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Original Research Article

Psychological Reports
2026, Vol. 0(0) 1–26
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DOI: 10.1177/00332941261506972
journals.sagepub.com/home/prx


Construct Overlap Between Two Widely Used Self-Report Measures of Dispositional Mindfulness: Evidence from Stress and Anxiety Control Outcomes

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Abstract

Researchers commonly conceptualise dispositional mindfulness as a multidimensional construct comprising attentional awareness, present-moment focus, and acceptance. However, widely used measures differ considerably in the dimensions they assess, raising questions regarding the extent to which they demonstrate construct overlap and can be considered interchangeable. The present study evaluated the psychometric functioning, construct overlap, and associations of the Mindful Attention Awareness Scale (MAAS) and the Freiburg Mindfulness Inventory (FMI) with stress and anxiety control outcomes. A community sample of 1,498 UK adults completed the MAAS, FMI, Perceived Stress Scale, and Anxiety Control Questionnaire. Confirmatory factor analysis (CFA), exploratory structural equation modelling (ESEM), Rasch analysis, and structural equation modelling (SEM) evaluated measurement properties and examined associations with stress and anxiety control outcomes. ESEM provided superior fit relative to CFA for multidimensional measures, while Rasch analyses indicated satisfactory measurement functioning across mindfulness measures. Contrary to expectations, despite satisfactory psychometric performance, the MAAS demonstrated

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Data Availability Statement included at the end of the article

near-zero correlations with the FMI total score and its Presence and Acceptance facets, indicating that these measures were essentially independent in this sample rather than showing substantial dimensional overlap. Structural models further revealed distinct patterns of association, with acceptance showing the strongest relationships with coping and emotion control, whereas mindfulness awareness displayed the strongest associations with threat control and stress control. Findings are consistent with multidimensional conceptualisations of mindfulness and demonstrate negligible convergence between the MAAS and FMI, indicating that researchers should not assume that these instruments are interchangeable. More broadly, the findings highlight the importance of empirically evaluating construct overlap when selecting scales intended to assess the same psychological construct.

Keywords
dispositional mindfulness, construct overlap, construct validity, structural equation modelling, Rasch analysis

Introduction

Researchers commonly conceptualise dispositional mindfulness as a multifaceted construct involving present-moment awareness, attentional regulation, and a non-judgemental acceptance of internal experiences (Baer et al., 2006; Kabat-Zinn, 2003). However, debate remains regarding whether it should be treated as a unitary construct or as a set of related psychological capacities (Baer et al., 2006). This distinction is important for measurement, because self-report instruments operationalise mindfulness in different ways. Although mindfulness can be assessed using behavioural, neuroscientific, qualitative, and observational approaches, self-report questionnaires remain the prevalent method due to their accessibility and ease of administration (Park et al., 2013). Although theorists have developed various self-report measures, they vary substantially in their theoretical foundations and the aspects of mindfulness they assess. Accordingly, instruments place varying emphasis on attention, awareness, acceptance, non-reactivity, and related experiential qualities (Baer et al., 2006; Grossman, 2008; Park et al., 2013). Consequently, interpretation of findings involving dispositional mindfulness depend partly on how the construct is defined and measured, raising questions about the extent to which measures converge empirically.

A prominent dispositional mindfulness measure is the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). This is a 15-item scale that assesses individual differences in attention and awareness during everyday activities. The MAAS defines mindfulness as a dispositional tendency to attend to, and remain aware of, present-moment experiences, and is typically treated as a unidimensional measure, with its factor structure reflecting a latent dimension of mindful attention. This single-factor structure is consistent with the scale's narrow item content, which focuses on everyday inattentiveness, automaticity, and reduced awareness (Brown & Ryan, 2003).

This makes the MAAS especially relevant to attentional accounts of mindfulness, in which mindful individuals are considered less likely to operate automatically or become absorbed in distracting internal and external experiences (e.g., Hughes et al., 2025).

Although the MAAS is framed in terms of lapses in attention and awareness, this does not necessarily mean that it evaluates mindlessness rather than mindfulness. The items were developed to appraise the extent to which individuals attend to and remain aware of their ongoing experience in everyday life, with reverse scoring providing an index of greater dispositional mindful attention and awareness. Thus, the MAAS represents a specific operationalisation of mindfulness rather than an attempt to capture all aspects of the construct. The scale's narrower attentional focus is important when considering its relationship with measures that incorporate additional components such as present-moment awareness and acceptance (e.g., Baer et al., 2008; Feldman et al., 2007).

The MAAS has demonstrated acceptable psychometric properties across previous research, including evidence for internal consistency, test–retest reliability, and construct validity (Brown & Ryan, 2003; Park et al., 2013). Supporting its convergent and construct validity as a measure of mindful awareness, the MAAS has demonstrated strong reliability estimates (Black et al., 2012) and theoretically meaningful associations with related constructs such as wellbeing, affect, stress, anxiety, and self-regulation (Hepburn et al., 2021).

Nevertheless, as the MAAS focuses on attention and awareness, it provides a narrower representation of mindfulness than measures that assess additional dimensions. Accordingly, questions remain regarding the extent to which the MAAS converges with broader operationalisations of dispositional mindfulness and whether the instrument is interchangeable with multidimensional measures. Indeed, long-standing debate has questioned whether the MAAS captures mindfulness more broadly or primarily reflects attentional awareness (e.g., Grossman, 2008; Sauer et al., 2012; Van Dam et al., 2010).

In contrast, the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006) was developed to capture a multidimensional mindfulness construct that includes present-moment awareness alongside an accepting, non-judgemental attitude toward experience. The short form of the FMI is used in non-meditating samples (e.g., Walach et al., 2006). Whilst some studies have used the FMI as an overall mindfulness score in intervention research (Orzech et al., 2009), others have treated it as assessing separable but related dimensions, including presence and acceptance (Kohls et al., 2009).

This distinction raises the question of whether FMI scores are best represented by a single global mindfulness factor or by distinct but correlated dimensions. The multidimensional structure of the FMI is theoretically important because awareness and acceptance can contribute to psychological functioning through different processes. Awareness supports the detection and monitoring of stress-related experiences, whereas acceptance facilitates adaptive coping and emotion regulation by reducing avoidance, suppression, and reactivity to unpleasant internal states (Baer et al., 2006; Hayes et al., 1999).

From a construct-validity perspective, presence would be expected to overlap more strongly with attentional awareness measures such as the MAAS, whereas acceptance may show stronger associations with coping, emotion regulation, and reduced stress reactivity. Previous research indicates that the FMI demonstrates acceptable measurement properties, including internal consistency and theoretically meaningful associations with wellbeing, stress, and anxiety-related outcomes (Kohls et al., 2009; Walach et al., 2006). While both instruments assess dispositional mindfulness, they may not represent interchangeable operationalisations but instead assess related yet distinct psychological processes. The extent to which these operationalisations converge empirically remains uncertain.

For example, moderate correlations between the MAAS and broader mindfulness measures have been reported in student, convenience, and mindfulness-training samples (Baer et al., 2006; Brown & Ryan, 2003). Such samples can produce greater convergence because participants have similar experiences of mindfulness or greater exposure to mindfulness-related concepts. Community samples provide greater variability in attentional awareness, acceptance, and self-regulation, which could reduce convergence between measures developed from different theoretical traditions.

The MAAS assesses attentional awareness and the absence of automatic pilot (Brown & Ryan, 2003), whereas the FMI, which emerged from meditative and phenomenological traditions, incorporates acceptance, openness, and non-judgemental awareness (Walach et al., 2006). Hence, associations between the measures depend partly on sample characteristics and the extent to which mindfulness is operationalised as attentional regulation versus acceptance-based awareness.

Though preceding research has established the psychometric properties and convergent validity of individual mindfulness measures, theorists have devoted less attention to evaluating the extent to which these instruments converge with one another and whether differences have meaningful implications for psychological functioning. This question is theoretically important given the possibility that mindfulness operates through multiple mechanisms. For example, attentional awareness is relevant to recognising and monitoring stress-related experiences, whereas acceptance may facilitate adaptive emotional responding by reducing avoidance, reactivity, and maladaptive coping (Baer et al., 2006).

Researchers have consistently reported associations between mindfulness and psychological wellbeing outcomes, including stress and anxiety, although the strength and specificity of these relationships vary across measures, samples, and study designs (for a review, see Keng et al., 2011). Early validation work with the MAAS observed that mindful attention and awareness were associated with lower anxiety, depression, unpleasant affect, and mood disturbance, and that increases in MAAS scores during an 8-week mindfulness intervention were linked to reductions in stress among cancer patients (Brown & Ryan, 2003).

Subsequent studies using the MAAS have similarly reported negative associations between mindful awareness and perceived stress across occupational, student, and health-related samples (e.g., Atanes et al., 2015; Wright et al., 2018). However, much of this evidence is cross-sectional, and findings are not uniform, making it difficult to

determine whether mindful awareness directly predicts improved stress and anxiety regulation or whether these associations reflect broader wellbeing, personality, or contextual factors (e.g., health status or recent life events).

Evidence from FMI-based investigations suggests that mindfulness components relate differently to psychological outcomes, with acceptance more strongly related to lower anxiety and perceived stress than presence when the two facets are considered separately (Kohls et al., 2009). Taken together, the literature suggests that mindfulness is broadly relevant to stress and anxiety, but different operationalisations may capture distinct psychological processes.

Present Study

The present study examined the construct overlap and associations of mindfulness awareness (MAAS), mindfulness presence, and acceptance (FMI facets) in relation to perceived stress and anxiety-control outcomes. In addition to traditional psychometric evaluation, the study employed structural equation modelling (SEM) to account for measurement error and estimate relationships between mindfulness dimensions and outcome variables. Consistent with recommendations for evaluating the relative contribution of correlated predictors using latent-variable approaches (Wang & Eastwick, 2020), separate and combined structural models were estimated to examine whether MAAS and FMI facets demonstrated distinct patterns of association with stress distress, coping, emotion control, threat control, and stress control. Although previous research reports positive associations among mindfulness measures, the extent to which they demonstrate construct overlap and can be considered interchangeable remains unclear. Accordingly, the present study also considered the degree of association among constructs.

The study examined the measurement structure and patterns of association of commonly used operationalisations of dispositional mindfulness to determine whether mindfulness awareness and acceptance represent overlapping or distinct psychological processes and whether these constructs show different patterns of association with psychological functioning. Based on previous theory and research, the following hypotheses were proposed. The MAAS and FMI would demonstrate acceptable psychometric properties with multidimensional measures (FMI, PSS, and ACQ), exhibiting improved fit under ESEM relative to traditional CFA models (H1). Mindfulness awareness (MAAS), mindfulness presence, and acceptance would each demonstrate significant associations with perceived stress and anxiety-control outcomes. Specifically, higher levels of mindfulness would be associated with lower stress distress and greater coping, emotion control, threat control, and stress control (H2).

Consistent with their differing conceptual foundations, the MAAS and FMI facets were expected to demonstrate only partial construct overlap and different patterns of association with the outcome variables (H3). Finally, the integrated SEM was expected to indicate distinct conditional associations between MAAS, presence, and acceptance and the psychological outcomes after accounting for measurement error and the shared variance among mindfulness constructs. Specifically, H4 predicted stronger

associations between acceptance and coping and emotion-related outcomes, and between the MAAS and stress-related outcomes and perceived control.

Method

Participants

The sample comprised 1,498 UK adults (*M*age = 39.61, *SD* = 14.56, age range from 18 to 89). This included 575 males (*M*age = 37.60, *SD* = 17.13, age range from 18 to 88), 913 females (*M*age = 41.01, *SD* = 12.49, age range from 25 to 89), seven non-binary (*M*age = 28.28, *SD* = 9.53, age range from 18 to 46), and three preferred not to say (*M*age = 29.33, *SD* = 19.26, age range from 18 to 52). Recruitment occurred through Qualtrics, an online data collection platform. Qualtrics gathers data from recruitment panels that are made up of a pre-arranged pool of individuals consenting to respond to research-based surveys. Respondents received a small compensation fee for taking part.

To obtain a representative sample, the only exclusion criterion was being under 18 years of age. Gathering data via participant recruitment panels typically results in a more diverse sample than traditional student samples. This advantage does not impede quality and resultant samples are comparable with traditional samples in terms of demographics and responses to established measures (Kees et al., 2017).

Measures

Freiburg Mindfulness Inventory (Walach et al., 2006). The short form of the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006) was used to assess dispositional mindfulness. The FMI comprises 14 items designed to measure mindfulness as a broad construct involving present-moment awareness and an accepting, non-judgemental attitude toward experience. Items are rated on a 4-point Likert scale ranging from 1 (*rarely*) to 4 (*almost always*), with higher scores indicating greater mindfulness. In the present study, the FMI was examined as a multidimensional measure comprising presence and acceptance factors.

Mindful Attention Awareness Scale (Brown & Ryan, 2003). The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) comprises 15 items assessing the tendency to experience lapses in attention and awareness during everyday activities. Items are rated on a 6-point Likert scale ranging from 1 (*almost always*) to 6 (*almost never*). Items are phrased such that higher scores reflect fewer lapses in attention and awareness, and therefore greater dispositional mindfulness. In the present study, MAAS scores were used as an indicator of mindfulness awareness.

10-Item Perceived Stress Scale (Cohen et al., 1983). The 10-item Perceived Stress Scale (PSS-10; Cohen et al., 1983) was used to assess the extent to which individuals appraise situations in their lives as stressful, unpredictable, uncontrollable, and

overwhelming over the previous month. Items are rated on a 5-point Likert scale ranging from 0 (*never*) to 4 (*very often*). The scale includes negatively worded items reflecting perceived distress and positively worded items reflecting perceived coping or control. In the present study, the PSS-10 was modelled as a two-factor measure comprising distress and coping factors. Higher distress scores indicated greater perceived stress, whereas higher coping scores indicated greater perceived ability to manage stress.

Anxiety Control Questionnaire, 15-Item Version (Brown et al., 2004). The 15-item version of the Anxiety Control Questionnaire (ACQ; Brown et al., 2004) was used to assess perceived control over anxiety-related experiences. The ACQ measures the extent to which individuals believe they can control internal emotional responses, external threats, and stressful events. Items are rated using a Likert-type response scale, with higher scores indicating greater perceived control. The 15-item version assesses three dimensions of anxiety control: emotion control, threat control, and stress control. Emotion control reflects perceived ability to manage emotional responses, threat control reflects perceived ability to control or cope with threatening situations, and stress control reflects perceived ability to manage stressful events. These three dimensions were retained as separate outcome variables in the present analyses.

Procedure

Data were collected using an online survey administered through Qualtrics. The survey was distributed in accordance with ethical protocols. Participants provided informed consent before proceeding to the study measures. To reduce potential order and carry-over effects, the Qualtrics randomiser varied the presentation order of the scales across participants. As the study used a cross-sectional design, procedural countermeasures were implemented to reduce potential common-method variance (Podsakoff et al., 2003). Instructions emphasised the distinct nature of the scales and constructs, with the aim of creating psychological distance between measures and directing participants' attention to the content of each scale (Krishnaveni & Deepa, 2013). Participants were instructed to read items carefully and were informed that there were no correct answers. Following survey completion, participants received the study debrief. Ethical approval was obtained from the Manchester Metropolitan University Ethics Committee.

Analytic Strategy

Analyses were conducted using Mplus Version 8 (Muthén & Muthén, 2018). Models were estimated using robust maximum likelihood (MLR). Questionnaire items were treated as continuous indicators rather than categorical variables. MLR was used to obtain robust standard errors, a scaled chi-square statistic and to accommodate non-normality in the observed indicators. Missing data were handled using full information maximum likelihood under the assumption that data were missing at random.

Prior to structural analyses, the measurement properties of instruments were evaluated. Confirmatory factor analysis (CFA) was conducted to assess the proposed factor structures of the Mindful Attention Awareness Scale (MAAS), Freiburg Mindfulness Inventory (FMI), Perceived Stress Scale (PSS-10), and Anxiety Control Questionnaire (ACQ). Model fit was evaluated using the chi-square statistic (χ^2), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA).

Consistent with conventional recommendations, values of CFI and TLI ≥.90 and values of SRMR and RMSEA ≤.08 were considered indicative of acceptable model fit, whereas values of CFI and TLI ≥.95 and RMSEA ≤.06 indicated good fit (Hu & Bentler, 1999; Kline, 2023). Standardized factor loadings of .40 or greater were considered practically meaningful indicators of latent constructs (Gliner et al., 2016).

The FMI, PSS-10, and ACQ represent multidimensional constructs in which cross-loadings between conceptually related factors are theoretically plausible. Therefore, exploratory structural equation modelling (ESEM) was additionally employed. ESEM combines the flexibility of exploratory factor analysis with the confirmatory framework of structural equation modelling (SEM) and is recommended when traditional independent-clusters CFA models may prove overly restrictive (Asparouhov & Muthén, 2009; Marsh et al., 2014). ESEM models were estimated using oblique target rotation, allowing the factors to correlate while specifying the hypothesised primary factor loadings as the target structure and permitting non-target cross-loadings to be estimated. CFA and ESEM solutions were compared using standard model fit indices, with preference given to models demonstrating superior fit and theoretical interpretability.

Multigroup confirmatory factor analyses examined whether measurement models for the MAAS and FMI were comparable across male and female participants. For the MAAS, configural, metric, and scalar invariance were assessed using the 15-item one-factor model. For the FMI, the 13-item two-factor model comprising presence and acceptance was evaluated. Invariance was assessed by progressively constraining factor loadings and item intercepts to equality across groups. Changes in CFI, RMSEA, and SRMR were examined across increasingly constrained models.

Discriminant validity between the presence and acceptance dimensions was additionally examined using the heterotrait–monotrait ratio of correlations (HTMT; Henseler et al., 2015). As conventional HTMT can be upward biased when indicators do not satisfy the assumption of tau-equivalence, the modified HTMT2 estimator was also assessed (Roemer et al., 2021). HTMT2 uses the geometric rather than arithmetic mean of indicator correlations and provides a consistent estimate of the correlation between latent variables under congeneric measurement.

To evaluate whether observed relationships between mindfulness measures could be attributed to response-scale functioning or measurement artefacts, Rasch analyses were conducted for the MAAS, FMI total score, and FMI presence and acceptance subscales using Winsteps. Category functioning was determined via ordered Andrich thresholds. The Partial Credit Model was used for the polytomous Likert-type items, with category functioning evaluated via ordered Andrich thresholds. Item fit was

assessed using infit and outfit mean-square statistics, with values between .50 and 1.50 considered productive for measurement, whereas values greater than 2.0 were interpreted as indicative of substantial misfit (Linacre, 2002; Wright & Linacre, 1994). Person and item reliability values ≥.70 were considered acceptable (Bond & Fox, 2015). Essential unidimensionality was evaluated using principal components analysis of residuals, with first contrast eigenvalues ≤2.0 indicating limited evidence of a substantive secondary dimension (Linacre, 2005).

Following evaluation of the measurement models, a structural equation model (SEM) was estimated in which mindfulness awareness (MAAS), presence, and acceptance were simultaneously specified as predictors of distress, coping, emotion control, threat control, and stress control. This approach allowed associations between each mindfulness construct and the outcomes to be estimated concurrently while accounting for shared variance among the mindfulness predictors. The structural model retained the ESEM measurement specification, with factors estimated using oblique target rotation. SEM permits relationships among latent variables to be estimated while accounting for measurement error (Kline, 2023; Wang & Eastwick, 2020).

To further investigate the individual associations of the mindfulness constructs with the outcomes, separate structural models were estimated for the MAAS, FMI presence, and FMI acceptance factors, with each mindfulness construct entered as the sole predictor. These models therefore did not control for other mindfulness predictors. Standardized regression coefficients (β) and coefficients of determination (R^2) were evaluated to quantify individual associations and the variance explained by each mindfulness construct. Given the magnitude of some standardized structural coefficients, additional analyses assessed potential multicollinearity among the mindfulness predictors. Variance inflation factors (VIFs) and tolerance values were calculated using observed mindfulness scores. Item content was inspected to identify potential conceptual overlap between the mindfulness constructs and the outcome measures.

Results

Preliminary Analyses

Preliminary analyses were conducted on data from 1,498 participants. The large sample size provided adequate statistical power for latent variable modelling. Skewness and kurtosis values fell within the acceptable range of −2 to +2 (Field & Miles, 2010). Descriptive statistics and bivariate correlations are presented in Table 1. Participants reported moderate levels of mindfulness, perceived stress, and anxiety control. Internal consistency was good across the mindfulness measures (ωs = .82–.91) and acceptable to excellent across study variables (ωs = .78–.91; see Table 1). The FMI total score was strongly associated with presence ($r = .92$, $p < .001$) and acceptance ($r = .95$, $p < .001$), while presence and acceptance were themselves strongly correlated ($r = .75$, $p < .001$), indicating substantial overlap between FMI dimensions. In contrast, MAAS scores demonstrated negligible associations with the FMI total score ($r = .06$,

Table 1. Means, Standard Deviations, and Pearson Correlations Among Study Variables

Variable	*M*	*SD*	ω	1	2	3	4	5	6	7	8	9
1. FMI total	35.42	8.35	.91									
2. Presence	15.31	3.93	.82	.92**								
3. Acceptance	20.11	4.99	.86	.95**	.75**							
4. MAAS	53.97	13.88	.91	.06*	.02	.09**						
5. Distress	18.28	5.82	.91	−.27**	−.15**	−.33**	−.56**					
6. Coping	12.90	3.32	.81	.52**	.41**	.54**	.13**	−.40**				
7. Emotion control	17.73	5.44	.81	.59**	.45**	.64**	.23**	−.55**	.62**			
8. Threat control	20.12	5.69	.81	.10**	.04	.13**	.45**	−.49**	.20**	.23**		
9. Stress control	13.55	4.30	.78	.20**	.11**	.25**	.51**	−.63**	.32**	.40**	.67**	

Note. FMI = Freiburg Mindfulness Inventory; MAAS = Mindful Attention Awareness Scale; *$p < .05$, **$p < .001$.

$p = .019$), presence ($r = .02$, $p = .451$), and acceptance ($r = .09$, $p < .001$), suggesting limited overlap between mindfulness awareness and the mindfulness facets assessed by the FMI.

MAAS and FMI dimensions were associated with more adaptive stress- and anxiety-control responses. Acceptance demonstrated stronger correlations with coping ($r = .54$, $p < .001$) and emotion control ($r = .64$, $p < .001$) than either presence or MAAS. Conversely, MAAS displayed the strongest associations with threat control ($r = .45$, $p < .001$) and stress control ($r = .51$, $p < .001$). Presence was not significantly associated with threat control ($r = .04$, $p = .161$) and showed only a weak association with stress control ($r = .11$, $p < .001$). Overall, the correlation pattern suggests that mindfulness awareness, presence, and acceptance represent related but distinguishable constructs that differentially relate to stress and anxiety-control outcomes.

Factor Analyses

Model fit statistics for measurement models are presented in Table 2. CFA revealed acceptable fit for the MAAS, $\chi^2(90) = 600.89$, $p < .001$, CFI = .92, TLI = .91, RMSEA = .06, 90% CI [.05, .06], SRMR = .03. Preliminary analyses indicated that FMI Item 13 demonstrated a negligible standardized loading ($\lambda = .09$). Consistent with previous findings (Walach et al., 2006), the item was excluded from subsequent CFA, ESEM, and structural analyses. The two-factor FMI also demonstrated acceptable fit under CFA, $\chi^2(64) = 462.53$, $p < .001$, CFI = .94, TLI = .93, RMSEA = .06, 90% CI [.05, .07], SRMR = .04. However, the ESEM solution provided substantially improved fit, $\chi^2(53) = 188.57$, $p < .001$, CFI = .98, TLI = .97, RMSEA = .04, 90% CI [.03, .04], SRMR = .02.

Similar improvements were observed for the PSS. The CFA model demonstrated good fit, $\chi^2(34) = 181.24$, $p < .001$, CFI = .97, TLI = .96, RMSEA = .05, 90% CI [.04, .06], SRMR = .03, whereas the ESEM solution demonstrated superior fit, $\chi^2(26) = 92.89$, $p < .001$, CFI = .99, TLI = .98, RMSEA = .04, 90% CI [.03, .05], SRMR = .01.

Table 2. Measurement Model Fit

Model	$\chi^2(df)$	CFI	TLI	RMSEA [90% CI]	SRMR
MAAS CFA	600.89 (90)	.92	.91	.06 [.05, .06]	.03
FMI CFA	462.53 (64)	.94	.93	.06 [.05, .07]	.04
FMI ESEM	188.57 (53)	.98	.97	.04 [.03, .04]	.02
PSS CFA	181.24 (34)	.97	.96	.05 [.04, .06]	.03
PSS ESEM	92.89 (26)	.99	.98	.04 [.03, .05]	.01
ACQ CFA	963.21 (87)	.85	.82	.08 [.07, .08]	.10
ACQ ESEM	151.69 (63)	.99	.98	.03 [.02, .03]	.01

Note. CFA = confirmatory factor analysis; ESEM = exploratory structural equation modelling; MAAS = Mindful Attention Awareness Scale; FMI = Freiburg Mindfulness Questionnaire; PSS = Perceived Stress Scale; ACQ = Anxiety Control Questionnaire.

The largest improvement occurred for the ACQ. The CFA solution demonstrated marginal fit, $\chi^2(87) = 963.21$, $p < .001$, CFI = .85, TLI = .82, RMSEA = .08, 90% CI [.07, .08], SRMR = .10, whereas the ESEM solution demonstrated excellent fit, CFI = .99, TLI = .98, RMSEA = .03, 90% CI [.02, .03], SRMR = .01.

Inspection of the ESEM solution indicated meaningful cross-loadings among the ACQ dimensions. For example, Item 26R loaded on Emotion Control ($\lambda = .32$), Threat Control ($\lambda = .21$), and Stress Control ($\lambda = .44$), while Item 18R loaded on Stress Control ($\lambda = .45$) and Threat Control ($\lambda = .25$). Other items also demonstrated smaller cross-loadings across dimensions. These findings indicate that the improvement in fit associated with ESEM reflects overlap among the ACQ dimensions that is not captured by a strict simple-structure CFA model. Overall, ESEM provided superior fit for multidimensional measures, supporting the inclusion of cross-loadings among conceptually related constructs. All retained indicators loaded significantly on their intended latent factors ($ps < .001$), with standardized loadings exceeding recommended minimum thresholds.

Given the weak associations between the MAAS and FMI dimensions, an additional ESEM model including only the MAAS and FMI factors was estimated. The negligible relationships remained at the latent level, with MAAS awareness demonstrating near-zero associations with FMI presence ($r = .01$) and acceptance ($r = .09$), whereas presence and acceptance remained strongly related ($r = .72$). These findings indicated negligible construct overlap between the MAAS and FMI dimensions, which persisted after accounting for measurement error.

Measurement Invariance Across Gender

Measurement invariance was examined across male and female participants for mindfulness measures. For the MAAS, the configural model demonstrated acceptable fit, $\chi^2(180) = 683.68$, CFI = .925, TLI = .913, RMSEA = .061, SRMR = .040. Constraining the factor loadings to equality resulted in minimal changes in model fit (metric model: $\chi^2(194) = 723.63$, CFI = .921, TLI = .915, RMSEA = .061, SRMR = .046; ΔCFI = $-.004$, ΔRMSEA = .000, ΔSRMR = .006). Further constraining item intercepts to equality produced similarly small changes (scalar model: $\chi^2(208) = 780.31$, CFI = .915, TLI = .914, RMSEA = .061, SRMR = .049; ΔCFI = $-.006$, ΔRMSEA = .000, ΔSRMR = .003). Thus, the MAAS demonstrated configural, metric, and scalar invariance across male and female participants.

The FMI showed a similar pattern. The configural two-factor model demonstrated acceptable fit, $\chi^2(128) = 534.18$, CFI = .938, TLI = .925, RMSEA = .065, SRMR = .040. Constraining factor loadings to equality resulted in minimal changes in fit (metric model: $\chi^2(139) = 554.35$, CFI = .937, TLI = .929, RMSEA = .063, SRMR = .042; ΔCFI = $-.001$, ΔRMSEA = $-.002$, ΔSRMR = .002). The scalar model also showed negligible changes in fit ($\chi^2(150) = 574.90$, CFI = .936, TLI = .933, RMSEA = .062, SRMR = .042; ΔCFI = $-.001$, ΔRMSEA = $-.001$, ΔSRMR = .000). These results support configural, metric, and scalar invariance of the presence and acceptance factors across male and female participants.

Table 3. Summary Rasch Statistics for Mindfulness Measures

Measure	Items	Person reliability	Item reliability	Person separation	Item separation	Infit MNSQ range	First contrast eigenvalue
FMI presence	6	.79	.99	1.95	8.56	0.75–1.22	1.4
FMI acceptance	7	.82	.96	2.15	4.75	0.85–1.20	1.5
FMI total (item 13 excluded)	13	.88	.99	2.73	8.14	0.70–1.31	2.0
MAAS	15	.88	.99	2.67	10.15	0.57–1.62	1.7

Note. Infit mean-square values between 0.50 and 1.50 are generally considered productive for measurement. First contrast eigenvalues ≤2.0 indicate limited evidence of a secondary dimension. MAAS = Mindful Attention Awareness Scale; FMI = Freiburg Mindfulness Inventory.

Discriminant Validity

Discriminant validity between the presence and acceptance dimensions was further examined using the HTMT ratio (Henseler et al., 2015). The conventional HTMT estimate was .91, which marginally exceeded the commonly applied .90 criterion. However, HTMT has been shown to be susceptible to upward bias when indicators have heterogeneous loadings. Therefore, the HTMT2 estimate was also examined, yielding a value of .72.

HTMT2 is designed for congeneric measurement models and provides a more consistent estimate of the latent-variable correlation under heterogeneous indicator loadings (Roemer et al., 2021). The HTMT2 estimate was closely aligned with the latent correlation between presence and acceptance obtained in the ESEM analysis (approximately .72). Taken together, these findings indicate substantial overlap between the two FMI dimensions while also providing evidence that they remain empirically distinguishable.

Rasch Analyses

Rasch analyses (Table 3) indicated satisfactory measurement functioning across mindfulness measures. Response categories were ordered for the MAAS, FMI total score, and the presence and acceptance subscales, indicating that participants used response options as intended. Person reliability ranged from .79 to .88 and item reliability ranged from .96 to .99, demonstrating adequate discrimination of respondents and stable item calibration. Item fit statistics were generally acceptable, with infit mean-square values ranging from .70 to 1.62. Although one MAAS item slightly exceeded the recommended 1.50 criterion, no item exceeded 2.0, suggesting an absence of substantial misfit. Principal components analyses of residuals supported essential unidimensionality, with first contrast eigenvalues ranging from 1.4 to 2.0. These findings provided little evidence of response-category dysfunction or substantial item misfit. However, these analyses do not rule out the potential for method effects arising from negatively phrased MAAS items, including potential effects of item wording or response style.

Structural Model

In the integrated SEM, MAAS, presence, and acceptance were entered simultaneously as predictors of the outcome variables, so the standardized coefficients represent conditional associations accounting for the other mindfulness predictors. The structural model demonstrated acceptable fit, $\chi^2(1254) = 3349.14$, $p < .001$, CFI = .93, TLI = .93, RMSEA = .03, 90% CI [.03, .04], SRMR = .04 (see Table 4). Standardized path coefficients (Table 5) revealed that MAAS and acceptance were significantly negatively associated with distress, whereas presence showed a positive conditional association after accounting for shared variance among the mindfulness dimensions. Acceptance showed the strongest conditional association with coping. MAAS

Table 4. Fit Statistics and Explained Variance for Structural Models

	Model fit						R^2				
Model	χ^2	df	CFI	TLI	RMSEA [90% CI]	SRMR	Distress	Coping	Emotion control	Threat control	Stress control
Full model	3349.14	1254	.93	.93	.03 [.03, .04]	.04	.54	.45	.64	.27	.40
MAAS	2117.61	693	.94	.93	.03 [.03, .04]	.04	.38	.03	.06	.25	.38
Presence	1016.64	387	.96	.96	.03 [.03, .04]	.03	.04	.27	.34	.003	.004
Acceptance	1072.24	417	.96	.96	.03 [.03, .04]	.03	.10	.42	.57	.01	.009

Note. Full Model includes MAAS (Mindful Attention Awareness Scale), presence, and acceptance simultaneously predicting all outcome variables.

Table 5. Standardized Structural Regression Coefficients for the Full Model

Outcome	Predictor	β	95% CI	p
Distress	MAAS	−.57	[−0.62, −0.52]	<.001
	Presence	.34	[0.24, 0.43]	<.001
	Acceptance	−.56	[−0.65, −0.47]	<.001
Coping	MAAS	.10	[0.04, 0.16]	.016
	Presence	−.11	[−0.23, 0.00]	.054
	Acceptance	.73	[0.63, 0.83]	<.001
Emotion control	MAAS	.16	[0.11, 0.21]	<.001
	Presence	−.17	[−0.26, −0.07]	.001
	Acceptance	.87	[0.79, 0.96]	<.001
Threat control	MAAS	.49	[0.43, 0.55]	<.001
	Presence	−.10	[−0.21, 0.01]	.067
	Acceptance	.16	[0.05, 0.27]	.002
Stress control	MAAS	.59	[0.53, 0.65]	<.001
	Presence	−.16	[−0.27, −0.04]	.003
	Acceptance	.24	[0.12, 0.37]	<.001

Note. Values represent standardized structural coefficients with 95% confidence intervals. MAAS = Mindful Attention Awareness Scale.

demonstrated a comparatively small positive association, whereas presence was not significantly associated with coping after accounting for overlap among the mindfulness dimensions.

Acceptance also showed the strongest conditional association with emotion control. MAAS was positively associated with emotion control, whereas presence was negatively associated. Acceptance likewise showed the strongest conditional association with coping. These coefficients represent standardized conditional associations within the simultaneous latent-variable model, with MAAS, presence, and acceptance entered concurrently. Their magnitude may partly reflect estimation at the latent-variable level, which reduces attenuation associated with measurement error, as well as the conditional nature of the associations after accounting for the other mindfulness predictors. Although observed-score VIFs indicated no problematic multicollinearity, these diagnostics do not exclude conditional or suppression effects within the latent-variable model.

MAAS showed the strongest conditional association with threat control. Acceptance demonstrated a smaller positive association, whereas presence was not significantly associated with threat control. Both MAAS and acceptance showed positive conditional associations with stress control, whereas presence demonstrated a small negative association. The structural model explained substantial variance across all outcome variables. Specifically, mindfulness predictors accounted for 53.5% of the variance in distress, 45.3% in coping, 63.9% in emotion control, 26.6% in threat control, and 40.2% of the variance in stress control.

Differential Associations of Mindfulness Dimensions

To examine the individual associations of each mindfulness construct with the outcomes, separate structural models were estimated with MAAS, presence, or acceptance entered as the sole predictor. All individual structural models demonstrated acceptable fit. The MAAS-only model demonstrated acceptable fit, $\chi^2(693) = 2117.61$, $p < .001$, CFI = .94, TLI = .93, RMSEA = .03, 90% CI [.03, .04], SRMR = .04. The presence-only model demonstrated good fit, $\chi^2(387) = 1016.64$, $p < .001$, CFI = .96, TLI = .96, RMSEA = .03, 90% CI [.03, .04], SRMR = .03. Similarly, the acceptance-only model demonstrated good fit, $\chi^2(417) = 1072.24$, $p < .001$, CFI = .96, TLI = .96, RMSEA = .03, 90% CI [.03, .04], SRMR = .03.

Results (see Table 4) indicated that the MAAS showed the strongest individual associations with stress-related outcomes, whereas acceptance showed the strongest individual associations with coping and emotion regulation outcomes. Specifically, the MAAS-only model explained 38.3% of the variance in distress, 25.4% of the variance in threat control, and 37.5% of the variance in stress control. The acceptance-only model explained 42.0% of the variance in coping and 57.3% of the variance in emotion control. The presence-only model explained 27.0% of the variance in coping and 34.3% of the variance in emotion control but explained negligible variance in threat control and stress control.

Taken together, these findings indicate that MAAS and acceptance show different patterns of association with stress- and anxiety-control outcomes. Whereas MAAS was particularly strongly associated with stress appraisal and perceived control, acceptance was particularly strongly associated with coping and emotion regulation. These individual associations should be distinguished from the conditional associations estimated in the integrated SEM, where the mindfulness constructs were entered simultaneously.

Collinearity and Item-Content Considerations

Collinearity diagnostics indicated no evidence of problematic multicollinearity among the mindfulness predictors. VIFs were 2.31 for Presence, 2.32 for Acceptance, and 1.01 for MAAS, with corresponding tolerance values of .43, .43, and .99, respectively. The relatively large, standardized coefficients observed in the simultaneous latent-variable model, particularly for acceptance with emotion control and coping, represent conditional associations after accounting for the other mindfulness predictors. These coefficients should therefore not be interpreted as zero-order associations.

Inspection of item content indicated some conceptual proximity between acceptance and emotion control, particularly concerning responses to unpleasant emotional experiences, non-reactivity, and emotional regulation. However, the item sets assess distinct aspects of these domains, with acceptance focusing primarily on an accepting and nonjudgemental orientation toward experience and emotion control focusing on perceived control over anxiety-related emotional responses. Conversely, this

conceptual proximity does not establish that item content accounts for the magnitude of the structural association.

Discussion

The present study examined the psychometric performance and patterns of association between mindfulness awareness, presence, acceptance, and stress and anxiety-control outcomes. Overall, findings were consistent with multidimensional conceptualisations of mindfulness. Despite sharing a common mindfulness label, the Mindful Attention Awareness Scale (MAAS) and Freiburg Mindfulness Inventory (FMI) demonstrated negligible construct overlap. Awareness and acceptance also displayed distinct patterns of association with stress and anxiety-related outcomes. These patterns of association are consistent with the possibility that these mindfulness measures capture different psychological processes.

Aligning with H1, multidimensional measures exhibited improved fit under ESEM relative to traditional CFA models. Although the FMI and PSS achieved acceptable fit under CFA, ESEM provided superior fit across multidimensional measures, with large improvements observed for the Anxiety Control Questionnaire. These results are consistent with recommendations that ESEM provides a more realistic representation of multidimensional psychological constructs by allowing conceptually related factors to exhibit meaningful cross-loadings (Asparouhov & Muthén, 2009; Marsh et al., 2014). Collectively, findings support the use of ESEM when evaluating multidimensional mindfulness and stress-related constructs.

Consistent with H2, mindfulness constructs demonstrated significant associations with stress and anxiety-control outcomes. Higher levels of mindfulness were associated with lower perceived stress and adaptive coping and emotion regulation. However, the magnitude and direction of these associations varied across mindfulness dimensions, suggesting that different aspects of mindfulness may be associated with psychological functioning through different processes. These conclusions are consistent with a substantial body of literature linking mindfulness to improved psychological functioning, reduced distress, and greater emotional wellbeing (Brown & Ryan, 2003; Kabat-Zinn, 2003).

Findings for H3 and H4 revealed discrete patterns of association between mindfulness constructs and outcome variables. Mindfulness awareness had the strongest associations with threat control and stress control, whereas acceptance had the strongest associations with coping and emotion control. Both awareness and acceptance had similarly strong negative associations with distress. This pattern is consistent with theoretical perspectives that conceptualise mindfulness as a multifaceted construct rather than a unitary trait (Baer et al., 2006). It also supports the view that attentional awareness and acceptance represent distinct psychological processes, such that measures sharing the same construct label should not necessarily be assumed to assess identical aspects of mindfulness.

The magnitude of some standardized structural coefficients warrants consideration. Explicitly, acceptance showed strong associations with emotion control ($\beta = .87$) and

coping ($\beta = .73$) in the simultaneous latent-variable model. These coefficients represent conditional latent-variable associations rather than zero-order correlations and therefore differ from the corresponding observed-score associations. The use of latent variables can reduce attenuation associated with measurement error, while conditioning on correlated mindfulness dimensions can additionally alter the magnitude of individual structural coefficients. Although observed-score collinearity diagnostics did not indicate problematic multicollinearity, these do not exclude conditional or suppression effects within the latent-variable model. Furthermore, inspection of item content suggested conceptual proximity between acceptance and aspects of emotional control and coping. Consequently, the large coefficients should be interpreted as evidence of strong conditional associations rather than as causal or uniquely discriminant relationships.

The strong relationship between mindfulness awareness and stress-related outcomes reflects the attentional processes measured by the MAAS. Brown and Ryan (2003) conceptualised mindfulness awareness as the tendency to attend to present-moment experiences rather than functioning on "automatic pilot." An alternative interpretation is that the MAAS primarily assesses the absence of mindlessness or attentional failure rather than mindfulness itself. However, the reverse-scored formulation of the MAAS does not in itself establish that it measures a distinct construct.

The MAAS was developed to assess individual differences in attention and awareness during everyday activities, with higher scores representing greater attention to and awareness of ongoing experience. Accordingly, the present findings are better interpreted as showing limited convergence between a measure focused on attentional awareness and measures incorporating present-moment presence and acceptance. They do not indicate that the MAAS is unrelated to mindfulness. This supports a cautious interpretation of the multidimensionality hypothesis. The limited overlap between these operationalisations of mindfulness does not, by itself, establish the broader dimensional structure of the construct.

Individuals who are more attentive to their internal and external experiences may therefore be better positioned to recognise stressors, monitor emotional responses, and respond adaptively to challenging situations. This interpretation provides a plausible account of why mindfulness awareness demonstrated particularly strong associations with perceived control over stress and threat-related experiences, although the present study did not directly test this mechanism.

In contrast, acceptance showed the strongest associations with coping and emotion control. This pattern is theoretically consistent with mindfulness-based models that emphasise acceptance and non-judgemental awareness as central mechanisms underlying emotional regulation and psychological adjustment (Baer et al., 2006; Hayes et al., 1999). Acceptance may facilitate adaptive coping by reducing experiential avoidance and promoting willingness to experience unpleasant thoughts and emotions without excessive attempts to suppress, control, or avoid them. Consequently, higher mindfulness acceptance may be associated with greater perceived capacity to regulate emotional responses and engage in adaptive coping during periods of stress. These proposed mechanisms should therefore be regarded as theoretically plausible

interpretations of the observed differential associations rather than mechanisms directly tested by the present study.

An additional finding was the limited conditional association of the presence dimension once overlap with acceptance and mindfulness awareness was controlled. Although presence demonstrated moderate bivariate associations with coping and emotion control, its associations were reduced within the full structural model. Furthermore, presence showed a positive conditional association with distress and negative conditional associations with emotion control and stress control when analysed simultaneously with acceptance and mindfulness awareness. Given the strong correlation between presence and acceptance, these findings could reflect suppression arising from shared variance among mindfulness dimensions rather than indicating that present-moment awareness increases psychological distress. Similar statistical artefacts have been observed when highly correlated predictors are entered simultaneously within regression and SEM frameworks (Kline, 2023). Consequently, these coefficients should be interpreted cautiously.

A noteworthy finding was the negligible association between the MAAS and FMI dimensions. Correlations between the MAAS and FMI total score (r = .06), presence (r = .02), and acceptance (r = .09) were smaller than typically reported in the mindfulness literature. Previous studies have observed small-to-moderate associations between mindfulness measures, particularly within student, convenience, and mindfulness-related samples (Baer et al., 2006; Brown & Ryan, 2003; Kohls et al., 2009).

The near-zero correlations observed here indicate that the MAAS and FMI dimensions are essentially independent in this sample. This finding raises a substantive theoretical issue concerning the relationship between these measures and whether they represent different facets of a single broader mindfulness construct or distinct constructs that share the label of mindfulness. Importantly, the negligible associations do not in themselves establish either interpretation, but they challenge the assumption that the MAAS and FMI dimensions necessarily reflect a common underlying construct.

Various explanations appear plausible. First, the MAAS and FMI were developed from separate theoretical traditions. The limited convergence is also consistent with the longstanding conceptual debate regarding the extent to which the MAAS captures mindfulness broadly or primarily reflects attentional awareness (e.g., Grossman, 2008; Sauer et al., 2012; Van Dam et al., 2010). The MAAS focuses on attentional awareness and the absence of automatic pilot, whereas the FMI incorporates acceptance, openness, and non-judgemental awareness derived from contemplative traditions (Brown & Ryan, 2003; Walach et al., 2006). Thus, the measures could capture partially distinct psychological processes rather than simply providing alternative indicators of the same latent construct. Second, the present study employed a large UK adult sample (N = 1,498; *Mage* = 39.61 years) recruited from a community-based online panel rather than students, meditators, or mindfulness intervention participants.

Previous studies reporting stronger convergence between mindfulness measures have relied on younger, more homogeneous, or mindfulness-related samples (Baer et al., 2006; Brown & Ryan, 2003; Kohls et al., 2009). However, sample composition

does not provide a straightforward explanation for the lower association observed in the present study. Classical range-restriction effects indicate that reduced variability can attenuate observed correlations, so the greater heterogeneity of the present sample cannot be assumed to explain the lower MAAS–FMI association. The present findings therefore provide evidence of limited convergence between the measures in this population, but do not establish that the lower association resulted from sample composition.

Importantly, the analyses suggest that the weak association cannot readily be attributed to scoring or measurement artefacts. The dissociation remained evident at the observed and latent levels, indicating that the finding persisted after accounting for measurement error. Similar results were obtained when examining the FMI total score, retaining or removing Item 13, and estimating latent-variable models. Furthermore, Rasch analyses indicated ordered response categories, acceptable item fit, strong reliability, and evidence of essential unidimensionality across all mindfulness measures. Collectively, these results provide little evidence that the observed dissociation reflects scoring problems, response-category dysfunction, or substantial item misfit.

Nevertheless, potential method effects associated with item wording cannot be ruled out. The MAAS comprises negatively phrased items describing lapses in attention and awareness, whereas FMI items are mainly positively phrased. Such effects may therefore have contributed to the magnitude of the observed dissociation, although they are unlikely to provide a complete explanation given the consistency of the pattern across the different analyses.

Overall, the evidence is consistent with conceptualisations of mindfulness as comprising distinguishable attentional and acceptance-based components (Baer et al., 2006). However, because the present study examined the MAAS and only two dimensions of the FMI, this evidence cannot establish the broader dimensional structure of mindfulness. This distinction has implications for psychological assessment and mindfulness research. Despite both measures being described as mindfulness instruments, studies employing the MAAS and FMI may be investigating different aspects of mindfulness. Consequently, comparisons across studies should consider the specific dimension of mindfulness assessed. Similarly, mindfulness-based interventions may influence attentional awareness and acceptance to varying extents depending on their content and emphasis.

Limitations and Suggestions for Future Research

The present study has several strengths, but limitations should also be considered. First, the cross-sectional design precludes causal inference regarding the relationships between mindfulness and psychological functioning. Longitudinal and experimental research is required to determine whether mindfulness awareness and acceptance causally influence stress and anxiety-control outcomes. In addition, measures relied on self-report methodology, which regardless of controls, may introduce common-method variance and response biases. Additionally, the strong correlation between presence and acceptance raises the possibility that some associations were affected by

conditional or suppression effects within the simultaneous structural model. Future research should examine these relationships using alternative mindfulness measures and behavioural indicators of attentional and emotional processes.

A further limitation concerns the possibility of wording-related method effects. Although the analyses provided little evidence that the observed dissociation resulted from scoring problems, response-category dysfunction, or substantial item misfit, they did not directly test for wording-related variance. Future research could address this issue using latent method-factor models that distinguish substantive mindfulness variance from wording-related variance, or by comparing the MAAS and FMI with measures that balance positively and negatively worded items.

Beyond mindfulness, the present evidence illustrates the importance of evaluating construct overlap when multiple instruments are assumed to assess the same psychological construct. Future research should move beyond comparisons of mindfulness scales to examine the specific psychological processes captured by different mindfulness constructs. The results are consistent with the possibility that mindfulness awareness and mindfulness acceptance contribute to psychological functioning through distinct pathways. Longitudinal and experimental designs would help determine whether awareness and acceptance influence stress and emotion regulation through distinct causal mechanisms. Clarifying these relationships may have implications for mindfulness theory and future intervention research.

The findings may also have practical implications for the assessment and design of mindfulness-based interventions. If attentional awareness and acceptance are differentially associated with psychological functioning, intervention programmes may benefit from distinguishing practices intended to develop present-moment attention from those intended to promote acceptance and non-judgemental engagement with difficult experiences. For example, interventions focused on stress monitoring and perceived control could place greater emphasis on attentional awareness, whereas those targeting coping and emotional regulation could incorporate acceptance-based practices. These implications remain tentative because the present study did not examine intervention outcomes, and experimental research is required to determine whether targeting specific mindfulness components produces corresponding changes in psychological functioning.

Conclusions

The MAAS showed negligible construct overlap with the FMI dimensions, whereas presence and acceptance remained substantially related despite being empirically distinguishable. MAAS scores demonstrated the strongest associations with stress, distress, and perceived control, whereas mindfulness acceptance showed the strongest associations with coping and emotion regulation. Collectively, these patterns are consistent with multidimensional conceptualisations of mindfulness, although they do not establish the dimensional structure of mindfulness in its entirety.

Presence and acceptance should therefore not necessarily be treated as interchangeable dimensions of mindfulness. More broadly, these results highlight the

importance of empirically evaluating construct overlap before assuming that conceptually related psychological measures are interchangeable. This issue extends beyond mindfulness and has implications for construct operationalisation, interpretation, and comparison across psychological research.

Acknowledgements

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Ethical Considerations

Ethical approval was obtained from the Manchester Metropolitan University Ethics Committee (Ethos ID #51727). All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee and the 1964 Declaration of Helsinki and its later amendments.

Consent to Participate

Informed consent was obtained from all individual participants included in the study.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

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