Examining the factor structures of the Five Facet Mindfulness Questionnaire and the Self-

Compassion Scale

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Abstract

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) and the Self-Compassion Scale (SCS; Neff, 2003) are widely used measures of mindfulness and self-compassion in mindfulness-based intervention research. The psychometric properties of the FFMQ and the SCS need to be independently replicated in community samples and relevant clinical samples to support their use. Our primary aim was to establish the factor structures of the FFMQ and SCS in individuals with recurrent depression in remission, since Mindfulness-Based Cognitive Therapy (MBCT) was developed as a treatment for preventing depressive relapse. In order to determine the consistency across populations, we examined the factor structures of the FFMQ and SCS in three samples: (1) A convenience sample of adults; (2) A sample of adults who practice meditation; and (3) A sample of adults who suffer from recurrent depression and were recruited to take part in a trial of MBCT. Confirmatory factor analyses (CFA) showed that a *four*-factor hierarchical model of the FFMQ best fits the community sample and the clinical sample, but that a *five*-factor hierarchical model of the FFMQ best fits the meditator sample. CFA did not endorse the SCS six-factor hierarchical structure in any of the three samples. Clinicians and researchers should be aware of the psychometric properties of the FFMQ to measure mindfulness when comparing meditators and non-meditators. Further research is needed to develop a more psychometrically robust measure of self-compassion.

Keywords: Mindfulness, self-compassion, Mindfulness-Based Cognitive Therapy, Mindfulness-Based Interventions, confirmatory factor analysis.

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The cultivation of mindfulness meditation skills has been incorporated into a broad range of

mindfulness-based interventions (MBIs), perhaps most notably Mindfulness-Based Cognitive

Therapy (MBCT; Segal, Williams, & Teasdale, 2013) and Mindfulness-Based Stress

Reduction (MBSR; Kabat-Zinn, 1990). There is now compelling evidence to support the

efficacy of MBCT in treating recurrent depression (see Piet & Hougaard, 2011 for a review)

and MBSR in improving mental health amongst people with chronic physical health

problems (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Grossman, Niemann, Schmidt, &

Walach, 2004).

MBIs are based on theoretical frameworks that posit that mindfulness plays an

important role in mental health (e.g. Kabat Zinn, 1990; Segal, Williams, & Teasdale, 2013).

For example, MBCT is a clinical intervention program designed to reduce depressive relapse

or recurrence by means of systematic training in mindfulness meditation combined with

cognitive-behavioural skills (Segal et al., 2013). It was developed to target the cognitive

reactivity that renders depressed individuals vulnerable to repeated relapse at times of stress.

It does this by teaching participants the ability to recognise and step out of reactivity, and

over time to respond in more adaptive ways. This theoretical rationale generates questions

such as 'Does the cultivation of mindfulness skills mediate the relationship between treatment

and outcome?' Questions such as this can only be answered if we have some way of

operationally defining and measuring mindfulness.

The most cited definition of mindfulness in the psychological literature comes from

Jon Kabat Zinn: Mindfulness is "paying attention in a particular way, on purpose, in the

present moment, and non-judgmentally" (1994, p4). For pragmatic reasons, the primary

method of measuring mindfulness is by self-report, and a growing research interest has been

the development and validation of self-report questionnaires to measure mindfulness (See Table 1 for a summary). Scales aiming to measure mindfulness reflect the diversity of definitions that have been proposed.

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; see Table 1) and the Self-Compassion Scale (SCS; Neff, 2003) are two self-report scales which have become commonly used in MBI research to test whether mindfulness and self-compassion mediate the relationship between MBCT and MBSR and improved outcome post-treatment (i.e., a decrease in clinical symptoms, such as depressive symptoms in MBCT for treating recurrent Major Depressive Disorder). In addition, the second edition of the MBCT manual now explicitly states that MBCT aims to cultivate mindfulness *and self-compassion* on the grounds that they have been found to be mechanisms of change in several studies (see: Kuyken, Watkins, Holden, White, Taylor, Byford,...Dalgleish., 2010; Segal et al., 2013). Although recent research has started to investigate the psychometric properties of the FFMQ and SCS (Baer et al., 2006; Baer et al., 2008; Neff, 2003), it is not well established whether scores on these scales in clinical samples have acceptable construct validity to support their use in MBI research (i.e., do scores measure what they aim to measure, in samples relevant to their use?).

An important aspect of establishing the construct validity of a scale's scores is through the examination of the scale's structure in relevant samples using factor analysis (Brown, 2006). A purpose of factor analysis in the development of a scale which measures a multifaceted construct is to ensure that each of the scale's items adequately captures one of the hypothesized facets of the construct, and not an alternate facet of the construct. Factor analysis can also be conducted to ensure that each of the factors which represent facets of a construct load on to one overarching factor, which represents the construct itself. This ensures that the structure of the scale reflects the hypothesized structure of the construct.

Confirmatory factor analysis can be used to examine if the structure of the scale reflects the hypothesized structure of the construct when a different population completes the scale. The main aim of the current study was to establish the factor structure of the FFMQ and SCS in a relevant clinical sample where there is a great deal of ongoing research using these scales - MBCT for people with recurrent major depression.

The Five Facet Mindfulness Questionnaire

The FFMQ is a 39-item self-report measure of mindfulness skills that is becoming widely used in psychological research generally and in process-outcome work on MBCT and MBSR specifically. It was developed through factor analyses with the aim of identifying the key facets of mindfulness using items from the five independently developed, theoretically derived, mindfulness scales which were available at the time: Mindfulness Attention Awareness Scale (Brown & Ryan, 2003); Freiburg Mindfulness Inventory (Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006); Cognitive Affective Mindfulness Scale (Hayes & Feldman, 2004); Mindfulness Questionnaire (Chadwick, Taylor, & Abba, 2005); and Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004). The analyses by Baer et al. (2006) suggested that mindfulness is a multi-faceted, five-factor construct (however, see Table 1 for additional hypothesized facets of mindfulness not included in the FFMQ). The FFMQ is thus considered to measure five mindfulness skills: *Non-Reactivity to Inner Experience*; *Observing/Noticing*; *Acting with Awareness*; *Describing*; and *Non-Judging of Experience*.

Although the items of the FFMQ were compiled from five separate mindfulness measures, 24 of its 39 items are from the KIMS and four of the five facets correspond to the four facets that comprise the KIMS. The KIMS was developed to measure the cultivation of mindfulness skills in the context of psychological therapies that include some degree of mindfulness training, including MBSR, MBCT, dialectical behaviour therapy, and acceptance

and commitment therapy (Baer et al., 2004). This underscores the need to demonstrate the validity of commonly used measures such as the FFMQ in clinical samples. Each of the 39 items of the FFMQ is measured using a 5-point Likert scale (1 = never or very rarely true to 5 = very often or always true). The five facets can be combined to yield a total score, which reflects a global measure of mindfulness. Research demonstrates that mindfulness can be cultivated through MBCT and MBSR, with several studies suggesting that mindfulness, as measured by the FFMQ pre to post-treatment, is a mediator of therapeutic change (e.g. Branstrom, Kvillemo, Brandberg, & Moskowitz, 2010; Carmody & Baer, 2008; McManus, Surawy, Muse, Vazquez-Montes, & Williams, 2012; Nyklicek & Kuijpers, 2008; Vollestad, Sivertsen, & Nielsen, 2011).

Preliminary psychometric analyses show that the English version of the FFMQ has adequate reliability, convergent and discriminant validity, and incremental validity in the prediction of psychological symptoms (Baer et al., 2006). However, those psychometric evaluations which are available to confirm the factor structure of the FFMQ raise important questions regarding the utility of this structure for clinical mindfulness research. Although a five-factor structure emerged in the development of the FFMQ, Baer et al. (2006) and Baer et al. (2008) found that a *four*-factor *hierarchical* structure provided the optimal fit for the data when a student sample, community sample, and sample of highly educated adults were used (i.e., that all subscales except *Observe* are key elements of an overarching mindfulness construct). A core component of MBIs is the use of regular meditation practice as a vehicle to deliver acquisition of mindfulness skills. However, the only published study that explores the factor structure of the FFMQ in a sample with experience of meditation found that a *five*-factor *hierarchical* structure provided the optimal fit (Baer et al., 2008; all facets including *Observe*).

An explanation could be that the *Observe* items have different meanings for meditators and non-meditators (Grossman and Van Dam 2011). Baer et al. (2008) suggests that the *Observe* subscale may be sensitive to changes with meditation practice, such that its relationship with other facets of mindfulness becomes stronger as meditation experience increases. Observing one's experience could therefore be a key facet of the mindfulness construct, but only once a certain level of meditation practice has been established. Using the FFMQ to measure change pre- to post-MBCT could therefore be problematic, if the factor structure changes through respondents' practicing meditation. It would be advantageous to replicate the findings of Baer et al. (2008) by replicating the factor structure of the FFMQ in meditators. If meditation experience is a prerequisite to the *Observe* items functioning in the way they were intended, it could be that using the *Observe* subscale items as part of the FFMQ in experimental studies comparing meditators and non-meditators, or assessing change pre- to post-MBIs, may produce biased results.

Baer et al. (2006) cautioned that the FFMQ "requires extensive additional validation in a range of samples" (p43); yet, to date, the factor structure of the English-version of the FFMQ has not been assessed using any clinical samples. This is an important omission given that the FFMQ has begun to be used in studies to assess change pre- to post- MBIs for clinical conditions (e.g., Bowen & Kurz, 2012; Deckersbach et al., 2012; McManus et al., 2012; Vollestad et al., 2011). For example, in the context of MBCT, the factor structure of the FFMQ has not been assessed using a sample of individuals who suffer from recurrent depression, thus suggesting caution regarding its use within clinical research or as a clinical tool to assess treatment change. Furthermore, studies suggest that certain facets of the FFMQ show medium to large correlations with depressive symptoms, highlighting shared variance in these constructs (Baer et al., 2006; Baer et al., 2008; Barnhofer, Duggan, & Griffith, 2011; Branstrom, Duncan, & Moskowitz, 2011; Lavender, Gratz & Tull, 2011). It is unknown how

this shared variance influences the factor structure of the FFMQ in a sample of individuals who suffer from recurrent depression.

The Self-Compassion Scale (SCS)

Self-compassion "involves being caring and compassionate towards oneself in the face of hardship or perceived inadequacy... having the right amount of distance from one's emotions so that they are fully experienced while being approached with mindful objectivity" (Neff, Kirkpatrick, & Rude, 2007, p.140). The SCS conceptualizes self-compassion as consisting of six key components: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification (Neff, 2003). The SCS is a 26-item scale that aims to measure these components of self-compassion using a 5-point Likert scale for each item (1 = Almost Never to 5 = Almost Always). The mean scores from the subscales can be combined to yield a total score, which reflects a global measure of self-compassion.

Empirical research has shown that self-compassion as measured by the SCS can be cultivated through MBIs such as MBCT (Dunn, Hanieh, Roberts, & Powrie, 2012; Kuyken, Watkins, et al., 2010; Rimes & Wingrove, 2011) and MBSR (Birnie, Speca, & Carlson, 2010; Shapiro, Astin, Bishop, & Cordova, 2005; Shapiro, Brown, & Biegel, 2007). Using data from a recent randomized controlled trial of MBCT for recurrent depression which compared MBCT to antidepressant medication (Kuyken, Byford, Taylor, Watkins, Holden, White,... Teasdale, 2008), Kuyken, Watkins, et al. (2010) found that MBCT's outcomes in terms of residual depressive symptoms at 1 year follow-up were mediated by the enhancement of self-compassion across MBCT treatment. Kuyken, Watkins, et al. (2010) also explored the effect of MBCT on cognitive reactivity, using a sad mood-induction paradigm one month after participants had received MBCT. They found that the relationship between greater reactivity

and poor outcome after one year was attenuated in people who became more self-compassionate during treatment.

The psychometric properties of the SCS have been examined in student samples (Neff, 2003), but to date its psychometric properties have yet to be established in clinical or meditator samples. As with the FFMQ, this is an important omission since the SCS is being used in studies to examine change following MBIs such as MBCT for recurrent depression (e.g., Kuyken, Watkins, et al., 2010).

Aim of the Present Study

This study addresses an important omission in the literature by examining the factor structures of the FFMQ and SCS in three samples relevant to mindfulness research: (1) An unspecified community sample of adults (e.g., to replicate the findings of Baer et al., 2006; and to establish the factor structure of the SCS given that the SCS was developed using a student sample); (2) A sample of adults who practice meditation (e.g., to replicate the findings of Baer et al., 2008; and to establish the factor structure of the SCS in a meditator sample, which is novel); and (3) A sample of adults who suffer from recurrent depressive disorder in remission recruited to participate in MBCT (novel for both scales).

Method

Participants

Table 2 shows participant characteristics for all three samples. Sample 1 comprised a large convenience sample of adults, recruited through the community via online forums ($N = 940$). Sample 1 was not assessed for clinical status or meditation experience. Inclusion criteria: aged 18 years or over. Sample 2 comprised an online sample of meditators which was recruited through the Exeter Mindfulness Network newsletter (www.exeter-mindfulness-network.org), local meditation centres, and online meditation forums ($N = 235$). The clinical

status of Sample 2 was unknown. Inclusion criteria: aged 18 years or over, who report

currently practicing meditation. Table 3 shows characteristics of reported meditation practice

for Sample 2. Sample 3 comprised individuals who had consented to take part in a trial of

MBCT for recurrent depression (PREVENT trial; Kuyken, Byford, Byng, Dalgleish, Lewis,

Taylor,... Evans, 2010; $N = 424$). This clinical sample is representative of the population for

whom MBCT was developed, namely people with a history of recurrent depression who are

open to trying a psychosocial approach to staying well (Segal et al., 2013). Sample 3

participants were recruited through primary care settings in rural and urban settings in the

UK. Inclusion criteria were: a diagnosis of recurrent major depressive disorder in full or

partial remission according to the Diagnostic and Statistical Manual of Mental Disorders

Fourth Edition (DSM-IV), with 3 or more previous major depressive episodes; aged 18 or

older. Exclusion criteria: a current major depressive episode; a co-morbid diagnosis of

current substance abuse; organic brain damage; current/past psychosis; current/past bipolar

disorder. To establish participants' diagnostic status the Structured Clinical Interview for

DSM-IV (SCID-I: First, Spitzer, Gibbon, & Williams, 2002) was administered.

Procedure

Participants comprising Sample 1 consented to take part in an online study that

involved completion of the FFMQ and SCS. No individual payment was offered for

participating, although two participants were selected at random to receive a £40 prize.

Participants comprising Sample 2 consented to take part in an online study that

involved completing the FFMQ and SCS along with three questions about their meditation

practice: (1) *How many years have you been meditating? (Even if your meditation practice

has been off and on)*; (2) *How many years have you been meditating fairly regularly? (i.e.

more 'on', than 'off and on')*; and (3) *A formal meditation is where you put time aside to

perform a specific meditation (such as a sitting meditation). How many minutes or hours do*

you typically spend carrying out formal meditations per week? For questions 1 and 2

participants were given a drop-down menu of options ranging from 0-99. For question 3,

participants were given a drop-down menu of options ranging from 0-100 hours, split up into

10-minute intervals. The questions about their meditation practice were included for

information only, and were not included in any of the analyses.

Participants comprising Sample 3 were asked to complete the FFMQ and SCS in a

booklet of measures as part of their intake assessment for a trial of MBCT for recurrent

depression (Kuyken, Byford, et al., 2010). Participants were paid £10 to cover expenses for

taking part in this assessment.

Participants from all three samples were asked to complete the FFMQ first, followed

by the SCS.

Statistical Analyses

Preliminary analyses. Preliminary analyses were conducted in order to prepare the

data, check for underlying assumptions about the samples used, and to report descriptive

statistics and reliability coefficients (Cronbach's alphas). These analyses were carried out

using SPSS, version 18.

Factor analyses. The factor analyses of the FFMQ (Baer et al., 2006; Baer et al.,

2008) and SCS (Neff, 2003) were evaluated through conducting confirmatory factor analyses

(CFAs), to confirm the factor structures detailed below. The CFAs were conducted using

SAS 9.3. Maximum Likelihood Estimation method was used based upon recommendations

of its robust performance in a variety of situations (Kline, 2005).

Five Facet Mindfulness Questionnaire. To replicate the procedure used by Baer et

al. (2006), the CFAs of the FFMQ were conducted using item parcels whereby items within

subscales were assigned to parcels randomly. A strength of this method is that the reliability

of a parcel is greater than the reliability of a single item, so parcels can serve as more stable

indicators of a latent construct (Little, Cunningham, Shahar, & Widaman, 2002). Each subscale comprised three parcels, totalling 15 parcels (see Baer et al., 2006; Baer et al., 2008).

For each sample, five FFMQ factor structures were tested. To replicate Baer et al. (2006) and Baer et al. (2008) we tested a single-factor model in which all item parcels are indicators of one, overall mindfulness factor; a five-factor model, in which item parcels are indicators of 5 distinct but correlated mindfulness factors; a hierarchical model in which the five factors were indicators of an overall mindfulness factor (*five-factor hierarchical model*); and a hierarchical model in which four factors (all except *Observe*) were indicators of an overall mindfulness factor (*four-factor hierarchical model*). Ideally, a five-factor model and a five-factor hierarchical model would be the best fit for all three samples. Since Baer et al. (2006) found that a *five*-factor model and a *four*-factor *hierarchical* model best fit their data we decided to also test a four-factor model in which all parcels except those of the *Observe* facet were included.

Self-Compassion Scale. To replicate the procedure used by Neff (2003), the CFAs of the SCS were conducted using scale items rather than item parcels. Since the SCS subscales consist of either 4 or 5 items, it is not possible to split the items into three or more parcels (the amount needed to perform factor analysis). For each of the four samples, three SCS factor structures were tested: a single-factor model in which all item parcels are indicators of one, overall self-compassion factor; the six-factor model; and a hierarchical model in which the six factors were indicators of an overall self-compassion factor (called *six-factor hierarchical model*). The latter two models were tested by Neff (2003) in the development of the SCS.

Assessing goodness of fit. There are rules of thumb when choosing cut-off points to say that a model fit is acceptable or poor, from the fit indices provided by structural equation

modelling statistical software (Hu & Bentler, 1998, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003). Suggested cut-offs for specific fit indices vary and should be used with caution since indices are influenced by sample size, model parameters, and data normality (e.g., Chen, Curran, Bollen, Kirby, & Paxton, 2008; Marsh, 2004; Nye & Drasgow, 2011). It is recommended that researchers report several indices rather than relying on a single type, since different indices together provide complimentary information (e.g., Kline, 2005). We will report six indices for the current analyses: the χ^2 statistic with degrees of freedom, comparative fit index (CFI; Bentler, 1990); non-normed fit index (NNFI; Bentler, 1990); root mean square error of approximation (RMSEA; Steiger & Lind, 1980); standardized root mean square residual (SRMR; Bentler, 1995), and Akaike information criterion (AIC; Akaike, 1974).

Since indices are influenced by sample size, model parameters, and data normality, for the SRMS, RMSEA, CFI, and NNFI we provide both conservative and liberal suggested cut-offs for an acceptable fit, and use both when drawing conclusions from the results (Schermelleh-Engel et al., 2003). For a model that fits the data to an acceptable level, CFI and NNFI would be $\geq .95$ (conservative) or $\geq .90$ (liberal), RMSEA would be $\leq .06$ (conservative) or $\leq .10$ (liberal), and SRMR would be $\leq .05$ (conservative) or $\leq .10$ (liberal), (Schermelleh-Engel et al., 2003). Collectively, these fit indices are considered to provide satisfactory criteria for overall model evaluation (Schermelleh-Engel et al., 2003), and a very stringent standard would be to satisfy them all. The AIC index will be used as a descriptive measure of model parsimony in order to further compare the one-, four-, and five-factor models, and the four- and five-factor hierarchical models. The lower the AIC, the better the model fit. Additionally, since models for both the FFMQ and SCS are nested (e.g., the four-factor model of the FFMQ is nested in the four-factor hierarchical model of the FFMQ),

comparative fit was evaluated using the χ^2 difference test to determine whether statistically significant differences existed between CFA models.

Conclusions drawn as to which model provides a superior fit was therefore based upon the combination of four factors: (1) meeting criteria for acceptable fit on the SRMS, RMSEA, CFI, and NNFI (conservative cut-offs as a first choice, liberal as a second); (2) having the lowest AIC; (3) being significantly improved compared to other models, based upon the χ^2 difference test; and (4) having items/parcels/facet factors load significantly on to relevant factors at $p = .001$ (the latter procedure used by Baer et al, 2006). Since the χ^2 difference test is sensitive to sample size, such that in large samples small differences may be statistically significant but not meaningful, a common rule of thumb is that if other fit indices (i.e., SRMS, RMSEA, CFI, and NNFI) do not differ by a full point at two decimal places (eg, .94 vs .93) then the difference is not meaningful even if the chi-square difference test is significant (Schermelleh-Engel et al, 2003).

Results

Preliminary analyses

In preliminary analyses the data were checked for normality. Scale scores in all four samples were normally distributed, as assessed by histograms, boxplots, and levels of skewness and kurtosis. The data were next checked for missing values. For Sample 1 (unspecified community sample) and Sample 2 (meditators) there were no missing data, since participants were required to select an answer for each item of the FFMQ and SCS. However, some participants only chose to complete the FFMQ, which was administered first. For Sample 1, 940 participants completed the FFMQ and 821 participants completed the SCS. For Sample 2, 235 participants completed the FFMQ and 211 participants completed the SCS. For Sample 3 (formerly depressed), cases with any missing data were excluded from the analyses. Out of a possible 424 participants, 391 completed the FFMQ with no

missing data and 390 completed the SCS with no missing data. The main analyses were run

with univariate and multivariate outliers removed, and again with them included. The main

results were not affected by the inclusion of outliers and so the results presented below are

those with outliers included, in order to maximise the sample sizes.

Descriptive Statistics and Reliability

FFMQ. Descriptive statistics and reliability coefficients for the FFMQ facets are

presented in Table 4. The Cronbach's alphas were between .77 and .93, and were similar to

those found by Baer et al. (2006) and Baer et al. (2008).

SCS. Table 4 also shows the descriptive statistics and reliability coefficients for the

SCS facets. The Cronbach's alphas were between .71 and .86, and were similar to those

found by Neff (2003).

Confirmatory Factor Analyses

FFMQ. Table 5 shows the fit indices for the five different FFMQ models that were

tested by CFA. Indices in bold are those that meet the suggested liberal cut-off criteria for

having acceptable fit (this does not apply for AIC, since it does not have an 'acceptable'

range, nor for the χ^2 statistic, which is included in order to statistically compare models using

the χ^2 difference test). In all samples the fit indices show that a one-factor model does not fit

the data well, and that a five-factor model fits the data better than a one-factor model. In all

samples, a four-factor model fits the data better than a five-factor model. In all samples a

four-factor hierarchical model (all facets except *Observe*) fits the data better than a five-factor

hierarchical model. The AIC index also reflects this pattern of findings.

When examining the findings based upon the liberal cut off criteria for acceptability

outlined in the Methods section, the fit indices for the unspecified community adult sample

and the meditator sample suggest that the four-factor model, the four-factor hierarchical

model, the five-factor model, and the five-factor hierarchical model all fit the data acceptably

well. The fit indices for the clinical sample suggest that the four-factor model, four-factor hierarchical model, and the five factor model all fit the data acceptably well whereas the five-factor hierarchical model does not. When examining the findings based upon the conservative cut off criteria for acceptability, none of the models meet the criteria for acceptability across the range of fit indices.

The χ^2 difference tests revealed that for all three samples, there was a significant improvement in model fit for the four-factor model compared to the four-factor hierarchical model, and for the five-factor model compared to the five-factor hierarchical model. For the unspecified community adult sample and the meditator sample, the significant χ^2 test found for the four-factor and four-factor hierarchical models may be a consequence of sample size, since a rule of thumb suggests that a significant χ^2 test is not likely to be meaningful in large samples where other fit indices do not differ (Schermelleh-Engel et al, 2003). For the unspecified community adult sample and the clinical sample, the significant χ^2 test and the differences in other fit indices found for the five-factor and five-factor hierarchical models suggest that the five-factor model is superior to the five-factor hierarchical model in these samples. For the meditator sample, the significant χ^2 difference test found for the five-factor and five-factor hierarchical models may also be a consequence of sample size, since the SRMR, RMSEA, and CFI indices do not differ in this sample.

Examination of the pattern of loadings for the five-factor hierarchical model revealed that for the unspecified community adult sample and the clinical sample, the loadings of *Describe*, *Act with Awareness*, *Non-Judgement*, and *Non-Reactivity* were all significant at $p >$ .001, but *Observe* loaded non-significantly on to the overarching mindfulness factor. For the meditator sample, all factors including *Observe* loaded significantly on to the overarching mindfulness factor, at $p >$ .001. Examination of the pattern of loadings for the four-factor

hierarchical model (all facets except *Observe*) revealed that, for all three samples, all factors loaded significantly onto the overarching mindfulness factor.

SCS. Table 6 shows the fit indices for the three SCS models that were tested by CFA. Indices in bold are those that meet the suggested cut-off criteria for having acceptable fit. Overall, these findings suggest that for the six-factor model, the CFI and NNFI fit indices for the three SCS models in all three samples were below thresholds typically used to represent acceptable model fit when using liberal cut-off criteria for what constitutes 'acceptable'. In all three samples, the χ^2 difference test revealed that the six-factor hierarchical model was a significantly poorer fitting model than the six-factor model. The AIC index also reflected this pattern.

Discussion

Until now, neither the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) nor the Self-Compassion Scale (SCS; Neff, 2003) have had their factor structures examined in a sample of adults who suffer from recurrent depression. Only the FFMQ has had its factor structure examined using a sample of meditators, showing that both a five-factor model and a *five*-factor hierarchical model fit the data in meditators, whereas a five-factor model and a *four*-factor hierarchical model fit the data in non-meditators (Baer et al., 2008). The SCS has only had its factor structure examined in student samples. The aim of the present study was to assess the replicability of the findings of Baer et al. (2006) and Baer et al. (2008) by examining the factor structure of the FFMQ in both a convenience community adult sample and a meditator sample. We extend their findings by examining a four-factor model in both samples, and by examining the different models in a clinical sample of adults who met diagnostic criteria for recurrent major depressive disorder (not currently depressed). We also aimed to confirm the factor structure of the SCS (Neff, 2003) using the same three samples.

Five Facet Mindfulness Questionnaire

Using an unspecified community sample of adults (Sample 1) and a sample of adult meditators (Sample 2), analyses showed that the four-factor and four-factor hierarchical models were superior to the five factor and five-factor hierarchical models in terms of model fit. These findings replicate those of (Baer et al., 2006; Baer et al., 2008). Using a clinical sample (Sample 3), analyses showed that only the four-factor and four-factor hierarchical models fit the data to an acceptable level. The fit indices for the five-factor hierarchical model were below what is commonly regarded as acceptable in the clinical sample (including liberal criteria for acceptability). Additionally, in both the unspecified community adult sample and the clinical sample, the *Observe* factor did not load significantly on to an overarching mindfulness factor whereas the other four factors did. This pattern of findings suggests that the four-factor hierarchical model is superior in the unspecified community adult sample and the clinical sample, whereas the five-factor hierarchical model is superior in the meditator sample.

In summary, these findings support the growing body of research examining the factor structure of FFMQ scores in adult and meditator samples by suggesting that the FFMQ would be a superior measure of mindfulness with the *Describe, Act with Awareness, Non-Judgement*, and *Non-Reactivity* subscales, but not the *Observe* subscale. This would render the FFMQ the *Four* Facet Mindfulness Questionnaire.

Implications. Baer et al. (2008) suggest that the construct of mindfulness may shift as meditation experience increases. According to Baer and colleagues, for non-meditators the key facets of mindfulness that are important to wellbeing are *Describing*, *Acting with Awareness*, *Non-Judgment*, and *Non-Reactivity*. As meditation experience increases, other facets of mindfulness emerge and are important to wellbeing, such as *Observing*. This is important theoretically, and our findings are supportive. However, our findings have

implications for studies that track change in mindfulness using the FFMQ in meditators and non-meditators, and potentially for studies that compare change pre- to post-MBIs.

When measuring mindfulness, rather than its facets, in order to compare the findings of meditators and non-meditators, it is important to only include those facets which evidence suggests are key facets of mindfulness in *both* samples. Including the *Observe* items when examining mindfulness scores in non-meditator adult samples may result in biased scores, if observing/noticing means something different to meditators and non-meditators. Such cross-sample comparisons using the FFMQ without the *Observe* scale would be less likely to produce biased scores, since the four-factor and four-factor hierarchical models fit the data well in both samples, whereas the *Observe* factor did not load significantly on to an overarching mindfulness factor in the unspecified community adult sample. This is important, regardless of whether the construct of mindfulness changes with meditation experience. Since there are other hypothesised facets of mindfulness not included in the FFMQ (see Table 1), the removal of one facet from this scale in order to make it a more structurally acceptable measure of mindfulness is something for researchers and clinicians to consider.

The FFMQ has begun to be used in studies to assess change pre- to post-MBIs for a variety of clinical conditions (e.g., Bowen & Kurz, 2012; Deckersbach et al., 2012; McManus et al., 2012; Vollestad et al, 2012). In particular, MBCT is a psychotherapeutic intervention which was specifically developed for the prevention of recurrent depression in people who are not currently suffering from depression. We found that only the four-factor and four-factor hierarchical models met criteria for an acceptable fit in this population. Since MBIs such as MBCT teach participants meditation techniques, it could be that the factor structure of the 39-item FFMQ does not remain stable pre- to post-MBCT for recurrent depression if meditation status alters the *Observe* subscale's relationship to the other facets. Further

research is needed to examine whether this is the case. Our findings also suggest that further research is needed to examine the factor structure of the FFMQ in other relevant clinical samples being used in MBI research. As with comparing non-meditators and meditators, a solution could be to remove the *Observe* facet if using the FFMQ to track change in mindfulness pre- to post-MBIs.

Self-Compassion Scale

In all three samples, none of the models fit the data to an acceptable level when using liberal cut-off criteria for what constitutes 'acceptable' fit. Only two of the fit indices used in our analyses were used in the development of the SCS (the CFI & NNFI), and less stringent cut-offs for these fit indices were also used (e.g., suggesting that an NNFI of .88 is acceptable, as is a CFI of .90). Applying our liberal criteria (e.g., NNFI and CFI should be ≥ .90) to the original SCS factor analysis by Neff (2003) suggests that, in that study also, the fit indices were not optimal.

Kenny and McCoach (2003) present a discussion on the impact of various fit indices and concludes that, with well-fitting models with many indicators, the CFI and NNFI indices may not function well but that this should not be a cause for concern if the SRMR and RMSEA meet suggested criteria for a good model fit. Our finding that the CFI and NNFI fell just below the liberal cut-off for acceptability for the six-factor model in the unspecified community sample may therefore not be a cause for concern. However, taken alongside our finding that the *hierarchical* six-factor model was not acceptable suggests that the SCS may be better suited to measuring six hypothesised facets of self-compassion in this population rather than for measuring an overarching construct (i.e., self-compassion).

Implications. The SCS was developed using two student samples (Neff, 2003) and the SCS has since been used to measure self-compassion in both clinical and non-clinical adult samples. Although the six-factor model was close to meeting liberal criteria for an

acceptable fit in the unspecified community sample, in all three samples the six-factor *hierarchical* model was not. This suggests that further research is needed to develop a more psychometrically robust measure of self-compassion.

Limitations of the Present Study

The clinical status of both the unspecified community adult sample and the meditator sample was not assessed, nor was meditation experience in the convenience adult sample. Had clinical and meditation status been assessed in all samples it would have been possible to perform multiple group analyses to firstly establish the factor structure of the FFMQ and SCS using all participants, and secondly to examine their factor structures according to clinical and meditation status. This would have enabled comparisons of fit indices and potential model improvement based upon these groupings (i.e., comparing the factor structures of clinical vs. non-clinical, and meditator vs. non-meditator). This would be a useful approach for helping to answer the question as to whether the factor structures of FFMQ and SCS are acceptable for their use in comparing non-clinical and clinical samples, and non-meditator and meditator samples.

In all three samples, the proportion of females was higher than that of males, Sample 2 consisted of participants who were highly educated, and Samples 2 and 3 consisted of participants who were older than Sample 1. Further research should attempt to replicate the findings using samples that are more generalizable to the wider population and matching samples in terms of gender, education and age.

Conclusion

The FFMQ is a widely employed measure of mindfulness in studies using clinical and meditator samples, sometimes with the aim of comparing levels of mindfulness in clinical and non-clinical samples, and meditator and non-meditator samples. However, the present findings suggest that researchers should be cautious about using the FFMQ to measure

mindfulness in order to compare meditator and non-meditator samples, unless the *Observe*

facet is excluded (e.g., examining change pre- to post-MBIs which teach meditation

techniques to individuals with recurrent depression in remission). Our findings also suggest

that the factor structure of the SCS falls below criteria for an acceptable fit for measuring

self-compassion. Further research is therefore needed to develop a more psychometrically

robust measure of self-compassion.

References

Akaike, H. (1974). A new look at statistical model identification. *IEEE Transactions on Automatic Control, 19*, 716-723.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment, 11*(3), 191-206. doi: 10.1177/1073191104268029

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45. doi: 10.1177/1073191105283504

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., . . . Williams, J. M. G. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329-342. doi: 10.1177/1073191107313003

Barnhofer, T., Duggan, D. S., & Griffith, J. W. (2011). Dispositional mindfulness moderates the relation between neuroticism and depressive symptoms. *Personality and Individual Differences. 51*(8), 958-962.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246. doi: 10.1037/0033-2909.107.2.238

Bentler, P. M. (1995). *EQS structural equations program manual.* Encino, CA: Multivariate Software.

Birnie, K., Speca, M., & Carlson, L. E. (2010). Exploring self-compassion and empathy in the context of Mindfulness-based Stress Reduction (MBSR). *Stress and Health, 26*(5), 359-371. doi: 10.1002/Smi.1305

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., . . . Devins,

G. (2004). *Mindfulness: A proposed operational definition*. Clinical Psychology:

Science and Practice, 11(3), 230-241. doi:10.1093/clipsy/bph077

Bohlmeijer, E., Prenger, R., Taal, E., & Cuijpers, P. (2010). The effects of Mindfulness-

Based Stress Reduction therapy on mental health of adults with a chronic medical

disease: A meta-analysis. *Journal of Psychosomatic Research, 68*(6), 539-544. doi:

10.1016/j.jpsychores.2009.10.005

Bowen, S., & Kurz, A. S. (2012). Between-session practice and therapeutic alliance as

predictors of mindfulness after Mindfulness-Based Relapse Prevention. *Journal of

Clinical Psychology, 68*(3), 236-245. doi: 10.1002/Jclp.20855

Branstrom, R., Duncan, L. G., & Moskowitz, J. T. (2011). The association between

dispositional mindfulness, psychological well-being, and perceived health in a

Swedish population-based sample. *British Journal of Health Psychology, 16*(2), 300-

316. doi: 10.1348/135910710X501683

Branstrom, R., Kvillemo, P., Brandberg, Y., & Moskowitz, J. T. (2010). Self-report

mindfulness as a mediator of psychological well-being in a stress reduction

intervention for cancer patients: A randomized study. *Annals of Behavioral Medicine,

39*(2), 151-161. doi: 10.1007/s12160-010-9168-6

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role

in psychological well-being. *Journal of Personality and Social Psychology, 84*(4),

822-848. doi: 10.1037/0022-3514.84.4.822

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York:

Guildford Press.

Buchheld, N., Grossman, P., & Wallach, H. (2001). Measuring mindfulness in insight

meditation (Vipassana) and meditation-based psychotherapy: The development of the

Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1*, 11–34.

Cardaciotto, L. A., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia mindfulness scale. *Assessment, 15*, 204-223. doi:10.1177/1073191107311467.

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*(1), 23-33. doi: 10.1007/s10865-007-9130-7

Chadwick P., Hember M., Symes J., Peters E., Kuipers E., & Dagnan D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton mindfulness questionnaire (SMQ). *British Journal of Clinical Psychology, 47*, 451–455. doi: 10.1348/014466508X314891.

Chadwick, P., Taylor, K. N., & Abba, N. (2005). Mindfulness groups for people with psychosis. *Behavioural and Cognitive Psychotherapy, 33*(3), 351-359. doi: 10.1017/S1352465805002158

Chen, F. N., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociological Methods & Research, 36*(4), 462-494. doi: 10.1177/0049124108314720

Deckersbach, T., Holzel, B. K., Eisner, L. R., Stange, J. P., Peckham, A. D., Dougherty, D. D., . . . Nierenberg, A. A. (2012). Mindfulness-Based Cognitive Therapy for nonremitted patients with bipolar disorder. *Cns Neuroscience & Therapeutics, 18*(2), 133-141. doi: 10.1111/j.1755-5949.2011.00236.x

Dimidjian, S., & Linehan, M. M. (2003). Defining an agenda for future research on the clinical application of mindfulness practice. *Clinical Psychology: Science and Practice*, *10*, 166-171.

Dunn, C., Hanieh, E., Roberts, R., & Powrie, R. (2012). Mindful pregnancy and childbirth: Effects of a mindfulness-based intervention on women's psychological distress and well-being in the perinatal period. *Archives of Womens Mental Health, 15*(2), 139-143. doi: 10.1007/s00737-012-0264-4

Feldman, C. (2012). *Exeter Mindfulness Network*. Retrieved from http://www.exeter-mindfulness-network.org/about-what-is-mindfulness.php

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. (2007). Mindfulness and emotion regulation: The development and initial validation of the cognitive and affective mindfulness scale-revised (CAMS-R). *Journal of Psychopathology & Behavioral Assessment, 29*, 177-190. doi: 10.1007/s10862-006-9035-8.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). *Structured clinical interview for DSM-IV-TR axis I disorders, research version, patient edition. (SCID-I/P)* New York: Biometrics Research, New York State Psychiatric Institute.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-Based Stress Reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*(1), 35-43. doi: 10.1016/S0022-3999(03)00573-7

Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology-Science and Practice, 11*(3), 255-262. doi: 10.1093/clipsy/bph080

Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3*(4), 424-453. doi: 10.1037/1082-989x.3.4.424

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55. doi: 10.1080/10705519909540118

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, N.Y.: Delacorte Press.

Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life.* New York: Hyperion.

Kenny, D. A., & McCoach, D. B. (2003). Effect of the number of variables on measures of fit in structural equation modelling. *Structural Equation Modelling: A multidisciplinary Journal, 10*(3), 333-351. doi:10.1207/S15328007SEM1003_1

Kline, R. B. (2005). *Principles and practices of structural equation modelling.* New York, NY: Guildford Press.

Kuyken, W., Byford, S., Byng, R., Dalgleish, T., Lewis, G., Taylor, R., . . . Evans, A. (2010). Study protocol for a randomized controlled trial comparing Mindfulness-Based Cognitive Therapy with maintenance anti-depressant treatment in the prevention of depressive relapse/recurrence: the PREVENT trial. *Trials, 11*. doi: 10.1186/1745-6215-11-99

Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., . . . Teasdale, J. D. (2008). Mindfulness-Based Cognitive Therapy to prevent relapse in recurrent depression. *Journal of Consulting and Clinical Psychology, 76*(6), 966-978. doi: 10.1037/A0013786

Kuyken, W., Watkins, E., Holden, E., White, K., Taylor, R. S., Byford, S., . . . Dalgleish, T. (2010). How does Mindfulness-Based Cognitive Therapy work? *Behaviour Research and Therapy, 48*(11), 1105-1112. doi: 10.1016/j.brat.2010.08.003

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson. L., . . . Carmody, J. (2006). The toronto mindfulness scale: Development and validation. *Journal of Clinical Psychology, 62*(12), 1445-1467. doi 10.1002/jclp.20326.

Lavendar, J. M., Gratz, K. L., & Tull, M. T. (2011). Exploring the relationship between facets of mindfulness and eating pathology in women. *Cognitive Behaviour Therapy, 40*(3), 174-182.

Leary, M. R., & Tate E. B. (2007). The multi-faceted nature of mindfulness. *Psychological Inquiry, 18*(4), 251-255. doi: 10.1080/10478400701598355.

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guilford.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9*(2), 151-173. doi: 10.1207/S15328007sem0902_1

Marsh, H. W. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling-a Multidisciplinary Journal, 11*(3), 320-341. doi: 10.1207/s15328007sem1103_2

McManus, F., Surawy, C., Muse, K., Vazquez-Montes, M., & Williams, J. M. G. (2012). A randomized clinical trial of Mindfulness-Based Cognitive Therapy versus unrestricted services for health anxiety (hypochondriasis). *Journal of Consulting and Clinical Psychology, 80*(5), 817-828. doi: 10.1037/A0028782

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223–250. doi: 10.1080/15298860390209035

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive

    psychological functioning. *Journal of Research in Personality, 41*(1), 139-154. doi:

    10.1016/j.jrp.2006.03.004

Nye, C. D., & Drasgow, F. (2011). Assessing goodness of fit: Simple rules of thumb simply

    do not work. *Organizational Research Methods, 14*(3), 548-570. doi:

    10.1177/1094428110368562

Nyklicek, I., & Kuijpers, K. F. (2008). Effects of Mindfulness-Based Stress Reduction

    intervention on psychological well-being and quality of life: Is increased mindfulness

    indeed the mechanism? *Annals of Behavioral Medicine, 35*(3), 331-340. doi:

    10.1007/s12160-008-9030-2

Piet, J., & Hougaard, E. (2011). The effect of Mindfulness-Based Cognitive Therapy for

    prevention of relapse in recurrent major depressive disorder: A systematic review and

    meta-analysis. *Clinical Psychology Review, 31*(6), 1032-1040. doi:

    10.1016/j.cpr.2011.05.002

Rimes, K. A., & Wingrove, J. (2011). Pilot study of Mindfulness-Based Cognitive Therapy

    for trainee clinical psychologists. *Behavioural and Cognitive Psychotherapy, 39*(2),

    235-241. doi: 10.1017/S1352465810000731

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of

    structural equation models: Tests of significance and descriptive goodness-of-fit

    measures. *Methods of Psychological Research Online, 8*(2), 23-74.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2013). *Mindfulness-Based Cognitive

    Therapy for depression* (2nd ed.). New York: Guildford Press.

Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-Based Stress

    Reduction for health care professionals: Results from a randomized trial.

International Journal of Stress Management, 12(2), 164–176. doi: 10.1037/1072-5245.12.2.164

Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of Mindfulness-Based Stress Reduction on the mental health of therapists in training. *Training and Education in Professional Psychology, 1*(2), 105–115. doi: 10.1037/1931-3918.1.2.105

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*(3), 373-386. doi: 10.1002/jclp.20237.

Steiger, J. H., & Lind, J. C. (1980). *Statistically based tests for the number of common factors.* Paper presented at the Spring Meeting of the Psychometric Society, Iowa City, IA.

Teasdale, J. D. (1999). Metacognition, mindfulness, and the modification of mood disorders. *Clinical Psychology and Psychotherapy, 6*(2), 146-155. doi: 10.1002/(SICI)1099-0879(199905)6:2<146::AID-CPP195>3.0.CO;2-E

Vollestad, J., Sivertsen, B., & Nielsen, G. F. (2011). Mindfulness-Based Stress Reduction for patients with anxiety disorders: Evaluation in a randomized controlled trial. *Behaviour Research and Therapy, 49*(4), 281-288. doi: 10.1016/j.brat.2011.01.007

Walach, H., Buchheld, N., Buttenmuller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness: The Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences, 40*(8), 1543-1555. doi: 10.1016/j.paid.2005.11.025

Table 1.
Psychological definitions of mindfulness, and mindfulness operationalised through self-report scales.

Author/Source	Definition of mindfulness (e.g., "Mindfulness is...")	Measure influenced by definition
Kabat-Zinn (1990; 1994)	"...paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (p.4, 1994). Kabat-Zinn (1990) proposes seven principles of mindfulness: Acceptance, non-judging, non-striving, beginner's mind, letting-go, patience, and trust.	None.
Linehan (1993); Dimidjian and Linehan (2003)	A set of skills/qualities, separated into two types. Three qualities related to what one does when practicing mindfulness: (1) observing/noticing, (2) describing/labelling, (3) participating. Three qualities related to the ways in which one does these activities: (1) non-judgmentally, (2) in the present moment, (3) effectively.	Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith & Allen., 2004); Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The KIMS comprises four factors: Observing, describing, acting with awareness, accepting without judgment; The FFMQ comprises five factors: observing, describing, acting with awareness, non-reactivity to inner experience, non-judging of inner experience.
Teasdale (1999); Segal, Williams and Teasdale (2013)	"... intentional use of attention and awareness in particular ways" (p.75). Particular ways include curiosity, non-judgment, acceptance, allowing, friendliness, kindness.	None
Buchheld, Grossman, and Wallach (2001)	"... the dispassionate, non-manipulative participant-observation of ongoing mental states, without lapsing into conceptualisations about momentary mental content or becoming lost in emotional reactions... carried out with curiosity and without bias or expectation."	Freiburg Mindfulness Inventory (FMI: Buchheld et al., 2001). Comprises four factors: Present-moment dis-identifying attention; non-judgmental/non-evaluative attitude to self and others; openness to negative mind states; process-oriented insightful understanding.
Brown and Ryan (2003)	"...attention to and awareness of whatever is occurring in the present" (p.824).	Mindful Attention Awareness Scale (MAAS: Brown & Ryan, 2003). Comprises of a single factor, measuring lapses in attention and awareness.
Bishop et al. (2004)	"... self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment." (p.232). "Adopting a particular orientation toward one's experience that is characterised by curiosity, openness and acceptance" (p.232). Two components: (1) Self-regulation of attention (skills of sustained attention, switching, inhibition of secondary elaborative processing), and (2) orientation to experience (curiosity, experiential openness and acceptance).	Toronto Mindfulness Scale (Lau et al., 2006). Comprises of two factors: Curiosity, Decentering.

Shapiro, Carlson, Astin, and Freedman (2006)	Three components, based upon Kabat-Zinn's (1994) definition: (1) On purpose (intention), (2) paying attention (attention), (3) in a particular way (attitude, or mindful qualities such as openness and non-judgment). Intention, attention and attitude lead to 'reperceiving' (i.e., a fundamental shift in perspective of the subject-object relationship).	None
Leary and Tate (2007)	Five components: (1) mindful attention, (2) diminished self-talk, (3) non-judgment, (4) non-doing, and (5) a particular set of philosophical, ethical, or therapeutic beliefs.	None
Feldman, Hayes, Kumar, Greeson, and Laurenceau (2007)	Four components, based upon definitions by Kabat-Zinn (1994) and Bishop et al. (2004): 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.	Cognitive and Affective Mindfulness Scale Revised (CAMS-R: Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Comprises of four factors: Attention, present focus, awareness, and acceptance.
Cardaciotto, Herbert, Forman, Moitra, and Farrow (2008)	"... the tendency to be highly aware of one's internal and external experiences in the context of an accepting, nonjudgmental stance toward those experiences" (p. 2005). Two components: What is done (awareness) and how (acceptance).	Philadelphia Mindfulness Scale (PMS: Cardaciotto et al., 2008). Comprises of two factors: Awareness, acceptance.
Chadwick, Hember, Symes, Perers, Kuipers, and Dagnan (2008)	Four related components: (1) 'decentred awareness', (2) allowing attention to remain with difficult cognitions, (3) accepting difficult thoughts/images and self, (4) letting difficult cognitions pass without reacting.	Southampton Mindfulness Scale (SMS: Chadwick et al., 2008). Comprises of a single factor, with items measuring all four hypothesised components.
Feldman (2012)	"...the willingness and capacity to be equally present with all events and experiences with discernment, curiosity and kindness".	None

Table 2

Participant Characteristics for Three Samples: Adult, Unspecified (Sample 1); Adult, Meditator (Sample 2); Adult, Clinical[a] (Sample 3)

	Sample		
	Sample 1 (*N* = 940)	Sample 2 (*N* = 235)	Sample 3 (*N* = 424)
Gender, Women: *n* (%)	697 (74.1)	153 (65.1)	325 (76.6)
Age (in years): *M* (*SD*)	25.7 (9.8)	46.51 (13.1)	50.16 (11.8)
Level of Education: *n* (%)			
No educational qualification	43 (4.6)	1 (0.4)	18 (4.2)
Some school education	69 (7.3)	12 (5.1)	77 (18.2)
High school and/or vocational education	444 (47.3)	51 (21.7)	175 (41.3)
University degree/professional qualification	384 (40.8)	171 (72.8)	136 (32.1)
Missing	0	0	18 (4.2)
Ethnicity *n* (%)			
White/Caucasian	800 (85.1)	216 (91.9)	410 (96.7)
Other	140 (14.9)	19 (8.1)	4 (0.9)
Missing	0	0	10 (2.4)

Note. MBCT = Mindfulness-based Cognitive Therapy.

a. Meeting criteria for recurrent Major Depressive Disorder, currently in remission

Table 3

*Characteristics of Meditation Practice in Adult Meditator Sample (*N *= 235)*

Years Meditated (Since Starting Meditation)	
Less than 1 year	5.2%
1-5 years	35.6%
6-10 years	21.6%
11-15 years	10.8%
16-20 years	9.3%
21 years or more	17.5%
Years Meditated (More On Than Off)	
Less than 1 year	13.9%
1-5 years	47.4%
6-10 years	14.9%
11-15 years	12.9%
16-20 years	4.6%
21 years or more	6.3%
Average Meditation Amount Per Week (hours)	
Less than one hour	17.0%
One to two hours	19.1%
Two to three hours	18.6%
Three to four hours	16.5%
Four to six hours	11.3%
Six to eight hours	11.8%
Eight to ten hours	2.1%
Ten or more hours	3.6%

Note. *Years Meditated* was measured in number of years, but is presented here in five year periods.

Table 4

Descriptive Statistics and Reliability Coefficients for FFMQ and SCS Facets in Three Samples: Adult, Unspecified (Sample 1), Adult, Meditator (Sample 2), Adult, Clinical[a] (Sample 3)

Scale/Facet	Sample 1 (FFMQ, N = 940; SCS, N = 821)			Sample 2 (FFMQ, N = 235; SCS, N = 211)			Sample 3 (FFMQ, N = 391; SCS, N = 390)		
	M	SD	α	M	SD	α	M	SD	α
FFMQ									
Observing	26.47	5.29	.77	30.48	4.56	.82	24.11	5.65	.77
Describing	26.43	6.60	.90	30.45	5.34	.90	26.03	6.79	.91
Act with Awareness	23.64	5.95	.89	27.43	4.89	.89	24.10	5.44	.86
Non-Judgement	23.62	7.38	.92	30.48	6.21	.93	24.94	6.62	.90
Non-Reactivity	20.35	4.73	.81	25.01	4.27	.89	19.66	4.80	.82
SCS									
Self-Kindness	13.36	4.50	.86	18.99	3.55	.84	12.53	4.14	.81
Self-Judgment (reversed)	12.10	4.40	.84	17.15	4.29	.82	11.81	3.93	.78
Common Humanity	11.89	3.76	.81	15.10	3.27	.79	11.64	3.78	.79
Isolation (reversed)	9.76	3.83	.81	13.71	3.83	.79	9.36	3.36	.76
Mindfulness	12.52	3.38	.76	15.67	2.65	.73	11.77	3.26	.74
Over-Identification (reversed)	9.75	3.66	.79	13.36	3.71	.80	9.28	3.18	.71

Note. FFMQ = Five Facet Mindfulness Questionnaire. SCS = Self-Compassion Scale. MBCT = Mindfulness-Based Cognitive Therapy. For the FFMQ facets, scores can range from 8-40, except for Non-React which can range from 7-35. For the SCS facets Self-Kindness and Self-Judgment, scores can range from 5-25. For all other SCS facets, scores can range from 4-20. For the FFMQ and SCS facets, higher scores represent higher facet levels of mindfulness or self-compassion.

a. Meeting criteria for recurrent Major Depressive Disorder, currently in remission.

Table 5

CFA Fit Indices for the Five FFMQ Models Tested, using Three Samples: Adult, Unspecified (Sample 1); Adult, Meditator (Sample 2); Adult, Clinical[a] (Sample 3)

Model, Per Sample	χ^2	*df*	χ^2 difference	SRMR	RMSEA	CFI	NNFI	AIC
Sample 1 (*N* = 940)								
One-Factor: All items load on to one factor	3877.839	90	—	.179	.223 (.217 - .229)	.401	.302	3937.839
Four-Factor: D, A, NJ, NR items load on to their respective factors	305.679	48	—	**.053**	**.079 (.071 - .088)**	**.953**	**.935**	365.679
Hierarchical: Four factors (D, A, NJ, NR) load on to one factor	315.469	50	9.790*	**.056**	**.079 (.071 - .087)**	**.952**	**.936**	371.469
Five-Factor: O, D, A, NJ, NR items load on to their respective factors	447.999	80	—	**.058**	**.074 (.067 - .080)**	**.942**	**.924**	527.999
Hierarchical: Five factors (O, D, A, NJ, NR) load on to one factor	575.233	85	127.234*	**.086**	**.082 (.076 - .089)**	**.922**	**.904**	645.233
Sample 2 (*N* = 235)								
One-Factor: All items load on to one factor	4057.696	90	—	.136	.228 (.222 - .234)	.495	.411	4117.696
Four-Factor: D, A, NJ, NR items load on to their respective factors	400.843	48	—	**.046**	**.093 (.085 - .102)**	**.948**	**.928**	460.843
Hierarchical: Four factors (D, A, NJ, NR) load on to one factor	407.093	50	6.250*	**.048**	**.092 (.084 - .100)**	**.947**	**.930**	463.093
Five-Factor: O, D, A, NJ, NR items load on to their respective factors	544.401	80	—	**.047**	**.083 (.076 - .089)**	**.941**	**.922**	624.401
Hierarchical: Five factors (O, D, A, NJ, NR) load on to one factor	556.342	85	11.941*	**.050**	**.081 (.074 - .087)**	**.940**	**.926**	626.342
Sample 3 (*N* = 391)								
One-Factor: All items load on to one factor	3945.257	90	—	.181	.225 (.219 - .231)	.371	.266	4005.257
Four-Factor: D, A, NJ, NR items load on to their respective factors	375.075	48	—	**.066**	**.087 (.081 - .098)**	**.935**	**.911**	435.075
Hierarchical: Four factors (D, A, NJ, NR) load on to one factor	420.393	50	45.318*	**.079**	**.093 (.085 - .102)**	**.927**	**.903**	476.393
Five-Factor: O, D, A, NJ, NR items load on to their respective factors	631.832	80	—	**.074**	**.090 (.084 - .097)**	**.910**	**.882**	711.832
Hierarchical: Five factors (O, D, A, NJ, NR) load on to one factor	870.325	85	238.493*	.121	.104 (.098 - .111)	.872	.842	940.326

Note. FFMQ = Five Facet Mindfulness Questionnaire. MBCT = Mindfulness-Based Cognitive Therapy. χ^2 = Chi squared. *df* = degrees of freedom; SRMR = standardized root mean square residual; RMSEA= root mean square of approximation; CFI = comparative fit index; NNFI = non-normed fit index; AIC = Akaike Information Criterion (Akaike, 1974). O, D, A, NJ, NR represent facets of the FFMQ (O = Observe, D = Describe, A = Act with Awareness, NJ = Non-Judgement, and NR = Non-Reactivity). Bold indices signify that they satisfy liberal cut-off criteria when rounded up or down to two decimal places and are therefore considered to be within an acceptable range (Schermelleh-Engel et al., 2003).

a. Meeting criteria for recurrent Major Depressive Disorder, currently in remission

* $p < .001$

Table 6

CFA Fit Indices for the Seven SCS Models Tested, using Three Samples: Adult, Unspecified (Sample 1); Adult, Meditator (Sample 2); Adult, Clinical[a] (Sample 3)

Model, Per Sample	χ^2	*df*	χ^2 difference	SRMR	RMSEA	CFI	NNFI	AIC
Sample 1 (*N* = 821)								
One-Factor: All items load on to one factor	3937.485	298	—	**.097**	.120 (.117 - .123)	.679	.650	4043.485
Six-Factor: Items load on to six factors (SK, SJ, C, I, M, O)	1471.682	279	—	**.056**	**.071 (.067 - .075)**	.895	.877	1615.682
Hierarchical: Six factors (SK, SJ, C, I, M, O) load on to one factor	2142.738	287	671.056*	**.091**	**.087 (.084 - .091)**	.836	.814	2270.738
Sample 2 (*N* = 211)								
One-Factor: All items load on to one factor	4649.683	298	—	.098	.131 (.128 - .134)	.638	.605	4755.683
Six-Factor: Items load on to six factors (SK, SJ, C, I, M, O)	2629.613	279	—	**.075**	**.100 (.096 - .103)**	.804	.772	2773.613
Hierarchical: Six factors (SK, SJ, C, I, M, O) load on to one factor	3104.758	287	475.145*	**.095**	.107 (.104 - .111)	.765	.734	3232.758
Sample 3 (*N* = 390)								
One-Factor: All items load on to one factor	3837.894	298	—	**.103**	.118 (.115 - .122)	.625	.591	3943.894
Six-Factor: Items load on to six factors (SK, SJ, C, I, M, O)	1673.588	279	—	**.061**	**.077 (.073 - .080)**	.852	.828	1817.588
Hierarchical: Six factors (SK, SJ, C, I, M, O) load on to one factor	2450.861	287	777.273*	**.102**	**.094 (.091 - .098)**	.771	.740	2578.861

Note. SCS = Self-Compassion Scale. MBCT = Mindfulness-Based Cognitive Therapy. χ^2 = Chi squared. *df* = degrees of freedom; SRMR = standardized root mean square residual; RMSEA= root mean square of approximation; CFI = comparative fit index; NNFI = non-normed fit index; AIC = Akaike Information Criterion (Akaike, 1974). SK, SJ, CH, I, M, and OI represent subscales of the SCS (SK = Self-Kindness, SJ = Self-Judgement, C = Common Humanity, I = Isolation, M = Mindfulness, and O = Over-Identification). Bold indices signify that they satisfy liberal cut-off criteria when rounded up or down to two decimal places and are therefore considered to be within an acceptable range (Schermelleh-Engel et al., 2003).

a. Meeting criteria for recurrent Major Depressive Disorder, currently in remission

* *p* < .001