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ORIGINAL ARTICLE

The Assessment of Emotion Regulation in Cognitive Context: The Emotion Amplification and Reduction Scales

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Abstract The purpose of this study was to provide initial psychometric evidence for the reliability and validity of The Emotion Amplification and Reduction Scales (TEARS), a questionnaire designed to assess perceived ability to change the trajectory of an emotional response. Items were formulated to assess perceived ability to *amplify* an emotionally response by either *prolonging* or *intensifying* an existing emotion. Additional items were selected to measure processes related to *emotion reduction*, *selecting* an emotional response or altering an existing emotion by *softening*, *stopping*, or *shortening* it. Both subscales, Emotion Amplification and Emotion Reduction, were found to have good internal consistency. Confirmatory Factor Analysis was used to document the two-factor structure of the measure and to assess evidence for construct validity. The latent Emotion Reduction variable was found to correlate inversely with negative affect and symptoms of depression. The latent Emotion Amplification variable was found to correlate with higher positive affect and also fatigue. As expected, TEARS is correlated with tonic measures of emotionality.

Keywords Emotion · Emotion regulation · Measurement

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Introduction

Strong emotion regulation skills are thought to be a hallmark of emotional intelligence (Mayer and Salovey 1997) and are associated with positive adjustment to chronic illness. Conversely, cognitive models of psychopathology suggest that difficulties in regulating emotional states play an important role in a variety of dysfunctional psychological states. For instance, emotion dysregulation is diagnostic of a number of disorders including mood disorders, anxiety disorders, and borderline personality (American Psychiatric Association 2000). In addition, persistent negative emotions have been found to predict health-related outcomes ranging from self-reports of somatic symptoms (Persson and Sjoberg 1987) to elevated ambulatory blood pressure (Carels et al. 2000). Thus, emotional health, or more specifically the ability to efficiently regulate emotion, is likely to be a strong determinant of psychological and physical health.

Interest in emotion regulation is undoubtedly rooted in clinical practices for the treatment of disorders such as depression. For obvious reasons, within clinical settings theories of emotion regulation have largely focused on regulating negative emotions. For instance, an empirically validated treatment for depression, cognitive behavior therapy (CBT; Beck et al. 1979) is designed to facilitate the reduction of pervasive negative mood states by challenging irrational thoughts. However, mood-regulation may be best understood as an integral portion of a broader theory of self-regulation. Specifically, emotion regulatory strategies may be among the most important moderators of effective goal pursuit (Karoly 1999).

There are three key elements within the goal-systems theory of self-regulation (Karoly 1993). First, individuals are assumed to be rational actors, motivated by personal goals.

Second, people are assumed to possesses specific instrumental skills that make progress towards a specific goal or set of goals more or less likely. Third, the pursuit of any specific goal can be either facilitated or inhibited by the individual's environment. Within the goal systems framework, emotion regulation is seen primarily as an instrumental self-regulatory skill that can facilitate or impede achievement of important goals. Emotions are thought to have the potential to either energize goal-directed pursuit or inhibit active movement towards a valued goal (Karoly 1999). Thus, from the goal systems perspective, it is important to examine a broad array of mood-regulation goals.

Following also from this framework, optimal functioning may require the ability to dampen negative moods and to also enhance positive moods. In recent goal-related research, positive emotional arousal in the context of goal pursuit was found to have a stronger link with physical health than was negative arousal (Affleck et al. 1998; Karoly and Ruehlman 1996). In addition, positive moods have been found to facilitate the performance of tasks requiring creative thinking (e.g., Isen et al. 1987). Thus, it may be necessary to recruit positive emotions to energize major changes in course or destination. From perspective the ability to amplify and reduce a given emotional state is considered to be a hallmark of effective goal pursuit.

Extant Measures of Emotion Regulation

Consistent with the goal systems framework, emotion theorists have defined emotion regulation as a set of goal directed processes designed to prevent, upregulate, enhance, maintain, or attenuate positive and negative emotions (Gross 1998; Morris and Reilly 1987; Parkinson and Totterdell 1999; Parrott 1993; Salovey et al. 1993). Despite this inclusive definition, most measures of emotion regulation almost exclusively focus on assessing methods for dampening negative emotions. For instance, early research employed a "bottom-up strategy" by asking participants to respond to questions such as "What's the thing to do when you're feeling depressed?" (e.g., Rippere 1977). Thayer and colleagues covered additional ground by asking participants to separately nominate strategies for changing a bad mood, reducing tension/anxiety, and enhancing energy (Thayer et al. 1994).

More theoretically driven researchers have operationalized emotion regulation mostly in terms of expectancies or specific types of strategies for emotion regulation. For instance, emotion regulation has been measured in terms of efficacy for negative mood reduction (Catanzaro and Mearns 1990) and for meta-cognitive beliefs about changing negative emotions (Salovey et al. 1995). Most recently, two different measures have focused on cognitive strategies to improve a bad mood (Kamholz et al. 2006) and strategies to manage emotions aroused by a stressful or negative event (Garnefski and Kraaij 2006). The latter measure expands upon a literature in which emotion regulation is measured in the context of stressful transactions (e.g., Carver et al. 1989; Folkman and Lazarus 1988). Thus, a number of measures are designed to assess skills or expectancies for managing negative emotions, but there are few that deal with attempts to manage positive emotions.

Although these measures are useful in many respects, there are a number of salient limitations. Many of these measures are quite lengthy (e.g., Kamholz et al. 2006; Roger and Najarian 1989) or cumbersome to use (Thayer et al. 1994). Yet other measures are designed to focus exclusively on situation specific (stress-related) emotion regulation (Carver et al. 1989; Folkman and Lazarus 1988; Garnefski and Kraaij 2006), to tap discrete strategies for emotion regulation such as rumination and distraction (Nolen-Hoeksema et al. 1990), or to control unwanted thoughts (Wells and Davies 1994). More importantly, however, some measures use items that overlap with other constructs that are related to, but distinct from, emotion regulation. For instance, a number of popular measures include items tapping cognitive processes that are indicative of emotional dysregulation such as catastrophic thinking (Catanzaro and Mearns 1990), self-blame or suicidal ideation (Kamholz et al. 2006), behavioral indications of dysregulation such as aggression, and also dysregulated emotional states such as irritability (e.g., Roger and Najarian 1989). Moreover, several of these scales appear to be composed of more items that measure emotional dysregulation than items that measure regulation (e.g., Roger and Najarian 1989). Conversely, still other measures assess constructs that are closely related to positive emotionality such as optimism (Salovey et al. 1995). Although all of these approaches have value, none measure the process of emotion regulation.

Measuring Process

One alternative to current approaches is to capture the process of emotion-regulation. Gross and colleagues have defined emotion regulation as the ability to change the trajectory of an emotional response, its magnitude, latency, and duration (Gross 1998). Gross and colleagues description of regulation is rooted strongly in a theory of emotion that emphasizes biological naturalism (Barrett et al. 2007). This model stipulates that the measurement of emotion must assess the content (what is felt) of emotion as well as the dynamic processes related to the unfolding of emotional experience. In defining emotion regulation in terms of the dynamic process of an unfolding emotion, rather than indications of dysregulated emotions, the possibility of confounding the predictor with outcomes of interest

such as irritability or depression is minimized. Furthermore, by examining processes rather than strategy, it is possible to develop items that cover a broader spectrum of the emotion regulation construct.

Thus, the purpose of the present research was to provide initial validation for a new measure of emotion regulation: The Emotion Amplification and Reduction Scales (TEARS). Derived from Gross and colleagues definition of an emotional response (Gross 1998), this measure was designed to assess two experiential dimensions of regulation, self-reported skills for emotion-upregulation (or amplification) and down-regulation (or reduction). In the item development phase, special care was taken to develop items that measured regulation as a positive state (as opposed to dysregulation) and to minimize language referencing dysregulated emotional states. An important goal was to develop a measure that could be easily used for both clinical and research purposes. After initial item selection, internal consistency was assessed for items thought to assess *amplification* or *reduction*.

A second goal was to provide evidence for convergent and discriminant criterion validity. At the most basic level, processes of emotion regulation should bear a relationship to experienced emotion. However, processes designed to amplify, as opposed to reduce emotion, would be expected to have different correlates. Specifically, it was predicted that *emotion amplification* would have stronger correlates in the positive affective domain. Thus, it was predicted that *emotion amplification* would correlate with higher levels of positive affect and have small to moderate inverse correlations with indices of negative affectivity (i.e., negative affect, symptoms of depression, and fatigue). In contrast *emotion reduction* would have stronger correlates in the negative affective domain. Thus, it was predicted that *emotion reduction* would be correlated with lower negative affect, fatigue, and symptoms of depression, but unrelated to positive affect. Confirmatory Factor Analysis was also used to document the two-factor structure of the measure and to assess evidence for construct validity.

Method

Participants

Participants were 375 undergraduate students (51.1% were female) enrolled in General Psychology at the University of Kansas. The average age of the sample was 18.79 (SD = 1.01) and the majority of respondents (64.6%) were university freshmen. The majority of participants were Caucasian (90.7%), 1.1% identified as African-American, 2.1% as Hispanic, 3.5% as Asian, and 2.7% as East Asian, Middle Eastern or other. Prior to performing statistical analyses, data from 10 participants were eliminated from further analyses because of a suspected random or careless responding to two questions embedded in questionnaire items (affirmative answer to both "I think I am a superhero" and "Small animals talk to me"). Two additional participants were eliminated because they did not respond to any of the TEARS items. The remaining sample was comprised of 178 male and 188 female participants and did not differ demographically from the total sample. In partial fulfillment of course requirements for General Psychology, participants completed the TEARS items along with measures of affect, depressive symptoms, fatigue, and demographic characteristics.

Item Selection

Initial scale development began with the development of the taxonomy of goals related to controlling the trajectory of an emotional response. Based on rational consideration, three emotion-amplification goals were identified: *Prolonging* an emotional response, *harnessing* its energy, or *intensifying* the response. Five emotion reduction goals were identified: *preventing* or *selecting* an emotional response, or once it has occurred, *shortening, softening*, or *stopping* the emotional response. In the initial round of item selection, approximately 40 items were generated on a rational basis that were later reduced to 36 items. To generate a final pool of items, initial items were administered to a variety of samples. Items were eliminated that showed little variability or were not endorsed, that did not contribute to an interpretable factor structure, or did not correlate with measures of affect. The end result was two 9-item subscales that demonstrated good internal consistency (α approaching .90). The process of determining the final item pool is described in the results section.

Measures

Affect

Positive and negative affect were assessed using the Positive and Negative Affect Scales (Watson et al. 1988). The PANAS is a widely-employed measure of emotion that makes use of 20 adjectives rated on a 5-point Likert scale to indicate the extent of felt mood. The present study used the "past week" as the time frame for assessing mood.

Beck Depression Inventory

Current depressive symptomatology was assessed by the Beck Depression Inventory (BDI; Beck et al. 1988). The BDI is a widely used, 21-item self-report measure of a

range of depressive symptoms. Each item is answered on a 0–3 scale with total scores ranging from 0 to 63. The BDI has undergone extensive reliability and validity studies (Beck and Steer 1993). Observed reliability was consistent with published norms ($\alpha = .90$).

Fatigue

Five items assessing duration of fatigue during the previous week. These items tapped the degree and severity of fatigue, disability from fatigue, and fatigue-related distress. These items were modeled after a measure developed by (Tack 1990) and modified by Sinclair and colleagues (Sinclair et al. 1998), who documented excellent internal consistency ($\alpha = .92$). Observed internal consistency in the current study was $\alpha = .90$.

Emotion Regulation

Emotion regulation was assessed by the TEARS. Participants responded to 18 items questioning perceived ability *Amplify* emotional states (9 items) or *Reduce* them (9 items). Participants rated each item on a 4-point Likert-scale, ranging from 1 = Not at all true for me to 4 = Very true for me. Items from the TEARS are shown in Table 1.

Results

Data Reduction

Of the 36 items that were written to assess emotion amplification and emotion reduction, 10 were negatively worded. A total of six items were discarded that did not meet the following criteria: (a) a mean and modal response that ranged from 2.0 to 3.0 on the 4-point Likert Scale (b) a standard deviation of at least .7, indicating an adequate distribution of scores. Interestingly, 5 of 6 of the dropped items were negatively worded, suggesting that most of these participants believed statements such as "I cannot make myself calm down" were "Not at all true for me."

Exploratory Factor Analysis

The structure for the remaining 30 items was examined using Principal Axis Factoring. Because items were expected to load on two correlated domains of emotion regulation, data were evaluated using a Promax oblique rotation. The goals for this step in our analytic procedure were to (a) determine whether a two-factor model adequately described the data, (b) determine whether a two-factor model was interpretable, (c) winnow down the list of 30 items, selecting items with maximal loadings on one factor and low to moderate loadings on the other factor. Although we expected that *emotion amplification* and *emotion reduction* would be correlated, we sought to maintain the highest possible level of discriminability between these constructs.

Approximately 50% of participants were randomly selected from the sample of 365 participants for initial exploration of the structure of these data. The resulting sample included 193 participants (52.8% were female). Examination of the scree plot for the initial model containing all 30 items unambiguously indicated that a two-factor model was appropriate for the data. Items with communalities lower than .35 and items with high loadings on both factors (loadings that exceeded half the size of the primary factor) were deleted. The final model contained 18 items. The first factor included items constructed to capture the process of *emotion reduction.* This factor explained 31% of the variance. The second factor included items constructed to capture the process of *emotion amplification*, and explained an additional 12% of the variance. Thus, the two-factor solution explained 43% of the variance in the set of data. Items and loadings from the pattern matrix are presented in Table 1.

Next a Confirmatory Factor Analysis (CFA) was used to cross-validate the structure of the model on the second half of the data. Following the recommendations of Little and colleagues (Little et al. 2002), the nine items assumed to load on *emotion amplification* and the nine items assumed to load on *emotion reduction* were randomly assigned to three parcels for each construct. The resulting model is consistent with the results of the factor analysis on the first half of the data. Items designed to measure processes to intensify, harness, and prolong an emotional response loaded on *emotional amplification.* Items designed to measure attempts to soften, shorten, stop, select and prevent an emotional response load on *emotion reduction.* The resulting model is presented in Fig. 1. Although $\chi^2(192,16)$ 24.185, $p = .09$, the Root Mean Square Error of Approximation (RMSEA) = 0.0540 (90% CI ranging from 0.0; 0.0960) and the Non-Normed Fit Index (NNFI) = 0.984, indicated a good fit for the data. No modifications were needed or employed to improve the fit of this model.

Next, we evaluated whether the observed indicators of *emotion amplification* and *emotion reduction* met conventional standards for internal consistency. Consistent with what was observed in latent space, both scales were found to have good internal consistency: *emotion amplification* $\alpha = .87$ and *emotion reduction* $\alpha = .89$.

Criterion Validity

Both Ordinary Least Squares (OLS) regression and CFA were used to provide evidence for construct validity.

Table 1 Loadings for emotion reduction and emotion amplification subscales

	Emotion reduction	Emotion amplification
Emotion amplification ($\alpha = 87$)		
Intensify		
1. If I want to, I can get myself emotionally "charged up"	−.02	.66
6. If I wanted to, I could turn UP the intensity level of whatever emotion I may be feeling	.02	.66
9. I can deepen the feeling of an existing emotion	−.16	.70
5. I can do things that will enrich my emotional experience	.06	.62
7. I can do things that will deepen my emotional experience	−.03	.63
Harness		
4. I can use my emotions or feelings to my advantage	−.02	.66
3. I can harness the energy of my emotions to enhance my performance	.22	.53
2. I can get emotionally "revved up" to enhance my performance	.09	.56
Prolong		
8. I can hold on to a feeling or emotion	−.04	.61
Emotion reduction ($\alpha = 89$)		
Soften		
1. No matter how intensely I may be feeling a particular emotion, I can almost always make myself calm down	.80	−.08
3. I can readily make myself tone down the intensity of any emotion that I might be feeling	.64	.04
Shorten		
2. When the need arises, I can cut short an emotional response	.67	.05
Stop		
4. I can stop an emotion before it overwhelms me	.70	−.05
Prevent		
5. Prior to a stressful situation, I can get myself into a calm state that actually prevents me from feeling bad when the stressful event happens	.66	.09
6. When I know in advance that an upcoming situation is going to make me feel a particular emotion (such as sadness or anger), I am able to do things that prevent the feelings from occurring when that situation arises	.65	.01
7. I can choose to remain calm in almost any situation	.73	−.19
9. When I know in advance that I will be faced with an exciting or stressful situation, I could (if I wanted to) remain calm	.65	.01
Select		
8. I can control my emotional reaction to events or situations	.58	.18

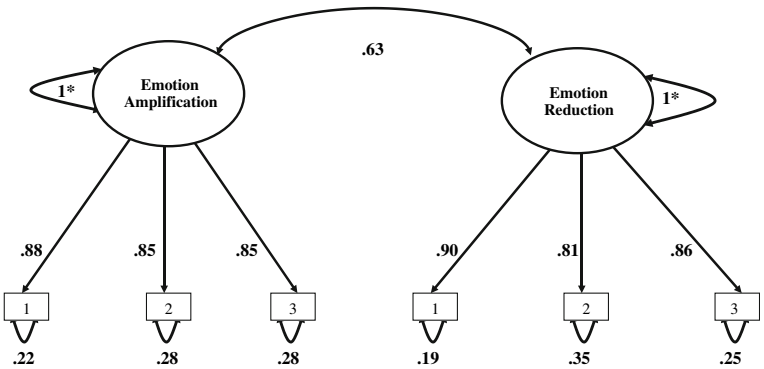

Fig. 1 Factor structure for the emotion amplification and reduction scales

Although it is not common to analyze the data using more than one statistical tool, it is important to demonstrate that the data can be successfully handled in both a latent and observed space. We examined the relationship between the dimensions of emotion regulation and indices of emotional health. Again, we predicted that *emotion amplification*

would have stronger positive correlations with positive affect, and weaker negative correlations with indices of negative affect. Conversely, we expected *emotion reduction* to show stronger negative correlations with indices of negative affect (negative affect, symptoms of depression, and fatigue) and little to no relationship with positive affect.

Examination of the data were largely consistent with predictions. Including data from all 365 participants, we first examined the relationship between the TEARS subscales and indices of emotional health in observed space. The results of this series of analyses are summarized in Table 2. After controlling for demographic characteristics (age, gender), emotion amplification was correlated with greater positive affect and had a small but significant relationship to higher fatigue. In addition, there was a marginal positive relationship between *emotion reduction and* higher positive affect scores. Thus, with the exception of the unexpected relationship between emotion amplification and fatigue, *emotion amplification* and *reduction* conformed to our predictions.

These relationships were largely confirmed in latent space. We used CFA to test a model in which *emotion amplification* and *emotion reduction* were modeled as cross-sectional predictors of positive affect, negative affect, symptoms of depression, and fatigue. Age and gender were controlled in this model. In addition to the parcels representing emotion amplification and emotion reduction, parceling was used to form the criterion variables. Specifically, three parcels of 3–4 items were created from the 10 positive affect items and 10 negative affect items from the PANAS; the 21 BDI items were divided into six 3–4 item parcels; fatigue into two 3–4 item parcels. Within each construct, items were assigned to parcels randomly.

The unconstrained model was a good fit for the data. As expected, $\chi^2(183,365)$ 284.50, $p < .001$. However, RMSEA = .039 (90% CI = .03–.05), and NNFI = .99. Non-significant paths including age as a covariate were removed with a slight improvement in fit, $\chi^2(171,365)$ 260.49, $p < .001$. The final model including significant paths is presented in Fig. 2. Similar to analyses in observed

Table 2 Observed relationship between TEARS and indices of affective health

Criterion variable	Emotion amplification		Emotion reduction		$R^2\Delta$
	b	*SE*	*b*	*SE*	
Positive affect	.34**	.07	.15[a]	.08	.12***
Negative affect	.05	.00	−.36**	.06	.06***
Symptoms of depression	.03	.04	−.15**	.04	.04**
Fatigue	.59*	.24	−.90**	.26	.03**

[a] $p < .10$,* $p < .05$, ** $p < .01$, *** $p < .001$

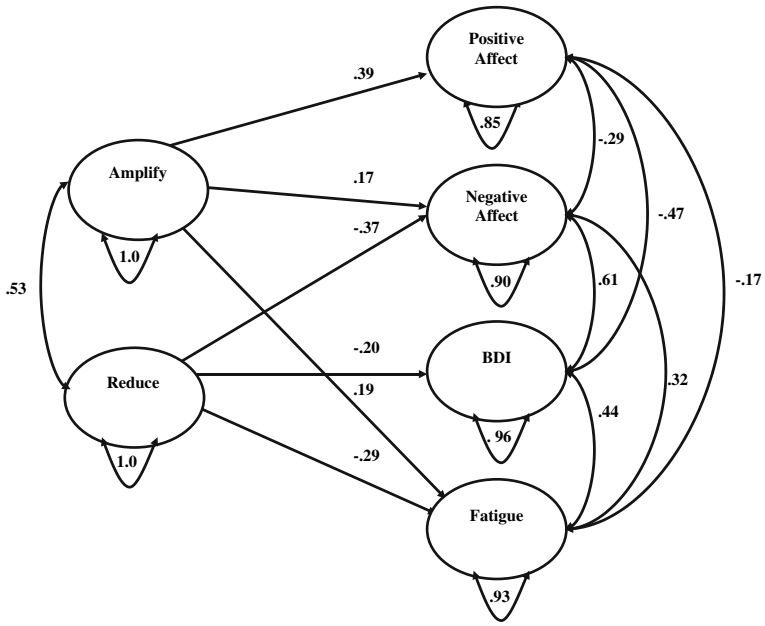

Fig. 2 Criterion validity for the emotion amplification and reduction scales

space, the data indicated that emotion amplification was related to higher positive affect and fatigue, and in this case higher negative affect. Emotion amplification was unrelated to scores on the BDI. Emotion reduction was related to lower negative affect, lower levels of depressive symptoms, and lower fatigue. For simplicity's sake, the model presented in Fig. 1 omits several relevant paths including the relationship of the gender to the predictor and criterion variables and the loadings of the predictors on latent variables. In brief, data indicated that females reported slightly lower levels of both *emotion amplification* (−.11) and *emotion reduction* (−.13). Consistent with this good fitting model, loadings of observed indicators on their respective latent variables ranged from .70 to .89.

Discussion

The data presented here provide initial support for the reliability and validity of TEARS. Both exploratory factor analysis and CFA identified two latent constructs, *emotion amplification* and *emotion reduction*. One of the primary goals for this study was to develop the constructs of emotional amplification and emotion reduction. Emotion regulation has been defined as the ability to change the trajectory of an emotional response, by altering its magnitude, latency, or duration (Gross 1998). Following from this definition, items were created to assess two broad emotion regulation goals, *amplifying* an emotion or *reducing* it. Specifically, it was hypothesized that strategies designed to increase the intensity of an emotion or prolong an emotion or harness its energy for instrumental reasons would represent attempts to *amplify* emotion. Conversely, attempts to select an emotional response, prevent an emotional response, shorten its duration, stop the emotion, or soften it were thought to represent attempts to *reduce* emotional arousal. These latent constructs were found to correlate in the (mostly) expected directions with positive affect, negative affect, symptoms of depression, and fatigue.

A second goal was to examine indices of criterion validity. A regulatory process should correlate with the content that it is designed to regulate. Thus, at the most basic level processes of emotion regulation should correlate with dimensions of affective health. In the case of TEARS, *emotion reduction* performed as expected, correlating with lower depression scores, fatigue, and negative affect. Also as expected, *emotion reduction* showed a marginal to non-significant relationship with positive affect. Although social situations may occasionally call for suppression of positive affect (Parrott 1993), these are relatively uncommon occurrences and probably do not impact the type of tonic affect captured by the instruments used in this study.

Criterion validity data for *emotion amplification* were more mixed. As expected, this subscale correlated with higher positive affect. However, *emotion amplification* also correlated with higher levels of fatigue and, in latent space, negative affect. However, the cross-sectional nature of the data may obscure the meaning of the relationship. It may very well be that fatigued or mildly sad individuals employ emotion amplification techniques as an adaptive response to increased environmental demands. Conversely, emotion amplification may be situationally useful, but taxing. Another possibility is that individuals with well-developed skills for emotion regulation may be able to maintain moderately high levels of positive and negative emotion, indicating increased emotional complexity (Zautra 2003). It is noteworthy that *emotion amplification* was unrelated to symptoms of depression, indicating that elevations in negative affect and fatigue may not progress beyond transient states.

Although the relationship between emotion regulation and emotional health is an important one, it will be important to document that self-reports of the process of emotion regulation also relate to evidence of "on-line" regulation (Barrett et al. 2007). In particular, perceived ability to regulate emotion should be related to evidence for emotion regulation, such as affect reports following an emotional challenge or more effective goal pursuit. Although removed from *actual* emotion regulation by several levels of analysis, evidence that TEARS facilitates adaptive behavioral self-regulation would provide evidence of real-world relevance for this construct.

The relationship between TEARS and indices of emotional health were small to moderate in magnitude, smaller than have been observed with other measures of emotion regulation (Catanzaro and Mearns 1990; Kamholz et al. 2006; Roger and Najarian 1989; Salovey et al. 1995). It is important to note, however, that unlike other measures, TEARS items are relatively free from reference to dysregulated emotion, processes known to produce dysregulated emotion (e.g., catastrophizing), or positive emotionality. Existing measures may conflate the process of emotion regulation with emotion, and thus inflate associations. However, TEARS scales were designed, and appear largely to, measure the process of emotion regulation with minimal overlap with emotion itself.

Because TEARS is relatively free of overlap with strategies for regulation, it may prove useful in a number of cognitive research and cognitive clinical contexts. For instance, TEARS may provide data on processes that are linked to vulnerability to negative affective states (e.g., depression and anxiety). For instance, individuals who have difficulty in regulating emotion may be especially at the mercy of negative life events that initiate a cascade into emotional disorders. TEARS may also be useful in

documenting progress in therapy by identifying mechanisms of action. In particular, TEARS could be used to document that the skills taught in cognitive and behavior therapy increase an individuals repertoire of emotion regulation skills.

Although the current data provided good evidence for the internal consistency and criterion validity of TEARS, a number of limitations must be acknowledged. First, it will be important to validate TEARS in an older adult sample and with clinical samples. Furthermore, it will be important to document that TEARS appraisals of emotion regulation correlate with more observable dimensions of emotion regulation. In addition, if TEARS is to be useful in evaluating cognitive accounts of psychopathology and in cognitive therapy contexts, it will be important to document that it can account for variance in the factors that comprise vulnerability to disorders, as well as track with changes in therapy. These issues notwithstanding, the current data indicate that TEARS shows promise for assessing processes that are linked to the regulation of emotion.

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