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Mindfulness and Emotion Regulation: The Development and Initial Validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)

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Abstract As interest grows in mindfulness training as a psychosocial intervention, it is increasingly important to quantify this construct to facilitate empirical investigation. The goal of the present studies was to develop a brief self-report measure of mindfulness with items that cover the breadth of the construct and that are written in everyday language. The resulting 12-item measure demonstrated acceptable internal consistency and evidence of convergent and discriminant validity with concurrent measures of mindfulness, distress, well-being, emotion-regulation, and problem-solving approaches in three samples of university students. To address potential construct contamination in two items, data are also presented on an alternate 10-item version of the measure.

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The field of clinical psychology has witnessed a recent surge of interest in mindfulness training as a psychosocial intervention. Two recent meta-analyses document the evidence for mindfulness training as an efficient method of distress reduction in medical and psychiatric populations, as well as in non-clinical populations (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004). The development of a reliable and valid self-report measure of mindfulness is an important research priority to further advance the scientific study of this construct (Bishop et al., 2004; Dimidjian & Linehan, 2003).

A critical task in measurement development is to generate an operational definition of the mindfulness construct. In Kabat-Zinn's writings on mindfulness (e.g., 2003), he defines the term as "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment to moment." In an effort to facilitate measurement development and hypothesis-testing of the construct, a consensus panel was recently convened to provide a common operational definition for researchers. The panel (Bishop et al., 2004) generated a definition that emphasizes the regulation of attention ("the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment") and one's orientation to experience ("adopting a particular orientation towards one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance"). Common to these definitions

are four components: 1) the ability to regulate attention, 2) an orientation to present or immediate experience, 3) awareness of experience, and 4) an attitude of acceptance or non-judgment towards experience.

Several years ago, the first three authors of the present series of studies began work on a self-report measure of individual differences in mindfulness called the Cognitive and Affective Mindfulness Scale (CAMS; Kumar, 2005; Kumar, Feldman, & Hayes, 2005). When the CAMS was created, no other self-report measures of mindfulness were available. Since that time, there are four additional self-report measures of mindfulness in various stages of development. It is useful to have multiple measures in the early stages of operationalization, as the existing measures come from slightly different perspectives, emphasize different components of mindfulness, and sample a variety of populations. Having some choice in measures allows researchers flexibility in matching instruments to research objectives.

The CAMS (Kumar et al., 2005) consists of 18 items designed to capture a broad conceptualization of mindfulness (Kabat-Zinn, 1990) with language that is not specific to any particular type of meditation training, which allows for use with a range of samples. The measure was first tested in a small sample of depressed individuals receiving an integrative psychotherapy that includes mindfulness training (Hayes, Beevers, Feldman, Laurenceau, & Perlman, 2005). The CAMS was found to be sensitive to change (Kumar et al., 2005) and demonstrated concurrent validity (Feldman, Kumar, Galyardt, & Hayes, 2002), but the internal consistency was low and the items generally lacked direct assessment (i.e., forward-scored items) of key aspects of the construct. The factor structure of the CAMS was not tested in this small sample. Subsequent exploratory factor analyses in large student samples generally supported a four-factor structure consistent with theory, but primary loadings of specific items failed to replicate across samples (Feldman et al., 2005). The present study was designed to address these limitations and to test this revised measure against a broader range of criterion measures.

Like the CAMS, the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) assesses mindfulness with items designed to be free of specialized, metaphorical, and idiomatic language. The MAAS includes the attentional and awareness aspects of mindfulness, but not the attitudinal components of acceptance and non-judgment that are emphasized across mindfulness-based clinical interventions (Baer, 2003), potentially limiting the use of the MAAS in clinically-related research. Like the CAMS, the Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2002) and the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004) assess a broad conceptualization of mindfulness. The FMI is limited in that it is intended for use only with individuals who already have familiarity with the principles of mindfulness. The KIMS can be scored to produce four internally-consistent subscales; however, a disadvantage is its length, which is more than twice as long as either the MAAS or the CAMS. Shorter measures can be useful when respondent burden is a concern. The Toronto Mindfulness Scale (TMS; Lau et al., in press) is a 13-item measure of the state of mindful self-regulation of attention and approach to experience. This measure is designed to be administered immediately after a meditation session, which limits the settings in which it can be applied.

The four existing measures reviewed above (i.e., FMI, MAAS, KIMS, and TMS) and the early version of the CAMS offer unique advantages and disadvantages in terms of their conceptual coverage of the components of mindfulness, their item content, their length, and their generalizability. The CAMS offers the advantages of capturing a multi-faceted conceptualization of mindfulness, being relatively brief, and using language and a format that does not restrict its use to a specific setting (e.g., mindfulness meditation training). In undertaking a revision of the CAMS, the goals were twofold. First, further analyses of the measure's psychometric properties were conducted and, where appropriate, its item content was refined. Second, consistent with the strengths of the original CAMS, a measure was created that has comprehensive conceptual coverage, uses clear everyday language, and is brief.

Theoretical writings on mindfulness, both modern and ancient, describe the practice of mindfulness as a means to quiet the mind, decrease suffering, and enhance quality of life (Gampopa, 2000; Kabat-Zinn, 2003; Walshe, 1987). Individuals who report lower levels of mindfulness also tend to report more distress and less psychological well-being (Baer et al., 2004; Brown & Ryan, 2003; Feldman et al., 2002). In the present study, it was hypothesized that the revised CAMS (CAMS-R) would demonstrate a similar pattern of associations with measures of distress and well-being.

In traditional Buddhist writings, mindfulness is thought to improve well-being by reducing tendencies towards aversion and attachment to internal and external phenomena, thereby facilitating emotional regulation (Kumar, 2002). Non-mindful approaches to internal experience have been characterized as under- or over-engagement with internal experiences (Buchheld et al., 2002; Hayes & Feldman, 2004; Kabat-Zinn, 1990). Emotional under-engagement has been studied in literatures on experiential avoidance (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996) and thought suppression (Wegner, 1994). Over-engagement includes processes in which individuals exaggerate or elaborate upon initial symptoms of distress, such as worry (Borkovec, 1994), rumination (Nolen-Hoeksema & Morrow, 1991), and

overgeneralization (Carver, 1998).[1] In contrast to under- and over-engagement, mindfulness involves a process of both acknowledging emotions as transient phenomena and fully experiencing emotions without necessarily acting upon them (Kabat-Zinn, 1990). Higher levels of self-reported mindfulness have been associated with less over- and under-engagement, such as experiential avoidance, thought suppression, and rumination, and with higher levels of emotional intelligence (Baer et al., 2004; Brown & Ryan, 2003; Feldman et al., 2002). Thus, it was hypothesized that higher mindfulness scores on the CAMS-R would be associated with less under-engagement (experiential avoidance and thought suppression), less over-engagement (worry, rumination, and overgeneralization), and more emotional intelligence.

Theoretical accounts highlight cognitive, attentional, and behavioral flexibility as components and consequences of mindfulness (Bishop et al., 2004; Borkovec, 2002; Kabat-Zinn, 1990; Roemer & Orsillo, 2003). The opposite pattern of taking a narrow perspective and responding in an automatic, habitual, and inflexible manner is often associated with poor problem-solving and more distress.[2] Thus, it was hypothesized that self-reported flexibility in coping would be associated with higher mindfulness scores on the CAMS-R. In the practice of mindfulness, individuals are often reminded to refrain from generating 'to do' lists as they meditate. Therefore, one aspect of the coping process that is particularly relevant to mindfulness is that of mental anticipatory coping (Aspinwall & Taylor, 1997; Feldman & Hayes, 2005), or the process by which individuals mentally prepare for pending problems. It was hypothesized that mindfulness would be associated with adaptive forms of mental preparation, such as problem analysis and mental rehearsal of action, but that these associations would not be strong, as mindfulness is neither an analytic or 'doing' mode of thought

(Teasdale, 1999). Individuals low in mindfulness would tend to unproductively dwell on future problems (a form of over-engagement) or passively fantasize about their resolution, while ignoring stressful details of the coping process (a form of under-engagement).

In the following sections, the process by which items were developed and selected for the revised Cognitive and Affective Mindfulness Scale (CAMS-R) is presented (Study 1) and evidence of convergent and discriminant validity is reported using a student sample (Study 2).

Study 1

The goal of the first study was to design a measure of mindfulness that is brief and yet captures the breadth of the construct of mindfulness. As such, the goal was not to create a measure of sufficient length to yield independent subscales with sufficiently strong separate psychometric properties to assess separate aspects of the construct. Instead, this study tests the hypothesis that a single, higher-order construct of mindfulness (i.e., second-order factor) can be inferred from four components (i.e., four first-order factors: attention, present-focus, awareness, and acceptance). A common pitfall in measure development is the "attenuation paradox" in which internal consistency of a measure is artificially increased by including items that access a single, narrow aspect of a broader construct (John & Benet-Martinez, 2000). The purpose of these analyses is to ensure that the mindfulness total score in the CAMS-R adequately represents the four components of mindfulness identified in previous operational definitions (Bishop et al., 2004; Kabat-Zinn, 2003).

Structural equation modeling (SEM) was used to guide the early phase of item-selection. For instrument development, use of SEM factor analytic strategies has two major advantages over traditional exploratory factor analysis (Bollen, 1989; Kline, 2004). First, unlike exploratory factor analysis, which is largely data-driven, SEM models allow the researcher to test a priori hypotheses about the underlying structure of the items. Second, SEM allows for the researcher to simultaneously test for the presence of both first- and second-order factors, as proposed in this model.

Method

Item generation

A pool of 35 items was generated by a group of researchers with expertise in mindfulness meditation, emotion regulation, and questionnaire development. Items were informed by a review of philosophical writings on mindfulness, as well as writings on clinical applications of mindfulness. Items were written to convey attitudes and approaches towards internal experiences of emotions and thoughts. Items that

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[1] There is considerable evidence that under- and over-engagement can and do co-occur. Individuals with little skill in regulating emotions may vacillate between under- and over-engagement. In addition, individuals can use over-engagement as a form of avoidance. Excessive worry may be a means of distracting oneself from more upsetting topics (Borkovec, 1994). Similarly, rumination has been conceptualized as a means of distracting one's self from one's actual life problems (Jacobson, Martell, & Dimidjian, 2001). There is also recent evidence that thought suppression prospectively predicts increased rumination for individuals experiencing a high degree of life stress (Wenzlaff & Luxton, 2003). Thus, under- and over-engagement are not necessarily mutually exclusive. However, these broad categorizations are used here to organize the criterion measures and the discussion of them.

[2] In this way, there is considerable overlap with an alternative conceptualization of mindfulness developed by Ellen Langer and colleagues (Langer, 1989), which involves both paying attention to one's environment, actively viewing situations from multiple perspectives, and responding in novel ways. This conceptualization, however, departs somewhat from Eastern notions of mindfulness that inform clinical interventions, which tend to emphasize "allowing" thoughts to pass through the mind rather than actively manipulating them.

reflect responses to external experiences or bodily sensations were not included, as these concerns are not relevant across disorders or treatment modalities. This item pool contained the 18 items from the original CAMS (Kumar et al., 2005). However, as noted previously, preliminary exploratory factor analyses of the CAMS revealed that the primary loadings of several items were unstable across samples (Feldman et al., 2005). Thus, for the present study, 17 new items were written and added to the item pool with the goal of more precisely capturing the four factors suggested by theory and preliminary exploratory factor analyses. The item pool contained both forward- and reverse-scored items. All items in the present study were designed to be comprehensible to individuals with no prior experience with mindfulness practice or meditation.

Participants

An ethnically-diverse sample of 548 university students responded to this item set in large testing sessions during two semesters in partial fulfillment of the research participation component of their introductory psychology course. Data from 250 students (Sample 1, 64.2% women, 35.8% men; mean age $= 19.31$, $SD = 2.66$; Ethnicity: 55.7% White/Caucasian, 18.4, Hispanic/Latino, 8.8% Black/African American, 6.1% Asian-American, 11.0% Other/Mixed Heritage) were used to test the preliminary models, and 298 (Sample 2, 60.5% women, 39.5% men; mean age $= 18.74$, $SD = 1.92$; Ethnicity: 55.7% White/Caucasian, 20.8, Hispanic/Latino, 7.2% Black/African American, 6.8% Asian-American, 9.5% Other/Mixed Heritage) were reserved for a confirmatory factor analysis.

Participants were asked to respond to the item set and were given the following prompt "People have a variety of ways of relating to their thoughts and feelings. For each of the items below, rate how much each of these ways applies to *you*." Participants were asked to rate their responses on a Likert scale with the following options: 1 (*Rarely/Not at all*), 2 (*Sometimes*), 3 (*Often*), or 4 (*Almost always*). Testing sessions were part of data collection procedures approved by the University of Miami Institutional Review Board and participants signed informed consent forms before participating. The CAMS-R was administered along with additional questionnaires not relevant to the present study. The order of the questionnaires was varied across testing sessions.

Results

Item reduction and preliminary model testing

A correlation matrix of the original pool of 35 items was examined to guide the first stage of item reduction. Items that tended to have low correlations with non-redundant items were eliminated. Twenty items were retained for model development using confirmatory factor analysis (CFA). All factor models were tested with the structural equation modeling software program LISREL 8.51 (Jöreskog & Sörbom, 2001) using maximum likelihood estimation. For all tested models, the following indices were used to assess goodness of fit: Comparative Fit Index (CFI), root mean squared error of approximation (RMSEA), standardized root-mean squared residual (SRMR), and the chi-square statistic (χ^2). Cut-off values (CFI "close to" .95, RMSEA "close to" .06, SRMR "close to" .08) were selected based on the recommendations by Hu and Bentler (1999, p. 1).
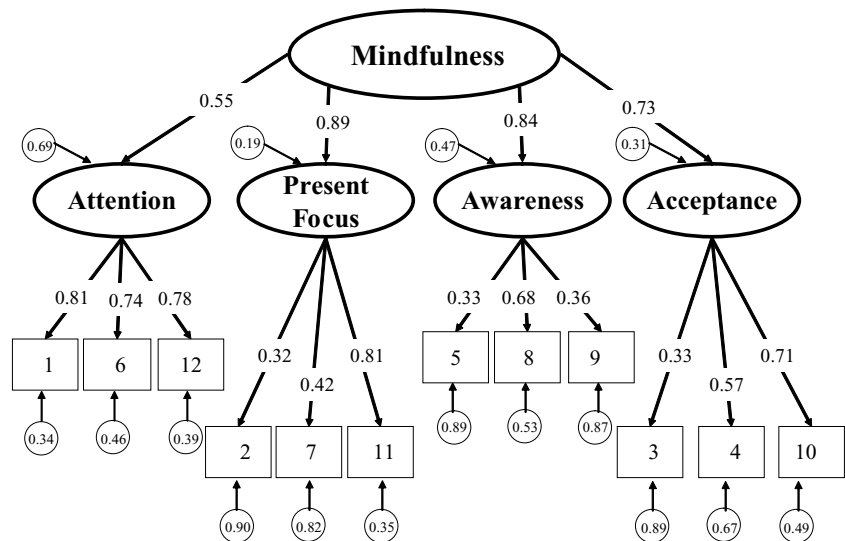
The twenty items that were retained from the initial item reduction were divided into four theoretically-derived categories (four attention items, four present-focus items, five awareness items, seven acceptance items). A CFA model was tested with one second-order latent factor (mindfulness) and four first-order latent factors, each indicated by the items that reflect that construct. All four factors were tested simultaneously. The 20-item model demonstrated relatively poor fit [$\chi^2(160) = 388.09$, $p < .00001$; RMSEA $= .073$; SRMR $= .075$; CFI $= .85$].

After exploring the patterns of item loadings in the 20-item model, items were eliminated in a series of iterative factor models. Items were eliminated if they demonstrated poor loadings on their hypothesized factor, demonstrated high cross-loadings on non-hypothesized factors, or were judged to be redundant with other retained items. All tested models were congeneric, which means that all items were allowed to load only on a single first-order factor and measurement error of the items was not permitted to be correlated.

Through this iterative process, a final model emerged that was a good fit to the data [$\chi^2(50) = 81.04$, $p = .004$; RMSEA $= .050$; SRMR $= .051$; CFI $= .95$]. This model appears in Fig. 1. The RMSEA, SRMR, and the CFI were within the cut-off range recommended by Hu and Bentler (1999). The chi-square test fell short of non-significance (an indication of model fit); however, it should be noted that the chi-square statistic has been criticized as an overly-sensitive test that can suggest rejecting potentially useful models, particularly as N becomes large (Bollen, 1989).

Consistent with the initially proposed model, this model consisted of one second-order latent factor (mindfulness) and four first-order latent factors (attention, present-focus, awareness, and acceptance). The 12 retained items appear in Table 1 along with their descriptive statistics across samples. Six of the retained items were from the original CAMS. In the final model, each first-order factor had three items, thus satisfying the recommended minimum number of observed variables per latent variable and latent variables per second-order factor (Kline, 2004; Wegener & Fabrigar, 2000). All

Fig. 1 Standardized parameter estimates for a second-order confirmatory factor analysis (LISREL) for the Cognitive and Affective Mindfulness Scale – Revised (CAMS-R). Numbers in boxes correspond to CAMS-R questionnaire items presented in Table 1

items had standardized loadings on their first-order factors above .30 (range = .32 to .81). The items with loadings in the .30 to .40 range were retained because they added theoretically substantive breadth to the mindfulness factor model. Moreover, smaller factor loadings for items can occur when attempting to create a broadband construct such as mindfulness (Hoyle, 2000).

Cross-validation

Because the model pruning approach can result in a model that achieves acceptable fit by capitalizing on chance error, an additional confirmatory factor analysis was performed on data drawn from an independent sample (Sample 2, N = 298) to test the replicability of the model derived from the preliminary analyses. Maximum likelihood estimation in LISREL 8.51 (Jöreskog & Sörbom, 2001) was again used. The fit indices suggest that the correspondence between the proposed model and the data was acceptable [$\chi^2(50) = 110.58$, $p < .0001$, RMSEA = .064, SRMR = .052, CFI = .92]. In general, the loading pattern for the second sample was similar to that of the first sample. Because violations of normality can artificially inflate fit statistics (Hu & Bentler, 1999), skew and kurtosis were examined for each of the 12 retained items in all samples (See Table 1). In all cases, these statistics indicate that the data did not significantly depart from the assumption of normally distributed population scores (Kline, 2004) as all skew values < |1.0| and all kurtosis values < |1.1|.

Internal consistency and factor intercorrelation

After appropriate scoring reversals, the 12 retained items demonstrated an acceptable level of internal consistency in both samples. (Sample 1 $\alpha = .74$; Sample 2 $\alpha = .77$). Table 2 presents factor intercorrelations and internal con-

sistency. Because the alpha coefficient is influenced by the number of items included in the measure (John & Benet-Martinez, 2000), it is not surprising that three of the four three-item subfactors had low internal consistency. This is particularly true when the items of a brief subscale sample the breadth of a construct (cf. Ryff & Keyes, 1995). The magnitude of the intercorrelations between the latent variables, calculated in a CFA in which the four latent variables were allowed to covary, ranged from medium to large (Cohen, 1988). The correlations between the unweighted scale scores ranged from small to medium.

Discussion

On the basis of results of preliminary and confirmatory SEM models, 12 items were retained for a measure of mindful approaches to thoughts and feelings, which was called the Cognitive and Affective Mindfulness Scale–Revised (CAMS-R). This 12-item measure was shown to adequately sample the four domains of mindfulness (attention, present-focus, awareness, acceptance/non-judgment). The overall CAMS-R, but not the subscales, demonstrated acceptable levels of internal consistency. These results are consistent with the four components emphasized in several definitions of mindfulness (Bishop et al., 2004; Kabat-Zinn, 1990, 2003). The results of this confirmatory factor analysis of the CAMS-R were recently replicated by another team of researchers in a community sample of adults diagnosed with inflammatory bowel disease (McPhail et al., 2005).

The findings from Study 1 offer support for use of a single total mindfulness score rather than four subscale scores. First-order factor covariances were medium to large, which suggests considerable interrelationship between the constructs assessed by the subscales. An additional advantage of using the total score rather than the first-order factors is

Table 1 Descriptive statistics for the items of cognitive and affective mindfulness scale-revised

	Study 1; Sample 1 (N = 250)				Study 1; Sample 2 (N = 298)				Study 2 (N = 212)			
	M	SD	Skew	K	M	SD	Skew	K	M	SD	Skew	K
1. It is easy for me to concentrate on what I am doing.	2.96	.87	−.25	−.97	3.08	.83	−.40	−.84	2.54	.87	.13	−.68
2. I am preoccupied by the future.	2.49	.91	−.07	−.79	2.53	.84	−.23	−.54	2.47	.97	.29	−.65
3. I can tolerate emotional pain.	2.72	.86	−.11	−.71	2.86	.89	−.33	−.67	2.67	.92	.02	−.94
4. I can accept things I cannot change.	2.92	.88	−.30	−.82	2.97	.86	−.28	−.89	2.75	.92	−.23	−.80
5. I can usually describe how I feel at the moment in considerable detail.	2.60	.99	.03	−1.07	2.56	.97	−.01	−.99	2.55	.95	.18	−.95
6. I am easily distracted.	2.96	.87	−.52	−.39	2.92	.91	−.63	−.31	2.40	.94	.22	−.81
7. I am preoccupied by the past.	3.25	.83	−.92	.16	3.16	.83	−.81	.14	1.98	.86	.63	−.22
8. It's easy for me to keep track of my thoughts and feelings.	2.77	.91	−.20	−.82	2.81	.84	−.11	−.75	2.59	.89	.12	−.81
9. I try to notice my thoughts without judging them.	2.29	.76	.34	−.09	2.37	.80	.13	−.43	2.25	.82	.41	−.21
10. I am able to accept the thoughts and feelings I have.	3.10	.79	−.32	−.93	3.06	.82	−.37	−.80	2.90	.85	−.13	−.74
11. I am able to focus on the present moment.	2.99	.81	−.36	−.54	3.07	.74	−.32	−.55	2.67	.81	−.06	−.52
12. I am able to pay close attention to one thing for a long period of time.	2.64	.94	.00	−.95	2.71	.91	−.11	−.85	2.35	.96	.33	−.66

Note. K = Kurtosis. Items 2, 6, and 7 are reverse-scored. After appropriate reversals, sum values for items 1 – 12. Higher values reflect greater mindful qualities.

that the internal consistency of the total score is higher than the internal consistency of most of the subscales. The low internal consistency of these subscales may be a result of the conceptual breadth of the items, the relative brevity of the scales, and the use of a four-point response format that can restrict the range in variance for each item and perhaps attenuate inter-item correlation. The use of the subscales therefore is discouraged, as they may increase the risk of Type II errors due to potentially attenuated correlations with criterion variables. The acceptable level of internal consistency in the 12-item total score has been replicated in studies of the CAMS-R conducted by independent research groups. For example, Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) reported an alpha of .81 for the CAMS-R in a large student sample, and McPhail and colleagues (2005) reported an alpha of .85 in a large adult community sample with a long-term health problem.

The process by which the measure has been refined departs somewhat from the typical sequence of measurement development. This is in large part because the CAMS (Kumar et al., 2005) was first used in a small clinical sample that did not permit factor analysis. However, once exploratory factor analyses in subsequent samples revealed instability in the factor structure of the CAMS (Feldman et al., 2005), the present study was conducted to refine the measure. Ordinarily, the item content of a full measure would first be refined to adequately capture each of the targeted components or subscales, and then a shorter version would be created. It is possible that collapsing these two steps in this study may have resulted in a less robust final item set than if these steps were taken in independent samples. Nonetheless, this process appears to have yielded a measure with acceptable internal consistency for the total score and a replicable factor structure.

Furthermore, the decision to use structural equation modeling instead of exploratory factor analysis for testing of preliminary models offered the advantage of an initial model that is theory-driven rather than data-driven. However, the simultaneous testing of the four first-order factors and the second-order factor may have resulted in a compromised ability to detect interpretational confounding (Anderson & Gerbing, 1988) and might have resulted in the retention of potentially complex items. As noted previously, several items were retained even with relatively low loadings on the hypothesized first-order factors in order to expand the conceptual coverage of the measure. Four of these items (2, 3, 5 and 7) contain somewhat stronger, more specific language ("I am preoccupied by the future/past" and "I can tolerate emotional pain") than other items, and they may be confounded with other constructs, such as worry or mood regulation. This possibility was explored further in Study 2.

The results from Study 1 suggest that the CAMS-R shows promise as a measure that broadly captures the construct of

Table 2 Descriptive statistics and scale and factor intercorrelations for Samples 1 and 2 (Study 1)

Note. Alpha reliabilities of the subscales are found on the diagonal. Correlation coefficients for scale values (unweighted sums of items loading on factor) appear below the diagonal and correlations of latent variables appear above the diagonal. Intercorrelations of the latent factors were calculated in a confirmatory factor analysis (CFA) model in which the four latent variables were allowed to covary. Correlations of latent factors and total score were calculated in a hierarchical CFA model.

	1	2	3	4	5	M	SD
Sample 1 ($N = 250$)							
1. Attention	(.81)	.55	.41	.36	.55	8.56	(2.30)
2. Present-focus	.31	(.53)	.56	.74	.89	8.74	(1.83)
3. Awareness	.24	.23	(.42)	.71	.73	7.66	(1.82)
4. Acceptance	.23	.41	.32	(.56)	.84	8.74	(1.85)
5. Mindfulness (Total)	.70	.70	.70	.64	(.74)	33.69	(5.32)
Skew	−.24	−.40	.25	−.19	.05		
Kurtosis	−.78	−.28	−.31	−.19	−.31		
Sample 2 ($N = 298$)							
1. Attention	(.79)	.63	.61	.44	.67	8.71	(2.23)
2. Present-focus	.32	(.47)	.69	.70	.89	8.77	(1.68)
3. Awareness	.36	.28	(.46)	.70	.85	7.74	(1.82)
4. Acceptance	.33	.35	.40	(.66)	.77	8.89	(1.98)
5. Mindfulness (Total)	.74	.66	.73	.71	(.77)	34.11	(5.50)
Skew	−.45	−.28	.05	−.16	−.14		
Kurtosis	−.54	−.23	−.27	−.74	−.34		

mindful approaches to thoughts and feelings. In Study 2, convergent and discriminant validity of the measure were assessed.

Study 2

An important question for any questionnaire under development is how it relates to existing questionnaires assessing related and independent constructs. In Study 2, associations were examined between the CAMS-R and two existing measures of mindfulness (FMI, MAAS) that were available at the time this study was being conducted. Associations are also reported for the CAMS-R and measures of distress, well-being, emotion regulation, and approaches to coping with problems. The CAMS-R was predicted to correlate highly with existing measures of mindfulness, particularly the FMI, which includes a similarly comprehensive definition of mindfulness. As noted in the introduction, greater mindfulness on the CAMS-R was predicted to be associated with less distress, greater well-being, less under- and over-engagement with emotions, greater adaptive emotional regulation, more cognitive flexibility, and less perseverative or avoidant approaches to problems. A secondary purpose of Study 2 was to examine whether the four items that evidenced relatively smaller loadings in the CFA analyses in Study 1 were confounded with other constructs.

Method

Participants

An ethnically-diverse sample of college students ($N = 212$) completed a packet of questionnaires during group ses-

sions in exchange for course credit (59.9% women, 40.1% men; mean age = 19.03, $SD = 2.35$; Ethnicity: 54.6% White/Caucasian, 17.1, Hispanic/Latino, 9.8% Black/African American, 7.3% Asian-American, 11.2% Other/Mixed Heritage). This study was approved by the University of Miami Institutional Review Board and participants signed informed consent forms before participating.

Measures

Questionnaire packets included the CAMS-R and the following self-report questionnaires that assessed distress and well-being, emotion regulation, and approaches to problems.[3]

Mindfulness. Mindfulness was assessed with the two published scales available when this study was undertaken. The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) is a 15-item instrument that measures attention to and awareness of present-moment experience in daily life. Respondents rate how often they have experiences of acting on 'automatic pilot,' being preoccupied, and not paying attention to the present moment. The measure has demonstrated internal consistency and concurrent and predictive validity (Brown & Ryan, 2003). The Freiburg Mindfulness Inventory (FMI; Buchheld et al., 2002) is a 30-item instrument that assesses nonjudgmental present-moment observation and openness to negative experience. The measure has been shown to have high internal consistency and to be

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[3] Because one of the questionnaires of interest (MAAS) was made available once the study was underway, it was administered to a subsample of participants who joined the study in a second recruitment wave. The Distraction subscale of the RSQ was also added to the protocol at this time.

sensitive to change following a meditation retreat (Buchheld et al., 2002).

Depression and anxiety symptoms. Symptoms of depression and anxiety were assessed with the Mood and Anxiety Symptoms Questionnaire (MASQ; Watson et al., 1995a,b), which has strong convergent and discriminant validity. The MASQ consists of 62 items that are divided into four subscales: 1) General Distress (GD): Anxiety Symptoms, 2) Anxious Arousal, 3) General Distress (GD): Depression Symptoms, and 4) Anhedonic Depression. Anxious Arousal measures somatic symptoms of intense anxiety, which do not typically co-occur with depression. Anhedonic Depression measures symptoms of depression that do not commonly occur with anxiety, such as the inability to experience pleasure and feelings of psychomotor slowing. GD: Anxiety Symptoms and GD: Depression Symptoms represent symptoms traditionally associated with depression and anxiety respectively; however, these symptoms are commonly comorbid. Other questionnaires that assess depression and anxiety are often highly intercorrelated, but the MASQ is designed to assess the overlapping general distress symptoms while also distinguishing specific anxiety and depression symptoms.

Well-being. Psychological well-being was assessed with an 18-item version (Ryff & Keyes, 1995) of an instrument that assesses six theoretically derived components of mental health: Autonomy, Environmental Mastery, Personal Growth, Positive Relations with Others, Purpose in Life, and Self-Acceptance (Ryff, 1989). The longer version has been shown to have good levels of internal consistency, temporal stability, and concurrent validity (Ryff, 1989). Factor analyses of data from a nationally representative sample using the 18-item version of the measure reveal that a six-factor model best fit the data and that the six factors predicted a single latent variable, psychological well-being (Ryff & Keyes, 1995).

Experiential avoidance/acceptance. The Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) is a measure of unhealthy efforts to escape or avoid emotions, thoughts, and memories; unhealthy efforts to control or suppress private experience; experiential acceptance; and taking action despite uncertainty and/or distress. Sample reverse scored items include "I am not afraid of my feelings." and "When I evaluate something negatively, I usually recognize that this is just a reaction, not an objective fact." The nine-item instrument has been shown to have internal consistency and convergent, discriminant, concurrent, and incremental validity, as well as treatment utility (Hayes et al., 2004). In the present study, the measure is scored so that higher scores reflect greater experiential avoidance and less experiential acceptance. For the sake of brevity, this variable

is referred to as "experiential avoidance" elsewhere in the manuscript.

Thought suppression. The White Bear Suppression Inventory (WBSI, Wegner & Zanakos, 1994) was used to measure individuals' general tendency to suppress unwanted negative thoughts. The WBSI has been shown to have acceptable internal consistency and convergent and predictive validity (Muris, Merckelbach, & Horselenberg, 1996; Wegner & Zanakos, 1994).

Rumination and distraction. Rumination and distraction were measured with subscales from the Response Style Questionnaire (Nolen-Hoeksema & Morrow, 1991), 22 and 11 items in length, respectively. For the rumination scale, participants indicated on a four-point scale (1 = *almost never*, 4 = *almost always*) the extent to which, when feeling depressed, they focus on themselves, their symptoms, and the possible antecedents and consequences of their mood. For the distraction scale, participants indicate on the same scale their tendency to engage in thoughts and behaviors that redirect one's attention away from a depressed mood. Previous studies have shown the scales to have acceptable convergent and predictive validity. In response to critiques that many of the items of the rumination scale of the RSQ are confounded with depression symptoms, two relatively symptom-free subscales were developed (Treynor, Gonzalez, & Nolen-Hoeksema, 2003): Brooding (pondering on negative mood and personal shortcomings) and Reflection (active efforts to understand one's negative feelings). Brooding has been shown to be a more maladaptive form of rumination than reflection (Treynor et al., 2003). In this study, the total rumination score, as well as the Brooding, Reflection, and Distraction subscales, were examined.

Worry. Worry was measured with the Penn State Worry Questionnaire (PSWQ, Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ consists of 16 items on a five point scale (1 = *not at all typical of me*, 5 = *very typical of me*) that assess the tendency to engage in clinically significant and pathological aspects of worry. The instrument has been demonstrated to have acceptable reliability and clinical utility (Molina & Borkovec, 1994).

Overgeneralization. Overgeneralization, the tendency to generalize from a single failure to the broader sense of self-worth, was measured with the four-item generalization scale of the Attitudes Towards Self Questionnaire (ATS-Q; Carver, La Voie, Kuhl, & Ganellen, 1988). This scale has been shown to have acceptable internal consistency and incremental validity (Carver et al., 1988) and to interact with stressful life events to predict increases in depression symptoms (Carver, 1998).

Emotional intelligence. The Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) measures emotional intelligence and includes three sub-scales: attention to one's feelings, clarity of feelings, and mood repair (i.e., ability to regulate one's feelings). The measure has been shown to have adequate internal consistency and convergent and discriminant validity (Salovey et al., 1995). It has been shown to be associated with both self-report and physiological markers of adaptive responses to stress (Salovey, Stroud, Woolery, & Epel, 2002).

Cognitive flexibility. Cognitive flexibility was assessed with the Cognitive Flexibility Scale (CFS; Martin & Rubin, 1995). The measure has 12 items that measure a person's awareness that alternative thoughts and behaviors are available in a given situation, as well as a person's willingness and self-efficacy to enact these options. The scale has been shown to have adequate test-retest reliability, internal consistency, and concurrent validity (Martin & Rubin, 1995).

Anticipatory mental coping. The Measure of Mental Anticipatory Processes (MMAP; Feldman & Hayes, 2005) is a questionnaire that measures mental preparation strategies that are productive and unproductive in coping with future stressful events. The measure has four subscales: problem analysis, plan rehearsal, stagnant deliberation, and outcome fantasy. Problem analysis is active contemplation of the antecedents and meaning of future stressful situations. Plan rehearsal involves envisioning the steps or strategies one could use to achieve a desired outcome. Stagnant deliberation is the tendency to dwell repetitively on a stressful life problem and to experience unproductive thoughts about it. Outcome fantasy is a tendency to respond to potential problems by day-dreaming or fantasizing about desired outcomes, while ignoring details of the problem-solving process. The four sub-scales demonstrated acceptable structural validity, internal consistency, temporal stability, and convergent and discriminant validity, and the two maladaptive strategies (stagnant deliberation and outcome fantasy) predicted change in depression symptoms in an at-risk sample (Feldman & Hayes, 2005).

Results and discussion

Mindfulness scores on the CAMS-R showed small associations with age ($r = .13$, *ns*) and gender ($r = .19$, $p = .007$). Men tended to endorse slightly higher levels of mindfulness than women [$M_{Men} = 32.71$ (SD $= 5.05$); $M_{Women} = 30.51$ (SD $= 5.90$)]. The internal consistency of the CAMS-R in this sample was acceptable ($\alpha = .76$).

Table 3 presents the correlations between the CAMS-R and criterion variables. The CAMS-R mindfulness scores were strongly correlated with total scores of mindfulness on the FMI and MAAS but were more strongly associated with scores on the FMI, which like the CAMS-R, also captures the acceptance aspect of mindfulness [Steiger's (1980) $z(110) = 1.95$, $p < .05$].[4] Higher mindfulness scores were significantly correlated with lower distress scores, as measured by the subscales of the MASQ, particularly with the Anhedonic Depression subscale. Higher scores on the CAMS-R were also significantly correlated with higher well-being scores. Higher mindfulness scores were associated with lower levels of maladaptive emotion regulation, including experiential avoidance, thought suppression, worry, rumination, and overgeneralization. Results suggest that individuals low in mindfulness may be vulnerable to escalations from feelings of distress to excessive cognitive elaborations about feared future events and personal inadequacies, processes that mindfulness-based interventions for depression and anxiety are designed to interrupt (Hayes et al., 2005; Hayes & Feldman, 2004; Roemer & Orsillo, 2002; Segal, Williams, & Teasdale, 2002).

In terms of adaptive emotion regulation, mindfulness was associated with clarity of feelings, mood repair, attention to feelings, and distraction. The magnitude of the association of the CAMS-R with clarity of feelings was greater than with distraction [Steiger's (1980) $z(89) = 3.162$, $p < .01$]. This suggests that mindfulness, although an alternative to rumination, is not synonymous with 'turning away from' negative emotions. Several descriptions of mindfulness instead underscore the ability to 'turn into' or 'sit with' unpleasant emotions (Hayes & Feldman, 2004; Hayes, Strosahl, & Wilson, 1999; Kabat-Zinn, 1990; Linehan, 1993; Segal et al., 2002).

Higher mindfulness scores were associated with more cognitive flexibility, problem analysis, and plan rehearsal and less stagnant deliberation and outcome fantasy. The magnitude of the association of the CAMS-R with cognitive flexibility was greater than the association with problem analysis [Steiger's (1980) $z(194) = 3.002$, $p < .01$] and plan rehearsal [Steiger's (1980) $z(194) = 2.863$, $p < .01$]. The relatively smaller associations with problem analysis and plan rehearsal suggest that mindfulness as assessed by the CAMS-R is an adaptive response to problems but one which is relatively distinct from more active analytical modes of thought (Teasdale, 1999) and, instead, may be better characterized by the tendency to approach problems without relying on habitual response sets (Borkovec, 2002; Bishop et al., 2004; Kabat-Zinn, 1990; Roemer & Orsillo, 2003).

Taken together these results offer evidence of discriminant as well as convergent validity in that the

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[4] Each Steiger's (1980) *z*-test was performed on the subsample that completed the CAMS-R and both criterion measures of interest for that analysis.

Table 3 Correlations of CAMS-R with criterion measures (Study 2)

	CAMS-R 12 item *r*	CAMS-R 10 items *r*	*N*	*M*	*SD*
Mindfulness					
Excluding acceptance component (MAAS)	.51***	.46***	144	56.78	11.73
Including acceptance component (FMI)	.66***	.69***	179	79.36	10.98
Distress/wellness					
General Distress Anxiety (MASQ)	−.24**	−.15*	209	22.05	7.59
Anxious Arousal (MASQ)	−.23**	−.15*	209	25.36	7.50
General Distress – Depression (MASQ)	−.30***	−.20**	209	25.40	9.37
Anhedonic Depression (MASQ)	−.44***	−.40***	209	57.87	13.89
Well-being	.47***	.45***	203	81.86	11.33
Emotion regulation					
Overengagement					
Worry (PSWQ)	−.46***	−.37***	188	49.71	16.62
Rumination (RSQ)	−.30***	−.23**	180	48.41	13.75
Reflection (RSQ)	−.11	−.04	189	11.08	3.62
Brooding (RSQ)	−.28***	−.18**	199	11.57	3.81
Overgeneralization (ATS)	.46***	.37***	210	12.59	4.37
Underengagement					
Experiential avoidance (AAQ)	−.52***	.45***	196	33.36	7.14
Thought Suppression (WBSI)	−.47***	.40***	209	48.36	10.67
Adaptive regulation					
Attention to Feelings (TMMS)	.14*	.18**	205	49.55	7.06
Clarity of Feelings (TMMS)	.53***	.51***	205	38.07	7.18
Mood Repair (TMMS)	.34***	.31***	207	21.74	4.41
Distraction (RSQ)	.22*	.26**	98	30.09	6.58
Approach to problems					
Plan rehearsal (MMAP)	.21**	.24***	210	10.79	2.45
Outcome fantasy (MMAP)	−.34***	−.29***	211	6.12	2.16
Problem analysis (MMAP)	.25***	.28***	202	18.04	4.40
Stagnant Deliberation (MMAP)	−.47***	−.44***	198	12.47	3.49
Cognitive flexibility	.46***	.47***	207	51.79	6.81

Note. The MAAS and RSQ-Distraction were added once the study was underway and thus were given to fewer participants. Correlations were calculated using pairwise deletion; as such, additional variations in sample size are due to missing data. MAAS = Mindfulness Attention Awareness Scale, FMI = Freiburg Mindfulness Inventory, MASQ = Mood and Anxiety Symptoms Questionnaire, PSWQ = Penn State Worry Questionnaire, RSQ = Response Style Questionnaire, ATS = Attitudes Towards Self, AAQ = The Acceptance and Action Questionnaire, WBSI = White Bear Suppression Inventory, TMMS = The Trait Meta-Mood Scale, MMAP = The Measure of Mental Anticipatory Processes.

*p < .05; **p < .01; ***p < .001.

CAMS-R was more strongly associated with theoretically consistent emotion regulation and problem-solving styles (i.e., awareness of feelings, cognitive flexibility) than with other potentially adaptive but less theoretically consistent styles (i.e., distraction, problem analysis, and plan rehearsal).

Tests of potential construct confounding Four of the items (Items 2, 3, 5, 7) retained in the Study 1 CFA demonstrated relatively low loadings on their first-order factors. The goal of these analyses is to assess the degree to which these items were potentially confounded with other constructs. Items 2 and 7 assess preoccupation with the future or past and therefore may be confounded with worry or rumination, respectively. Similarly, Item 5 ("I can usually describe how I feel at the moment in considerable detail") may be confounded with emotional clarity, and Item 3 ("I can tolerate emotional pain") may be confounded with mood regulation. For these analyses, a series of separate multiple regression analyses were performed in which two predictors were entered simultaneously: a measure of mindfulness (total score of the FMI) and a measure of a potentially

confounding construct [worry (PSWQ), rumination (RSQ), clarity of feelings (TMMS), or mood repair (TMMS)]. For each of these analyses, the dependent variable was one of the four CAMS-R items listed above. The FMI was chosen for these analyses because it has greater conceptual coverage of the construct of mindfulness than the MAAS. Furthermore, the MAAS has an item "I find myself preoccupied with the future or past," which shares content with two of the CAMS-R items being investigated in these analyses. Each analysis served to examine whether a given item could be independently explained by the construct of mindfulness above and beyond the potentially confounding construct.

In the first analysis, worry ($B = .025$, $SE = .004$, $p < .001$) but not mindfulness ($B = .010$, $SE = .006$, $p = .13$) uniquely explained variance in Item 2. Similarly, rumination ($B = .021$, $SE = .004$, $p < .001$) but not mindfulness ($B = -.005$, $SE = .006$, $p = .40$) uniquely predicted Item 7. Both clarity of feelings ($B = .049$, $SE = .009$, $p < .001$) and mindfulness ($B = .024$, $SE = .006$, $p < .001$) were significant independent predictors of Item 5; however, only mindfulness ($B = .037$, $SE = .006$, $p < .001$) and not mood repair

($B = -.003$, $SE = .015$, $p = .85$) was a significant predictor of Item 3.

In summary, items 3 and 5 remained significantly correlated with mindfulness above and beyond measures of mood regulation and clarity of feelings respectively. This suggests that these items are not unduly influenced by alternative constructs. However, items assessing preoccupation with the future (Item 2) and past (Item 7) appear to overlap with the constructs of worry and rumination, respectively. Furthermore, follow-up analyses revealed these two items had the largest average correlation with the four subscales of the MASQ (Item 2: mean $r = .27$, $SD = .050$; Item 7 mean $r = .33$, $SD = .054$). In contrast, the average correlation between the remaining 10 CAMS-R items and the MASQ subscales was considerably smaller ($r = -.11$, $SD = .076$).

An alternate 10-item version of the CAMS-R was constructed by omitting items 2 and 7 (10-item CAMS-R $M = 25.84$, $SD = 5.18$, $\alpha = .78$) to investigate the degree to which items 2 and 7 impact the magnitude of the associations of the CAMS-R and criterion variables. Correlations between the 10-item version and criterion variables are presented in Table 3. The 10- and 12-item CAMS-Rs were highly correlated ($r = .97$). A series of Steiger's (1980) z-tests were performed to test for differences in the magnitude of the correlations between the 10- and 12-item measures and the criterion variables. Fluctuations among certain correlation coefficients were evident, yet none of the 23 Steiger's (1980) z-tests that were performed indicated a difference that was statistically significant ($p < .05$).

General discussion

The results of the present studies offer preliminary and promising support for the use of the CAMS-R as a self-report measure of mindfulness. Study 1 provides evidence that the 12-items of the CAMS-R adequately cover several aspects of mindfulness outlined in theoretical discussions of the construct (Bishop et al., 2004; Kabat-Zinn, 1990), including the ability to regulate attention, an orientation to present or immediate experience, awareness of experience, and an attitude of acceptance or non-judgment towards experience. The total score has acceptable internal consistency for a brief measure.

Study 2 provides evidence of convergent and discriminant validity in that mindfulness scores on the CAMS-R were significantly correlated with scores on measures of mindfulness, distress, well-being, emotion-regulation, and approaches to problems, and were consistent with findings from researchers testing similar associations with other mindfulness questionnaires (Baer et al., 2004; Brown & Ryan, 2003). Furthermore, many of the present findings have been replicated by other researchers using the CAMS-R and different questionnaires

assessing distress and emotion regulation in student, community, and clinical samples (Adair, Berman, & Block-Lerner, 2005; Baer et al., 2006; Feldman et al., 2005; Haigh, Mares, Croft, Moore, & Fresco, 2004; McPhail et al., 2005). Taken together, findings suggest that mindfulness is more than the absence of distress and maladaptive responses to emotion; mindfulness is also associated with greater mental health and responses to distress that are characterized by flexibility, awareness of one's emotional state, and an ability to soothe oneself when upset.

The CAMS-R total scores were strongly correlated with other measures of mindfulness, offering evidence of convergent validity. The CAMS-R was more strongly associated with the more comprehensive FMI than with the MAAS, which does not include acceptance items. Findings from Baer and colleagues (2006) replicate this pattern of results with the CAMS-R, FMI, and MAAS. Baer and colleagues (2006) also found that the CAMS-R shared a large correlation ($r = .67$) with the total score of the multidimensional KIMS. Another recent study (Haigh et al., 2004) also reported large associations between CAMS-R and MAAS mindfulness scores, and smaller correlations with mindfulness scores on a measure based upon Ellen Langer's (1989) model that differs in many important ways from the conceptualization of mindfulness underlying the CAMS-R. The results of the present study, together with the findings from two independent research laboratories, suggest that the CAMS-R captures the construct of mindfulness and tends to share greater variance with mindfulness measures that include items capturing acceptance, as well as attention, present-focus, and awareness of internal experience.

There are several limitations to the present study that are worth noting, as they suggest avenues for future studies. The first limitation is the reliance on undergraduate samples. Such samples of convenience facilitate the early phase of questionnaire development when analyses require large samples, as is the case with factor analyses. Although the initial version of the CAMS was developed in a clinical sample (Kumar et al., 2005), further research is needed to determine how the CAMS-R performs in clinical and community samples. Nonetheless, the findings of hypothesized relationships between the CAMS-R and criterion measures in a student sample offer further support for theoretical models on the role of mindfulness in everyday suffering and well-being, as well as during clinically significant levels of distress.

A second limitation of this study is that all criterion variables were self-report, which introduces potential method bias. The validation of the CAMS-R against objective measures of behavior and physiological functioning is an important next step. Several researchers have begun to explore overt correlates and consequences of mindfulness, including brain and immune function (Davidson et al., 2003), measures of attention (Bishop et al., 2004) and responses to

emotional challenge in laboratory settings (see Block-Lerner, Salters-Pedneault, & Tull, 2005). Work has also begun on outcomes in information-processing and experiential sampling paradigms (Brown & Ryan, 2003). However, the promise of identifying observable aspects of mindfulness does not replace the need for self-report methods of assessing the construct. The assessment of mindfulness by self-report offers a convenient, non-invasive method for assessing an individual's internal, thus inherently subjective, experience. This is particularly relevant in settings where intensive behavioral and physiological assessment is not feasible, such as in clinical settings and clinical trials.

A third area that warrants further empirical investigation is the relative advantage of assessing mindfulness as a transitory, temporal state or as an individual difference. On this point, investigators differ. The format for the CAMS-R reflects the assumption that mindfulness can be conceptualized as a response tendency that tends to be stable across situations, yet is modifiable by life experience including mindfulness training. A similar conceptualization also underlies the KIMS (Baer et al., 2004). Other measures ask participants to respond to items on mindful qualities occurring during a specified period of time (TMS; Lau et al., in press; FMI; Buchheld et al., 2002). Brown and Ryan (2003) initially developed the MAAS as a measure of individual differences and later adapted a subset of items to assess intra-individual differences in the context of an experiential sampling paradigm.

In its present form, the CAMS-R is potentially useful for studies examining the association of mindfulness and other individual differences or examining mindfulness as a predictor of subsequent adjustment, behavior, or response to treatment. Furthermore, another possible application is the pre-selection of individuals high and low in mindfulness for experiments. However, given the dispositional conceptualization of the CAMS-R, an important future direction for measurement development is to examine the test-retest reliability of the measure. There are advantages and disadvantages to both state and dispositional approaches. Relative to measures of mindful states, dispositional measures such as the CAMS-R may better capture an individual's perceived capacity for mindfulness across situations; however, they may be less sensitive to change. A valuable future direction is to develop a version of the CAMS-R to assess mindfulness during a fixed period of time. As presently written, most items can be easily adapted for such a purpose.

A fourth consideration for future research is the potential construct confounding in the 12-item version of the CAMS-R. Two items that assess preoccupation with the past and future (Items 2 and 7) were included as a means of indirectly assessing the present-focus component of the mindfulness construct. Analyses suggest that these items correlate significantly with the constructs of worry, rumination,

depression, and anxiety symptoms and thus might be outcomes rather than processes of mindfulness. These findings suggest that inclusion of these two items may contribute to construct contamination.

On the other hand, there are theoretical, methodological, and empirical justifications for the retention of these items. A degree of conceptual overlap between worry and rumination and low levels of mindfulness is conceptually meaningful. A core rationale for application of mindfulness to the treatment of depression and generalized anxiety disorder is to provide clients a contrasting mental habit to the excessive focus on the past (i.e., rumination) and future (i.e., worry) typical of the thought processes of individuals with these disorders (Hayes et al., 2005; Hayes & Feldman, 2004; Roemer & Orsillo, 2002; Segal et al., 2002). During mindfulness practice, clients are asked to be aware of when their thoughts drift to the past or future and to gently redirect them to present moment experience (e.g., breathing, somatic sensations). Brown and Ryan (2003) argue that indirect assessment of mindfulness (e.g., preoccupation with the past or future) is advantageous because inattention to the present experience may be more typical than mindfulness in everyday life, and thus more accessible to respondents. Consistent with this strategy, the MAAS and KIMS include items that assess preoccupation with past and future, as well as daydreaming and worrying (Baer et al., 2004; Brown & Ryan, 2003). Furthermore, when the two preoccupation items were removed and correlations with criterion variables were recalculated in the Study 2 sample, the strength of associations was not significantly different from the associations calculated with the items included. This suggests that these two items may not unduly influence the associations of the CAMS-R with criterion variables.

To address issues of potential construct contamination in future research, investigators studying the association of mindfulness with constructs such as a worry, rumination, depression, or anxiety are advised to consider using the 10-item version of the CAMS-R presented in this manuscript. The 10-item measure also has acceptable psychometric properties (i.e., internal consistency, concurrent and discriminant validity), correlates strongly with the 12-item measure, and focuses on aspects of mindfulness most clearly distinct from worry and rumination.

The CAMS-R offers promise as a measure of individual differences in mindful approaches to thoughts and emotions. Given the mounting evidence for mindfulness as a means to reduce suffering and enhance quality of life, it is important to quantify this attribute and study its cultivation.

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