Examining the Structure of Emotion Regulation: A Factor-Analytic Approach

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Objective: Critiques of self-report indices of emotion regulation suggest that its measurement is in need of more critical investigation. The current study examined the factor structure of emotion regulation as informed by Gross’ (1998a) Process Model: Situation Selection, Attentional Deployment, Cognitive Change, and Response Modulation. Method: A sample of 553 participants was recruited using Amazon’s Mechanical Turk (M_age = 37.12, SD = 13.66; n = 352 female). Confirmatory factor analysis with maximum likelihood estimation was performed in Mplus. Results: A four-factor model of emotion regulation demonstrated poor fit. An alternative five-factor model fit the data well: CFI = .94, TLI = .93, RMSEA = .07. Conclusion: Emotion regulation may be better conceptualized as a combination of specific strategy use and a broader construct, called “emotional distancing” (a trait-like disposition towards emotions). Further research is required to determine if the observed five-factor model can be replicated in more diverse samples. © 2015 Wiley Periodicals, Inc. J. Clin. Psychol. 00:1–19, 2015.

Introduction

Emotion regulation has received a great deal of attention in the clinical psychology literature, as difficulty in regulating emotion has been identified as a key factor in the development and maintenance of many psychological disorders (Bradley, 1990; Kring & Buchorowski, 1999). As such, multiple theoretical models have been developed to organize constructs that are considered to be aspects of emotion regulation. In one conceptualization, “difficulties in emotion regulation” is considered to be a multifaceted construct involving nonacceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies perceived to be effective, and lack of emotional clarity (Gratz & Roemer, 2004). Within this model, the general tendency to have difficulty regulating one’s emotions is viewed as a transdiagnostic risk factor for the development and maintenance of psychopathology.

Another model of emotion regulation may be gleaned from a meta-analytic review conducted by Aldao, Nolen-Hoeksema, and Schweizer (2010). Results of the Aldao et al. (2010) study suggested that emotion regulation strategies typically referred to as maladaptive (e.g., suppression, avoidance, rumination) were more strongly related to psychopathology than were strategies typically referred to as adaptive (e.g., acceptance, reappraisal). Therefore, “maladaptive” emotion regulation strategies may be more pertinent to psychopathology. This view may be contrasted with that of regulatory flexibility (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). According to Bonanno et al. (2004), individual emotion regulation strategy use may be less important than the flexible use of such strategies (i.e., context influences the usefulness of individual strategies).

Last, Gross’ (1998a) process model may be considered the most influential theory of emotion regulation (Aldao & Nolen-Hoeksema, 2013; Gross, 2014). According to Gross (1998a, p. 275), emotion regulation involves “the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions.” In other words, an individual may regulate their emotions to attenuate, maintain, amplify, or change them.
depending on their goals. Gross and Thompson (2007) have suggested that emotion regulation may be distinguished from the related process of coping, such that emotion regulation is not necessarily good or bad, and it may be used to increase or decrease either positive or negative emotions (while on the other hand, coping has historically been referred to as inherently adaptive or maladaptive). Given the large influence of the process model, the current study focused on this model of emotion regulation to inform factor structure. Although many studies have invoked the process model, a factor analytic investigation of its emotion regulation processes has yet to be conducted to further inform the theory.

The processes referred to in the process model include situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross, 1998a). Theoretically, these five processes are distinct, but mutually influential, and individuals may use one or all of them to deal with a particular situation (Gross, 1998a). The first four processes are antecedent-focused, occurring before an emotion (the response) is elicited, while response modulation is a response-focused process that occurs after an emotion has been elicited (Gross, 1998a). The terms antecedent- and response-focused refer to the emotion that is elicited (e.g., anxiety), not the situation itself (e.g., giving a presentation).

**Situation Selection**

Situation selection involves the approach to, or avoidance of, certain people, places, or things (Gross, 1998a). Like any emotion regulation strategy, an individual's use of situation selection depends on their goals (i.e., if a situation is not relevant to one's goals, then he or she will not use situation selection to regulate emotion). Behavioral avoidance may be considered a form of situation selection. The earliest conceptualization of behavioral avoidance can be traced back to Mowrer (1947), who proposed that fear comes about via classical conditioning, and when individuals avoid the feared stimuli, extinction is impeded, thus maintaining the fear. The negative long-term effect of avoidance may be evidenced by the strong relations between behavioral avoidance and various forms of psychopathology, such as anxiety, depression, and substance abuse ($r = .26$ to $r = .48$; Aldao et al., 2010).

A common measure of avoidance is the Cognitive Behavioral Avoidance Scale (CBAS), which comprises items relevant to both cognitive and behavioral avoidance (Ottenbreit & Dobson, 2004). The CBAS was originally constructed to be a multidimensional measure of avoidance. Items were generated by both theory and previous measures of avoidance, and they were independently rated for content validity (Ottenbreit & Dobson, 2004). Using exploratory factor analysis, a four-factor solution with 31 items was found: Behavioral Social (eight items), Behavioral Nonsocial (six items), Cognitive Social (seven items), and Cognitive Nonsocial (10 items). The two behavioral avoidance factors (of interest in the current study) demonstrated eigenvalues of 8.54 (Behavioral Social) and 1.32 (Behavioral Nonsocial), and accounted for 27.54 and 4.24% of the variance, respectively (Ottenbreit & Dobson, 2004).

**Situation Modification**

Situation modification occurs when an individual is already in a situation that could give rise to emotion, and they attempt to alter the situation to reduce its potential emotional effect (Gross, 1998a). As pointed out by Gross (1998a), “boundaries with situation selection are not always clear” (p. 283), and therefore it is not apparent how situation modification is qualitatively distinct from situation selection. Currently, there are no measures of situation modification in the literature. However, there are measures of similar constructs, such as an individual's ability to cope (e.g., Brief COPE; Carver, 1997; Social Problem-Solving Inventory-Revised; D'Zurilla, Nezu, & Maydeu-Olivares, 2001; Ways of Coping Questionnaire; Folkman & Lazarus, 1988). Coping has long been conceptualized as a way of purposefully alleviating distress, and it may sometimes include altering one's situation to do so (e.g., problem solving, support seeking, planning; Lazarus & Folkman, 1984). These coping strategies have demonstrated significant relations with psychopathology, such that lower coping ability has been associated with higher levels of general distress, worry, anger, depression, anxiety, and worse physical health outcomes.
Another strategy similar to situation modification is the use of safety behaviors, which are behaviors intended to reduce anticipated fear or anxiety in a given situation by altering the situation itself (Salkovskis, 1991). For example, an individual who fears contamination may carry hand sanitizer when going to a shopping mall to alleviate the anxiety that he or she expects will occur when they encounter germs. By altering the situation, individuals have regulated their anxiety, though this behavior likely impairs their ability to learn that most feared situations are arguably safe (Foaw & Kozak, 1986). It follows that safety behaviors have been associated with increased symptoms of anxiety (Deacon & Maack, 2008; Olatunji, Etzel, Tomarken, Ciesielski, & Deacon, 2011).

Although coping and safety behaviors are highly relevant to psychopathology and appear similar to emotion regulation processes, they are not explicitly conceptualized as forms of situation modification. Consequently, situation modification as described in the process model cannot currently be measured and was therefore not included in the current study.

Attentional Deployment

Attentional deployment is the focusing of attention either toward or away from an emotion-eliciting situation (Gross, 1998a). A form of attentional deployment, rumination is conceptualized as a fixation on the nature, causes, and consequences of one’s emotional distress (Gross, 1998a; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Importantly, rumination involves only passive fixation on one’s distress, not attempts to actively change it or address the problem to which it relates (Nolen-Hoeksema et al., 2008). Much of the research on rumination has been in relation to depression, with effect sizes for rumination being highest for individuals with symptoms of depression compared to other psychological disorders (average $r = .55$; Aldao et al., 2010). For example, rumination is generally related to longer episodes of depression and is a form of responding to depression that is relatively consistent such that individuals who have a ruminative response style to their depressive symptoms tend to have more depression and in longer episodes (Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema, 1991; Nolen-Hoeksema, Morrow, & Fredrickson, 1993).

In addition, rumination has been linked to binge eating, substance abuse, general anxiety, and posttraumatic stress disorder (Calmes & Roberts, 2007; Nolen-Hoeksema, 2000; Nolen-Hoeksema & Harrell, 2002; Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). The relationship between rumination and psychopathology may not be significant for individuals who engage in mild rumination, such as thinking about how a negative interaction could have gone better. However, this relationship may get stronger as individuals use higher levels of rumination, such as thinking about the negative interaction for days or weeks. Nolen-Hoeksema (1991) identified three specific mechanisms through which this occurs: (a) rumination increases the ability of distressed mood to have an effect on one’s thinking (i.e., memories and mood are stored together in one’s mind such that being in a negative mood that is associated with certain memories increases the likelihood of retrieving those memories); (b) because rumination is focused on negative states, it does not leave room for one to solve the problem at hand; (c) rumination perpetuates distress because it prevents individuals from making positive behavioral changes.

The most common self-report measure of rumination is the Ruminative Responses Scale (RRS; Nolen-Hoeksema et al., 2008). The original construction of the RRS and its norms were not published; however, researchers have reported that it has good internal consistency and adequate test-retest reliability over one year ($\alpha = .89$ to .90, $r = .67$; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema & Morrow, 1991). A more recent analysis found that the RRS serves as a more accurate measure of rumination after the removal of 12 items that appeared to demonstrate significant content overlap with depression (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Specifically, Treynor et al. (2003) conducted a principal components analysis of the remaining 10 items of the RRS and found two five-item factors that accounted
for 50.5% of the variance. One of these factors comprised neutrally worded items and was called Reflection, while the second factor comprised negatively worded items and was called Brooding (Treynor et al., 2003).

**Cognitive Change**

Cognitive change involves thinking about a potentially emotion-eliciting situation in a different way (Gross, 1998a). Specifically, once an individual assigns a cognitive label to a situation, they can subsequently change it to reduce its potential emotional effect. Reappraisal is a form of cognitive change that is often defined as the reconstruction of a situation to change its emotional salience (Gross, 1998a; Lazarus & Alfert, 1964). Research has demonstrated that reappraisal may lower one's subjective experience of distress or negative affect ($r = -0.37$ to $-0.51$) and that it is associated with better well-being ($rs = 0.25$ to $0.41$) and interpersonal functioning ($rs = 0.12$ to $0.26$; Egloff, Schmukle, Burns, & Schwerdtfeger, 2006; Gross, 1998b; Gross & John, 2003). Reappraisal has been positively associated with decentering, which is defined as “taking a nonjudgmental and accepting stance regarding thoughts and feelings” ($r = 0.25$; Fresco et al., 2007, p. 234). This may suggest that individuals who use reappraisal are less likely to believe that their emotions either define them or will not change.

Additionally, reappraisal has been identified as a significant negative predictor of depression, anxiety, and anger ($rs = -0.23$ to $-0.29$; Martin & Dahlen, 2005). As with any emotion regulation strategy, context is important, and it may not always be beneficial to think of a situation in a more positive way (i.e., when a reappraisal is in conflict with reality; Aldao & Nolen-Hoeksema, 2012; Gruber, Mauss, & Tamir, 2011).

Reappraisal may be measured using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The authors generated the items on the ERQ to assess general use of emotion regulation strategies and, specifically, use related to positive and negative emotions. Exploratory factor analysis indicated the presence of an uncorrelated two-factor solution, which the authors called Reappraisal and Expressive Suppression. Results of confirmatory factor analyses (CFAs) replicated these findings, providing further support for an uncorrelated two-factor model of the ERQ (Gross & John, 2003). In a subsequent study, the ERQ again demonstrated a two-factor solution with good model fit: comparative fit index (CFI) = 0.96, Tucker-Lewis index (TLI) = 0.95, standardized root mean square residual (SRMR) = 0.06 (Moore, Zoellner, & Mollenholt, 2008).

An additional form of cognitive change may be thought suppression, which is an emotion regulation strategy whereby an individual attempts to suppress unwanted thoughts, such as trying not to think about chocolate while on a diet (Wegner & Zanakos, 1994). This may create a paradox, which Wegner, Schneider, Carter, and White (1987, p. 5) call “the self-referent quality of the plan to suppress.” The self-referent quality can easily be demonstrated by asking someone not to think about a red truck, for example. The first thing that someone must do is to identify a red truck in their mind, and then try not to think about it further. It is easy to imagine how repeated attempts to suppress a particular thought (such as the red truck, an offensive comment, or a car accident) may actually increase its frequency. Indeed, research has shown that suppressing a thought is not only difficult, but it also results in preoccupation or obsession with the thought, resulting in what has been called “the rebound effect” (Abramowitz, Tolin, & Street, 2001; Gold & Wegner, 1995; Wegner et al., 1987; Wegner & Zanakos, 1994).

Given this effect and the strong relation between thought suppression and psychopathology, it has been proposed as a maladaptive emotion regulation strategy ($rs = 0.29$ to $0.36$; Aldao et al., 2010). Although thought suppression was not part of Gross’ (1998a) original process model, its preponderance in the literature and its relations with psychopathology suggest that it is an emotion regulation strategy worthy of consideration in the current study (Aldao et al., 2010; Nixon, Wilsch, & Hosking; Tull, Gratz, Salters, & Roemer, 2004; Wenzlaff & Wegner, 2000).

The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994) is a 15-item measure of one’s tendency to use thought suppression. Originally, Wegner and Zanakos (1994) generated 72 items related to thought suppression. A principal axis factor analysis was conducted and seven factors were obtained. Items with factor loadings greater than .30 were further examined...
and several were discarded because of their mutual loadings on thought suppression and other factors (Wegner & Zanakos, 1994). The remaining 33 items were administered to a new sample and a second principal axis factor analysis was conducted. This analysis revealed three factors: thought suppression, negative affectivity, and concentration. Items with factor loadings ≥ .41 on the thought suppression factor were retained, which resulted in 15 items (Wegner & Zanakos, 1994). Further analysis of the thought suppression factor confirmed the one-factor solution, and this factor has demonstrated good internal consistency and adequate to high test-retest reliability (α = .87 to .89; rs = .92 over 1 week, .69 over 3 to 12 weeks; Wegner & Zanakos, 1994).

Response Modulation

Once an emotion has been elicited, response modulation occurs when an individual attempts to regulate its subjective, behavioral, and/or physiological components (Gross, 1998a). Expressive suppression is considered a type of response modulation because it occurs after an emotion has been elicited (Gross, 1998a). It involves attempting to hide the physical appearance of one’s emotion, such as trying not to cry after receiving negative feedback.

Expressive suppression does not appear to be a particularly adaptive emotion regulation strategy, as it has been associated with greater psychopathology (rs = .12 to .27) as well as increased physiological arousal without reductions in subjectively experienced negative emotion (Egloff et al., 2006; Gross, 1998b). Therefore, although one may be able to hide the appearance of their emotion from others, they will not necessarily feel any different, and they may experience increased heart rate, sweating, etc. It is important to note that these negative effects may be specific to particular situations. For example, expressive suppression may be adaptive in social situations where it is more desirable to be perceived as humble or caring (e.g., suppressing pride after winning; Kalokerinos, Greenaway, Pedder, & Margetts, 2014). The Expressive Suppression subscale of the ERQ appears to be the most commonly used measure of expressive suppression and was used in the current study to determine if items representing expressive suppression fall under the response modulation factor.

According to Werner and Gross (2009), experiential avoidance is another form of response modulation. Experiential avoidance has been defined as “the phenomenon that occurs when a person is unwilling to remain in contact with particular private experiences (e.g., bodily sensations, emotions, thoughts, memories, behavioral predispositions) and takes steps to alter the form or frequency of these events and the contexts that occasion them” (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996, p. 1154). When an individual is unwilling to feel an emotion, such as anxiety, they may experience an increase in that emotion and perhaps become “anxious about being anxious” (Hayes et al., 1996). Thus, experiential avoidance may have a paradoxical effect such that instead of an individual experiencing anxiety that may dissipate on its own, the individual may perpetuate the state of anxiety by attempting not to feel anxious (Kashdan, Barrios, Forsyth, & Steger, 2006). This may explain the strong relation between experiential avoidance and psychopathology (rs = .27 to .55; Hayes et al., 1996).

The most common self-report questionnaire for assessment of experiential avoidance is the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). The AAQ-II was a revision of the original AAQ, which was developed to address the emergence of behavioral treatments focused on experiential avoidance (Hayes et al., 2004). The primary treatment in mind was acceptance and commitment therapy (ACT), which posits that experiential avoidance underlies many forms of psychopathology (Hayes, Strosahl, & Wilson, 1999).

Originally, a 32-item version of the AAQ was created from a pool of items stemming from the theory of ACT. These 32 items were subjected to exploratory factor analysis to determine the factor structure of the AAQ (Hayes et al., 2004). Several models were tested, and ultimately a nine-item one-factor version of the AAQ was found to demonstrate the best fit and had low to average internal consistency and test-retest reliability over 4 months (α = .70 and .64, respectively; Hayes et al., 2004). Subsequently, a CFA was conducted and the one-factor solution was a good fit to the data (goodness-of-fit index [GFI] = .98, adjusted goodness-of-fit index [AGFI] = .97, root mean square residual [RMR] = .05; Hayes et al., 2004). Further, the
nine-item AAQ demonstrated significant relations with the WBSI ($r_s = .44$ and $.50$), measures of avoidance and distancing ($r_s = .21$ to $.38$), and measures of psychopathology ($r_s = .35$ to $.72$; Hayes et al., 2004).

The nine-item version of the AAQ continued to demonstrate low to average internal consistency and test-retest reliability, which was attributed to its complex and unclear wording. This prompted researchers to develop a more psychometrically sound version. To do this, 12 ACT researchers and clinicians generated items regarding experiential avoidance (similar to the development of AAQ items) with the goal of creating a unidimensional measure of the construct. Once an initial list of items was created, five ACT experts rated the items for their salience to experiential avoidance (Bond et al., 2011). This resulted in 49 items that were examined in an undergraduate sample. Items with item–total correlations below .30 were discarded, resulting in 27 items that were subjected to exploratory factor analysis (Bond et al., 2011). Seventeen items were then removed based on factor loading cutoffs, resulting in a 10-item version called the AAQ-II (Bond et al., 2011). Two factors were identified in this version, with eigenvalues of 4.64 (seven-item factor) and 1.06 (three-item factor; Bond et al., 2011).

Because the three-item factor demonstrated a very low eigenvalue and comprises only the positively worded items on the AAQ-II, it was determined that the two-factor finding was likely due to a method effect (i.e., individuals may respond differently to negatively versus positively worded items). After further psychometric investigation, it was determined that the seven negatively worded items on the first AAQ-II factor were not improved upon by the addition of the three positively worded items. Therefore, a seven-item one-factor model of the AAQ-II was further examined via CFAs in three samples. This model fit the data well in all three samples: CFI = .96 to .99, root mean square error of approximation (RMSEA) = .04 to .06, SRMR = .03 to .04 (Bond et al., 2011).

Acceptance can be conceptualized as the nonjudgmental stance that one takes when dealing with emotion (Kabat-Zinn, 1990). Instead of attempting to change one’s emotion, an individual may accept the way that he or she feels and not judge it as good or bad. Nonjudgmental acceptance is considered to be an adaptive form of emotion regulation that has its roots in the concept of mindfulness (the present-centered awareness and nonjudgmental acceptance of one’s experiences; Gratz & Roemer, 2004; Kabat-Zinn, 1990). Acceptance was hypothesized as falling under the response modulation process of emotion regulation.

One way that acceptance has been measured is via the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Using exploratory factor analysis, the FFMQ was originally constructed from five preexisting measures of mindfulness. These measures were first examined for internal consistency and convergent and discriminant validity. Differential correlations among mindfulness measures and other constructs were interpreted as evidence for multiple facets of mindfulness. Therefore, exploratory factor analysis (with items from all five measures) was used to determine the factor structure of mindfulness. A five-factor structure emerged and accounted for 33% of the variance. Subsequently, items with the highest loadings were extracted to create the five factors of mindfulness: observing, acting with awareness, nonjudging, describing, and nonreactivity. Baer et al. (2006) then used CFA and determined that a five-factor structure of mindfulness demonstrated the best model fit.

Gross and Thompson (2007) describe emotion as a continuous cycle, as opposed to a unidirectional line. Therefore, emotion regulation may be considered cyclical in that a response, or emotion, can lead one back to other processes, such as cognitive change (considered to be an antecedent form of emotion regulation). As an example, one may experience anxiety as a result of being told that he or she must give a presentation at work. The emotion has been elicited, but now he or she may engage in cognitive change to ease their anxiety, which may lead to a new emotion, such as lowered anxiety. Once the individual feels less anxious, he or she may reappraise the situation (e.g., “it’s not so bad”), resulting in the individual feeling even less anxious, and perhaps excited. As demonstrated by this example, the generation of emotion and concurrent emotion regulation are ongoing, cyclical processes. These processes may be conscious or unconscious, may refer to the regulation of either positive or negative emotions, and are inherently neither good nor bad (Gross & Thompson, 2007). Context, along with the goals
of the individual, appear to be key factors in determining the usefulness and effectiveness of particular emotion regulation strategies.

The Current Study
Given the degree of acceptance and use of the Gross (1998a) process model of emotion regulation, it is of interest to examine whether the specific emotion regulation strategies that are being measured and reported in the literature map onto the broad emotion regulatory processes described in the model. In particular, self-report measures of emotion regulation have been criticized for item overlap with one another and with measures of psychopathology (Treynor et al., 2003). Also, the degree to which participants may inaccurately reflect upon their emotion regulation along with the confusion in the definitions of emotion and emotion regulation suggest that we need to more critically investigate the measurement of emotion regulation (Cole, Martin, & Dennis, 2004; Robinson & Clore, 2002).

The current study is a factor-analytic examination of emotion regulation as informed by the Gross (1998a) process model. Specifically, this study used CFA to investigate whether emotion regulation strategies as typically measured (e.g., thought suppression, rumination) load onto the broad categories of emotion regulation identified by Gross (1998a). Behavioral avoidance items were expected to load onto the situation selection factor; rumination items were expected to load onto the attentional deployment factor; reappraisal and thought suppression items were expected to load onto the cognitive change factor; and expressive suppression, experiential avoidance, and acceptance items were expected to load onto the response modulation factor. It is important to note that the current study is an investigation of only self-reported emotion regulation.

As pointed out by Gross (1998a), emotion regulation may be either conscious or unconscious. Therefore, the current study may gain insight into only conscious, self-reported emotion regulation, rather than more objective indicators, such as those offered by psychophysiological measures and experimental tasks. Most self-report measures ask participants to indicate how they generally regulate emotions instead of asking how they are currently regulating emotion. As a result, the self-report measures used in the current study are not only less objective than other measures (e.g., psychophysiological methods), but they may also be considered retrospective in nature. A potential benefit to the use of these measures is that an individual’s general tendency to use particular emotion regulation strategies (as indicated by self-report measures) has been associated with psychopathology (Aldao et al., 2010). As such, an examination of self-reported emotion regulation is still warranted despite its more subjective nature.

Method
Participants and Procedure
All participants were recruited from an online survey system, Amazon’s Mechanical Turk (MTurk), and compensated 50 cents for 1 hour of work (mturk.com). Participants were required to be at least 18 years old, live in the United States, be fluent in English, and have an MTurk response accuracy rating of at least 95%. Though research has demonstrated that MTurk respondents may report greater levels of social anxiety than the general population, they appear to report levels of trauma exposure, anxiety, and depression that are similar to those of both the general population and undergraduates (Shapiro, Chandler, & Mueller, 2013).

Eligible individuals were given a link where they could first complete the informed consent document and then the online survey. Additionally, participants had to respond accurately to the following catch questions: “Please select ‘Much’ if you are paying attention right now” and “I have experienced a fatal heart attack while watching television.” Individuals who responded incorrectly to either of these items were not included in the analyses (n = 58). The final sample size for analysis was 553 (n = 352 women [64%]). Following completion of the survey, participants were led to a screen with a debriefing form and received payment.
The mean age of participants was 37.12 (standard deviation $[SD] = 13.66$). In terms of race, 81.7% of participants identified as White, 6.7% Black, 6.1% Asian or South Asian, 4.3% other, and .2% American Indian or Alaskan Native. In terms of ethnicity, 92.9% of participants identified as Non-Hispanic/Latino. Five individuals preferred not to respond to the race and ethnicity questions.

**Measures**

**Demographics questionnaire.** A nine-item demographics questionnaire was administered to gather information regarding age, race/ethnicity, education, relationship status, and income.

**AAQ-II** (Bond et al., 2011). The AAQ-II is a seven-item self-report measure of experiential avoidance. Items are rated on a 7-point Likert-type scale ranging from 1 (*never true*) to 7 (*always true*). Example items include “I worry about not being able to control my worries and feelings” and “Emotions cause problems in my life.” The AAQ-II has demonstrated adequate internal consistency ($\alpha = .78$ to $.88$) and test-retest reliability ($r = .81$ and $.79$ over 3 and 12 months, respectively; Bond et al., 2011). Additionally, the AAQ-II has demonstrated convergent validity with a measure of thought suppression (the WBSI), which is considered an indicator of experiential avoidance ($rs = .59$ to .63; Bond et al., 2011; Wegner & Zanakos, 1994). The AAQ-II has been shown to be distinct from social desirability, as evidenced by its discriminant validity with this construct ($r = –.09$; Bond et al., 2011). Negative affect encompasses distress, guilt, fear, hostility, and worry (Watson, Clark, & Tellegen, 1988). Therefore, the AAQ-II ought to be distinct from overall trait-like negativity because it is intended to measure one’s unwillingness to experience certain emotions, and not the frequency or intensity of the emotions themselves. Cronbach’s alpha in the current sample was .93.

**CBAS** (Ottenbreit & Dobson, 2004). The CBAS is a 31-item self-report measure of both cognitive and behavioral avoidance of distressing thoughts and situations. Items are rated on a 5-point Likert-type scale ranging from 1 (*not at all true for me*) to 5 (*extremely true for me*). Two subscales were used in the current study: Behavioral Social and Behavioral Nonsocial. The Behavioral Social subscale (eight items) comprises items such as “I avoid attending social activities” and “I find that I often want to leave social gatherings.” This subscale has demonstrated high internal consistency ($\alpha = .86$) and test-retest reliability over 3 weeks ($r = .86$; Ottenbreit & Dobson, 2004). The Behavioral Nonsocial subscale (six items) comprises items such as “I quit activities that challenge me too much” and “I avoid trying new activities that hold the potential for failure.” This subscale has demonstrated adequate internal consistency ($\alpha = .75$) and test-retest reliability over 3 weeks ($r = .88$; Ottenbreit & Dobson, 2004). The CBAS has demonstrated moderate convergent validity with other measures of avoidance, such as the Escape-Avoidance Scale of the Ways of Coping Questionnaire ($rs = .41$ to .50) and the Total Avoidance Scale of the Coping Responses Inventory ($rs = .30$ to .34; Folkman & Lazarus, 1988; Moos, 1988; Ottenbreit & Dobson, 2004). Additionally, the CBAS has demonstrated discriminant validity with the Total Approach Scale of the Coping Responses Inventory ($rs = −.05$ to $−.15$; Ottenbreit & Dobson, 2004). Cronbach’s alpha in the current sample was .94.

**ERQ** (Gross & John, 2003). The ERQ is a 10-item self-report measure comprising two subscales: Reappraisal and Expressive Suppression. Items are rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Reappraisal subscale (six items) comprises items such as “I control my emotions by changing the way I think about the situation I’m in” and “When I want to feel less negative emotion, I change the way I’m thinking about the situation.” This subscale has demonstrated adequate internal consistency ($\alpha s = .75$ to .82) and test-retest reliability over 3 months ($r = .69$; Gross & John, 2003). The Reappraisal subscale has demonstrated convergent validity with the Reinterpretation subscale from the COPE ($\beta = .43$; Carver, Scheier, & Weintraub, 1989; Gross & John, 2003). Additionally,
the Reappraisal subscale has demonstrated discriminant validity with ego control and social desirability, suggesting that reappraisal is not related to one’s tendency to control impulses or act strictly in a socially desirable manner ($\beta = -.03$ and .11, respectively; Gross & John, 2003). Cronbach’s alpha in the current sample was .90.

The Expressive Suppression subscale (four items) comprises items such as “When I am feeling negative emotions, I make sure not to express them” and “I control my emotions by not expressing them.” This subscale has demonstrated adequate internal consistency ($\alpha = .68$ to .76) and test-retest reliability over 3 months ($r = .69$; Gross & John, 2003). Additionally, the Expressive Suppression subscale has demonstrated convergent validity with a measure of inauthenticity (i.e., behaving in a way that is not congruent with one’s feelings and beliefs; $\beta = .47$; Gross & John, 2003). The Expressive Suppression subscale has also demonstrated discriminant validity with ego control and social desirability ($\beta = -.06$ and -.09, respectively; Gross & John, 2003). Cronbach’s alpha in the current sample was .82.

**FFMQ (Baer et al., 2006)**. The FFMQ is a 39-item self-report measure of mindfulness. Items on the FFMQ are rated on a 5-point Likert-type scale ranging from 1 (never or very rarely true) to 5 (very often or always true). The Nonjudgmental Acceptance subscale was used in the current study. This subscale (eight items) comprises items such as “I criticize myself for having irrational or inappropriate emotions” and “I tell myself I shouldn’t be feeling the way I’m feeling.” The FFMQ has demonstrated high internal consistency ($\alpha = .87$; Baer et al., 2006). The Nonjudgmental Acceptance subscale has demonstrated convergent validity with self-compassion and thought suppression ($r = .48$ and -.56, respectively; Baer et al., 2006). Cronbach’s alpha in the current sample was .94.

**RRS (Treynor et al., 2003)**. The RRS is a 22-item self-report measure of rumination. Only 10 items, from the Reflection and Brooding subscales, were used in the current study. Treynor et al. (2003) removed the remaining 12 items because of their specificity to depressive symptoms; therefore, they were not used in the current study. Since the original instructions for the RRS were also specific to depressive symptoms, a novel version of these instructions, with depressive content removed, was used in the current study. In this version, two portions of the original instructions were removed (highlighted in bold): “People think and do many different things when they feel depressed. Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed. Please indicate what you generally do, not what you think you should do.” Items are rated on a 4-point Likert-type scale ranging from 1 (almost never) to 4 (almost always). The Reflection subscale of the RRS (5-items) comprises items such as “Go away by yourself and think about why you feel this way” and “Analyze your personality to try to understand why you are depressed.” This subscale has demonstrated adequate internal consistency ($\alpha = .72$) and test-retest reliability ($r = .60$; Treynor et al., 2003). Cronbach’s alpha in the current sample was .81. The Brooding subscale of the RRS (5-items) comprises items such as “Think about a recent situation, wishing it had gone better” and “Think, Why can’t I handle things better?” This subscale has also demonstrated adequate internal consistency ($\alpha = .77$) and test-retest reliability ($r = .62$; Treynor et al., 2003). Cronbach’s alpha in the current sample was .85.

**WBSI (Wegner & Zanakos, 1994)**. The WBSI is a 15-item self-report measure of thought suppression. Items are rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Example items include “I wish I could stop thinking of certain things” and “I always try to put problems out of mind.” The WBSI has demonstrated high internal consistency ($\alpha = .87$ to .89) and adequate test-retest reliability over 3 to 12 weeks ($r = .69$; Wegner & Zanakos, 1994). Additionally, the WBSI has demonstrated convergent validity with the Thought Control Questionnaire and a measure of intrusive thinking ($rs = .21$ to .35 for the Thought Control Questionnaire, $r = .56$ for intrusive thinking; Muris, Merckelbach, & Horselenberg, 1996; Wells & Davies, 1994). Cronbach’s alpha in the current sample was .94.
Data Analysis

A CFA with maximum likelihood estimation was performed in Mplus to examine the factor structure of emotion regulation (Muthén & Muthén, 2012). Specifically, CFA was used to test whether specific items from self-report measures of seven emotion regulation strategies loaded onto four latent factors: situation selection, attentional deployment, cognitive change, and response modulation. Data were screened for quality and assumptions of CFA, and no violations were found.

Model Specification and Identification

Self-report items representing behavioral avoidance (from the CBAS) were modeled as three manifest indicators for the situation selection latent factor; items representing rumination (from the RRS) were modeled as four manifest indicators for the attentional deployment latent factor; and items representing reappraisal (from the ERQ) and thought suppression (from the WBSI) were modeled as six manifest indicators for the cognitive change latent factor. The response modulation factor comprised three lower-level factors: expressive suppression (modeled as four manifest indicators from ERQ-Suppression items); experiential avoidance (modeled as three manifest indicators from AAQ-II items); and acceptance (modeled as three manifest indicators from FFMQ-Nonjudgmental Acceptance items). Demographic variables were entered into a covariance matrix to examine relations between demographics and key variables of interest. Specifically, gender and a combined race/ethnicity variable (White, non-Hispanic versus other) were examined as factors that may influence how individuals regulate their emotions (for example, particular emotion regulation strategies may be more acceptable in certain cultures, and therefore the structure may appear different for some individuals).

Item parceling was used for most of the self-report measures versus modeling individual items under the four factors. Item parceling is an atheoretical technique in which a measure is broken up into a smaller number of groups, or parcels, by combining two or more individual items (Bandalos, 2008; Sass & Smith, 2006). It is recommended only for unidimensional measures, and therefore the selection of items for each parcel is subjective (and theoretically meaningless because all items represent the same construct). This technique is preferred over using individual items for several reasons: (a) it reduces the number of indicators for each factor, which reduces estimation errors; (b) parcels have a greater chance of meeting the multivariate normality assumption criteria than individual items; (c) parcels are better indicators of latent factors (producing larger factor loadings); and (d) parceling improves model fit (Bandalos, 2008; Sass & Smith, 2006). The four items from the ERQ-Expressive Suppression subscale were entered individually, as item parceling would result in an insufficient number of indicators for a CFA.

One loading on each latent factor was fixed to 1, with remaining loadings freely estimated. The four-factor correlated model had 80 free parameters, with 214 degrees of freedom.

Results

For descriptive statistics and bivariate correlations among parcels, see Table 1. For a summary of all model fit indices, see Table 2.

Measurement Model

A measurement model was estimated that included each of the hypothesized latent emotion regulation constructs. This included behavioral avoidance, rumination, reappraisal, thought suppression, expressive suppression, experiential avoidance, and acceptance. The parcels used in the measurement model were identical to those used in the later structural models. One correlated seven-factor model was used to examine all seven emotion regulation strategies concurrently. This model fit the data well: $\text{CFI} = .95$, $\text{TLI} = .94$, $\text{RMSEA} = .07$ (90% confidence interval [CI] [.06, .07]), $\text{SRMR} = .05$. Loadings ranged from .89 to .95 for behavioral avoidance, .65 to
Table 1
Descriptive Statistics and Bivariate Correlations for All Item Parcels

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SD  | 4.53 | 3.48 | 3.09 | 5.02 | 5.02 | 4.12 | 2.79 | 2.60 | 2.86 | 3.23 | 3.38 | 2.32 | 2.37 | 1.69 | 2.14 | 1.72 | 5.24 | 5.18 | 4.67 | 1.84 | 1.68 | 1.92 | 1.85 |

Note. AAQ-II = Acceptance and Action Questionnaire-II; CBAS = Cognitive Behavioral Avoidance Scale; ERQ = Emotion Regulation Questionnaire (R = Reappraisal, S = Suppression); FFMQ-NA = Five Facet Mindfulness Questionnaire-Nonjudgmental Acceptance Subscale; RRS = Ruminative Responses Scale (B = Brooding, R = Reflection); WBSI = White Bear Suppression Inventory; ns = not significant; SD = standard deviation.

*aNot parceled.
All p < .05 unless otherwise noted.
Table 2
Summary of Fit Indices for All Models

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<th>Model tested</th>
<th>$X^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA [90% CI]</th>
<th>SRMR</th>
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<td>1. Measurement model</td>
<td>706.68*</td>
<td>209</td>
<td>.95</td>
<td>.94</td>
<td>.07 [.06, .07]</td>
<td>.05</td>
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<td>2. Four-factor correlated model</td>
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<td>.80</td>
<td>.77</td>
<td>.13 [.12, .13]</td>
<td>.17</td>
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<td>3. Five-factor correlated model</td>
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<td>256</td>
<td>.94</td>
<td>.93</td>
<td>.07 [.06, .07]</td>
<td>.06</td>
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<td>4. Higher order one-factor model</td>
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<td>261</td>
<td>.93</td>
<td>.92</td>
<td>.07 [.07, .08]</td>
<td>.07</td>
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<tr>
<td>$\Delta X^2/df$ Model 3 vs. 4</td>
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<tr>
<td>5. Higher order two-factor model</td>
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<td>.92</td>
<td>.07 [.07, .08]</td>
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<td>$\Delta X^2/df$ Model 4 vs. 5</td>
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Note. Gender and race/ethnicity were controlled in all structural models. CFI = comparative fit index; df = degrees of freedom; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; SRMR = standard root-mean-square residual; CI = confidence interval.

*p* < .001.

.92 for rumination, .79 to .92 for reappraisal, .89 to .93 for thought suppression, .88 to .92 for acceptance, .57 to .87 for expressive suppression, and .84 to .88 for experiential avoidance.

Structural Model

A structural model of emotion regulation was examined with four correlated factors: situation selection, attentional deployment, cognitive change, and response modulation. Additionally, gender and race/ethnicity were included as control variables. This model did not fit the data well: CFI = .80, TLI = .76, RMSEA = .13 (90% CI [.12, .13]), SRMR = .17. Nonsignificant paths between the demographic variables and each factor were removed, and a trimmed model was run. In this model, gender was included as a predictor of only attentional deployment and cognitive change, and race/ethnicity was included as a predictor of only attentional deployment and response modulation. This model did not fit the data well either: CFI = .80, TLI = .77, RMSEA = .13 (90% CI [.12, .13]), SRMR = .17. All manifest indicators loaded onto the hypothesized factors, with the exception of the WBSI parcels and ERQ-Suppression items.

Alternative Model

Next, modification indices were inspected to explore whether model changes, bolstered by theory, might improve model fit. The highest modification indices were observed for thought suppression (indicated by parcels from the WBSI). Based on the modification indices, it appeared that modeling thought suppression under the response modulation factor (with acceptance and experiential avoidance) might improve model fit. In addition, low factor loadings for expressive suppression were consistent with removing expressive suppression from the original placement under response modulation with acceptance and experiential avoidance. Given that expressive suppression is Gross’ (1998a) primary example of response modulation and best captures the meaning of this category of emotion regulation, items representing expressive suppression were kept as the sole indicators of response modulation, and a new latent factor was created for acceptance, experiential avoidance, and thought suppression.

Thus, a novel five-factor model was tested, with parcels from the CBAS representing situation selection, parcels from the RRS representing attentional deployment, parcels from the ERQ-Reappraisal representing cognitive change, items from the ERQ-Suppression representing response modulation, and items from the FFMQ-Nonjudgmental Acceptance, AAQ-II, and WBSI representing a new factor, called “emotional distancing.” This model was initially tested with demographic variables included, and nonsignificant paths were removed such that gender was examined only in relation to attentional deployment, cognitive change, response modulation, and emotional distancing; race/ethnicity was examined only in relation to attentional deployment, response modulation, and emotional distancing. All included demographic
relations were significant in the five-factor model, which fit the data adequately, meeting criteria for three out of four fit statistics (see Figure 1): CFI = .94, TLI = .93, RMSEA = .07 (90% CI [.06, .07]), SRMR = .06.

Discussion
The current study examined the factor structure of emotion regulation guided by Gross’ (1998a) process model. Four categories of emotion regulation were examined as latent factors: situation selection, attentional deployment, cognitive change, and response modulation. Indicators of these factors included items from self-report measures of emotion regulation strategies: behavioral avoidance, rumination, reappraisal, thought suppression, experiential avoidance, acceptance, and expressive suppression. An alternative five-factor model was also examined.

In terms of the four-factor model, the majority of manifest indicators of the emotion regulation categories (e.g., CBAS parcels, AAQ-II parcels) loaded onto the expected factors. However, for attentional deployment, the RRS-Brooding parcels loaded at .92 and .85, respectively, while RRS-Reflection parcels loaded at .65 and .66, suggesting that Brooding items may better represent the construct of attentional deployment. For cognitive change, the WBSI parcels loaded below .23, suggesting that thought suppression might not be a form of cognitive change. Items from the ERQ- Suppression subscale loaded onto the latent factor of expressive suppression, but expressive suppression did not load onto response modulation. This suggests that expressive suppression does not fit into the same category of constructs as acceptance and experiential avoidance. Further, the correlated four-factor model did not fit the data well. Guided by theory and modification indices, a novel five-factor model was tested and found to have adequate fit.

Regarding the poor fit of the four-factor model, it is possible that the findings of the current study reflect a measurement issue in the field of emotion regulation, and that current self-report measures do not accurately assess their intended constructs. Specifically, it may be that content overlap among measures or vaguely worded items reduce the validity of some emotion regulation measures. For example, items from both the FFMQ-Nonjudgmental Acceptance and the WBSI appear to measure individuals’ questioning of their thoughts: “Sometimes I wonder why I have the thoughts I do (WBSI)” and “I tell myself that I shouldn’t be thinking the way I’m thinking (FFMQ-NA).” Additionally, vaguely worded items such as “I keep my emotions to myself (ERQ-Suppression)” and “I control my emotions by changing the way I think about the situation I’m in (ERQ-Reappraisal)” may not be specific enough to obtain accurate responses from participants. These items may elicit varying responses based on differences in understanding the item and context. For example, some individuals may interpret “I keep my emotions to myself” to mean that they do not discuss their emotions with others, versus meaning that they hide the physical expression of their emotion. Responses could also vary by context, such that individuals may use expressive suppression in response to anger but not fear. Further psychometric analyses are warranted to determine if the purported self-report measures of emotion regulation are reliably measuring their intended constructs.

The observed five-factor solution may have implications for the Gross (1998a) process model. For example, it is possible that the new factor, emotional distancing, represents an aspect of emotion regulation not covered by the model. The other four categories appear to fit the data with the intended self-report measures as specified by Gross (1998a; e.g., reappraisal as measured by CBAS parcels emerged as indicators of cognitive change). Gross (1998a) suggests that these categories are indicated by particular emotion regulation strategies, and results of the current study support that assertion. The new emotional distancing factor, however, may represent a broader construct: One could argue that experiential avoidance, acceptance, and thought suppression are reactions to or dispositions toward emotions, not specific strategies. For example, items from the FFMQ-Nonjudgmental Acceptance do not necessarily relate to a strategy or tactic that one uses when distressed; instead, items like “I criticize myself for having irrational or inappropriate emotions” appear to pull for one’s tendency to respond to the experience of emotion in a particular way. Therefore, if emotional distancing represents a stance toward emotions, then it may be considered a trait-like variable, and not a strategy in itself. It may be that emotion regulation, as a construct, comprises not only specific strategies that one may
Figure 1. Trimmed five-factor model.

Note. All ps < .05 unless otherwise noted. AAQ-II = Acceptance and Action Questionnaire-II; CBAS = Cognitive Behavioral Avoidance Scale; ERQ = Emotion Regulation Questionnaire; FFMQ-NA = Five Facet Mindfulness Questionnaire-Nonjudgmental Acceptance Subscale; RRS = Ruminative Responses Scale; WBSI = White Bear Suppression Inventory.
use, but also may comprise one's disposition toward emotions. These two components (specific strategy use and general disposition) may be necessary in understanding how individuals regulate their emotions. Indeed, some researchers have argued that one's ability to flexibly respond to emotions may be more important than one's use of specific strategies to regulate emotions (Bonnano, Papa, Lalande, Westphal, & Coifman, 2004).

Clinical Implications

Given that difficulties in emotion regulation have been implicated in the onset and maintenance of various types of psychopathology, it follows that therapeutic interventions have begun to address emotion regulation (Aldao et al., 2010; Kring & Bachorowski, 1999). If clinicians were better able to clarify whether individuals use specific strategies that they believe to be maladaptive, or if they have more general difficulty accepting their emotions, then such information could affect the way that treatment is focused. For example, if individuals endorse greater difficulty using strategies to manage their emotions, then dialectical behavior therapy (Linehan, 1993) may be more appropriate because it has a strong focus on specific skills, such as observing and describing emotions (though certain aspects of dialectical behavior therapy also encourage self-acceptance). Alternatively, if individuals endorse a strong tendency to reject their emotions (or judges themselves for experiencing certain emotions), then mindfulness, self-compassion, or ACT (Hayes et al., 1999; Gilbert, 2009, 2010; Kabat-Zinn, 1990; Neff & Germer, 2013) may be more appropriate because of their focus on self-acceptance and the acceptance of one's emotional experiences.

Limitations

The current study has important limitations to acknowledge. First, all data were self-report and therefore may be less accurate than clinician-administered assessments. However, there are no clinical assessments of emotion regulation currently in existence. Further, self-report is only one aspect of emotion regulation measurement; the current study did not include psychophysiological or experimental measures of emotion regulation. Second, the majority of participants in the current study were White and non-Hispanic/Latino. As evidenced by the significant relations among the observed factors and demographic variables (gender and race/ethnicity), there may be important differences in emotion regulation among racial and ethnic groups in addition to potential gender differences. Future studies are necessary to determine if the observed results may be generalized to other racial and ethnic populations and to explore gender differences in emotion regulation.

Third, the current sample was obtained using the online recruitment system, MTurk. A review by Paolacci and Chandler (2014) noted that although MTurk samples appear to be reliable and valid, there might be demographic differences. For example, some research suggests that compared with other populations such as undergraduates or the community, MTurk workers are more likely to reside in the United States or India, have more education, have more social anxiety, and be unemployed (Paolacci & Chandler, 2014). Therefore, results obtained from MTurk samples may not reflect those of the general population. Fourth, the instructions for the RRS were modified in the current study, and it is possible that these revised instructions affected the manner in which participants responded. Further research would be necessary to help determine if the revised instructions could affect the validity of the RRS.

Fifth, the current study used only a small selection of all available emotion regulation measures. Although these measures were selected based on their prevalence and psychometric properties, there may be other measures that could provide additional information not gathered by the current study. In particular, inclusion of the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) may have provided additional measurement of acceptance as an emotion regulation strategy. Last, the current study is limited by method variance, such that the relations observed may not be solely indicative of the emotion regulation constructs studied. Therefore, study findings may have been affected by the shared variance and common measurement method of the variables examined.
Conclusion

In summary, results of the current study suggest that conceptualizations of emotion regulation may benefit from the distinction between specific strategy use and broader constructs, such as the observed emotional distancing factor. Further research is required to determine if the observed five-factor model can be replicated in more diverse samples.

In addition, there is a great need in the field of emotion regulation for measures that take context into account when assessing emotion regulation, such as the emotion being regulated and the situation in which specific strategies are used. Research in this area will be further improved by the addition of clinician-administered assessments of emotion regulation. This is especially important given the vague wording and item overlap of some self-report measures. To help address method variance, multiple measures of emotion regulation (such as self-report and clinician-administered) are necessary. Given the prominent study of emotion regulation in the psychological literature, these improvements and future steps are necessary for clarifying what emotion regulation is, and more importantly, bettering our understanding of how it is implicated in psychological distress.

References


