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Measuring Regulation in the Here and Now: The Development and Validation of the State Emotion Regulation Inventory (SERI)

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The relationship between context and emotion regulation is currently at the center of a burgeoning area of research. Commonly used emotion regulation questionnaires, however, are predominantly trait-based, and insensitive to situational choice of regulatory strategy. The current work describes the development and validation of the State Emotion Regulation Inventory (SERI), a brief measure of situational use of distraction, reappraisal, brooding and acceptance. In Study 1, an initial item pool was constructed, based on commonly used trait-based emotion regulation surveys. Then, the psychometric properties of the items were examined with a group of 181 participants who recalled a saddening autobiographical event, identified a distressing thought it triggered, and then waited for 3 minutes without instruction, as an opportunity to allow for spontaneous emotion regulation. Participants then completed the initial item pool, and other relevant trait-based scales. Exploratory factor analysis suggested a 4-factor solution, corresponding to the 4 regulatory strategies measured in the SERI. The 4 items to exclusively load highest on each factor were selected for the final measure. Assembled subscales correlated with relevant trait-based subscales in the expected directions. In Study 2, another sample of 155 participants completed the same procedure and the new SERI, and confirmatory factor analysis supported the 4-factor structure of this instrument. As a brief, validated instrument, the SERI may be a useful measure for studies of state emotion regulation, in protocols that use repeated measures in a single session, over the course of multiple sessions, or via ecological momentary assessments.

Public Significance Statement
In 2 studies a brief scale for measuring recent use of common emotion regulation strategies was developed and validated. Such a scale can potentially be of great use within the rapidly growing emotion-based research field of psychological flexibility.

Keywords: psychological flexibility, measurement, emotion regulation, state emotion regulation

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Emotion regulation has been conceptualized as a dynamic interaction between personal factors and environmental context (Thompson, 1994). With emotions serving as vital pieces of information and motivation in everyday decision-making, emotion regulation serves to optimize emotions to be most appropriate for the situation (Tamir, 2009). For this reason, the situational sensitivity of this process to context is key to its adaptivity.

Instruments used to measure such cognitive regulatory strategies, however, tend to measure traits—tendencies to habitually use a particular regulatory strategy, regardless of context (e.g., Gross & John, 2003; Wells & Davies, 1994). A wealth of such measures has grown in accordance with the wealth of research on issues varying from the effects of age on trait regulation (Urry & Gross, 2010) to the connections between trait regulation and various types of psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Although trait instruments effectively measure individual differences in regulatory tendencies, they inherently ignore the extent to which strategies vary depending on the situation. Thus, rather than accounting for the variability of a particular strategy, the measurement of trait regulatory habits assumes a stable deployment of regulatory strategies.

Research into context-sensitive emotion regulation, however, has found that the stable use of any particular strategy is both a departure from the norm (Cheng, 2001; Sheppes et al., 2014), and maladaptive (Berking & Wupperman, 2012; Kashdan & Rottenberg, 2010). In fact, the ability to flexibly shift between regulatory strategies, in light of situational demands, is a predictor of healthy adjustment (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). It is important to note that research on psychological flexibility, and state emotion regulation in general, focuses less on questions concerning the healthfulness of particular strategies, and

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more on questions of their appropriateness (e.g., Genet, Malooly, & Siemer, 2013; Sheppes et al., 2014). Trait emotion regulation questionnaires that measure regulatory habits, on the other hand, only measure frequency of certain strategies across situations, but they do not assess their adaptability.

Because of the lack of standardized self-report instruments, research on state regulation tends to rely on behavioral methods to study state emotion regulation. In many studies, participants are explicitly instructed to deploy a particular strategy, such as either reappraising or accepting their discomfort in a pain tolerance task (Kohl, Rief, & Glombiewski, 2013). Other paradigms allow participants to decide in advance which regulation strategy they will use (Sheppes, Scheibe, Suri, & Gross, 2011). Such paradigms, which are aimed at choices between isolated regulatory strategies, are excellent for comparing their basic processes. They do not, however, enable the examination of the simultaneous strategy deployment often used in spontaneous regulation (Aldao & Nolen-Hoeksema, 2013; Egloff, Schmukle, Burns, & Schwerdtfeger, 2006).

Self-report measures that follow spontaneous regulation tend to take a nonstandardized narrative approach via open questions (e.g., McRae, Ciesielski, & Gross, 2012) or daily diaries (e.g., Cheng, 2001). When questionnaires are used, they are typically short sets of ad hoc questions used only in the context of a particular study (e.g., Egloff et al., 2006; Rood, Roelofs, Bögels, & Arntz, 2012), sometimes with only one item per strategy (e.g., Aldao & Nolen-Hoeksema, 2013), and rarely in reference to other, validated, trait-based measures (but see Forman et al., 2012). The quality of such nonvalidated measurements varies, limiting reliable comparisons of effects. Although effectively detecting regulatory habits, validated trait-based, self-report measures cannot measure spontaneous regulation strategy, limiting insight into what may have led to a particular choice of strategy. A brief, validated state regulation questionnaire is still lacking.

One scale that does measure state emotion regulation is the Inventory of Cognitive Affect Regulation Strategies (ICARUS; Kamholz, Hayes, Carver, Gulliver, & Perlman, 2006). Although effective at thoroughly analyzing different strategies in particular situations, the ICARUS, which includes 59 items, is also quite lengthy, and may be too distracting to be completed while the regulatory processes are still active, and too lengthy to be administered multiple times in a single experimental session. A brief, valid measure of state emotion regulation strategy may integrate better into aroused states, without presenting excessive demands on the respondent.

Because of additional demands introduced by longer questionnaires, a short instrument would need to carefully define the range of what it measures. It may measure cognitive constructs, such as reappraisal or distraction, or constructs with behavioral implications as well, such as problem solving or expressive suppression (Aldao et al., 2010; Gross, 1998; Watkins, 2008). Including both kinds of constructs may increase the breadth of the instrument, but it also carries the risk of detrimentally increasing its length, and reducing the precision of its definition. A focus on exclusively cognitive strategies would allow for a less demanding, more precisely defined scale. Among cognitive strategies, a wide range may be deployed in any given context, from relatively uncommonly studied ones such as humor, to those more central in the research literature, such as distraction (Carver, Scheier, & Weintraub, 1989). A brief scale, therefore, would serve the most use if developed in accordance with current state emotion regulation literature, focusing on the more researched strategies. The strategies most commonly used tend to integrate into Gross's process model of emotion regulation (Gross & Thompson, 2007), namely distraction, brooding, reappraisal and acceptance (Aldao et al., 2010; Watkins, 2008; Webb, Miles, & Sheeran, 2012). Current research on these strategies points to the necessity of their examination at the resolution of a state level:

Distraction. Distraction may be defined as an attempt to deflect attention away from a troubling stimulus or cognition in order to avoid processing it (Webb et al., 2012). A meta-analysis found that habitual use of such avoidance is associated with general psychopathology, to a medium-to-large effect (Aldao et al., 2010). Distraction as a strategy in itself, however, is not always maladaptive. For example, distraction was found to be a preferred choice for downregulating negative affect in response to a high-intensity stimulus, even in a normative population (Sheppes et al., 2011). This may be due to the fact that distraction is a cognitively simple process (Sheppes et al., 2014; Suri, Sheppes, & Gross, 2015) that filters out the stimulus already at a presemantic stage (Gross, 1998; Sheppes et al., 2011). Thus, although the relationship between trait-distraction and psychopathology is a robust finding, there nevertheless remain situations in which normative populations opt to use distraction, when it is best suited for contextual demands.

Brooding. Brooding is a class of ruminative thought, entailing an abstract dwelling on problems and concerns, with a self-critical stance (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Brooding is considered an unconstructive form of rumination (Watkins, 2008, 2009), as opposed to reflective pondering (Joormann, Dkane, & Gotlib, 2006; Schoofs, Hermans, & Raes, 2010). It typically predicts psychopathology with medium to large effect sizes (Aldao et al., 2010; Nolen-Hoeksema & Watkins, 2011). Although the effects of brooding are widely agreed upon, its causes are still hotly debated (e.g., Smith & Alloy, 2009; Watkins, 2008). This is problematic, as brooding—much like most forms of repetitive thought—is maladaptive insofar as it is recursive (Segerstrom, Stanton, Alden, & Shortridge, 2003). Therefore, it seems that special attention needs to be paid to ways that personality and situation interact, that encourage entry to and exit from the recursive loop of brooding (Aldao, 2013). Such research would benefit from a measurement that is sensitive to time-dependent states.

Reappraisal and acceptance. Reappraisal and acceptance are both regulatory processes widely studied for their adaptive qualities (e.g., Hofmann, Heering, Sawyer, & Asnaani, 2009; Levitt, Brown, Orsillo, & Barlow, 2004; Malooly, Genet, & Siemer, 2013) and are hypothesized to be mechanisms of change in most standard cognitive–behavioral therapies (Arch & Craske, 2008; Beck, 1995; Forman et al., 2012; Hayes, Strosahl, & Wilson, 2012; Yovel, Mor, & Shakarov, 2014). Reappraisal involves a reassessment of the content of the disturbing stimulus, whereas acceptance entails a nonjudgmental willingness to engage in the negative experience, without allowing it to impact subsequent behavior (Aldao & Nolen-Hoeksema, 2012; Hofmann et al., 2009). Despite these strategies' prominence in treatment, their dispositional uses only have small-to-medium effect sizes in predicting psychopathology (Aldao et al., 2010). This may be due to the fact that although dispositional strategies such as distraction and brooding

are generally maladaptive, reappraisal and acceptance need to be used appropriately in order to be healthful (Aldao & Nolen-Hoeksema, 2012; Kashdan & Rottenberg, 2010). Thus, studying the contexts in which reappraisal and acceptance are particularly effective (or ineffective), may provide insight into their regulatory efficacy, and subsequently raise the impact of the cognitive–behavioral therapies that hypothesize them to be key mechanisms of change (Kashdan & Roberts, 2007; Kazdin, 2007).

Current Study

Although much progress has been made in the study of flexible deployment of regulation strategies, a validated measure of current use of common strategies remains conspicuously absent. The present two studies describe an attempt to supply such a measure, in the construction and validation of a new instrument, the State Emotion Regulation Inventory (SERI). The SERI assesses common cognitive mechanisms and emotion regulation strategies used while coping with negative thoughts, specifically: distraction, reappraisal, brooding, and acceptance. It is important to note that the SERI aims to measure specific instances of regulation strategy deployment, through a state-based approach to inquiry and assessment. To optimize the scale's usefulness, its development procedure was designed to make it brief enough to limit distracting effects caused by measurement, while still maintaining strong psychometric properties.

In contrast to typical scale development undertakings, the two studies reported here entailed the use of laboratory manipulations specifically designed to provide the optimal context for state measurement. Because the scale measures regulation of negative affect and cognition, its development and validation necessitated experimental arousal of distressing negative cognitions, followed by an opportunity for spontaneous regulation, prior to testing of the items' psychometric properties.

Study 1: Derivation and Item Selection

Method

Participants. One hundred and 88 undergraduate students of The Hebrew University of Jerusalem were recruited through the Department of Psychology participant matching website, as well as through printed fliers posted on the university campus. Seven participants (3.72%) were excluded due to unexpected improvement in mood over the course of the negative cognition extraction procedure (see Procedure). Analyses were based on the remaining 181 participants (115 female), all Caucasian, between ages of 18 and 36 ($M = 23.64$, $SD = 2.34$). The study was approved by the departmental Ethics Committee, and participants provided informed consent prior to participation in the study. They were either financially compensated, or given course credit for their participation.

Procedure. The items of the new SERI measure recent attempts to regulate negative cognitions. Therefore, to test their psychometric properties, it was necessary to first prompt participants to engage in spontaneous regulation before responding to the initial item pool. To do so, a negative cognition was extracted, followed by a waiting period in order to allow for spontaneous emotion regulation to occur.

First, participants were seated a laboratory room, devoid of external stimuli, with their personal belongings left outside the room. They were then given a paper-and-pencil workbook, containing the first part of the procedure. They completed a baseline measure of negative affect (Time 1), and then participated in a negative cognition extraction procedure (cf. Katz, Catane, & Yovel, 2016; Yovel et al., 2014; see supplemental materials). In the extraction procedure, participants first recalled an unpleasant, nontraumatic personal event that still arouses negative feelings and thoughts when recalled (e.g., failing a test), along with a negative cognition experienced at the event (e.g., "*I'm not good enough.*"). They then extracted a general self-critical thought triggered by recalling the event (e.g., "*I'm never good enough"*). In order to maximize candor, participants were told that the workbook would be disposed of at the end of the experiment, to ensure anonymity. Because extraction of negative thoughts tends to arouse negative affect as well (Kamholz et al., 2006; Yovel et al., 2014), negative affect arousal was used as a proxy to verify that participants indeed extracted a negative cognition. Accordingly, negative affect was again measured (Time 2) to examine mood change over the course of the cognition extraction.

Following extraction of the negative cognition, participants were instructed to call the experimenter back into the room. The experimenter entered, turned over the participant's workbook, and asked the participant to remain as the next part of the experiment was ostensibly being prepared. No other instructions were given. The experimenter only returned after three minutes, in order to allow for spontaneous emotion regulation to occur (cf. Egloff et al., 2006).

Following the wait period, participants received a second workbook, containing the remainder of the experimental procedure. First, they completed the pool of the 36 initial items for the SERI. Then, participants completed the manipulation check questions regarding the 3-min wait. Next, after completing the primary assessment of their experience during the wait, they completed a 3-min arithmetic task in order to lessen effects produced by the previous procedures on the completion of the trait questionnaires. Following the task, participants completed the Thought Control Questionnaire (Wells & Davies, 1994), the Brooding subscale of the Ruminative Responses Scale (Treynor et al., 2003), and the manipulation check questions regarding the elicited cognition. Participants were then thanked and debriefed.

Initial item generation. Item generation began with a thorough review of already validated subscales in trait-based measures of distraction, reappraisal, brooding and acceptance. Items were first drawn from the following instruments: the Thought Control Questionnaire (TCQ; Wells & Davies, 1994), the Cognitive Avoidance Questionnaire (CAQ: Sexton & Dugas, 2008), the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991), the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski, Kraaij, & Spinhoven, 2001), the COPE (Carver et al., 1989), the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), the Ruminative Responses Scale (RRS; Treynor et al., 2003), the Reflection–Rumination Questionnaire (RRQ; Trapnell & Campbell, 1999), the Rumination on Sadness Scale (RSS; Conway, Csank, Holm, & Blake, 2000), the Acceptance and Action Questionnaire–II (AAQ-II; Bond et al., 2011), and the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004). Following review

of the relevant subscales, items were developed for state-based measurement. Items were converted from present, general, trait-based assessment to past, specific, state-based assessment. For example, the Positive Reinterpretation and Growth subscale of the COPE (Carver et al., 1989) contains the item, "*I try to look for something good in what is happening*." The item was then converted to a state item, "*I looked for positive aspects of the situation*." An initial pool of 36 potential items was generated following this procedure (see Table 1).

In Study 1, the psychometric properties of the initial item pool were examined, in order to select the most appropriate ones for each subscale in the final version of the SERI. Respondents were instructed to recall the negative emotion that resulted from an elicited self-critical cognition, and how they related to the emotion while they waited (see below). They then completed the item pool, rating the extent to which they used the strategies included in the listed statements (e.g., "*I let go of every attempt to understand or change the thought"*), on a Likert scale of 1 (*completely disagree*) to 7 (*completely agree*).

Measures. Assessment entailed the 36-item initial pool, along with theoretically relevant questionnaires and subscales.

Current mood. A self-report scale containing eight items, each measured by a visual analogue scale (VAS; *completely disagree* to *completely agree*), which were adapted from the Positive Affect-Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). This scale was used to assess participants' mood at two different time points. Participants rated their current mood in terms of six negative affective states (e.g., sad), and, in order to prevent mindless responses, two positive affective states (e.g., content) were included as well. Internal consistencies (alphas) ranged between .89 and .91 for the negative items and between .72 and .82 for the positive items. A composite score was generated by averaging the scores of the negative items and reverse-coded positive items (αs = .90, .91), and was used to exclude the small number of participants nonresponsive to the cognition extraction procedure (see Participants).

Thought Control Questionnaire (TCQ; Wells & Davies, 1994). The TCQ is a 30-item, self-report measure of trait tendency to deploy strategies for regulating unpleasant cognitions. The current study uses four of the TCQ's subscales, of six items each. Distraction measures intentional deployment of attention (e.g., "*I think about something else*"). Punishment measures self-blame emerging from the cognition (e.g., "*I get angry at myself for having the thought*"). Reappraisal measures attempts to modify the content of the cognition (e.g., "*I try to reinterpret the thought*"). Worry measures attempts to avoid confronting the cognition by replacing it with other concerns (e.g., "*I replace the thought with a more trivial bad thought*"). Participants rated how often they would utilize methods to regulate an unpleasant thought on a Likert scale

Table 1
Factor Loadings From the Constrained Four-Factor PAF for the Initial Pool of 36 Potential Items

Item	Factor 1	2	3	4
[a]35. I tried to think about other things	**.85**	−.07	−.03	−.04
[a]23. I tried to call to mind other topics that were unrelated to the thought	**.84**	−.06	.03	.06
[a]2. I tried to think about something else instead of dealing with the thought	**.72**	−.11	−.05	.10
31. I tried to think more pleasant thoughts instead of the current thought	**.67**	**.30**	−.10	−.09
20. I tried to center my thoughts on more positive topics, instead of facing the thought	**.64**	**.37**	−.05	−.03
9. I tried to bring to mind other positive things, instead of the thought	**.56**	**.32**	.03	.01
[a]27. I tried to worry about other things instead	**.58**	−.14	−.08	.12
16. I tried to bring up in my mind other positive things instead of the thought	**.58**	**−.34**	**.32**	.03
17R. When the thought entered my head, I didn't try to push it out	**.43**	−.13	−.01	**−.31**
[a]28. I tried to reevaluate the situation more positively	.01	**.65**	.08	−.08
[a]19. I looked for positive aspects of the situation	−.06	**.64**	.01	.02
[a]15. I tried to change the way I think about the situation	.04	**.59**	.19	−.10
[a]7. I tried to see the situation in a more positive light	−.02	**.59**	.00	.01
3. I investigated whether it's possible to see the topic in a different way	.01	**.56**	.12	−.17
32. I tried to reappraise it entirely	−.04	**.52**	.28	−.15
18. I analyzed my thought without judging myself	−.03	**.53**	−.21	.27
34. I uncritically faced the thought	−.04	**.41**	**−.31**	.29
[a]14. I critically analyzed the possible implications of my thought	−.02	.10	**.77**	.18
[a]30. I critically dealt with the significance of my thought and how it reflects on me	−.08	−.09	**.72**	.05
[a]22. I considered how my thought highlights problematic aspects of my current situation	.13	−.10	**.65**	.14
10. I investigated the nature of my thought with interest	−.07	**.35**	**.53**	.06
[a]8. I critically analyzed the possible reasons for my thought	−.05	.08	**.50**	−.11
4. I investigated with curiosity the meanings that may arise out of my thought	−.06	.19	**.40**	−.15
6. I tried to think about other negative topics instead of dealing with the thought	.10	**−.28**	**.27**	.04
[a]36. When the thought entered my head, I simply accepted it as it was	−.04	−.01	.19	**.81**
[a]29. I allowed the thought to enter my head as it was	−.03	−.09	.08	**.69**
[a]21. I allowed the thought to come up without delving into it or avoiding it	.09	−.02	.01	**.58**
[a]5. I allowed the thought to come up without putting in great effort to change it	.03	−.12	.07	**.45**
33. I told myself that my thought is only a thought and nothing more, without trying to wrestle with it	.07	**.36**	−.05	**.46**
1. I let go of every attempt to understand or change the thought	.01	−.02	.00	.22

Note. Bold typeface indicates loadings greater than .30. PAF = principal axis factoring.
[a] Items selected for the State Emotion Regulation Inventory.

of 1 (*never*) to 4 (*almost always*). Higher scores on a subscale indicate greater trait use of a particular strategy. The TCQ subscales' scores showed good internal consistency in the current study (αs = .70–.77).

Ruminative Responses Scale—Brooding (RRS-B; Treynor et al., 2003). The RRS is a five-item self-report measure of trait brooding, a self-punishing form of rumination, deployed in response to negative affect. Participants rated on a Likert scale of 1 (*almost never*) to 4 (*almost always*) ways that they generally respond to their negative moods (e.g., "*I think about how alone I feel"*). Scores from this subscale showed high internal consistency in the current study (α = .89).

Manipulation checks. In order to assess adherence to the experimental protocol, manipulation-check questions were included at two different points. Three questions were integrated into the initial item pool to assess the extent to which the waiting period required spontaneous regulation. Participants rated on a Likert scale of 1 (*not at all*) to 7 (*very much so*) the extent to which they were occupied by the elicited cognition during the period of spontaneous regulation (i.e., "*My thought occupied my mind while I waited*"; "*After I wrote my thought, it no longer occupied my mind* (R)") and the extent to which they were bothered by the elicited cognition (i.e., "*The thought bothered me*"). These items were averaged to a single, 3-item scale that measured subjective importance, with higher scores indicating greater subjective importance (α = .54). In addition to the subjective importance questions, following the completion of the trait scales at the end of the protocol, three more questions assessed the elicited cognition's unpleasantness ("*How significant and unpleasant is the thought?*"), centrality ("*How central is the thought to the way you see yourself?*") and relevance ("*To what extent does the thought you noted come up in different contexts?*"). Participants endorsed the items on a Likert-type scale of 1 (*not at all*) to 4 (*very*). These items were examined separately.

Results and Discussion

Manipulation check. To assess the effectiveness of the negative cognition extraction procedure, paired *t* tests were conducted, with time (Time 1, Time 2) as the within-subject factor, and positive and negative affect, as the dependent variables. Negative affect significantly increased from T1 ($M = 26.44$, $SD = 18.28$) to T2 ($M = 42.52$, $SD = 22.03$), $t(180) = 16.08$, $p < .001$, $d = 0.79$, 90% confidence interval (CI) [0.66, 0.91]. Similarly, positive affect significantly decreased from T1 ($M = 67.72$, $SD = 16.24$) to T2 ($M = 53.06$, $SD = 22.51$), $t(180) = 14.67$, $p < .001$, $d = 0.72$, 90% CI [0.59, 0.84]. Thus, in keeping with other studies utilizing the procedure (Katz et al., 2016; Yovel et al., 2014), participants' mood worsened over the course of the distressing cognition extraction procedure.

To assess whether participants chose a central negative event as instructed, descriptive statistics were calculated for the manipulation check questions about the event choice. The ad hoc subjective importance scale showed that participants tended to assign moderately high importance to their thought ($M = 4.5$, $SD = 1.3$, 95% CI [4.31, 4.69]). The manipulation check items administered at the end showed that when considering the events they identified, participants rated them as still difficult to recall (96.1%), and that the accompanying thought was at least somewhat central to how they see themselves (72.3%). Furthermore, most participants reported that the cognition they extracted has accompanied them in multiple different situations (85.6%). Participants therefore indicated that the elicited thought was personally important, unpleasant to recall, central to the way they see themselves, and relevant to a variety of different situations.

Item selection. In order to assess the appropriateness of implementing a principal axis factoring (PAF) procedure on the existing potential item pool, a series of preliminary tests were conducted. The Kaiser-Meyer-Olkin test of sampling adequacy (KMO) was .786, indicating a good degree of nonunique covariance among the items (Kaiser, 1974). Similarly, Bartlett's test of sphericity was significant ($\chi^2 = 2350.90$, $df = 435$, $p < .001$). Together, these tests indicate that the item pool used in the study was suitable for PAF.

A PAF was conducted on the pool of 36 items, with Promax oblique rotation to allow for correlation between factors. Factor retention was based on parallel analysis (Horn, 1965; O'Connor, 2000) of the raw data, as well as on theoretical considerations. The eigenvalues of the first four factors were greater than the average eigenvalue and the 95th percentile eigenvalue from 1000 random data factor analyses. The eigenvalue of the fifth factor, however, fell below both these cutoffs. The parallel analysis criterion (Montanelli & Humphreys, 1976) therefore suggested a four-factor solution. This was in keeping with the original conceptualization of the SERI as a measure of four distinct (albeit related) regulation strategies. Table 1 presents the list of items used and their factor loadings.

Development of the final scales. The final SERI was assembled with two intended goals. On one hand, scales that are too lengthy can be overly demanding for respondents, as well as potentially distracting from the current state. On the other hand, scales with too few items suffer from scores with insufficient reliability. Therefore, to balance between brevity and reliability, each subscale was set to an a priori length of four items, with the final SERI becoming a measure of 16 items altogether.

Items were selected based on their psychometric properties. Factor loadings of .30 and higher were considered meaningful. All items loaded at least .30 or higher on at least one factor, and as such, no items needed to be removed. However, items that had meaningful loadings on more than one factor (e.g., Item 31: *I tried to think more pleasant thoughts instead of the current thought*), were excluded from selection of items for the final scale (Ferguson & Cox, 1993).

The subscales comprised of the four items that loaded the most on each factor, which were not excluded due to multiple loadings. For example, in Factor 3, Items 14 (*I critically analyzed the possible implications of my thought*), 30 (*I critically dealt with the significance of my thought and how it reflects on me*), and 22 (*I considered how my thought highlights problematic aspects of my current situation*) were the three items with greatest loadings on Factor 3, that also loaded exclusively on the factor. Item 10 (*I investigated the nature of my thought with interest*), however, also loaded meaningfully on Factor 2, and was therefore excluded. Item 8 (*I critically analyzed the possible reasons for my thought*) was the item with the next greatest loading on Factor 3, with no loading greater than .30 on any other factor.

Based on the content of the items that were selected for each factor, the structure of the new scale reflects the originally in-

tended four cognitive strategies of emotion regulation. Items in Factor 1 concern attempts to deploy attention elsewhere (e.g., "*I tried to think about other things*"). As such, those selected from Factor 1 became a subscale labeled "Distraction." Items in Factor 2 measure attempts to modify the content of the cognition to be less negative (e.g., "*I tried to reevaluate the situation more positively*"). As such, those selected from Factor 2 became a subscale "Reappraisal." Items in Factor 3 concern self-critical analysis of the cognition (e.g., "*I critically analyzed the possible implications of my thought*"). Items selected from Factor 3 therefore became a subscale labeled "Brooding." Items in Factor 4 reflect a nonjudgmental willingness to allow the cognition to appear without resistance (e.g., "*I allowed the thought to come up as it was*"). Accordingly, items selected from Factor 4 became a subscale labeled "Acceptance." These four subscales of four items each comprised the new, 16-item SERI (see Appendix).

Psychometric properties of the SERI. Because Cronbach's alpha is a function of the scale's length (Nunnally & Bernstein, 1994), alphas were computed along with mean interitem correlations in the examining of the subscales' internal consistencies, and with corrected item–total correlations. Results indicate that the Distraction ($\alpha = .82$; mean interitem correlation = .54; item–total correlations = .52–.73), Reappraisal ($\alpha = .78$; mean interitem correlation = .47; item–total correlations = .55–.70), Brooding ($\alpha = .73$; mean interitem correlation = .40; item–total correlations = .40–.67), and Acceptance ($\alpha = .70$; mean interitem correlation = .38; item–total correlations = .38–.59) subscale scores all had good levels of internal consistency.

To examine evidence for the validity of the SERI subscale interpretation, Pearson correlations were computed between the SERI subscales and the Distraction, Social Control, Worry, Punishment, and Reappraisal subscales of the TCQ, as well as the Brooding subscale of the RRS (see Table 2). As expected, the TCQ Distraction subscale correlated with the SERI Distraction subscale, $r = .26$, $p < .001$. The Worry subscale of the TCQ correlated negatively with the SERI Acceptance subscale, $r = -.27$, $p < .001$. The Worry subscale also had a positive correlation with the Distraction subscale of the SERI, $r = .18$, $p = .02$. Similarly, the Reappraisal subscale of the TCQ correlated with the Reappraisal subscale of the SERI, $r = .36$, $p < .001$, but also a with the Brooding subscale, $r = .34$, $p < .001$. The TCQ Punishment subscale, however, only correlated with the SERI Brooding subscale, $r = .17$, $p = .03$. Similarly, the Brooding subscale of the RRS correlated only with the Brooding subscale of the SERI, $r = .26$, $p < .001$, and with no other subscale ($ps = .11$–$.60$). Taken together, the SERI subscales generally correlated in the predicted directions with their corollary trait measures, and did not correlate with unrelated measures. Furthermore, the effect sizes of these correlations may provide evidence for the need for a state regulatory measure different from trait regulatory measures. On one hand, the SERI subscales correlated with the relevant trait measures. On the other hand, the magnitude of these obtained correlations suggests that the two types of constructs measured by the SERI and the trait scales are in fact distinct.

Table 2
Correlations Between State Emotion Regulation Inventory Subscales and Corollary Trait-Based Emotion Regulation Measures

Measures	Distraction	Reappraisal	Brooding	Acceptance
Thought Control Questionnaire				
Distraction	.26***	.11	−.08	−.10
Worry	.18*	.05	.10	−.27***
Punishment	.02	.05	.17*	−.10
Reappraisal	−.10	.36***	.34***	−.08
Ruminative Responses Scale (Brooding)	.10	−.04	.26***	−.12

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

To test the incremental utility of the SERI scores above trait measures in predicting recent mood change, hierarchical linear regression analyses were performed, in which change in positive and negative affect (Time 2 – Time 1) were the dependent variables. In the first step of these analyses, the RRS and the TCQ subscales scores were entered, and in the second step, the SERI subscales scores were entered, in order to examine whether they incrementally predicted change in affect, over and above the existing trait scales (see Table 3). Results showed that the trait scores combined did not predict change in negative affect in the first step, $F(5, 175) = 2.00$, $R^2 = .053$, $p = .08$. However, prediction of both types of self-regulation scales (i.e., trait and state) in second step was significant, $F(9, 171) = 2.28$, $R^2 = .107$, $p = .02$. Most important, the addition of the SERI subscales in the second step accounted for a significant increase in explained variance, $\Delta R^2 = .060$, $F(4, 171) = 2.28$, $p = .040$. The combined trait scales did significantly predict change in positive affect in the first step, $F(5, 175) = 2.43$, $R^2 = .065$, $p = .037$. Likewise, the second step of state and trait scales was significant, $F(5, 175) = 2.80$, $R^2 = .128$, $p = .004$. More important, however, the addition of the SERI subscales in the second step accounted for a significant increase in explained variance, $\Delta R^2 = .0.63$, $F(4, 171) = 3.010$, $p = .017$. These results point to the added utility of the state-based assessment of the SERI as a tool to predict current change in distress levels, over and above the measurement provided by existing trait-based measures.

Finally, Pearson correlations between the four assembled SERI subscales were examined in order to assess the relationships between the reported levels of the various emotion regulation strategies that participants used in order to cope with the extracted negative cognitions. As Table 4 shows, Acceptance was negatively correlated with Reappraisal, $r = -.32$, $p < .001$, and Brooding, $r = -.20$, $p = .008$. Reappraisal and Brooding correlated positively with each other, $r = .26$, $p < .001$. Distraction did not correlate with the other three subscales, ($ps > .22$).

Study 1 entailed the development of potential items for the SERI, and item selection for the final measure based on their psychometric properties. Exploratory factor analysis of the item pool supported a four-factor solution, reflecting the intended state-level measurement of the four emotion regulation strategies of distraction, reappraisal, brooding and acceptance. Subscales were assembled based on the four items with the highest exclusive loading on each factor. The four subscales of four items each comprise the 16-item SERI, providing four scores referencing their regulatory criteria.

Subscale scores showed good levels of internal consistency, and correlated with associated trait-based scales, providing evidence for the validity of the SERI's intended interpretation. Furthermore,

Table 3
Hierarchical Regression Predicting Change in Negative and Positive Affect

Step	Negative Affect			Positive Affect		
	B	R^2	ΔR^2	*B*	R^2	ΔR^2
Step 1		.05	.05		.07*	.07*
TCQ Distraction	.00			−.02		
TCQ Worry	.09			−.02		
TCQ Punishment	.02			−.16		
TCQ Reappraisal	−.11			.15		
RRS Brooding	.17*			−.10		
Step 2		.11*	.06*		.13**	.06*
TCQ Distraction	.04			−.07		
TCQ Worry	.07			−.02		
TCQ Punishment	.02			−.17*		
TCQ Reappraisal	−.07			.07		
RRS Brooding	.01			−.03		
SERI Acceptance	−.07			.05		
SERI Reappraisal	−.23**			.29***		
SERI Brooding	.17*			−.11		
SERI Distraction	.01			−.01		

Note. TCQ = Thought Control Questionnaire; RRS = Ruminative Responses Scale; SERI = State Emotion Regulation Inventory.
* $p < .05$. ** $p < .01$. *** $p < .005$.

they showed an incremental validity over trait-based scales in the prediction of recent change in negative affect. Unexpectedly, the TCQ's Reappraisal subscale correlated with both the SERI's Reappraisal and Brooding subscales. The TCQ's Punishment subscale, and the RRS's Brooding subscale, however, correlated only with the SERI's Brooding subscale. Some subscales correlated with each other as well. Acceptance correlated negatively with Reappraisal and Brooding. Reappraisal and Brooding positively correlated with each other. Given the exploratory nature of Study 1, further examination and confirmation of the latent structure of the SERI was needed.

Study 2

The SERI contains four subscales, meant to provide separate measurements. Therefore, in the second study, we attempted to validate the proposed four-factor structure of the SERI using confirmatory factor analysis (CFA), and examined the reliability of its subscales' scores in a different sample.

Method

Participants. A different sample of 157 undergraduate students of The Hebrew University of Jerusalem was recruited through the Department of Psychology website, and fliers posted on the university campus. Two participants (1.27%) were excluded due to unexpected improvement in mood over the course of the negative cognition extraction procedure. Analyses were based on the remaining 155 participants (105 female), all Caucasians, between ages of 18 and 52 ($M = 24.64$, $SD = 4.35$). Participants provided informed consent, and received either financial compensation or course credit for their participation. The study was approved by the departmental Ethics Committee.

Measures. Assessment entailed a measure of current mood similar to that used in Study 1, the newly assembled SERI, and manipulation check questions.

Current mood. A six-item self-report, visual analogue scale (VAS; *completely disagree* to *completely agree*) measure of mood adapted from the PANAS (Watson et al., 1988), with four negative affect items and two positive affect items. Internal consistencies (alphas) ranged between .88 and .89 for the negative affect items, and between .79 and .80 for the positive affect items. As in Study 1, composite scores (αs = .90) were used to exclude the small number of participants nonresponsive to the cognition extraction procedure (see Participants).

SERI. Participants completed the newly assembled SERI. The instructions and response scale were identical to those used for the initial item pool in Study 1.

Manipulation check questions. The three items from Study 1 that assessed the centrality and relevance of the event and thought were included in Study 2 as well, to ensure participants' adherence to the experimental procedure.

Procedure. Study 2 followed the same procedure as Study 1, but with participants completing only the SERI after a 3-min waiting period. The manipulation check questions about unpleasantness, centrality, and relevance of the elicited cognition were administered at the end of the procedure.

Results and Discussion

Manipulation check. As in Study 1, paired *t* tests were conducted, with time (Time 1, Time 2) as the within-subject factor, and negative and positive affect as the dependent variables, to assess the effectiveness of the distressing cognition extraction procedure in inducing a negative mood to be regulated. These tests revealed that negative affect increased significantly from T1 ($M = 30.86$, $SD = 21.51$) to T2 ($M = 44.66$, $SD = 23.92$), $t(154) = 7.10$, $p < .001$, $d = 0.55$, 90% CI [0.40, 0.71]. Similarly, positive affect decreased significantly from T1 ($M = 63.45$ $SD = 19.31$) to T2 ($M = 52.31$ $SD = 20.85$), $t(154) = 7.76$, $p < .001$, $d = 0.60$, 90% CI [0.45, 0.76]. Thus, participants' negative affect again increased, and positive affect decreased, over the course of the negative cognition extraction procedure.

In order to assess whether participants followed the protocol's instructions, descriptive statistics of the manipulation check questions were calculated. The majority of the participants selected

Table 4
Correlations and Cronbach's Alphas of Subscales of the State Emotion Regulation Inventory in Study 1, and Correlations of Principle Factors of Initial Item Pool

Measure	1	2	3	4
1. Distraction	(.82)	.17	.02	−.22
2. Reappraisal	−.01	(.78)	.33	−.34
3. Brooding	−.09	.26***	(.73)	−.44
4. Acceptance	−.07	−.32***	−.20**	(.70)

Note. Correlations above the diagonal indicate correlations between principle factors. Correlations below the diagonal indicate correlations between unit-weighted subscale scores. Reliabilities of the subscales are presented in the diagonal.
** $p < .01$. *** $p < .001$.

events that were at least somewhat unpleasant when recalled (81.3%). Most also rated the elicited thought as at least somewhat central to how they see themselves (84.4%) and at least somewhat relevant to multiple different aspects of their lives (68%). As in Study 1, participants in Study 2 elicited thoughts both central to the way they see themselves, and relevant to their daily lives.

Psychometric properties. As in Study 1, to assess the reliability of the SERI subscale scores, Cronbach's alpha was computed, along with mean interitem correlations and corrected item–total correlations. The Distraction (α = .91; mean interitem correlation = .72; item–total correlations = .62–.90), Reappraisal (α = .91; mean interitem correlation = .72; item–total correlations = .76–.87), Brooding (α = .82; mean interitem correlation = .54; item–total correlations = .51–.71), and Acceptance (α = .82; mean interitem correlation = .53; item–total correlations = .60–.68) subscale scores all showed good levels of internal consistency. Thus, reliability estimates of the subscale scores again indicated good levels of internal consistencies.

Confirmatory factor analysis. To confirm the four-factor structure of the SERI's subscales, a CFA was performed in MPlus version 7 (Muthén & Muthén, 2012). Normality of the distributions was examined in order to discern the appropriate estimator to be used (Byrne, 2012). Univariate normality of distribution, as indicated by the rescaled standardized kurtosis index (β^2), remained below the threshold of 7 ($\beta^2 = -1.38$–.757; Boomsma & Hoogland, 2001), indicating that no item was exceptionally kurtotic. Multivariate kurtosis was examined via the z-statistic of the kurtosis ratio, with a cutoff beyond 5 indicating a non-normal distribution (Bentler, 2005). The *z* statistic was 10.794, indicating a need to correct for non-normality. CFA was therefore performed with a maximum likelihood mean-adjusted (MLM) estimator, that includes a Satorra–Bentler correction for the chi squared statistic in the case of non-normality (S-B χ^2; Byrne, 2012; Chou, Bentler, & Satorra, 1991; Hu, Bentler, & Kano, 1992; Satorra & Bentler, 1988). The model loaded each subscale on separate factors, with no cross-loadings or correlated errors (see Figure 1).

The χ^2 test was calculated as an initial measure of goodness of fit. However, due to the χ^2 statistic's sensitivity to sample size and overestimation of lack of model fit (Bollen, 1989), four additional indices of fit were examined: (a) relative chi-square (χ^2/df) was used as an informal correction for the chi-square test, with a cutoff score of below 3.00 (Kline, 1998); (b) the comparative fit index (CFI) was calculated as a measure of relative fit, with a minimum cutoff score of .95 (Hu & Bentler, 1999), along with (c) root-mean-square error of approximation (RMSEA), with a maximum cutoff score of 0.7 (Steiger, 2007); and (d) the standardized root means residual (SRMR) was also computed with a score below 0.08 indicating good model fit (Hu & Bentler, 1998).

Three alternative models were considered as well. First, a general Emotion Regulation model was tested, wherein all items loaded on a single factor. Second, a two-factor, Adaptive/Maladaptive model was tested, wherein the Acceptance and Reappraisal subscales loaded on the first factor, Adaptive, and Brooding and Distraction loaded on the second factor, Maladaptive. Third, due to the high correlation observed between Brooding and Reappraisal, a three-factor model was tested as well, wherein Brooding and Reappraisal loaded onto a single factor, Content Modification, and Acceptance and Distraction were discrete factors. All factors were allowed to correlate with each other. No cross-loadings or correlated errors were included in any of the models.

A five-factor model was considered as well. In an attempt to select items for each factor, a PAF with Promax oblique rotation was repeated on the SERI items in the sample in Study 1, constrained to five factors. Such a procedure, however, resulted in only one item loading primarily on the fifth factor ("*I allowed the thought to come up without putting in great effort to change it*").

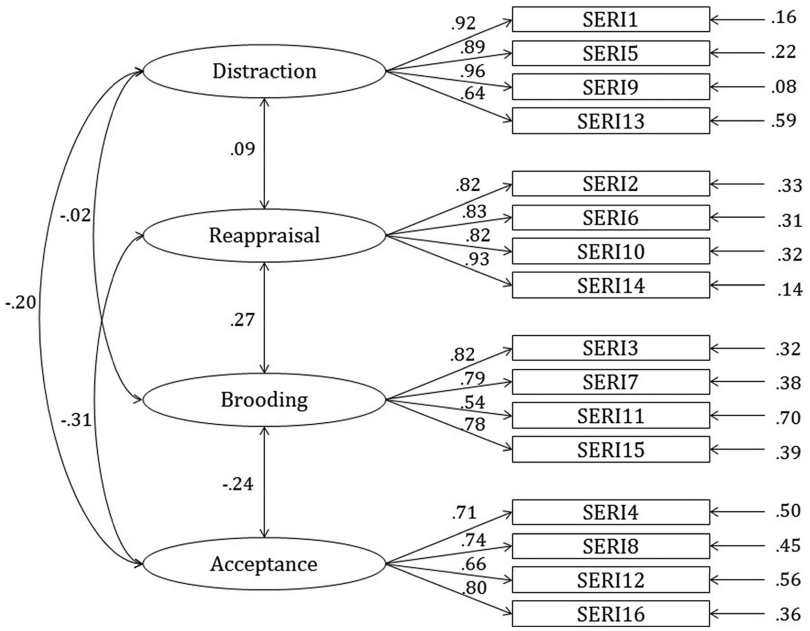

Figure 1. Four-factor model of State Emotion Regulation Inventory (SERI) for confirmatory factor analysis validation sample.

The five-factor structure was therefore deemed an unviable alternative.

Fit indices for the three alternative models and for the current four-factor model are presented in Table 5. Only the four-factor model met the criteria for adequate fit: $\chi^2(98) = 163.02$, $p < .001$; Normalized $\chi^2 = 1.66$; CFI = .952; RMSEA = .065 (90% CI [.047, .083]); SRMR = .072. Furthermore, in the four-factor model, loadings of all 16 items on their respective factors were significant at the $p < .001$ level. The four-factor model was therefore found to show the most adequate fit, in addition to being most consistent with the intended four-factor design of the SERI's measurement of four different cognitive strategies (i.e., distraction, reappraisal, brooding, and acceptance). Modification indices were examined in the four-factor model in order to discern recommended changes to the model. No cross-loadings or correlated errors were recommended (*MI*'s < 12.10). Rather, in the final model, each item remained independent of other items, and loaded exclusively on its own factor.

Pearson correlations between the four assembled subscales (Distraction, Reappraisal, Brooding and Acceptance) were performed in order to assess their interrelationships in the new sample of respondents (see Table 6). As in Study 1, Reappraisal correlated positively with Brooding, $r = .24$, $p = .002$, and negatively with Acceptance, $r = -.28$, $p < .001$. Distraction and Acceptance correlated negatively as well, $r = -.16$, $p = .05$. All other correlations were nonsignificant ($ps > .05$).

General Discussion

Current emotion regulation research is progressively deepening our understanding of the person-situation interaction (e.g., Gross & Thompson, 2007). Further study in this field would benefit from a valid measure sensitive to states of regulatory strategy that fluctuate based on context. In Study 1, initial potential items for such a measure were developed based on existing trait scales that measure distraction, reappraisal, brooding and acceptance. In order to examine the psychometric properties of the initial item pool, it was necessary for participants to enter a situation that encouraged spontaneous emotion regulation. To create such conditions, they were asked to extract a negative, self-focused cognition, and then waited for three minutes, with no instructions, and free of stimuli. They then completed the initial item pool based on how they regulated their emotions during the waiting period. PAF of the initial item pool yielded four factors, along the original expected state regulatory strategies. The four items to yield most highly and exclusively on each factor were chosen to comprise the subscales of Distraction, Reappraisal, Brooding and Acceptance in the 16-item SERI. Providing convergent and discriminant evidence for the validity of this scale's interpretation, the subscales correlated with related trait measures, and not with others. In Study 2, a second sample completed the same cognition extraction procedure, followed by a 3-min wait to allow for spontaneous regulation. After the wait, participants completed the newly assembled SERI, and CFA supported the four-factor structure of the SERI.

A validated state measure of emotion regulation would integrate well with new approaches of emotion regulation research that place less of a stress on the general salubrity of any strategy, and more on the relative appropriateness of deploying a given strategy in a particular moment (Aldao, 2013; Bonanno et al., 2004; Kashdan & Rottenberg, 2010; Zeman, Klimes-Dougan, Cassano, & Adrian, 2007). Research in this line marks mental health as a function of choosing appropriate regulatory strategies (Fernandez, Jazaieri, & Gross, 2016; Sheppes et al., 2014), and flexibly switching between them (Kashdan & Rottenberg, 2010; Sheppes et al., 2011), even if the resulting emotion would be hedonically unpleasant, but nevertheless in service of a higher goal (Tamir, Mitchell, & Gross, 2008; Tamir, 2009; Wilson & Murrell, 2004).

The SERI was therefore specifically designed to maintain attributes that would address the challenges unique to such lines of research. The brevity of the instrument allows for measurement with fewer demands from the respondent. This may allow for respondents to report their current regulatory states, relatively free from potentially distracting effects introduced by lengthier questionnaires (Zeman et al., 2007). Furthermore, the SERI's sensitivity to current state may allow for it to be used multiple times within a single session, tracking change in strategy based on context. This may be of particular use to studies that track emotional responses to changes in demands based on stimulus (e.g., Sheppes et al., 2011) or goal (e.g., Cameron & Payne, 2011). Finally, the SERI assumes that more than one strategy may be used simultaneously. This may make the SERI of particular use for measurement in naturalistic settings, where demands on the respondent may be lower, and simultaneous use of multiple strategies is a common occurrence (Aldao & Nolen-Hoeksema, 2013; Gyurak, Gross, & Etkin, 2011). Often, such findings have been based on ad hoc questionnaires developed within the context of the studies (e.g., Egloff et al., 2006), or using behavioral measures (e.g., Sheppes et al., 2011). The SERI provides a validated alternative to such methods.

It is important to note that comparisons between the SERI and corollary trait-based scales points to domains wherein the SERI

Table 5
Summary of Model Fit Statistics From the Alternative Confirmatory Fit Analyses With MLM Estimator

Model	$\chi^2(df)$	χ^2/df	CFI	RMSEA [90% CI]	SRMR
One factor	993.51 (104)	9.55	.344	.235 [.222, .248]	.207
Two factor	549.53 (103)	5.34	.671	.167 [.154, .181]	.174
Three factor	352.74 (101)	3.49	.814	.127 [.113, .141]	.119
Four factor	163.02 (98)	1.66	.952	.065 [.047, .083]	.072

Note. CFI = comparative fit index; RMSEA = root-mean-square error of approximation; CI = confidence interval; SRMR = Standardized root mean square residual; MLM = maximum likelihood mean-adjusted.

Table 6
Correlations and Cronbach's Alphas of State Emotion Regulation Inventory Subscales in Study 2

Measure	1	2	3	4
1. Distraction	(.91)			
2. Reappraisal	.08	(.91)		
3. Brooding	−.08	.24**	(.82)	
4. Acceptance	−.16*	−.28***	−.14	(.82)

Note. Reliabilities are presented in the diagonal.
* $p < .05$. ** $p < .01$. *** $p < .001$.

provides additional, unique, measurement utility. The moderate, albeit significant, correlations between them suggest a relationship between trait- and state-emotion regulation. However, the present findings also indicate that regulatory habits and regulatory choice are two types of related constructs that may nevertheless be distinct. Whereas a trait regulatory strategy reflects a general tendency to deploy a strategy across contexts, it remains only one factor among many that influences the choice to deploy any particular strategy within given situational demands (e.g., Aldao & Nolen-Hoeksema, 2013; McRae et al., 2012; Sheppes et al., 2011; Tamir et al., 2008). This may also explain the incremental utility that the state-based assessment of the SERI provided in predicting current change in mood, beyond the parallel trait-based instruments.

Although items of the SERI were selected based on exclusive factor loadings in the PAF, certain subscales correlated with each other in both studies. These interrelationships may point to similarities and differences in their underlying constructs (Kollman, Brown, & Barlow, 2009). For example, in keeping with current literature on their corollary trait strategies, the Brooding and Reappraisal subscales were found to positively correlate with each other. Although these two strategies lead to different affective results (Grisham, Flower, Williams, & Moulds, 2011; Rood et al., 2012), both similarly process negative stimuli semantically, without necessarily impacting behavioral intention (Gross, 1998; Nolen-Hoeksema & Watkins, 2011). Furthermore, rumination and reappraisal have shown similar neural correlates (Ray et al., 2005), and have shown to be positively correlated with each other in emotions such as anger (Ray, Wilhelm, & Gross, 2008). The Acceptance and Reappraisal subscales, on the other hand, correlated negatively across studies. This may point to a basic difference between how the two strategies are construed. Whereas reappraisal aims to modify the content of the cognition or emotion (McRae et al., 2012), acceptance inherently aims to engage with the negative stimulus, unchanged (Kohl, Rief, & Glombiewski, 2012). In that sense, the occurrence of acceptance to some extent precludes the occurrence of other strategies, and indeed between both studies this subscale negatively correlated with the other three subscales.

As research continues to examine the relationship between situation and emotion regulation strategy, the SERI may be of use. First, it may serve as a manipulation check in studies that utilize participant training paradigms for the strategies included in the measure (e.g., Shurick et al., 2012). Second, repeated administration of the SERI may be used for detecting mediators of clinical change over the course of therapy (see Kazdin, 2007). State measures may better detect not only whether therapies lead to general increases in particular strategies, but also whether those increases tend to center around particular theorized domains (Arch & Craske, 2008; Forman et al., 2012; Garnefski et al., 2001; Hofmann & Asmundson, 2008). Finally, the SERI's ease of use makes it a candidate for ecological momentary assessments (EMA; Shiffman, Stone, & Hufford, 2008). EMA studies have been successfully used as regular assessments of mood and behavior in daily life, usually delivered through self-reports on cellphones (Killingsworth & Gilbert, 2010), and have been noted as an untapped resource for emotion regulation research (Aldao, 2013). The SERI may be integrated into brief EMA questionnaires, along with general questions about context, in order to better detect whether certain kinds of contextual demands lead to certain regulatory strategies, or whether deployment of one strategy predicts a different one at a later time. Such studies may better define the difference between strategies that tend to be used by the same people, and those that tend to be used in the same situation. For example, respondents who tend to use reappraisal may tend to use acceptance as well (Garnefski et al., 2002). They may not, however, necessarily deploy the two strategies simultaneously.

The present studies, however, have a number of limitations to consider, which point toward potential future directions of research. The nonclinical population used here may encounter negative thoughts, emotional states, and regulatory strategy patterns that are qualitatively different from those in other, clinical populations. Similarly, the current sample was taken from an educated population of college students. Future studies should therefore incorporate the use of the SERI among a greater variety of participants.

Also, the development of a state-based measure prompted additional demands for the test administration procedure, above and beyond those involved in the development of trait-based measures. Specifically, it was necessary in both studies to also reliably elicit arousal of a negative, core cognition in a way that could ensure a conformity of inner states to be regulated. For this reason, SERI items were used to rate recent use of emotion regulation for a negative cognition that was elicited using a procedure with an efficacy that has been validated through prior research in a carefully controlled laboratory setting (Katz et al., 2016; Yovel et al., 2014). The psychological flexibility model, on the other hand, emphasizes the variety of emotions and regulatory strategies that different situations may arouse, even in the same person (Aldao, Sheppes, & Gross, 2015; Bonanno & Burton, 2013; Kashdan & Rottenberg, 2010). Therefore, in order to examine the SERI's psychometric properties in a variety of contexts, it may be administered following the experimental elicitation of different types of negative thinking (e.g., rumination vs. worry). Similarly, the SERI may be administered repeatedly in a variety of settings, in order to examine its sensitivity to within-subject changing states.

Finally, studies may compare the SERI against external criteria, such as therapies geared toward particular regulatory strategies (e.g., acceptance and commitment therapy; Hayes et al., 2012), or explicit instructions (e.g., instructing participants to reappraise or accept; Campbell-Sills, Barlow, Brown, & Hofmann, 2006). In addition to focusing on specific research questions associated with flexible deployment of emotion regulation strategies, these studies will also provide opportunities to further examine the validity of the state-based measurement provided by the SERI.

In sum, the current article presents a methodology for eliciting spontaneous emotion regulation in a laboratory environment, and a brief, validated measure for the major types of state emotion regulation. The result, the SERI, is a validated and accessible measure of recent deployment of distraction, reappraisal, brooding and acceptance. For future research that requires sensitivity to changes in strategy, or how context influences strategy choice, the ease of use of the SERI may be of service.

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(*Appendix follows*)

Appendix

Text of the State Emotion Regulation Inventory (SERI)

Instructions and Items

(*Sections in brackets to be filled in by survey administrator*)

Remember [*a distressing cognition that called for cognitive emotion regulation*]. Below is a list of statements. Please mark on the scale the extent to which you agree with each of the following statements regarding your negative thought, and the way you dealt with it.

This applies **from the moment [*starting point*] until now.** Please mark each item in order, without skipping any.

1----------2----------3----------4----------5----------6----------7

Strongly Disagree — Strongly Agree

1. I tried to think about other things
2. I tried to reevaluate the situation more positively
3. I critically analyzed the possible implications of my thought
4. When the thought entered my head, I simply accepted it as it was
5. I tried to call to mind other topics that were unrelated to the thought
6. I looked for positive aspects of the situation
7. I critically dealt with the significance of my thought and how it reflects on me
8. I allowed the thought to enter my head as it was
9. I tried to think about something else instead of dealing with the thought
10. I tried to change the way I think about the situation
11. I considered how my thought highlights problematic aspects of my current situation
12. I allowed the thought to come up without delving into it or avoiding it
13. I tried to worry about other things instead
14. I tried to see the situation in a more positive light
15. I critically analyzed the possible reasons for my thought
16. I allowed the thought to come up without putting in great effort to change it

Scoring

Distraction: 1, 5, 9, 11
Reappraisal: 2, 6, 10, 14
Brooding: 3, 7, 11, 15
Acceptance: 4, 8, 12, 16

No items are reverse coded. Items in each subscale are to be averaged together, with higher scores indicating greater deployment of strategy. Please note that the scores of each subscale are to be left discrete, as the SERI does not measure a composite, general emotion regulation score.

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