some gender comparisons within the present sample bear further discussion. Though men and women reported experiencing almost an identical number of life events during the past year, female participants rated these events as significantly more negative than male participants, suggesting one of two potential scenarios. One possibility is that women experienced more events that could be objectively considered negative than men and thus rated these events accordingly. This prospect is difficult to test, as some events (e.g., starting a new job) may not be inherently positive or negative. A second and more likely possibility is that women and men experienced events that are of an objectively similar valence overall; however, women perceived these events as having a greater negative impact than did men. This gender difference in perception of life experiences is consistent with prior research (e.g., Matud, 2004) and suggests that regardless of the objective level of life events experienced, women may carry greater strain related to their stressors than men. The present study also revealed a significant gender difference in another static factor—distress tolerance. Consistent with prior research (Simons & Gaher, 2005), male participants reported greater ability to withstand negative emotion than did

female participants, as indicated by significant differences in average self-reported distress tolerance. It is unlikely that men in the present study endorsed higher distress tolerance due to lesser experience of negative affect than women, as other findings among the current participants reveal no gender differences in negative affect ratings at any assessment point. Instead, it is possible that men may use more external strategies for coping with distress, while women rely on more internal tactics (see Daughters et al., 2009). Lastly, the absence of a gender difference in jealousy deserves mention. A sizeable body of literature grounded in evolutionary psychology suggests that men report more jealousy in response to sexual threats to interpersonal relationships, while women report more jealousy in response to threats to emotional threats to interpersonal relationships (e.g., Edlund, Heider, Scherer, Farc, & Sagarin, 2006; Guadagno & Sagarin, 2010). These fairly consistent findings suggest that jealousy assessments are likely to yield different responses from male and female participants. However, a set of studies conducted by DeSteno, Bartlett, Braverman, and Salovey (2002) suggest that the evolutionary-based and oft-reported pattern of gender differences in jealousy may be a product of measurement style more than a sex-specific pattern of responding to perceived relationship threat. Specifically, DeSteno and his colleagues showed that evolution-predicted gender differences in jealousy only materialized when assessment methods involved simultaneously judging between two infidelity-themed events and when jealousy was measured while participants appeared cognitively unburdened. Indeed, participants in the present study completed a questionnaire based assessment (i.e., the IJS; Mathes & Severa, 1981) that did not call for judging infidelity scenarios. Further, it was likely that participants were experiencing a fair cognitive load when completing the IJS given its placement in an hour and a half experimental study. These factors may have contributed to

the lack of gender differences in the present study. Despite the conclusions of DeSteno et al., as well as others who show similar results (e.g., Harris, 2003), it is difficult to dismiss the long-standing body of research documenting gender differences in jealousy that may be explained by evolutionary theory (see Buss, Larsen, & Westen, 1996; Sagarin, 2005). In the case of the present findings, it is also possible that gender differences did not emerge because the IJS includes items reflect both emotional and sexual jealousy, possible occluding any disparities.

Regarding emotion regulation strategy use, participants again reported trait levels of both expressive suppression and cognitive reappraisal that were consistent with other undergraduate samples (Gross & John, 2003; Magar et al., 2008). In line with these same studies, the present investigation also demonstrated a gender difference in suppression, with men reporting greater use of this strategy than women. However, overall, participants reported a greater tendency to use reappraisal in response to negative emotions as opposed to using suppression. Published investigations to date do not appear to have reported data regarding individuals' tendencies to use suppression versus reappraisal, rendering it difficult to place these findings in context with the greater body of research on emotion regulation.

The present study relied on a negative mood induction (i.e., the PASAT; Lejuez et al., 2003) and the random assignment of emotion regulation strategy use. Regarding the former, the current results strongly support the utility of the PASAT as an effective method of producing expected changes in both positive and negative affect, consistent with prior empirical investigations (Daughters et al., 2005; Feldner et al., 2006; Gratz et al., 2006). Data regarding the strength of the emotion regulation strategy were mixed, with strong support for the effectiveness of the suppression instructions and mixed support for the reappraisal

instructions. The possibility that the reappraisal manipulation was weaker than the suppression manipulation deserves consideration; however, other possibilities may explain these mixed findings as well. For example, as noted above, all study participants reported greater general use of reappraisal than suppression. That is, at a trait level, participants left to their own devices will tend to use reappraisal strategies more so than suppression strategies. When considering this context, it may be difficult for participants to override habitual tendencies to use a particular emotion regulatory strategy, even when instructed to do so. Thus, participants in the suppression condition may have markedly increased their use of suppression, while only slightly decreasing their use of reappraisal, during the PASAT task. Additionally, the reappraisal manipulation may have produced mixed support due to a ceiling effect. Given the frequency with which participants already reported using this strategy, there may not have been significant additional opportunity to increase its use. Yet another reason that data do not show the expected differences between emotion regulation strategy groups on certain measures of reappraisal may be measurement problems, such as low internal consistency among items comprising the *in vivo* reappraisal scale and/or difficulties reporting on the use of reappraisal in the moment.

The overall rate of past-year IPA perpetration was 26.3% for male participants and 21.4% for female participants. Although these prevalence rates are significant and consistent with some studies of undergraduate students, they are lower than a number of studies that report percentages of IPA perpetration nearing 50% (Cogan & Fennell, 2007; Forke et al., 2008; Nabors, 2010; Neufeld et al., 1999; Straus & Ramirez, 2004). Further, the frequency of reported acts was quite low, averaging near only one act per year.

Methodological differences between the present study and prior research may account for the

somewhat lower prevalence of IPA relative to other samples. Specifically, some prior studies have administered the CTS2 in large groups, perhaps allowing for additional anonymity, or have documented rates based on victims' reports, which may produce higher (and more accurate) estimates of aggression (Cogan & Fennell, 2007; Neufeld et al., 1999). Indeed, other work employing methodologies similar to that used here (i.e., asking participants about their own perpetration) resulted in similar or slightly lower IPA prevalence to the present study (Forke et al., 2008; Straus & Ramirez, 2004). Regarding hot sauce allocation as an analogue measure of interpersonal aggression, there is wide variation in mean weights reported among participants in other studies employing similar procedures (Bushman et al., 2005; DeSteno et al., 2006; Evers, Fisher, Mosquera, & Manstead, 2005; Klinesmith, Kasser, & McAndrew, 2006; Meier & Hinsz, 2004; Warburton, Williams, & Cairns, 2006). A likely reason for the great degree of variability is the inconsistency in size of both the container from which the hot sauce is allocated from and the cup in which the hot sauce is placed into, as well as the use of hot sauce of varying textures and weights. Similarly, assessment-related issues render IPA propensity difficult to compare across investigations, as the present study uses a version of the PAVE with adapted instructions (Babcock et al., 2004) designed to examine *in vivo* likelihood of aggressive behavior in specific situations. Of additional relevance to IPA findings, gender differences varied across assessment modality. There were no differences between men's and women's self-reported past-year IPA perpetration, which is consistent with a number of other studies of undergraduate students employing the CTS2 (Fincham, Cui, Braithwaite, & Pasley, 2008; Straus & Ramirez, 2007). On the other hand, women reported greater IPA propensity than men. This finding adds to the literature examining propensity toward engaging in IPA, as the only two known published studies to

have used the PAVE (Babcock et al., 2004; Finkel, DeWall, Slotter, Oakten, & Foshee, 2009) administered the measure to male participants only or did not test gender differences in scores on this measure. Lastly, men allocated significantly more hot sauce than women, which is in line with the vast majority of prior investigations that have used this aggression task (e.g., Evers et al., 2005; DeSteno et al., 2006). These findings support prior assertions that the IPA researchers must continue to investigate aggression perpetrated by individuals of both genders (e.g., Straus, 2011) and that assessment modality may significantly impact findings related to gender differences in aggressive behavior (Hamberger, 2005; Melton & Belknap, 2003).

### **Static Risk Factors and Aggression Perpetration**

As hypothesized, for male participants, more stressful life events were associated with increased past-year IPA perpetration. This finding adds to the substantial body of evidence documenting strong links between self-reported life stress and partner aggression (see meta-analysis by Stith et al., 2004). However, for females, lesser perceived negative valence of life events was associated with increased past-year IPA perpetration, counter to expectations. Although this finding is difficult to interpret, it is possible that, for women, periods of less life stress are associated with increased time spent with intimate partners, potentially increasing the opportunity for aggressive behavior to occur. Interestingly, no associations were found between either indicator of life stress and either *in vivo* form of aggression (i.e., IPA propensity, observed interpersonal aggression). Although no published investigation to date has examined the relationship between life stressors and in-lab aggressive behavior, a number of experiments suggest that acute stress and behavior during aggression paradigms are directly linked (Verona & Kilmer, 2007; Verona, Sadeh, & Curtin,

2009). Thus, life stress may be a risk factor for aggression only when both are assessed during the same time period that the stress is occurring. For example, in the present study, both life stress and aggression were assessed with respect to the year prior to assessment. Indeed, future studies that examine the life stress-aggression relationship may benefit from additional knowledge of the status of the stressor (e.g., resolved versus ongoing), as this factor may impact the potential relationship between prior stress and in-lab behavior.

Although the relationship between low distress tolerance and increased externalizing behaviors (e.g., addiction relapse, alcohol problems, self-harm) has been well documented (see Leyro et al., 2010 for review), this may be the first investigation to find an association between distress tolerance and IPA perpetration. Consistent with hypotheses, lower distress tolerance was associated with greater IPA propensity for both men and women (as assessed by the PAVE); these medium effects did not differ by gender. Individuals who have difficulty withstanding increased negative and decreased positive affect may be more attracted to aggressive responding when faced with a difficult interpersonal situation, as IPA may serve an emotion-soothing function for those who have difficulty managing distress (Daughters et al., 2008; DeWall et al., 2007). Another potential mechanism explaining the linkage between distress tolerance and IPA is put forth by Brown and colleagues (Brown et al., 2002, 2005), who posited that low distress tolerance coupled with a general tendency toward the experience of negative affect may serve as a “double whammy” that places individuals at greater risk for problematic behavior. Consistent with this view, a study by Verona, Patrick, and Lang (2002) demonstrated that participants high in trait negative emotionality behaved more aggressively toward an imaginary target following exposure to a physical stressor than participants low in trait negative emotionality.

Greater trait rumination was associated with the two forms of IPA perpetration for men—past year aggressive behavior and IPA propensity, consistent with hypotheses. The tendency toward rumination was not related to any form of women’s aggression; however, there were no significant gender differences in the effects found for men and women. Though the link between rumination and non-partner interpersonal aggression is reasonably well established (Bushman, 2002; Bushman et al., 2005; Peled & Moretti, 2010; Verona, 2005), this is among the first studies to document a relationship between rumination and partner-related IPA. Findings add to the literature documenting a relationship between rumination and general aggression (Bushman, 2002; Verona, 2005), including a study linking rumination to aggression toward objects during arguments with one’s partner (Carson & Cupach, 2000). According to trigger displaced aggression theory (Bushman et al., 2005; Miller et al., 2003), rumination may activate and sustain negative emotiocognitive processes that are coupled with aggression. As this process continues, aggressive behavior is primed and become mentally accessible. Extended and more intense rumination can facilitate the retrieval of these aggression networks, thus potentiating aggressive behavior.

In the present study, jealousy emerged as the most consistent static correlate of IPA outcomes, predicting three out of six potential associations. Specifically, men’s jealousy was associated with greater IPA propensity, while women’s jealousy was associated with greater past-year IPA perpetration and greater IPA propensity—all consistent with hypotheses and prior research (Archer & Webb, 2006; Holtzworth-Munroe et al., 2007; O’Leary et al., 2007; Wigman et al., 2008). It is not surprising that individuals with higher levels of jealousy reported greater IPA propensity, in light of the items that comprise this particular assessment of aggression. Jealousy is often enacted to protect valued relationships from attack—perceived



or real (Buss et al., 1992). The PAVE includes a number of scenarios asking respondents to place themselves in situations where their intimate relationship threatened (e.g., *I walk in and catch my partner having sex with someone; I find out that my partner has been flirting with someone*). An interesting possibility put forth by Archer and Webb (2006) is that jealousy and aggression both represent a latent characteristic such as emotional reactivity and are thus strongly correlated. Self-esteem may be another such trait. When an individual is threatened by an interpersonal affront, self-esteem may decrease while jealousy increases, leading to greater aggressive behavior (DeSteno et al., 2006).

The lack of associations between any of the static factors and observed interpersonal aggression, as assessed by the hot sauce allocation task, merits additional discussion. In contrast to two prior studies documenting direct links between rumination and jealousy and hot sauce allocation weight (Bushman et al., 2005; DeSteno et al., 2006), the present study used self-reports of static variables rather than experimental manipulations of these factors. It is possible that inconsistencies across studies are due to these different methodologies, and self-reports may be biased by factors such as social desirability that would not impact laboratory manipulations. Some researchers claim that the hot sauce allocation task may be influenced by other weaknesses common to aggression paradigms (e.g., demand characteristics; lack of availability of range of responses; see review by Ritter & Eslea, 2005), which may have limited associations between static factors and the hot sauce paradigm in the present study. However, combating this argument, are the multiple unique benefits that attest to the validity of the task. Notably, the pretext of the cover story provides a low likelihood that participants would view providing hot sauce as competitive, vengeful, or altruistic—a common limitation of many other aggression tasks. Participants were also unlikely to be influenced by demand

characteristics, given the specific wording of the instructions (e.g., “you can put in as much or as little as you want,” “any amount is fine”). These instructions also provide participants with a non-aggressive response option; indeed, some participants in this study chose to allocate no hot sauce to the target. Other paradigm procedures, such as the provision of privacy in which to allocate the hot sauce and a separate shelf on which to place the covered hot sauce cup, reduce the prospect that social desirability may play a role in responses. To ensure that the benefits conferred by the hot sauce paradigm procedures were applicable to all participants, any individual who expressed suspicion regarding the task’s true purpose or confusion regarding the instructions during debriefing interviews was removed from analyses. Collectively, these factors suggest that the lack of associations between static variables and this measure of observed interpersonal aggression are perhaps not due to characteristics inherent in the aggression task, but rather may be attributed to the less powerful assessment of static factors.

### **Emotion Regulation Strategy Use and Aggression Perpetration**

The hypotheses that participants instructed to use suppression would demonstrate increased IPA perpetration compared to participants using reappraisal, and that participants instructed to use reappraisal will demonstrate decreased aggression compared to participants using suppression were partially supported. Consistent with expectations, men who used suppression allocated more hot sauce than men who used reappraisal. However, this pattern of differences by emotion regulation strategy use did not hold for women, nor did it apply to IPA propensity for participants of either gender. Men may have been particularly influenced by the process of suppression in this study given their greater tendencies, on average, to use this strategy more than women (in this study and in others; Gross & John, 2003; Magar et al.,

2008). The lack of a relationship between emotion regulation strategy use and observed interpersonal aggression among women may also be due to gender differences in socialization of emotion, as well as aggression-related behavior. Whereas men typically are expected to stifle emotions, women are encouraged to display—not suppress—emotions (Haga, Kraft, & Corby, 2009). Similarly, identification with certain characteristics associated with the conventional male gender role (e.g., dominance) may lead men to behavior more aggressively than women (Cohn & Ziechner, 2006; Kilianski, 2003).

Several processes inherent to suppression may explain its influence on observed interpersonal aggression. Suppression is associated with enhancements in negative affect relative to reappraisal (Gross, 1998a), which, according to the Cognitive Neoassociationist (CN) model, Berkowitz (1989, 1990) provides amplified opportunity for accession of aggression networks and the enactment of aggressive behavior. Evidence documenting the significant cognitive load required of suppression as compared with reappraisal (Bonanno et al., 2004; Gross, 2002; Richards & Gross, 2000) suggests that men in the present study may have used their available resources managing emotion as opposed to dampening aggressive impulses. Male participants engaging in suppression may have also been experiencing increases in heart rate (Hofmann et al., 2009; John & Gross, 2004), which can give rise to increased aggression relative to participants using reappraisal, who may not experience similar physiological changes (Mauss et al., 2007). On the other hand, men using reappraisal may have greater access to problem solving strategies, cognitive flexibility, and/or resources for decision making given their ability to reframe the computer task in a manner that is less negative affect-eliciting (via the use of reappraisal; Aldao & Nolen-Hoeksema, 2010; Fladung et al., 2010; Heilman et al., 2010). Thus, after the computer task, male participants

who reappraised may have had the ability to think about the consequences of their actions (i.e., if they wanted to harm the purported participant by allocating a large amount of hot sauce). With negative affect looming and cognitive resources demanded, participants who suppressed were likely to be more limited in their ability to engage in higher-order thinking.

Regarding the absence of significant associations between emotion regulation strategy use and IPA propensity, it is possible that participants had adequately stabilized their affectual state by the time they engaged in the PAVE task. Some theorists posit that engaging in aggressive behavior may have an emotion regulatory function itself (e.g., DeWall et al., 2007). Thus, after participants completed the hot sauce allocation task, any potential impact of other emotion regulatory processes (i.e., suppression or reappraisal) on PAVE completion may have been occluded.

### **Emotion Regulation Strategy Use as a Moderator of the Relationship Between Static Risk Factors and Aggression Perpetration**

The third aim of the present study focused on potential moderators of the static risk factor-IPA perpetration relationship. Study results provided limited evidence that emotion regulation strategy use served as moderator of the association between any of the static risk factors and IPA perpetration. In one instance, partially consistent with hypotheses, men in the suppression condition allocated greater amounts of hot sauce as their reported negative valence of life events increased; men in the reappraisal condition did not differ in their hot sauce allocation based on their perceived valence of life stress. Similarly, consistent with hypotheses, women assigned to suppress negative emotions reported greater IPA propensity as the total number of life events they experienced in the prior year increased, while women assigned to reappraise reported lesser IPA propensity as the total number of life events they

reported in the prior year decreased. This relationship only applied to female participants, who reported viewing life events as more negative than did male participants. Considering these findings, the way in which individuals regulate stress-related negative emotions may particularly influence their behavior. Indeed, chronic life stress may increase the global negative affect that an individual brings into a stressful situation (Colder, 2001; Moberly & Watkins, 2008). When coupled with an ineffective down-regulation strategy (i.e., suppression), the CN theory states that emotion-aggression networks have a higher likelihood of activation (Berkowitz, 1989, 1990). An additional moderator was found between distress tolerance and observed interpersonal aggression for women who allocated hot sauce to male targets only. Specifically, women assigned to suppress allocated more hot sauce if they reported greater distress tolerance, while women in the reappraisal condition allocated less hot sauce if they had less distress tolerance. Although this finding is counterintuitive, it is possible that female college students participating in experiments may be more susceptible to demand characteristics than males (see Nichols & Maner, 2008), particularly when women have both the general ability to withstand negative emotions and are using effective emotion regulation strategies in the moment. In other words, women with high levels of distress tolerance engaging in reappraisal likely are effective at managing negative affect in a given moment, rendering them able to focus on a presented task and act in a goal-directed way. If these participants interpreted their goal as placing hot sauce in the cup—in line with the experimenter's request—they may have been more likely to comply as compared with low distress tolerance, suppression-assigned women.

### **Limitations and Directions for Future Research**

Several limitations of the current study bear note. Although the participants were demographically representative of the university from which they were recruited, they were fairly homogenous in race and ethnicity. In addition, all participants were college undergraduates who participated in this study for course credit. Due to the wide-ranging societal occurrence of IPA (Coker et al., 2002), there is great need to explore these research questions among a more broadly representative sample of individuals. Rates of IPA have been shown to be even higher among clinical samples, which suggests the need to explore the risk factors examined in the study among non-undergraduate groups (see Stith et al., 2004). Such investigations may yield very different results and provide crucial insight into these interrelationships for at-risk populations.

This study employed multimodal assessment of aggression via self-report and laboratory tasks measuring past-year IPA perpetration, IPA propensity, and observed interpersonal aggression. However, these three behaviors capture only a small portion of the aggressive behaviors in which individuals may engage. Future research should examine covert aggression, relational aggression, psychological aggression, and sexual coercion, among others, to provide a comprehensive picture of risk factors for aggression perpetration. These less-studied actions are part of the broader spectrum of aggressive behavior, and the CN model provides a theoretical rationale for why individuals may engage in these forms of aggression when faced with negative affect. However, because the rationale for participating in these forms of aggression may vary, so may the static and situational risk factors. Nonetheless, it is likely that emotion and the ways in which they are managed play an influential role. Further, given that aggression is interpersonal by nature, employing dyadic assessment strategies represents a key next step. Obtaining both partners' reports

questionnaires of past IPA is often suggested as an ideal way to limit biases associated with this form of measurement (Panuzio et al., 2006) and is one essential method in which partners may be included in assessment. Beyond questionnaire-based assessment, studies employing analogue IPA tasks have been published recently (e.g., painful yoga positions; Finkel et al., 2009; voodoo doll task; Slotter et al., in press) raising interesting possibilities for the observational examination of IPA perpetration. Although not without limitations, these approaches could address several limitations of the current study (e.g., social desirability and memory biases associated with self-reported IPA perpetration) while maximizing ability to assess constructs of interest.

The present study focused on four theoretically relevant static risk factors. However, there are a multitude of other variables that may interact with emotion regulation strategy use to predict aggression, thus serving as possible areas for expansion in this field. For example, positive and negative urgency—or the tendency toward impulsivity under conditions of positive or negative affect, respectively—are traits that are linked to a variety of problematic externalizing behaviors (Cyders & Smith, 2008). However, no research to date has investigated the links between urgency and IPA perpetration, nor urgency as it relates to emotion regulation, despite its very clear relevance to both fields. Lastly, the cross-sectional assessment employed here, while appropriate for the research questions at hand, do not allow for the prospective prediction of IPA perpetration or for investigation of how the static risk factors, emotion regulation strategy use, and IPA may covary over time. These time-dependent questions may be interesting avenues for future research.

Lastly, this study made multiple comparisons without controlling for alpha inflation. This liberal approach was used to minimize Type II error; however, this method also presents the possibility that Type I error may be responsible for some of the findings.

### **Clinical Implications**

Findings point to distress tolerance and jealousy as potential static predictors of IPA perpetration, while emotion regulation strategy use was highlighted as a possible influence on interpersonal aggression for men. Links between aggression and distress tolerance suggest several interventions that may be useful for individuals who perpetrate aggression. Given that interventions currently used in the community for IPA perpetrators often lag behind research evidence and are of questionable effectiveness in reducing recidivism (Price & Rosenbaum, 2009; Stuart, Temple, & Moore, 2007), knowledge of useful treatments for perpetrators would be invaluable. In specific, existing empirically supported treatments such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Dialectical Behavior Therapy (DBT; Linehan, 1993) target increasing distress tolerance as a treatment objective and may be useful in reducing aggressive behavior. Indeed, ACT protocols focusing on anger (see Eifert, McKay, Forsyth, & Hayes, 2006) may be particularly useful as they encourage the address of aggressive behavior as a treatment target. However, consistent with an ACT approach (Hayes et al., 1999), individuals who are motivated to reduce their aggression may benefit from the values-directed work, while other experiential exercises may assist with conceptualizing ongoing emotional struggles. Targeting aggressive behavior within DBT fits quite readily into this therapy's general framework. Given DBT's emphasis on mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness skill acquisition in the service of reducing ineffective behaviors and increasing



effective ones, aggression can easily serve as a primary treatment target for in the therapeutic context.

In addition to distress tolerance, jealousy was also fairly consistent correlate of IPA in this study. Nonetheless, there is little clinical attention paid to the treatment of functionally impairing jealousy, and the majority of empirical research on this emotion has focused on its underpinnings rather than ways of targeting its impact (Hart & Legerstee, 2010). Reducing interpersonal jealousy among individuals who tend to experience it at high levels may serve to prevent or reduce IPA perpetration. In the limited research on this topic, cognitive-behavioral therapy approaches have shown promise in reducing trait jealousy in a non-randomized wait-list controlled clinical trial (Dolan & Bishay, 1996). An empirical article that links jealousy to traits of dominance over one's partner also points to gender role-based approaches (O'Leary et al., 2007), which suggest that the address of power, control, and gender ideology may be useful components of treatment interventions for IPA perpetrators. Lastly, expressive suppression and cognitive reappraisal have been examined relative to myriad outcomes; however, this research has yet to translate to clinical intervention. The possibility that suppression may be associated with increased aggression, while reappraisal associated with less aggression, is an important one, given the centrality of negative affect management to most forms of psychopathology, internalizing behavior problems, and externalizing behavior problems (Gross, 2002).

### **Conclusions**

The impetus driving continued efforts to develop empirically supported theoretical models of IPA perpetration is a strong need to reduce the prevalence—and thus, the negative impact—of aggressive behavior. In this light, the present study attempted to integrate

previously separate, though related, theoretical frameworks (i.e., research on static factors, the CN model, emotion regulation theory) to systematically investigate individual differences in the negative affect-aggression relationship described by early aggression theorists (Berkowitz, 1983). Adding support to the present effort was evidence that conceptual and empirical models of IPA that have included both static and situational risk factors evidence greater predictive ability than models including solely static factors (e.g., Riggs & O’Leary, 1989, 1996; White et al., 2001). Although support for the primary hypotheses was inconsistent, and there was limited evidence that situational factors may assuage or enhance the impact of static factors, results provide preliminary evidence that the individual impact of these factors are important in predicting IPA perpetration. Stated otherwise, to continue to propel the field forward, research must continue to propose and test complex, multivariate models that consider both static and situational risk factors—and perhaps focus on their direct, as opposed to interactive, effects. In particular, emotion-related static factors such as distress tolerance, rumination, and jealousy were related to some forms of aggressive behavior, and observed interpersonal aggression differed depending on the form of emotion regulation participants used—thus highlighting the importance of the study of emotion as it relates to aggression. As research progresses, it is essential that these empirical findings are integrated and incorporated into clinical practice (see Hamby, 2011) to continue to propel the field and reduce the deleterious consequences of interpersonal aggression.

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Appendix A  
Questionnaires Used

### LES/CCLSS

Listed below are a number of events which sometimes bring about change in the lives of those who experience them and which necessitate social readjustment. Please check those events which you have experienced in the past twelve months. Be sure that all check marks are directly across from the items they correspond to (only check those that apply).

Also, for each item checked below, please indicate the extent to which you viewed the event as having either a positive or negative impact on your life at the time the event occurred. That is, indicate the type and extent of impact that the event had. A rating of -3 would indicate an extremely negative impact. A rating of 0 suggests that no impact either positive or negative. A rating of +3 would indicate an extremely positive impact.

1. Marriage
2. Detention in jail or similar institution
3. Death of spouse/partner
4. Major change in sleeping habits (much more or much less sleep)
5. Death of close family member:
  - a. mother
  - b. father
  - c. brother
  - d. sister
  - e. grandmother
  - f. grandfather
  - g. other (specify)
6. Major change in eating habits (much more or much less food intake)
7. Foreclosure on mortgage or loan
8. Death of close friend
9. Outstanding personal achievement
10. Minor law violations (traffic tickets, disturbing the peace, etc.)

11. Male: Wife/girlfriend's pregnancy
12. Female: Pregnancy
13. Changed work situation (different work responsibility, major change in working conditions, working hours, etc.)
14. New job
15. Serious illness or injury of close family member:
  - a. father
  - b. mother
  - c. sister
  - d. brother
  - e. grandfather
  - f. grandmother
  - g. spouse/partner
  - h. other (specify)
16. Sexual difficulties
17. Trouble with employer
18. Trouble with in-laws
19. Major change in financial status
20. Major change in closeness of family members
21. Gaining a new family member
22. Change of residence
23. If married: Separation from spouse (due to conflict)
24. Major change in church activities
25. If married: Reconciliation with spouse



26. Major change in number of arguments with spouse/partner
27. For Married Males: Change in wife`s work outside home
28. For Married Females: Change in husband`s work outside home
29. Major change in usual type and/or amount of recreation
30. Borrowing more than \$10,000
31. Borrowing less than \$10,000
32. Being fired from job
33. For Males: Wife/girlfriend having abortion
34. For Females: Having abortion
35. Major personal illness or injury
36. Major change in social activities
37. Major change in living conditions of family
38. Divorce
39. Serious injury or illness of close friend
40. Retirement from work
41. Son or daughter leaving home
42. Ending of formal schooling
43. Separation from spouse (due to work, travel, etc.)
44. Engagement
45. Breaking up with boyfriend/girlfriend
46. Leaving home for the first time
47. Reconciliation with boyfriend/girlfriend
48. Beginning a new school experience at a higher academic level

49. Changing to a new school at a same academic level
50. Academic probation
51. Being dismissed from dormitory or other residence
52. Failing an important exam
53. Changing a major
54. Failing a course
55. Dropping a course
56. Joining a fraternity/sorority
57. Financial problems concerning school
58. Roommate conflict
59. Homesickness
60. Friend conflict
61. Juggling school and job
62. Time spent on extracurricular activities
63. Noisy dorm/apartment
64. Not having privacy
65. Helping a friend with a problem
66. Parental pressure
67. Conflict with ex-boyfriend/ex-girlfriend
68. Difficult class
69. Not enough sleep
70. Uncertainty about future

## DTS

Directions: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

- a. Strongly agree
- b. Mildly agree
- c. Agree and disagree equally
- d. Mildly disagree
- e. Strongly disagree

1. Feeling distressed or upset is unbearable to me.
2. When I feel distressed or upset, all I can think about is how bad I feel.
3. I can't handle feeling distressed or upset.
4. My feelings of distress are so intense that they completely take over.
5. There's nothing worse than feeling distressed or upset.
6. I can tolerate being distressed or upset as well as most people.
7. My feelings of distress or being upset are not acceptable.
8. I'll do anything to avoid feeling distressed or upset.
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.
10. Being distressed or upset is always a major ordeal for me.
11. I am ashamed of myself when I feel distressed or upset.
12. My feelings of distress or being upset scare me.
13. I'll do anything to stop feeling distressed or upset.
14. When I feel distressed or upset, I must do something about it immediately.
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.

**RRQ-R**

Please respond to each item on a scale from 1 (strongly disagree) to 5 (strongly agree).

1. My attention is often focused on aspects of myself that I wish I'd stop thinking about.
2. I always seem to be rehashing in my mind recent things I've said or done
3. Sometimes it is hard for me to shut off thoughts about myself.
4. Long after an argument or disagreement is over, my thoughts keep going back to what happened.
5. I tend to dwell over things that have happened to me for a really long time afterward.
6. I don't spend time rethinking things that are over and done with.
7. Often, I'm playing back over in my mind how I acted in a past situation.
8. I often find myself reevaluating or rethinking something I've done.
9. I never dwell on myself for very long.
10. It is easy for me to put unwanted thoughts out of my mind.
11. I often reflect on episodes or times in my life that I should no longer be concerned with.
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments.

**IJS**

In responding to each item, picture you and your partner in the situation. Then use the scale below to express your feelings concerning the truth of each item. Please write the number that corresponds with your answer on the line provided.

1 = absolutely false; disagree completely

2 = definitely false

3 = false

4 = slightly false

5 = neither true nor false

6 = slightly true

7 = true

8 = definitely true

9 = absolutely true; agree completely

- \_\_\_\_\_ 1. If my partner were to see an old friend of the opposite sex and respond with a great deal of happiness, I would be annoyed.
- \_\_\_\_\_ 2. If my partner went out with same-sex friends, I would feel compelled to know what s/he did.
- \_\_\_\_\_ 3. If my partner admired someone of the opposite sex, I would feel irritated.
- \_\_\_\_\_ 4. If my partner were to help someone of the opposite sex with work or homework, I would feel suspicious.
- \_\_\_\_\_ 5. When my partner likes one of my same-sex friends, I am pleased.
- \_\_\_\_\_ 6. If my partner were to go away for the weekend without me, my only concern would be whether s/he had a good time.
- \_\_\_\_\_ 7. If my partner were helpful to someone of the opposite sex, I would feel jealous.

- \_\_\_\_\_ 8. When my partner talks of happy experiences of his/her past, I feel sad that I wasn't part of them.
- \_\_\_\_\_ 9. If my partner were to become displeased about the time I spend with others, I would be flattered.
- \_\_\_\_\_ 10. If my partner and I went to a party and I lost sight of him/her, I would become uncomfortable.
- \_\_\_\_\_ 11. I want my partner to remain good friends with the people s/he used to date.
- \_\_\_\_\_ 12. When I notice that a person of the opposite sex and my partner have something in common, I am envious.
- \_\_\_\_\_ 13. If my partner were to become very close to someone of the opposite sex, I would feel very unhappy and/or angry.
- \_\_\_\_\_ 14. I would like my partner to be faithful to me.
- \_\_\_\_\_ 15. I don't think it would bother me if my partner flirted with someone of the opposite sex.
- \_\_\_\_\_ 16. If someone of the opposite sex were to compliment my partner, I would feel that the person was trying to take him/her away from me.
- \_\_\_\_\_ 17. I feel good when my partner makes a new friend.
- \_\_\_\_\_ 18. If my partner were to spend the night comforting a friend of the opposite sex who had just had a tragic experience, his/her compassion would please me.
- \_\_\_\_\_ 19. If someone of the opposite sex were to pay attention to my partner, I would become possessive of my partner.
- \_\_\_\_\_ 20. If my partner were to become exuberant and hug someone of the opposite sex, it would make me feel good that s/he was expressing his/her feelings openly.
- \_\_\_\_\_ 21. The thought of my partner kissing someone else drives me up the wall
- \_\_\_\_\_ 22. If someone of the opposite sex lit up at the sight of my partner, I would become uneasy.

- \_\_\_\_\_ 23. I like to find fault with my partner's old dates.
- \_\_\_\_\_ 24. I feel possessive toward my partner.
- \_\_\_\_\_ 25. If my partner had previously been married, I would feel resentment towards his/her ex-spouse.
- \_\_\_\_\_ 26. If I saw a picture of my partner and an old date I would feel unhappy.
- \_\_\_\_\_ 27. If my partner were to accidentally call me by the wrong name, I would become furious.





### IV-ERQ

Please respond to the following questions based on how you dealt with your emotions during the computer task.

	Not At All	0	1	2	3	4	Extremely 5
1. I tried to see the computer task as positive as possible.	0	1	2	3	4	5	
2. I viewed the computer task as a challenge.	0	1	2	3	4	5	
3. I thought of the computer task in a way that made me stay calm.	0	1	2	3	4	5	
4. During the computer task, I controlled my emotions.	0	1	2	3	4	5	
5. During the computer task, I showed my emotions.	0	1	2	3	4	5	
6. One could have seen my feelings during the computer task.	0	1	2	3	4	5	

## CTS2

No matter how well a couple gets along, there are times when they disagree, get annoyed with the other person, want different things from each other or just have spats or fights because they are in a bad mood, are tired, or for some other reason. Couples also have many different ways of trying to settle their differences. This is a list of things that might happen when you have differences. Please circle how many times you did each of these things in the past six months, and how many times your partner did them in the past six months. If you or your partner did not do one of these things in the past six months, but it happened before that, circle “7”.

### HOW OFTEN DID THIS HAPPEN?

- |                                   |  |
|-----------------------------------|--|
| 1 = Once in the past 6 months     | 6 = More than 20 times in the past 6 mo. |
| 2 = Twice in the past 6 mo.       |  |
| 3 = 3-5 times in the past 6 mo.   | 7 = Not in the past 6 mo.,               |
| 4 = 6–10 times in the past 6 mo.  | but it did happen before                 |
| 5 = 11-20 times in the past 6 mo. | 0 = This has never happened              |

1. I insulted or swore at my partner.	1 2 3 4 5 6 7 0
2. My partner did this to me.	1 2 3 4 5 6 7 0
3. I threw something at my partner that could hurt.	1 2 3 4 5 6 7 0
4. My partner did this to me.	1 2 3 4 5 6 7 0
5. I twisted my partner's arm or hair.	1 2 3 4 5 6 7 0

6. My partner did this to me.	1 2 3 4 5 6 7 0
7. I made my partner have sex without a condom.	1 2 3 4 5 6 7 0
8. My partner did this to me.	1 2 3 4 5 6 7 0
9. I pushed or shoved my partner.	1 2 3 4 5 6 7 0
10. My partner did this to me.	1 2 3 4 5 6 7 0
11. I used force (like hitting, holding down, or using a weapon) to make my partner have oral or anal sex with me.	1 2 3 4 5 6 7 0
12. My partner did this to me.	1 2 3 4 5 6 7 0
13. I used a knife or gun on my partner.	1 2 3 4 5 6 7 0
14. My partner did this to me.	1 2 3 4 5 6 7 0
15. I called my partner fat or ugly.	1 2 3 4 5 6 7 0
16. My partner called me fat or ugly.	1 2 3 4 5 6 7 0
17. I punched or hit my partner with something that could hurt.	1 2 3 4 5 6 7 0
18. My partner did this to me.	1 2 3 4 5 6 7 0
19. I destroyed something belonging to my partner.	1 2 3 4 5 6 7 0
20. My partner did this to me.	1 2 3 4 5 6 7 0
21. I choked my partner.	1 2 3 4 5 6 7 0
22. My partner did this to me.	1 2 3 4 5 6 7 0
23. I shouted or yelled at my partner.	1 2 3 4 5 6 7 0
24. My partner did this to me.	1 2 3 4 5 6 7 0
25. I slammed my partner against a wall.	1 2 3 4 5 6 7 0
26. My partner did this to me.	1 2 3 4 5 6 7 0

27. I beat up my partner.	1 2 3 4 5 6 7 0
28. My partner did this to me.	1 2 3 4 5 6 7 0
29. I grabbed my partner.	1 2 3 4 5 6 7 0
30. My partner did this to me.	1 2 3 4 5 6 7 0
31. I used force (like hitting holding down, or using a weapon) to make my partner have sex with me.	1 2 3 4 5 6 7 0
32. My partner did this to me.	1 2 3 4 5 6 7 0
33. I stomped out of the room, house, or yard during a disagreement.	1 2 3 4 5 6 7 0
34. My partner did this to me.	1 2 3 4 5 6 7 0
35. I insisted on sex when my partner didn't want to (but did not use physical force).	1 2 3 4 5 6 7 0
36. My partner did this to me.	1 2 3 4 5 6 7 0
37. I slapped my partner.	1 2 3 4 5 6 7 0
38. My partner did this to me.	1 2 3 4 5 6 7 0
39. I used threats to make my partner have oral or anal sex.	1 2 3 4 5 6 7 0
40. My partner did this to me.	1 2 3 4 5 6 7 0
41. I burned or scalded my partner on purpose.	1 2 3 4 5 6 7 0
42. My partner did this to me.	1 2 3 4 5 6 7 0
43. I insisted that my partner have oral or anal sex (but did not use physical force).	1 2 3 4 5 6 7 0
44. My partner did this to me.	1 2 3 4 5 6 7 0

45. I accused my partner of being a lousy lover.	1 2 3 4 5 6 7 0
46. My partner accused me of this.	1 2 3 4 5 6 7 0
47. I did something to spite my partner.	1 2 3 4 5 6 7 0
48. My partner did this to me.	1 2 3 4 5 6 7 0
49. I threatened to hit or throw something at my partner.	1 2 3 4 5 6 7 0
50. My partner did this to me.	1 2 3 4 5 6 7 0
51. I kicked my partner.	1 2 3 4 5 6 7 0
52. My partner did this to me.	1 2 3 4 5 6 7 0
53. I used threats to make my partner have sex.	1 2 3 4 5 6 7 0
54. My partner did this to me.	1 2 3 4 5 6 7 0

## PAVE

Sometimes there are situations when people are more likely to become **PHYSICALLY** aggressive than other times. Sometimes people feel that violence is justified, given the situation. Please indicate how likely it is that you would be physically aggressive in each of the following situations, if they were to arise **RIGHT NOW**. If you are not in a relationship currently, please answer these questions regarding how you would be likely to act if you were in a relationship and these situations were to occur **RIGHT NOW**.

Please use the following scale:

1	2	3	4	5	6
Not at all likely			Extremely likely		

1. My partner does something to offend or disrespect me.
2. My partner threatens to leave me.
3. My partner just won't stop talking or nagging.
4. I walk in and catch my partner having sex with someone.
5. My partner says, "I wish we never got together."
6. My partner spends a lot of time with close friends of the opposite sex.
7. I find out that my partner has been flirting with someone.
8. My partner comes home late.
9. My partner spends money without consulting me.
10. When my partner and I argue about sex.
11. My partner threatens to divorce/break up with me.
12. My partner ridicules or makes fun of me.
13. My partner tells me not to do something that I want to do.
14. My partner tries to control me.
15. My partner interrupts me when I'm talking.
16. My partner does not include me in important decisions.
17. My partner ignores me.
18. My partner is physical aggressive towards me first.
19. My partner tries to leave during an argument.
20. My partner blames me for something I didn't do.

### Modified PANAS

Directions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you feel this way RIGHT NOW.

Use the following scale to record your answers.

(1) = Very slightly or not at all

(2) = A little

(3) = Moderately

(4) = Quite a bit

(5) = Extremely

1. Cheerful
2. Disgusted
3. Relaxed
4. Irritable
5. Enthusiastic
6. Upset
7. Happy
8. Nervous
9. Calm
10. Distressed

11. Jealous

12. Angry



**Computer Task Questions** (adapted from Gross, 1998)

Scale from 0 (strongly disagree) to 8 (strongly agree)

1. During the computer task, I tried not to feel anything at all.
2. During the computer task, I felt emotions but tried to hide them.
3. During the computer task, I reacted completely spontaneously.

Appendix B

University of Nebraska – Lincoln Institutional Review Board Approval Letters



May 30, 2008

Jillian Panuzio  
 Department of Psychology  
 1340 N 44th St #12 Lincoln, NE 68503

David DiLillo  
 Department of Psychology  
 238 BURN UNL 68588-0308

IRB Number: 2008-05-8497 FB  
 Project ID: 8497  
 Project Title: Life Events, Emotions, and Problem Solving

Dear Jillian:

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study. Your proposal seems to be in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

You are authorized to implement this study as of the Date of Final Approval: 05/30/2008. This approval is Valid Until: 04/29/2009.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

- Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
- Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- Any breach in confidentiality or compromise in data privacy related to the subject or others; or
- Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

For projects which continue beyond one year from the starting date, the IRB will request continuing review and update of the research project. Your study will be due for continuing review as indicated above. The investigator must also advise the Board when this study is finished or discontinued by completing the enclosed Protocol Final Report form and returning it to the Institutional Review Board.

If you have any questions, please contact the IRB office at 472-6965.

Sincerely,  
Dan Hoyt, Chair  
for the IRB

---

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Appendix C  
Study Informed Consent Form

Informed Consent Form  
**Life Events, Emotions, and Problem Solving**

***Purpose of the Research***

You have been invited to participate in a research study investigating how prior life experiences and emotions may affect problem solving abilities. You must be University of Nebraska student in order to participate. You were invited to participate in this study because you are currently enrolled in a Psychology course that offers extra credit.

***Procedures***

If you agree to participate, your participation in this project will take approximately 1.5 hours to complete. The study will take place in room 52 or room 74 of the Psychology Department. You will be asked to complete questionnaires about adverse childhood and adulthood events (including childhood sexual abuse, other forms of childhood neglect, and other events of a sexual nature), emotional experiences and ways of dealing with emotions, aggressive behavior, alcohol use, and current symptoms of psychological distress. You also will complete a computer task that may cause you to feel frustrated or upset. You will be video-recorded while you are completing this computer task. Finally, you will be asked to put together and label a food sample.

***Risks and/or Discomforts***

It is possible that you might experience some discomfort when answering questions about adverse child or adult experiences or when completing the computer task mentioned above. You may refuse to answer the questions or stop at any time without penalty and for any reason. If you wish to stop the study at any time, you may do so without harming your relationship with the researchers or with the university. In the event of problems resulting from participation in this study, psychological treatment is available on a sliding scale fee at the UNL Psychological Consultation Center, telephone (402) 472-2351.

***Benefits***

Although there are no known direct benefits to study participants, this project may provide researchers with a better understanding of how prior life experiences and emotions affect one another.

Participant Initials \_\_\_\_\_



### ***Confidentiality***

Any identifying information (e.g., names, UNL student identification numbers) obtained during this study will be protected and will not be disclosed unless required by law or regulation. The responses you provide will be identified only by a randomly assigned participant identification number, which will not be linked to your name or the data you provide.

Any paper data will be stored in a locked cabinet in the principal investigator's office and will be kept for five years after the study is complete. Any computerized data that you provide, including video-recordings, will be stored without any identifying information on a password-protected computer. Only the researchers listed at the bottom of this form and study personnel will have access to your data. The knowledge gained from this study may be published in scientific journals or presented at scientific meetings, but it will be reported only as aggregate data.

### ***Compensation***

You will receive three units of research credit for participating in this project. Credit will be awarded after the completion of the study. If you choose not to participate in this study, you should consult your instructor about alternate ways to earn credit. If you withdraw before completing all elements of the study, you will receive 1 credit for each half an hour of the study that you completed.

### ***Opportunity to Ask Questions***

You may ask questions about this research and have those questions answered before agreeing to participate in the study. In addition, you may ask questions during the study. You may also call the investigator, Jill Panuzio, MA, at any time at (402) 478-8162. If you have questions concerning your rights as a research participant that have not been answered by the investigator or if you wish to report concerns about the study, you may contact the University of Nebraska-Lincoln Institutional Review Board at (402) 472-6965.

### ***Freedom to Withdraw***

You are free to decide not to participate in this study or to withdraw at any time without harming your relationship with the researchers or the University of Nebraska. Your decision will not result in any loss or benefits to which you are otherwise entitled.

### ***Consent to Participate and Right to Receive a Copy***

You are voluntarily making a decision whether or not to participate in this research study. Your signature indicates that you have decided to participate in the study after reading the

Participant Initials \_\_\_\_\_

238 Burnett Hall / P.O. Box 880308 / Lincoln, NE 68588-0308 / (402) 472-3721 / Fax (402) 4



consent form and having opportunities to ask questions about the information presented.  
You will be given a copy of this consent form to keep.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Researcher

\_\_\_\_\_  
Date

Names and Phone Numbers of Investigators

Jill Panuzio, M.A., Principal Investigator  
David DiLillo, Ph.D., Secondary Investigator

(402) 478-8162  
(402) 472-3297

238 Burnett Hall / P.O. Box 880308 / Lincoln, NE 68588-0308 / (402) 472-3721 / Fax (402) 4



## Appendix D

### Emotion Regulation Strategy Instructions

Suppression Condition:

- Say: “The next part of the study involves the computer task that I told you about earlier.”
  - Say: “Like in many situations, there are different ways to think about this task. In this case, we would like you to try your best to not let any emotions or feelings that you have while doing this task show. Specifically, we ask that you try to act in a way so that someone watching you would not know that you are feeling anything at all. So, do your best with it, but please try to keep any feelings you have inside.”
  - Say: “As an example of what I’m talking about, imagine that you are driving down a street when someone in another car pulls out right in front of you without warning, and you have to slow down to avoid them.. How might you react so that someone riding in the car with you wouldn’t know what you were feeling?”
    - Have participant generate at least one example. Then say, “Exactly” and repeat or paraphrase the example she/he provided. Then say: “You could also say <pick two DIFFERENT examples from the “acceptable examples” list below.>”
    - If participant cannot come up with an example, say: “Well, for example, you might keep thinking about the situation even though you’re not talking about it.” Can you think of any other examples like that?”
      - If they generate an example here, repeat the step above.
      - If they cannot generate an example, say: “Here are some other things you might say to yourself to think of things in a positive way ...” and then list of the remaining examples in the “acceptable examples” list below. Be sure to make a note on the Participant Appointment Notes form if the participant cannot generate an example of her/his own.
    - Acceptable examples:
      - You might not say anything but still think about it.
      - You might grip the steering wheel tighter and stop talking for a bit.
      - You might pay less attention to what your friend is saying and stare at the road.
      - You might feel your heart beat faster or feel flushed or hot.
    - Say: “The main thing here is to act so that someone looking at you wouldn’t be able to tell what you were feeling. Some people call this suppressing or stuffing your emotions.”
  - Say: “Do you have any questions?”
  - Say: “Okay, we’ll get started on the computer task now. This camera will be recording, so we can see how you respond. Remember to do your best with the task, but try to behave so that someone watching you would not know that you are feeling anything at all. You’ll hear several reminders of this during the computer task.”
- [The reminder during the PASAT will say: “Remember to not show your feelings.”]

Reappraisal Condition:

- Say: “The next part of the study involves the computer task that I told you about earlier. Many people find it difficult, and it can be frustrating. But, like in many situations, there are different ways to think about it. In this case, we would like you to think of the positive

aspects of the task. Specifically, we ask that you think of the task as a game or a challenge. So, do your best with it, but please try to think of it in a less negative way.”

- Say: “As an example of how to think of things in a less negative way, imagine that you are driving down a street when someone in another car pulls out right in front of you without warning, and you have to slow down to avoid them. How might you react that would be an example of thinking of that situation in a less negative way?
    - Have participant generate at least one example. Then say, “Exactly” and repeat or paraphrase the example she/he provided. Then say: “You could also say <pick two DIFFERENT examples from the “acceptable examples” list below.>”
    - If participant cannot come up with an example, say: “Well, for example, you could say ‘maybe that other person didn’t see me; I’ve done that before.’” Can you think of any other examples like that?”
      - If they generate an example here, repeat the step above.
      - If they cannot generate an example, say: “Here are some other things you might say to yourself to think of things in a positive way ...” and then list of the remaining examples in the “acceptable examples” list below. Be sure to make a note on the Participant Appointment Notes form if the participant cannot generate an example of her/his own.
    - Acceptable examples:
      - “Maybe the other person didn’t see me; I’ve done that before.”
      - “Maybe they were in a hurry.”
      - “At least no one got hurt.”
      - “I’m not in any rush, so it’s no big deal.”
  - Say: “Do you have any questions?”
  - Say: “Okay, we’ll get started on the computer task now. This camera will be recording, so we can see how you respond. Remember to do your best with the task, but to try to think of it in a less negative way. You’ll hear several reminders of this during the computer task.”
- [The reminder during the PASAT will say: “Remember to think of this in a less negative way.”]

Appendix E  
Study Debriefing Form

## Debriefing Form

Thank you for participating in this study. The purpose of this basic research study was to examine how different ways of dealing with negative emotions may be related to behavior, particularly aggression. This experimental investigation also explored how prior life experiences, life stress, emotions, and psychological symptoms might impact aggression. Your responses may provide valuable information that may improve our understanding of aggression and inform prevention and treatment efforts.

Some of the questionnaires that you completed dealt with serious and potentially difficult issues. These questions were included so that we can examine the relationships between certain stressful life experiences and emotions and future behavior and functioning.

The computer task that you completed is designed to be almost impossible and to induce a mild negative mood. All participants in the study receive negative feedback on their performance regardless of how well they do on the task. This is done to ensure that all participants have similar experiences with the task. The video-recordings were done so that we can see how you were managing your emotions during the computer task.

The hot sauce task was actually part of this study and is used to “estimate” aggressive behavior. The study staff did not fully disclose this information at the beginning of the study because it is important for participants to respond to the hot sauce task without knowing what it is about. If participants know about the purpose of the hot sauce task, they are likely to respond differently. In such a case, information provided during the study would not be as useful.

It is important for you to know that no one actually had to consume the hot sauce that you put in the cup. Different participants have put various amounts of hot sauce in the cup in response to the demands of the experiment. This does not mean that any study participant is aggressive or bad. This just means that you and other participants were reacting to the experimental situation.

For the data collected as part of this study to be most useful, it is important that new participants are not given information about the study until the very end of their participation. **For this reason, we ask that you please do not share any information about the nature or purpose of this study with other UNL undergraduates.**

Some parts of this study may have caused you to feel uncomfortable or distressed. For most participants, such negative feelings will have disappeared by the time you have finished the study. However, if you still feel distressed or uncomfortable after you leave the study and wish to speak to someone, you may contact the study Principal Investigator, Jill Panuzio, MA, at [panuzio@gmail.com](mailto:panuzio@gmail.com) or (402) 478-8162. You may also contact the Principal Investigator if you wish to talk about your experience with the study. Psychological services are also available on a sliding scale fee or free of charge at the UNL Psychological Consultation Center, 325 Burnett Hall, (402) 472-2351 or the UNL Counseling and Psychological Services, 15<sup>th</sup> & U St., (402) 472-7450.

Thank you again for your participation.

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Signature of Participant

Date

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Signature of Study Staff

Date