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Jillian Panuzio Scott

University of Nebraska-Lincoln, jillian.scott@va.gov

David DiLillo

University of Nebraska-Lincoln, ddilillo@unl.edu

Rosalita C. Maldonado

University of Nebraska-Lincoln

Laura E. Watkins

University of Nebraska-Lincoln, watlaura@gmail.com

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Negative Urgency and Emotion Regulation Strategy Use: Associations with Displaced Aggression

Jillian Panuzio Scott, David DiLillo, Rosalita C. Maldonado, and

Laura E. Watkins

Department of Psychology, University of Nebraska–Lincoln, Lincoln, Nebraska

Jillian Panuzio Scott's current affiliation is Psychology Service, VA Boston Healthcare System and Department of Psychiatry, Boston University School of Medicine, Boston, Massachusetts.

Corresponding author – Jillian Panuzio Scott, Psychology Service (116B), VA Boston Healthcare System, 150 S. Huntington Avenue, Boston, MA 02130, email jillian.scott@va.gov

Abstract

The numerous public health consequences of interpersonal aggression highlight the necessity of a comprehensive understanding of factors influencing its perpetration. This study examined direct and interactive associations between negative urgency and emotion regulation strategy use in predicting displaced aggression under conditions of negative mood. Participants were 197 male and female undergraduate students who were randomly assigned to employ either cognitive reappraisal or expressive suppression in response to a negative mood induction. Immediately afterward, participants engaged in an analog displaced aggression task. Results revealed direct, positive associations between negative urgency and aggression. In addition, the use of suppression was associated with greater aggression than was the use of reappraisal alone. Counter to the hypothesis, there were no interactive effects between negative urgency and emotion regulation strategy use in predicting aggression. Findings suggest reducing negative urgency and use of suppression as potential intervention targets for individuals who engage in aggressive behavior.

Introduction

Interpersonal aggression is among the chief social problems facing the United States today, affecting individuals in all stages of life and resulting in a host of serious physical, psychosocial, legal, and economic costs (Centers for Disease Control and Prevention, 2012; Institute of Medicine and National Research Council, 2012; Waters et al., 2004). The alarming consequences of interpersonal aggression, along with the millions of individuals directly and indirectly impacted by it, underscore the need for a comprehensive understanding of factors that contribute to this phenomenon. Given its prevalence, it is not surprising that interpersonal aggression takes many forms. One significant but relatively less studied type is *displaced aggression*, or aggressive behavior perpetrated after a provocation, but against an uninvolved—and often less powerful—target rather than the original provocateur (Marcus-Newhall, Pedersen, Carlson, & Miller, 2000). Displacement is implicated in aggressive behavior across a variety of contexts, including child abuse, intimate partner violence, police brutality, and animal cruelty.

Aggressive behavior arises from a complex set of influences, and prominent theoretical writings highlight various classes of risk factors that independently and collectively may increase the risk of aggression (see Anderson & Bushman, 2002; Miller, Pedersen, Earleywine, & Pollock, 2003). One such model, originally developed to explain intimate partner violence and later applied to aggressive behavior more broadly, is the I³ theory (Finkel, 2007; Finkel & Eckhardt, 2013; Slotter & Finkel, 2011). I³ theory posits that the stage for aggression is set by the convergence of factors at three levels of analysis: instigation forces, which serve as a provocation for aggression; impellance forces, which strengthen the propensity toward aggression; and inhibition forces, which weaken the ability to restrain aggressive propensities. In other words, the presence of strong instigating and impelling forces, coupled with weak inhibiting forces, creates a high-risk situation for aggression. The present study adopts I³ theory and extends its application to displaced aggression in particular.

Negative Urgency and Aggression

Research focusing on impellance factors points to negative urgency, or the tendency to act impulsively under conditions of strong negative affect, as an important dispositional contributor to interpersonal aggression (Dvorak, Pearson, & Kuvaas, 2013; Miller, Flory, Lynam, & Leukefeld, 2003; Miller, Zeichner, & Wilson, 2012; Settles et al., 2012). For example, in a study of general interpersonal aggression, Miller, Flory et al. (2003) examined four personality dimensions: negative urgency, sensation seeking, (lack of) premeditation, and (lack of) perseverance. While all dimensions correlated with aggression, in simultaneous regression analyses, only negative urgency predicted self-reported aggression. Although no known study has examined the link between negative urgency and displaced aggression, specifically, related work with adult prisoners reveals positive associations between generalized impulsivity and self-reported displaced aggression (Archer, Ireland, & Power, 2007), suggesting that rash action influenced by negative affect may drive aggression against an uninvolved target.

Emotion Regulation and Aggression

Although it may take many forms, emotion regulation most generally involves “the process by which we influence which emotions we have, when we have them, and how we experience and express them” (Gross, 1998b, p. 275). Some emotion regulatory attempts are employed before the emotion response tendencies have fully manifested (antecedent-focused), whereas others occur after these response tendencies have been generated (response-focused). Two well-studied forms of emotion regulation are cognitive reappraisal and expressive suppression. As an antecedent-focused strategy, cognitive reappraisal involves construing an emotion-invoking situation in a nonemotional way, before it is fully manifested. The response-focused strategy of expressive suppression involves inhibiting outward expression of emotion once it is experienced. Studies in which participants are instructed to either reappraise or suppress in response to a stressor, as well as investigations examining self-reported emotion regulation strategy use, consistently find that reappraisal is linked to more adaptive outcomes in social, emotional, cognitive, and physiological domains, whereas suppression is associated with a host of maladaptive outcomes (see John & Gross, 2004 for a review).

The use of reappraisal and suppression also may impact the occurrence of aggression, albeit in different ways. Reappraisal may serve as a strong inhibiting force for aggression via several pathways. In studies comparing suppression to reappraisal, use of reappraisal is linked to more adaptive social functioning (Butler et al., 2003; Gross & John, 2003), less negative emotion and improved ability to self-soothe negative mood (Butler et al., 2003; Denson, Moulds, & Grisham, 2012; John & Gross, 2004), greater availability of cognitive resources (Franchow & Suchy, 2014; Gross, 2002; Richards & Gross, 2000), and superior physiological functioning (Denson, Grisham, & Moulds, 2011; Mauss, Cook, Chen, & Gross, 2007; Memedovic, Grisham, Denson, & Moulds, 2010)—all of these may inhibit aggressive responding among individuals using reappraisal. Indeed, experimental investigations demonstrate that when participants receive mitigating information about a provocateur’s actions (i.e., fodder for reappraisal), they respond less aggressively toward the instigating target than in instances where such attributional information is not provided (see Barlett, 2013). In contrast, suppression is likely to serve as a strong disinhibiting force for aggression, as using expressive suppression to conceal negative affect, such as anger arising from interpersonal conflict, appears to increase the risk of aggression. For example, suppression has been found to predict men’s self-reported aggressive behavior, even after controlling for trait anger (Tull, Jakupcak, Paulson, & Gratz, 2007). These authors suggest that attempts to suppress negative affect actually enhance state anger, creating an aversive internal state that disinhibits aggressive responding. Suppression is also associated with poorer social relationships (Butler et al., 2003; Richards, Butler, & Gross, 2003; Srivastava, Tamir, McGonigal, John, & Gross, 2009), more long-lasting and intense negative affect (Dalgleish, Yiend, Schweizer, & Dunn, 2009; Ehring, Tuschen-Caffier, Schnulle, Fisher, & Gross, 2010; Harris, 2001), increased demands on cognitive resources (Gross, 2002; Richards & Gross, 2000), and greater physiological arousal (Butler et al., 2003), all of which may increase risk for aggressive behavior (Berkowitz, 1990; Hoaken, Shaughnessy, & Pihl, 2003; McMurrin, Blair, & Egan, 2002; Patrick & Verona, 2007). Alt-

though experimental investigations of the emotion regulation-aggression link have not focused on displaced aggression, it is plausible that this form of aggression may be influenced by emotion regulation via comparable mechanisms, given the importance of similar social, affective, and cognitive variables in determining displaced aggression (Marcus-Newhall et al., 2000).

Do Negative Urgency and Emotion Regulation Interact to Predict Aggression?

The consistent evidence linking negative urgency to greater aggression raises the important question of whether this predisposition might be altered by (dis)inhibiting factors occurring more proximal to the aggression. Specifically, because urgency impels “affect-driven rash action,” conscious efforts to regulate emotions in the moment may serve to either amplify or reduce associations between negative urgency and aggression. Applying Finkel’s (2007) P theory in the present context, we suggest that trait-level tendencies toward rash action under instigating conditions of intense negative affect may be mitigated or aggravated by the use of *in vivo* strategies to regulate that affect. In particular, cognitive reappraisal may enable individuals to disrupt the escalation of negative affect before it reaches levels that set impulsivity into motion. Conversely, the use of suppression may prompt individuals high in negative urgency to experience the intense cognitive and affective states that heighten the risk of impulsive displaced aggression.

The Present Study

In the current study, we examined associations among negative urgency, emotion regulation strategy use, and displaced aggression by testing the following hypotheses. First, consistent with prior work (e.g., Miller, Flory et al., 2003), we predicted that increased negative urgency would be associated with greater aggression perpetration. Second, based on research documenting links between emotion regulation strategy use and aggressive behavior (e.g., Barlett, 2013; Tull et al., 2007), we predicted that participants who engaged in reappraisal would demonstrate decreased displaced aggression compared to participants using expressive suppression. Finally, based on evidence suggesting interactions between impelling and inhibiting factors in predicting interpersonal aggression perpetration (e.g., Finkel, 2007), we predicted that associations between increased negative urgency and greater displaced aggression would be *attenuated* by the use of reappraisal, whereas suppression would *enhance* associations between increased negative urgency and greater aggression.

Method

Participants

Participants were 197 undergraduate students (99 men, 98 women) who were recruited for a larger study of emotion regulation and aggressive behavior among individuals in an intimate relationship. 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, six (3.0%) identified as African American or Black, three (1.5%) identified as Native Hawaiian or Pacific Islander, one (0.5%) identified as American Indian or

Alaskan Native, and three (1.5%) identified as “other.” Mean participant age was 20.55 ($SD = 3.55$; range 18–51 years). 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 2 months, and the mean relationship length was 21.06 months ($SD = 36.26$; range 2–366 months). 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

Negative urgency

Negative urgency was assessed with the 12-item Negative Urgency subscale of the UPPS-P Impulsive Behavior scale (Lynam, Smith, Whiteside, & Cyders, 2006), which measures respondents’ tendency to behave rashly when experiencing negative affect. Responses are given on a scale from 1 (agree strongly) to 4 (disagree strongly). The reliability and validity of this measure has been well documented (Cyders & Smith, 2007, 2010). The internal consistency reliability estimate for this subscale was .85.

In vivo displaced aggression

In vivo displaced aggression was assessed using the hot sauce allocation task (Lieberman, Solomon, Greenberg, & McGregor, 1999), an analog measure of aggressive behavior. In accordance with procedures outlined by Lieberman et al. (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. Specifically, a 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 analog measure of aggression in a number of empirical investigations (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 (Adachi & Willoughby, 2011; McGregor et al., 1998). The ecological validity of this task is supported by a number of real world incidents (Lacerra, 2013; Lehman, 2007; Rock, 2007) in which hot sauce has been used to cause physical harm to another person.

Procedures

All procedures were approved by the Institutional Review Board of the home university. Participants were recruited for a study of students in relationships via a participant management website that links students in undergraduate psychology courses that offer credit for research participation with research study investigators. To minimize recruitment bias,

the study was described nondescriptly as “a research study about life experiences, emotions, and problem solving.” Students received credit for completing this study, consistent with departmental policy. Following informed consent, participants completed self-report questionnaires via computer, after which they 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 (reappraisal or suppression) to be used in response to the negative mood induction. Random assignment was stratified by gender to facilitate the examination of gender differences. Consistent with procedures employed by Gross and colleagues (e.g., Gross, 1998a; Richards & Gross, 2000), participants 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. Those 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. To support these 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, Kahler, & Brown, 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 nonresponse, 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. After completing the PASAT, all participants were given negative feedback about their performance (i.e., told that they scored in the bottom 20th percentile), to reinforce negative mood consistently, regardless of their perception of task performance. For this investigation, the PASAT also was modified from its original form by removing a button that allowed participants to choose when to discontinue the task, thus, ensuring a uniform “dose” of negative mood induction across participants. The PASAT has been used in a number of studies to induce negative mood among a variety of populations (e.g., Daughters et al., 2005; Feldner, Leen-Feldner, Zvolensky, & Lejuez, 2006; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). The completion of the PASAT has been found to induce moderate, short-term (i.e., 5–10 min) levels of emotional distress (Brown, Lejuez, Kahler, & Strong, 2002; Lejuez et al., 2003).

Two checks were employed to ensure that (i) the mood manipulation (described above) was successful in inducing negative mood, and (ii) 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) immediately pre- and post-mood induction, 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; 12 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). Multiple investigations attest to the validity and reliability of the PANAS (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, four items designed to assess *in vivo* use of suppression and reappraisal were examined individually to assess the success of the emotion regulation manipulation (see Egloff, Schmukle, Burns, & Schwerdtfeger, 2006). Items measuring suppression (both reverse-scored) were as follows: "During the computer task, I showed my emotions" and "One could see my feelings during the computer task." Items measuring reappraisal were as follows: "I tried to see the computer task as positive as possible" and "I viewed the computer task as a challenge." Responses indicate participants' agreement with each statement on a scale ranging from 0 (not at all) to 5 (extremely).

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" to consume. Following this and to address any residual distress, participants watched two film clips that have been found to increase feelings of contentment (Gross & Levenson, 1995). All participants were verbally debriefed about the full purposes of the study and thanked for their participation.

Results

Descriptive Data and Manipulation Check

Descriptive data are presented in table 1. Both male and female participants reported similar levels of negative urgency on the UPPS-P: men's mean negative urgency total score was 25.39 ($SD = 6.36$), and women's mean negative urgency total score was 25.49 ($SD = 6.34$). Participants' negative urgency total scores were similar between the two emotion regulation strategy conditions for both males, $t(97) = 1.09$, $P = .28$, and females, $t(96) = 1.71$, $P = .09$. Additionally, negative urgency was associated with change in negative mood during the PASAT, $r = .24$, $P < .001$. For this reason, and to reduce any potential biases that may have been accounted for by individual differences in responsiveness to the computer task, negative mood change was included as a control when examining study hypotheses. The mean amount of hot sauce allocated was 22.85 g ($SD = 25.55$) among men and 13.13 g ($SD = 9.06$) among women. Male participants allocated significantly more hot sauce as part of the aggression task than female participants, $t(179) = 3.35$, $P < .001$. The amount of hot sauce allocated was not related to participant's negative mood before, $r = -.08$, $P = .26$, or after the PASAT task, $r = -.04$, $P = .54$, or their negative mood change during the PASAT task, $r = -.01$, $P = .86$.

Table 1. Descriptive Statistics of Study Variables

Measure	All			Male			Female		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Negative urgency	25.44	6.33	12–48	25.39	6.36	12–48	25.49	6.34	13–41
Pre-PASAT negative mood	8.73	2.79	7–26	8.69	2.76	7–26	8.78	2.83	7–25
Post-PASAT negative mood	11.65	5.22	7–35	11.40	4.97	7–31	11.91	5.48	7–35
Negative mood change during PASAT	2.92	4.54	–3–21	2.71	4.55	–3–20	3.13	4.55	2–21
Hot sauce allocation (grams)	18.02	19.76	5–141	22.85	25.55	5–141	13.13	9.06	5–63

Note: PASAT, Modified Paced Auditory Serial Addition Task. Hot sauce allocation values include the weight of the 5 g container.

To ensure that participants exhibited the expected increase in negative emotion during the PASAT, differences in participants' pre-PASAT and post-PASAT PANAS scores were examined as a function of gender and emotion regulation condition. PANAS scores were positively skewed; thus, a lognormal residual distribution was used instead of a normal distribution. Results reveal a significant increase in negative emotion across PANAS administrations, $F(1, 193) = 106.07, P < .0001$, indicating that participants experienced greater negative emotion after the PASAT than before the PASAT. Reports of negative emotion did not differ significantly by gender, $F(1, 193) = .35, P = .56$, or emotion regulation condition, $F(1, 193) = 1.20, P = .28$, across PANAS administrations. Overall, these results provide consistent evidence that the PASAT task produced significant increases in negative affect, as expected.

To evaluate whether participants followed the emotion regulation strategy instructions, responses to the four questions assessing *in vivo* use of reappraisal and suppression (Egloff et al., 2006) were compared across the two randomly assigned groups: participants asked to suppress their emotions during the PASAT versus those asked to reappraise. Supporting their adherence to instructions, participants in the suppression condition reported lesser agreement with the statement "During the computer task, I showed my emotions;" (suppression group: $M = 2.61, SD = 1.12$; reappraisal group: $M = 3.69, SD = 1.34; t[195] = 6.12, P < .001$) and "One could see my feelings during the computer task" (suppression group: $M = 3.02, SD = 1.29$; reappraisal group: $M = 3.94, SD = 1.29; t[195] = 4.99, P < .001$). However, participants in the suppression condition and participants in the reappraisal condition did not differ in their agreement with the following statements: "I tried to see the computer task as positive as possible" (suppression group: $M = 4.70, SD = 0.98$; reappraisal group: $M = 4.44, SD = 1.06; t[195] = -1.77, ns$) and "I viewed the computer task as a challenge" (suppression group: $M = 4.51, SD = 1.24$; reappraisal group: $M = 4.49, SD = 1.22; t[195] = -0.09, ns$). These results suggest that participants assigned to suppress used more of this emotion regulation strategy than participants assigned to reappraise and that participants in both conditions used high—but not significantly different—levels of reappraisal.

Primary Analytic Approach

Prior to creating interaction terms for the main analyses, all variables were recoded so that 0 was an interpretable value. Negative urgency was recoded so that its lowest value was 0 (i.e., 12 was subtracted from the original negative urgency values); thus, after recoding, the 0 value represented individuals with the lowest levels of negative urgency. Emotion regulation strategies were coded into two groups, where 0 represented individuals assigned to the reappraisal group, and 1 represented individuals assigned to the suppression group. Gender was coded into two groups, where 0 represented male participants and 1 represented female participants. Interaction effects were constructed by multiplying variables (e.g., negative urgency \times emotion regulation strategy condition). We controlled for gender by including a main effect of gender, plus the interaction of gender with the other two predictors (negative urgency and emotion regulation strategy condition) and a three-way interaction between gender, negative urgency, and emotion regulation strategy condition.

The distribution of the allocated hot sauce weight was non-normal, rendering the use of standard analysis of variance (ANOVA) models that assume normal distribution of the residuals inappropriate. The allocated hot sauce weight variable most closely resembled a count distribution; therefore, two generalized linear models for non-normal count data were considered: the Poisson and negative binomial models. These count models are the most appropriate techniques for analyzing non-normally distributed data with a count distribution (Gardner, Mulvey, & Shaw, 1995) and have been used successfully to examine aggression (e.g., Finkel, DeWall, Slotter, Oaten, & Foshee, 2009; Sorensen & Cunningham, 2010; Taft et al., 2010). Each of these models includes a log link for the prediction of the count outcome. The Poisson model assumes that the model-predicted mean of allocated hot sauce is equal to its residual variance; the negative binomial model does not make this assumption, allowing the residual variance to exceed the mean (i.e., overdispersion) if necessary.

To determine the best model for describing the distribution of allocated hot sauce, each model was estimated using maximum likelihood within SAS PROC GENMOD, and included the main effects of gender, negative urgency, emotion regulation condition, and all interactions. The fit of the Poisson and negative binomial models were initially compared with likelihood ratio tests. The negative binomial model was found to fit significantly better than the Poisson model, $-2\Delta LL(1) = 1,114.39$, $P < .0001$, due to overdispersion. Thus, a negative binomial regression model was estimated to examine study hypotheses.

Study Results

Results are presented in table 2, and findings for specific hypotheses are reported in the following paragraphs. To examine study hypotheses, a negative binomial model that controlled for negative mood change and included main effects of gender, negative urgency, emotion regulation condition, and all interactions was estimated. As a measure of effect size, we obtained the correlation between the model predicted and actual outcomes ($r = .30$). Using an index of the strength of association between these variables is a useful effect size indicator that provides an accurate representation for continuous and categorical data (Ferguson, 2009). Of note, gender had no significant effects on displaced aggression when controlling for other study variables, suggesting that the effects of negative

urgency and emotion regulation strategy use on aggressive responding do not differ between men and women.

Table 2. Negative Binomial Model Results Predicting Interpersonal Aggression

Measure	<i>b</i>	<i>SE</i>	χ^2
PASAT negative mood change	0.01	0.02	0.45
Gender	0.01	0.06	0.00
Negative urgency	0.06	0.03	4.86*
Emotion regulation condition	1.25	0.55	5.09*
Negative urgency \times Emotion regulation	-0.05	0.04	1.70
Gender \times Negative urgency	-0.04	0.04	1.10
Gender \times Emotion regulation	-0.77	0.77	1.01
Gender \times Negative urgency \times Emotion regulation	0.03	0.05	0.32

Note: PASAT, Modified Paced Auditory Serial Addition Task.

* $P < .05$

Effects of negative urgency on displaced aggression

We predicted that individuals who reported greater negative urgency would display greater levels of aggression as assessed by the hot sauce allocation task than individuals who reported lesser negative urgency. This hypothesis was supported; individuals who had greater levels of negative urgency allocated greater amounts of hot sauce to the supposed other study participant than individuals who had lesser levels of negative urgency ($b = 0.06$, $P = .03$).

Effects of emotion regulation strategy use on displaced aggression

We predicted that individuals who were in the reappraisal condition would display lesser aggression as assessed by the hot sauce allocation task than those in the suppression condition. This hypothesis was also supported; participants in the reappraisal group allocated lesser amounts of hot sauce than participants in the suppression group ($b = 1.25$, $P = .02$).

Effects of the interaction between negative urgency and emotion regulation strategy use on displaced aggression

Finally, we predicted that associations between increased negative urgency and greater displaced aggression would be weaker among individuals instructed to use reappraisal than among individuals instructed to use suppression. This hypothesis was not supported; the interaction between negative urgency and emotion regulation strategy used was not significant ($b = -0.05$, $P = .19$).

Discussion

The primary aim of this study was to investigate the direct and interactive associations between negative urgency and two emotion regulation strategies—cognitive reappraisal and expressive suppression—and displaced aggression following provocation, using I³ theory (Finkel, 2007; Finkel & Eckhardt, 2013; Slotter & Finkel, 2011) as a framework. As

predicted, we found that negative urgency was positively associated with displaced aggression, as reflected by greater hot sauce allocation. Likewise, compared to participants using reappraisal exclusively, the use of suppression was associated with greater displaced aggression. Contrary to expectations, however, there was no interaction between negative urgency and emotion regulation strategy condition in predicting aggression. These findings provide partial support for I³ theory, extended to displaced aggression, in that the presence of a strong impelling force (negative urgency) and of a strong disinhibiting force (use of suppression) were associated independently (but not jointly) with aggression after the instigating factor of a negative mood induction.

Descriptive analyses showed that levels of negative urgency reported by participants did not differ by gender and were comparable to other groups of undergraduate students (Carlson, Pritchard, & Dominelli, 2013; Dvorak et al., 2013). Regarding hot sauce allocation as an analog measure of displaced aggression, there is wide variation in mean weights reported among participants in other studies employing similar procedures (Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Evers, Fisher, Mosquera, & Manstead, 2005; Meier & Hinsz, 2004; Warburton, Williams, & Cairns, 2006). The inconsistencies in hot sauce allocation across studies is likely to be attributable to methodological differences (e.g., varied textures of hot sauces, different sized materials used in the task) and render comparisons across samples difficult. Consistent with prior work using this paradigm (e.g., Adachi & Willoughby, 2011), men allocated significantly more hot sauce than women. Our mood induction paradigm, the PASAT, was successful in generating the desired increases in negative emotion, with men and women reporting the same degree of increase in negative emotion during completion of the PASAT.

As predicted, and consistent with prior research (e.g., Miller et al., 2012; Settles et al., 2012), greater negative urgency (a strong impellance factor) was associated with greater aggression, suggesting that individuals with a tendency to respond impulsively when provoked to the point of experiencing negative affect are more likely to direct aggression toward an unknown person than individuals with lesser endorsement of this tendency. With few exceptions (e.g., Seibert, Miller, Pryor, Reidy, & Zeichner, 2010), prior research examining this association has been correlational in nature and has measured general interpersonal aggression via self-report. The current study extends this work by using an experimental design to assess displaced aggression through direct observation. Consistent with the role of impelling forces posited in I³ theory, behaving aggressively without significant forethought under conditions of negative affect may be attributable to the cognitive load that negative emotion places on individuals, leaving them depleted and with limited means for more reasoned and effective interpersonal responses. This explanation is supported by findings that experiencing strong, poorly regulated negative emotions is associated with limited cognitive resources for information processing and self-regulation and, thus, linked to aggressive behavior (DeWall, Baumeister, Stillman, & Gailliot, 2007; Robertson, Daffern, & Bucks, 2012).

In reference to the manipulation checks, consistent with expectations, participants assigned to suppress endorsed greater use of this strategy than participants assigned to reappraise. Conversely, and counter to our expectancies, participants in both emotion regulation conditions endorsed similarly high levels (i.e., means of nearly 4.5 or greater on

a 0–5 scale) of cognitive reappraisal. This finding suggests that individuals assigned to reappraise used this strategy a great deal, but no more so than participants asked to suppress. The pattern differs from prior work documenting group differences in both suppression and reappraisal using similar instructions (e.g., Egloff et al., 2006; Ehring et al., 2010). Our measurement of reappraisal may partially explain these differences, as one of the two items employed to assess this strategy (“I viewed the computer task as a challenge”) simply may reflect all participants’ perceptions of a task that was difficult by nature, rather than indicate the way in which they managed their responses. It is also possible that participants in the suppression group used both strategies, albeit at different times (e.g., suppressing during the initial phases of the task, as instructed, but using reappraisal to down-regulate negative emotions thereafter). Finally, the high endorsement of reappraisal (in both groups) may reflect participants’ view of reappraisal items as a more socially acceptable choice. Regardless, although the two groups reported equivalent levels of reappraisal, it was the use of suppression that differentiated the two emotion regulatory conditions and contributed to greater displaced aggression among those assigned to suppress.

Consistent with expectations, participants who used suppression in addition to reappraisal engaged in more displaced aggression than did participants who reported using only reappraisal. Although suppression is associated with enhancements in negative affect relative to reappraisal (Gross, 1998b), our findings that negative mood ratings were unrelated to aggressive behavior are inconsistent with the notion that negative mood served a role in the linkage between emotion regulation strategy use and aggression. Nevertheless, evidence documenting the significant cognitive load required of suppression (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Gross, 2002; Richards & Gross, 2000) suggests that participants in this condition may have used their available resources to tamp down emotional distress. Suppression has also been linked to increases in heart rate (Hofmann, Heering, Sawyer, & Asnaani, 2009; John & Gross, 2004), which may give rise to greater aggression relative to participants using reappraisal exclusively, which is less physiologically taxing (Mauss et al., 2007). By contrast, those using reappraisal alone were likely to have had greater access to resources such as problem solving strategies and cognitive flexibility at the time of hot sauce allocation (Aldao & Nolen-Hoeksema, 2010; Fladung, Baron, Gunst, & Kiefer, 2010; Heilman, Crisan, Houser, Miclea, & Miu, 2010). Thus, participants who reappraised the provocation without also employing suppression may have considered the consequences of their actions (i.e., if they wanted to harm the purported participant by allocating a large amount of hot sauce). With cognitive resources expended, those who suppressed in addition to reappraising were more limited in their ability to engage in higher-order thinking needed to avert aggression. Of course, emotion regulation is a complex process, and it is unlikely that any one strategy is completely effective or ineffective across situations. Thus, future studies might explore the importance of regulatory flexibility (see Bonanno & Burton, 2013) in determining the efficacy of particular emotion regulation strategies across situations, particularly in light of the present findings that participants assigned to suppress may have engaged in both strategies in concert.

We expected that emotion regulation strategy use would moderate relations between negative urgency and subsequent displaced aggression. Results did not support this outcome but rather showed that negative urgency was positively associated with displaced

aggression regardless of emotion regulation efforts. As a dispositional characteristic, the tendency toward rash action that is a hallmark of negative urgency may be resistant to alteration through proximal attempts to regulate mood, at least in response to the type of brief instructions used here. Indeed, negative affect increased pre- to post-PASAT regardless of emotion regulation strategy, suggesting that reappraisal was ineffective in attenuating negative mood. It is possible that more extensive training and practice in the use of reappraisal, involving feedback and multiple rehearsals, would lessen the impact of negative urgency through reduced negative emotion. Certain methodological factors may help to explain this finding as well. For example, our inclusion of a video camera during the completion of the PASAT may have heightened participants' self-awareness, leading to enhanced negative affect uniformly across experimental condition (see Mor & Winquist, 2002). It is also possible that the PANAS, our measure of state negative affect, may have lacked the sensitivity to detect variations in negative affect specific to these experimental procedures (e.g., changes in frustration).

Several limitations of the current study should be mentioned. First, participants were college students who received course credit completing the study. This group may not possess levels of key constructs (e.g., aggression) that are found in the general population. The racial and ethnic homogeneity of the sample limits generalizability as well. Thus, similar studies with more diverse samples are needed. Second, our analog measure assessed displaced aggression toward a stranger, capturing only a small portion of the aggressive behavior in which individuals may engage. Future research might examine retaliatory aggression, psychological aggression, and covert aggression, among others, to further clarify the contributions of urgency and emotion regulation. With regard to emotion regulation strategy manipulation, the absence of a control (i.e., uninstructed) condition precludes causal conclusions that may be drawn regarding the impact of reappraisal and suppression in displaced aggression relative to participants' baseline emotion regulatory behavior. Finally, although analog methods address several limitations of self-report measures of aggression (e.g., social desirability and memory biases), their strength depends on establishing the external validity of such tasks for the type of aggression being studied. Future research should build upon this and other studies (e.g., DeWall et al., 2013; Finkel et al., 2009) to both broaden and strengthen the examination of aggression through novel assessment methods.

The present study used an experimental design to extend a growing body of research suggesting that negative urgency and suppression are associated with aggressive behavior. Findings point to negative urgency as an impellance risk factor for displaced aggression, while suppression use was highlighted as an independent disinhibiting influence on aggression perpetration. These links suggest interventions that may be helpful for individuals who perpetrate aggression. For example, treatments that focus on emotion management skills, such as Dialectical Behavior Therapy (DBT; Linehan, 1993), may be particularly useful (see Frazier & Vela, 2014). Targeting aggressive behavior fits readily into this treatment's general framework, which emphasizes mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness skill acquisition in the service of reducing maladaptive interpersonal behaviors. With regard to specific emotion regulation strategies, our finding that suppression use may potentiate aggression, is an important one, given the

centrality of negative affect management to many forms of psychopathology, internalizing behavior problems, and externalizing behaviors (Gross, 2002). Such findings also add to existing research (e.g., Barlett & Anderson, 2011) suggesting that interventions targeting emotion regulation strategy use may be effective in reducing aggression via related constructs (e.g., propensity toward vengeance). If future research corroborates these associations, it will be important to integrate such findings into clinical practice (see Hamby, 2011) to continue to help reduce interpersonal aggression and its harmful consequences.

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