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ORIGINAL PAPER

Nonattachment as a Mediator of the Mindfulness-Well-being Relationship: Comparing Emirati and Australian Students

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Abstract

Objectives Few studies have explored mindfulness and nonattachment in Arab populations. This study extends our understanding of mindfulness and nonattachment to Arab students in the United Arab Emirates (UAE) based on the 20-item Five Facet Mindfulness Questionnaire (FFMQ) and the 7-item Nonattachment Scale (NAS-7). This study investigated the model fit of each measure, in conjunction with examining the measurement invariance of both measures across Emirati and Australian samples. Next, this study investigated the mediating role of nonattachment.

Methods University students from the UAE ($N=452$) and Australia ($N=731$) completed self-report measures of mindfulness, nonattachment, positive and negative affect, and depression, stress, and anxiety.

Results For the FFMQ, a four-factor model—excluding the facet Observe but with the addition of covariance between two items from the facet Describe—provided adequate fit in both samples. The NAS-7 provided adequate fit in the Australian sample but not the UAE. While the FFMQ model was invariant across samples, the NAS-7 was non-invariant, thus preventing sample comparison. Overall, nonattachment partially mediated the relationship between mindfulness and well-being with differences across samples.

Conclusions Findings support the use of a four-factor model of the FFMQ in Emirati samples and attest to its robustness and suitability as a measure for cross-cultural comparisons. Findings also support a partial mediating role for nonattachment and attest to the intricacies of the Emirati culture.

Keywords Mindfulness · Nonattachment · Emirati · Australian

Mindfulness refers to the ability to be present in the moment and aware of one's thoughts, feelings, and sensations without judgment (Kabat-Zinn, 1990). Mindfulness calls attention to what is happening in the here-and-now rather than over-identifying with thoughts and regrets about past events or worrying about future possibilities. In turn, this enables reflective responses to events and experiences rather than automatic, habitual reactions (Bishop et al., 2004). Nonattachment is a related concept to mindfulness. As a trait, nonattachment represents a balanced approach to experience life as it is without the need to control event outcomes (Whitehead et al., 2018), and without the need to hang on to one's experiences or suppress them (Sahdra et al., 2010; Shapiro et al., 2006). This promotes a less judgmental (Whitehead et al., 2018) and a more flexible way of relating to one's life experiences (Sahdra et al., 2010) enabling one to live with a greater sense of satisfaction and ease.

While mindfulness and nonattachment have long been recognized in Eastern and Buddhist traditions (Baer et al., 2006; Sahdra et al., 2016), only in the past decades have they attracted empirical research (Rajesh et al., 2012; Sahdra et al., 2016). Although there are numerous measures of mindfulness, the most comprehensive and widely used instrument (Carpenter et al., 2019; Sahdra et al., 2016) is the Five Facet Mindfulness Questionnaire (39-item FFMQ; Baer et al., 2006). The five facets include the following: (a) *Observing* by attending to internal sensations, thoughts, and feelings rather than remaining on autopilot; (b) *Describing* one's internal sensations, thoughts, and feelings without any judgment; (c) *Acting* with awareness by consciously

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directing one's attention to the present; (d) *Nonjudging* by refraining from evaluating one's thought and feelings; and (e) *Nonreactivity* by allowing thoughts and feelings to be without becoming entangled in them (Baer et al., 2006; Swickert et al., 2019).

Many studies have examined the relationship between dispositional mindfulness and measures of well-being and have emphasized its importance in promoting mental health (e.g., Klainin-Yobas et al., 2016; Rajesh et al., 2012). More specifically, the relationship between the multifaceted construct of mindfulness based on the FFMQ and well-being is well established with findings indicating a positive correlation between mindfulness and well-being (Bendre, 2019), and a negative correlation with depression (Ramadas & Simões, 2019; Tran et al., 2014), anxiety (Cole et al., 2015; Tran et al., 2014), negative affect (Swickert et al., 2019), and stress (Ramli et al., 2018).

However, a growing number of studies have identified that the Observe facet of the FFMQ may be problematic in samples of non-meditators (see Carpenter et al., 2019 for a review). For example, the Observe facet has displayed either a non-significant correlation (e.g., Baer et al., 2008; Jensen et al., 2019) or, countering expectations, a significant positive correlation with measures of distress in non-meditating samples (e.g., Baer et al., 2008; Harnett et al., 2016). Similarly, Baer et al. (2008) reported that whereas other FFMQ facets were associated with greater well-being, Observe either did not correlate significantly or displayed negative correlations with measures of well-being in non-meditating samples. Furthermore, in non-meditator samples, the Observe facet exhibits negative correlations with other FFMQ facets, particularly Non-Judging. Accordingly, while a five-factor model including the Observe facet provides good model fit in samples of meditators (e.g., Baer et al., 2006; Williams et al., 2014), a four-factor model excluding the Observe facet provides the best fit in non-meditator samples (e.g., Haas & Akamatsu, 2019; Jensen et al., 2019). Overall, it appears that the Observe facet is not adequate for assessing mindfulness in individuals without formal meditation training (Aguado et al., 2015; Feliu-Soler et al., 2020).

There is also ongoing discussion about the extent to which mindfulness has been appropriately operationalized and measured, given the number and diversity of existent measures (Van Dam et al., 2012). For example, Feng et al. (2018) surveyed Buddhist clergy and found that popular mindfulness measures such as the FFMQ were misaligned with the Buddhist ideal of mindfulness. Additionally, Desbordes et al. (2015) argued that the focus of research and interventions ought not to be on mindfulness, but on concepts such as equanimity (i.e., an even-minded mental state towards all aspects of experience regardless of whether they are pleasant or unpleasant) which are considered to arise from the present-centered awareness provided by mindfulness.

Nonattachment—the ability to detach from unhealthy mental fixations (Lamis & Dvorak, 2014) that have the potential to cause psychological distress (Sahdra et al., 2010)—is considered to be theoretically similar to equanimity (Desbordes et al., 2015) and has been shown to be closely related but distinct to mindfulness (Sahdra et al., 2016). Indeed, nonattachment has been found to at least partially mediate relationships between mindfulness and outcome measures of well-being and psychological distress in diverse cultural contexts, for instance, Australian (Whitehead et al., 2018), Chinese (Wang et al., 2018; Zhang et al., 2021), Indonesian (Budiarto, 2019), South Korean (Ju & Lee, 2015), German (Tran et al., 2014; see also Burzler et al., 2019), and American (Bhambhani & Cabral, 2016; Sahdra et al., 2016). Longitudinal research also indicates that nonattachment can predict future levels of well-being (Ciarrochi et al., 2020).

While the FFMQ and nonattachment have been investigated in different countries and cultures, such research has not extended to participants from the UAE. More specifically, while the mediating role of nonattachment in the relationship between mindfulness and well-being has been well established in different cultural contexts, it has not been extended to an Emirati context, and it has not been cross-culturally compared to Australian data. The UAE is a fast-growing country that has witnessed rapid economic and social change in the past 30 years. This has led to the exposure of the traditionally Islamic society to Western practices and customs brought on by expatriates (Petkari & Ortiz-Tallo, 2018). The UAE is a country with distinctive features. It fits many of the *WEIRD* categories, an acronym referring to the prevalence of research participants from "Western, Educated, Industrialized, Rich and Democratic" countries (Ottsen & Berntsen, 2014). Its educational system is primarily *Western* including the university surveyed in this study, which is a federally funded university accredited by Western accreditation bodies with similar programs to the West. The UAE values *education* and has deemed it to be one of its main priorities as per the UAE's National Higher Education Strategy 2030 (Kamal, 2018). The UAE is also deemed to be *industrialized and rich* with the country conjuring up an image of power and wealth (Maitner, 2015). Its focus on education, its role as a hub for economic growth and globalization, and its diverse community make it close to other WEIRD countries such as Australia. However, it differs from Australia with its political system which is a constitutional federation, and its gender segregation such as in the university surveyed in this study which offers day classes for women and night classes for men. Investigating a WEIRD and a less WEIRD country therefore allows for a more comprehensive view of the internal mechanisms of variables (Ottsen & Berntsen, 2014). This is also important given the need for more cross-cultural research on the role of mindfulness in student samples (Cole et al., 2015),

especially since most research on mindfulness has focused on adult populations in Western societies (Cole et al., 2015; Edwards et al., 2014). Moreover, researching mindfulness and nonattachment in Emirati students is relevant in this context given the emphasis placed by the UAE's National Program for Happiness and Well-Being on promoting well-being in the community through the cultivation of mindfulness (UAE Government, 2020).

The aims of the current study are twofold and follow a two-step process of analyses. First, this study aimed to investigate the model fit of each of the mindfulness and nonattachment measures and to explore the role of the Observe FFMQ facet since the sample consisted of non-meditators. Prior to conducting cross-cultural comparisons, this study examined measurement invariance of both measures across Emirati and Australian samples to determine whether participants interpreted and responded to items in a similar way (Van de Schoot et al., 2012). Secondly, and building on the previous analyses, this study aimed to investigate the different mediating models as an increased insight into the differing cultural differences across both samples and a specific focus on the Arab, Emirati context. On the basis of findings in samples from other countries, the current study expected that nonattachment would at least partially mediate the relationship between mindfulness as measured by the FFMQ and the outcome measures of positive and negative affect and psychological distress as measured by the PANAS and DASS (e.g., Sahdra et al., 2010; Whitehead et al., 2018). This two-step process of analyses provides increased insight into the inner workings of nonattachment in the relationship between mindfulness and well-being across both samples.

Method

Participants

This study accounted for two university student samples, an Emirati sample and an Australian sample. The Emirati sample consisted of 452 students (17 men, 435 women) aged 17 to 43 ($M = 20.49$, $SD = 3.94$) while the Australian sample consisted of 731 students (368 men, 363 women) aged 17 to 55 ($M = 24.57$, $SD = 7.56$). Emirati respondents were undergraduate students majoring in Psychology (22.3%), Information Technology (10.4%), International Relations (8.6%), Environmental Science (6.8%), Health Science (4.2%), Communications (3.5%), Accounting (3.3%), and an array of other courses. Australian respondents were predominantly undergraduate students (86%; 14% postgraduate) majoring in Accounting (13.1%), Psychology (11.6%), Business (10.9%), Marketing (7.7%), Engineering (5.2%), Information Technology (4.0%), Finance (3.8%), and a wide range of other courses.

Procedure

Prior to collecting data, this study obtained ethics approval from the Ethics Committee of Swinburne University in Australia, and the Ethics Committees of Zayed University (ZU), and the United Arab Emirates University (UAEU) in the UAE. Data were collected separately in Melbourne and Dubai. In Australia, students across the university received an invitation by email to participate in the study on a voluntary basis. In the UAE, the Office of Student Affairs disseminated a link to the survey across campus, inviting interested students to participate on a voluntary basis. All participants provided informed consent and completed an anonymous online survey consisting of demographics (e.g., age, gender) and self-report measures. The measures were provided in English to both the Australian and the Emirati samples.

Measures

Five Facet Mindfulness Questionnaire (20-item FFMQ; Tran et al., 2013; see also Baer et al., 2006). The original FFMQ (Baer et al., 2006) is a 39-item comprehensive and commonly used self-report measure of mindfulness (López et al., 2016; Sahdra et al., 2016). It was developed through factor analysis which identified the five facets of the following: Non-Reactivity to Inner Experience; Observing/Noticing; Acting with Awareness; Describing; and Non-Judging of Experience. Items are measured using a 5-point Likert scale ranging from 1 (never or very rarely true) to 5 (very often or always true). The five facets can be combined into a total score, designating a global measure of mindfulness (Williams et al., 2014). The present study used the abridged 20-item FFMQ by Tran et al. (2013). Internal consistency is adequate to good in the 20-item version with alpha ranging from 0.62 to 0.81 (Sahdra et al., 2016; Tran et al., 2013) consistent with the 39-item version (Tran et al., 2013; Whitehead et al., 2020). The short form of the FFMQ also closely reproduces the factor structure of the 39-item version with its item loadings and factor intercorrelations matching the 39-item version (Tran et al., 2013).

Nonattachment Scale (NAS-7: Elphinstone et al., 2020; see also Sahdra et al., 2010, 2016). The original Nonattachment Scale (NAS; Sahdra et al., 2010) is a 30-item self-report measure assessing the Buddhist construct of nonattachment. The present study used the abridged 7-item NAS. Items are measured using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The 7-item version is reliable ($\alpha = 0.84$) consistent with the 30-item version (Elphinstone et al., 2020). Incremental validity (Sahdra et al., 2016) and internal reliability of the NAS-7 are well established ($\alpha = 0.83$; Sahdra et al., 2016; $\alpha = 0.87$; Whitehead et al., 2020). An examination of the factor structure

of the NAS-7 also showed that the single-factor model of NAS-7 has excellent fit (Sahdra et al., 2016).

Positive and Negative Affect Schedule (I-PANAS-SF; Thompson, 2007; see also Watson et al., 1988). The PANAS is a 20-item self-report scale measuring two dimensions of mood; positive affect (PA) which reflects enthusiasm and alertness and negative affect (NA) which reflects distress. It is also used to measure subjective, hedonic well-being (Haas & Akamatsu, 2019; Whitehead et al., 2018). Respondents rate the extent to which they experienced each mood at the present time on a 5-point scale ranging from 0 "very slightly, or not at all" to 4 "extremely." The present study used the I-PANAS-SF short form which has good psychometric properties similar to the original full form (Thompson, 2007). The correlations between the short and full form subscales are 0.92 ($p < 0.01$) for PA and 0.95 ($p < 0.01$) for NA (Thompson, 2007). The I-PANAS-SF shows good test–retest reliability ($N = 143$, $r = 0.84$ for both PA and NA, $p < 0.01$) and good internal consistency with Cronbach's alpha ranging from 0.72 to 0.78 (Thompson, 2007) consistent with the 20-item version (Crawford & Henry, 2004; Watson et al., 1988). It also has good convergent and criterion-related validity (Thompson, 2007) consistent with the 20-item version (Crawford & Henry, 2004; Voogt et al., 2005).

Depression Anxiety Stress Scales-Short Form (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a self-report instrument consisting of 21 items measuring depression, anxiety, and stress, with each subscale consisting of seven items. Respondents rate the extent to which they have experienced each state "over the past week" based on a 4-point scale measuring severity and frequency. Items are scaled from 0 "did not apply to me at all" to 4 "applied to me very much, or most of the time." The DASS-21 has the same factor structure as the original 42-item version (Antony et al., 1998). It also has adequate to high internal consistency with Cronbach's alpha ranging from 0.82 to 0.94 across the subscales in a range of samples (Antony et al., 1998; Henry & Crawford, 2005). Good convergent validity (Le et al., 2017; Sinclair et al., 2012) and concurrent validity are established (Lee et al., 2019; Osman et al., 2012).

Data Analyses

Confirmatory Factor Analyses (CFA)

The current study used MPlus version 6 to conduct CFA (Muthén & Muthén, 2010). The robust Satorra-Bentler chi-square estimation method (Hu et al., 1992) was used to account for multivariate skewness and determined adequate model fit by the criteria provided by Hu and Bentler (1999): CFI and TLI ≥ 0.95, RMSEA ≤ 0.06, and SRMR ≤ 0.08. Hierarchical second-order models (i.e., all facets loading onto an overarching mindfulness latent variable) were tested, as were correlated models where each facet is allowed to covary and with no overarching variable.

Measurement Invariance

Measurement invariance indicates that participants similarly interpret and respond to items and that the same factor structure is evident across different samples (Van de Schoot et al., 2012). As outlined by Van de Schoot et al. (2012), the process involves comparing the fit of nested models. This commences by obtaining evidence of configural invariance, in which a model with no constraints (i.e., all parameters vary freely between groups) is examined in the combined dataset to determine if the model provides good model fit. Metric invariance is then examined by holding factor loadings constant across samples. This is followed by scalar invariance which tests whether participants scored similarly on each item by holding factor loadings and intercepts equal. One method to determine invariance is to examine differences in χ^2. However, as this is sensitive to sample size, Chen (2007) suggested that evidence of invariance can be indicated if $\Delta CFI \leq -0.01$, $\Delta SRMR \leq 0.01$, and $\Delta RMSEA \leq 0.015$.

Mediation

To assess the potential mediating effect of nonattachment, the current study used MPlus version 6 (Muthén & Muthén, 2010) to investigate Structural Equation Models in each sample. Mindfulness was included as the independent variable, nonattachment as a mediator, and each of depressive symptoms, stress, anxiety, negative affect, and positive affect as dependent variables. This study controlled for gender and age by including them as covariates given the gender imbalance in the present sample and given that nonattachment has often been associated with increased age in the literature (Sahdra et al., 2010). This study also used parcelling to reduce the number of parameters in the model, which is an appropriate approach if the focus is on relationships between constructs rather than investigating the performance of individual items within a measure (Little et al., 2002). Adequate model fit was determined by the following criteria: CFI and TLI ≥ 0.95, RMSEA ≤ 0.06, and SRMR ≤ 0.08 (Hu & Bentler, 1999).

Results

Correlations and Descriptive Statistics

As shown in Table 1, and in accordance with previous findings (see Carpenter et al., 2019 for a review), higher scores on the Observe facet were associated with greater negative affect, stress, anxiety, and depressive symptoms, and lower scores on the Nonjudge facet in both samples. However, Observe was associated with greater positive affect in both samples. The patterns of results for the other FFMQ facets showed each to be associated with greater well-being (lower levels of stress, anxiety, depression, and negative affect, and greater levels of positive affect). Of note, the Nonjudge facet was associated with greater positive affect in the Australian sample, but this correlation was not significant in the UAE sample. Nonattachment in both samples was associated with greater well-being (lower levels of stress, anxiety, depression, and negative affect, and greater levels of positive affect). All measures appeared to be adequately reliable across both samples on the basis of Cronbach's alpha and McDonald's omega reliability coefficients. Notable differences were observed on the FFMQ Nonjudge subscale and on Positive Affect, in which the measures appeared to be less reliable in the UAE than in Australian samples.

Confirmatory Factor Analyses (CFA)

As the correlations indicated that the Observe facet was not appropriate for non-meditator samples, it was excluded from subsequent analyses. However, for the sake of transparency, this study presents the fit indices for five-factor models including Observe in Table 2. While the five-factor models did not provide adequate fit, correlated four-factor models provided better fit similarly to the results of Haas and Akamatsu (2019) in US and Bhutanese samples. However, in the current study, the intercorrelated four-factor model also provided inadequate fit. With the addition of covariance between two Describe items (i.e., "My natural tendency is to put my experiences into words"; "I can usually describe how I feel in the moment in considerable detail"), model fit improved to an adequate level in both samples.

The DASS displayed adequate model fit in both samples. Nonattachment fit the Australian data well but had inadequate fit in the UAE sample. This appeared to be due to the item, "I can take joy in others' achievements without feeling envious" which had a lower R^2 value in the UAE sample ($R^2 = 0.08$, $p = 0.011$) than in the Australian sample ($R^2 = 0.37$, $p < 0.001$). The PANAS provided poor fit in both samples, and this was more pronounced in the UAE sample. However, Sellbom and Tellegen (2019) suggest that even robust maximum likelihood estimation can result in poorer model fit than forms of estimation used which treat the data as ordinal which is technically more appropriate for Likert-type response scales, particularly those with five or fewer response categories. As a result, although all measures were included in the subsequent analyses, results for the PANAS should be treated with caution.

Measurement Invariance

As shown in Table 3, on the basis of chi-square comparisons, as used by Haas and Akamatsu (2019) in assessing the FFMQ for invariance in Bhutanese and US samples, there was significant difference between the configural and metric, and metric and scalar models, thus indicating a lack of invariance. However, if the criteria suggested by Chen (2007) are prioritized, the FFMQ appeared to display metric and scalar invariance across samples permitting direct comparisons. However, for the other measures, changes in CFI values between the scalar and metric models suggested non-invariance. It was decided, therefore, that it would be inappropriate to directly compare means from each sample.

Mediation

Due to the correlations among the well-being variables (depression, stress, anxiety, negative affect, and positive affect, see Table 1), they were allowed to covary in the model. With 81 distinct parameters to be estimated in the mode, on the basis of each sample size, the case to parameter ratio in the Australian sample was 9.03:1, and in the UAE sample 5.58:1. These exceed the minimum 5:1 ratio recommended by Bentler and Chou (1987).

The initial model did not reach the ideal fit indices in each sample (UAE: $\chi^2(172) = 391.22$, $p < 0.001$, CFI = 0.94, TLI = 0.92, SRMR = 0.05, RMSEA = 0.05 (90% confidence interval = 0.05–0.06); Australia: $\chi^2(172) = 604.76$, $p < 0.001$, CFI = 0.94, TLI = 0.93, SRMR = 0.05, RMSEA = 0.06 (90% confidence interval = 0.05–0.06)). For both models, modification indices recommended that the FFMQ nonreactivity facet and nonattachment should covary. This was deemed an appropriate change to the model as there is theoretical similarity between both concepts, and nonreactivity and nonattachment were found to be strongly related by Sahdra et al. (2016). With this amendment, the model provided marginally better fit in the UAE ($\chi^2(171) = 349.49$, $p < 0.001$, CFI = 0.95, TLI = 0.94, SRMR = 0.05, RMSEA = 0.05 (90% confidence interval = 0.04–0.06)) and Australian ($\chi^2(171) = 514.96$, $p < 0.001$, CFI = 0.96, TLI = 0.94, SRMR = 0.04, RMSEA = 0.05 (90% confidence

Table 1 Correlations between the FFMQ, nonattachment, PANAS, and DASS in both samples

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. FFMQ (five facets)	-	.94***	.65***	.63***	.55***	.65***	.31***	.53***	.36***	−.50***	−.45***	−.49***	−.49***	.30***	.09*
2. FFMQ (four facets)	.95***	-	.76***	.73***	.48***	.64***	−.05	.50***	.32***	−.60***	−.52***	−.56***	−.56***	.28***	.06
3. ActAware	.69***	.76***	-	.45***	.14***	.33***	−.21***	.33***	.27***	−.48***	−.45***	−.45***	−.46***	.20***	.06
4. Nonjudge	.56***	.67***	.36***	-	.11**	.24***	−.19***	.30***	.13**	−.52***	−.47***	−.50***	−.48***	.22***	.09**
5. Nonreact	.61***	.58***	.27***	.16**	-	.18***	.27***	.45***	.26***	−.29***	−.20***	−.24***	−.27***	.10**	−.13***
6. Describe	.69***	.69***	.36***	.27***	.21***	-	.10**	.28***	.22***	−.25***	−.21***	−.25***	−.23***	.21***	.10**
7. Observe	.36***	.03	−.04	−.19***	.21***	.12**	-	.15***	.15***	.19***	.14***	.13**	.12**	.08*	.10**
8. Nonattachment	.47***	.43***	.31***	.22***	.44***	.20***	.20***	-	.31***	−.41***	−.37***	−.33***	−.41***	.18***	−.02
9. Positive affect	.36***	.27***	.22***	−.01	.29***	.24***	.33***	.28***	-	−.10**	−.32***	−.15***	−.17***	.12**	−.01
10. Negative affect	−.52***	−.59***	−.50***	−.43***	−.31***	−.34***	.09	−.42***	−.14**	-	.57***	.60***	.63***	−.17*	.10**
11. Depression	−.55***	−.59***	−.51***	−.40***	−.32***	−.36***	.01	−.38***	−.26***	.62***	-	.68***	.72***	−.14*	−.06
12. Anxiety	−.37***	−.46***	−.38***	−.35***	−.21***	−.29***	.16**	−.25***	−.03	.53***	.65***	-	.78***	−.22*	−.01
13. Stress	−.51***	−.58***	−.47***	−.44***	−.38***	−.28***	.10*	−.31***	−.07	.60***	.70***	.70***	-	−.11**	.03
14. Age	.07	.05	−.02	.01	−.05	.20***	.07	.08	.07	.01	−.04	−.06	.09	-	.08*
15. Gender	.18***	.12*	.07	.10*	.12*	.03	.20***	.10*	.03	.04	−.02	.07	−.02	.01	-
Cronbach's α (UAE)	.77	.80	.82	.67	.69	.71	.68	.73	.64	.74	.89	.80	.83	-	-
McDonald's ω (UAE)	.75	.80	.82	.68	.69	.72	.68	.73	.65	.75	.89	.80	.83	-	-
Cronbach's α (AUS)	.77	.81	.87	.82	.67	.68	.74	.84	.77	.79	.91	.88	.87	-	-
McDonald's ω (AUS)	.70	.81	.87	.83	.67	.69	.74	.84	.78	.79	.91	.88	.87	-	-
M (*SD*)—UAE	2.99 (.53)	2.80 (.62)	2.76 (.97)	2.56 (.89)	2.99 (.83)	2.88 (.94)	3.77 (.85)	4.03 (.90)	3.36 (.70)	2.88 (.82)	1.40 (.85)	1.54 (.74)	1.59 (.72)	20.48 (3.93)	-
M (*SD*)—AUS	3.22 (.50)	3.19 (.60)	3.23 (.99)	3.22 (1.02)	3.14 (.75)	3.18 (.84)	3.32 (.88)	4.31 (.91)	3.54 (.73)	2.51 (.85)	.86 (.75)	.78 (.69)	1.00 (.69)	24.57 (7.56)	-

*$p < .05$, **$p < .01$, ***$p < .001$. Results for the UAE sample are shown below the diagonal, Australian (AUS) sample results are above the diagonal

Table 2 Confirmatory factor analysis model fit results in both samples

	χ^2	CFI	TLI	SRMR	RMSEA (95% confidence interval)
UAE					
Five-factor FFMQ (hierarchical)	(165) = 433.37*	.86	.84	.08	.06 (.05–.07)
Five-factor FFMQ (correlated)	(160) = 370.77*	.89	.87	.06	.05 (.05–.06)
Four-factor FFMQ (hierarchical)	(100) = 244.57*	.91	.89	.06	.06 (.05–.07)
Four-factor FFMQ (correlated)	(98) = 243.27*	.91	.89	.06	.06 (.05–.07)
Four-factor FFMQ (correlated) with added covariance	(97) = 204.51*	.93	.92	.06	.05 (.04–.06)
Nonattachment	(14) = 57.70*	.91	.86	.05	.08 (.06–.11)
PANAS	(34) = 187.43*	.82	.76	.09	.10 (.09–.11)
DASS	(186) = 465.52*	.92	.91	.05	.06 (.05–.06)
Australia					
Five-factor FFMQ (hierarchical)	(165) = 793.06*	.85	.83	.09	.07 (.07–.08)
Five-factor FFMQ (correlated)	(160) = 710.72*	.87	.85	.08	.07 (.06–.07)
Four-factor FFMQ (hierarchical)	(100) = 522.45*	.88	.86	.08	.08 (.07–.08)
Four-factor FFMQ (correlated)	(98) = 521.51*	.88	.86	.08	.08 (.07–.08)
Four-factor FFMQ (correlated) with added covariance	(97) = 359.39*	.93	.91	.06	.06 (.05–.07)
Nonattachment	(14) = 56.17*	.97	.96	.03	.06 (.05–.08)
PANAS	(34) = 198.04*	.91	.89	.06	.08 (.07–.09)
DASS	(186) = 632.81*	.94	.93	.04	.06 (.05–.06)

*$p < .001$

Table 3 Results of multiple group CFAs to determine measurement invariance

	$\chi^2(df)$	CFI	TLI	SRMR	RMSEA	$\Delta\chi^2(df)$	ΔCFI	ΔSRMR	ΔRMSEA
Four-factor FFMQ									
Configural model	(194) = 662.93*	.92	.91	.06	.06 (.06–.07)				
Metric model	(206) = 715.65*	.92	.90	.07	.07 (.06–.07)	(12) = 57.72*	.00	.01	.01
Scalar model	(218) = 760.87*	.91	.90	.07	.07 (.06–.07)	(12) = 45.22*	− .01	.00	.00
Nonattachment									
Configural model	(28) = 113.83*	.96	.93	.04	.07 (.06–.09)				
Metric model	(34) = 142.16*	.94	.93	.05	.07 (.06–.09)	(6) = 29.54*	− .02	.00	.00
Scalar model	(40) = 191.94*	.92	.92	.06	.08 (.07–.09)	(6) = 55.05*	− .02	− .01	.01
DASS									
Configural model	(372) = 1108.60*	.93	.92	.04	.06 (.05–.06)				
Metric model	(390) = 1159.44*	.93	.92	.05	.06 (.05–.06)	(18) = 49.48*	.00	.00	.01
Scalar model	(408) = 1364.78*	.91	.91	.06	.06 (.06–.07)	(18) = 227.02*	− .02	− .01	.00
PANAS									
Configural model	(68) = 385.69*	.88	.85	.07	.09 (.08–.10)				
Metric model	(76) = 402.41*	.88	.86	.07	.09 (.08–.09)	(8) = 14.68	.00	.01	.00
Scalar model	(84) = 521.07*	.84	.83	.08	.09 (.09–.10)	(8) = 125.57*	− .04	− .03	.01

*$p < .001$

interval = 0.04–0.06)) samples. The model, with standard regression weights for the UAE and Australian samples respectively, is shown in Fig. 1. For ease of interpretation, the model does not display the covariances between each well-being variable, and the covariates of age and gender.

Direct Effects

As shown in Fig. 1, in both samples, greater mindfulness was associated with higher scores on nonattachment and positive affect, and lower scores on depressive symptoms,

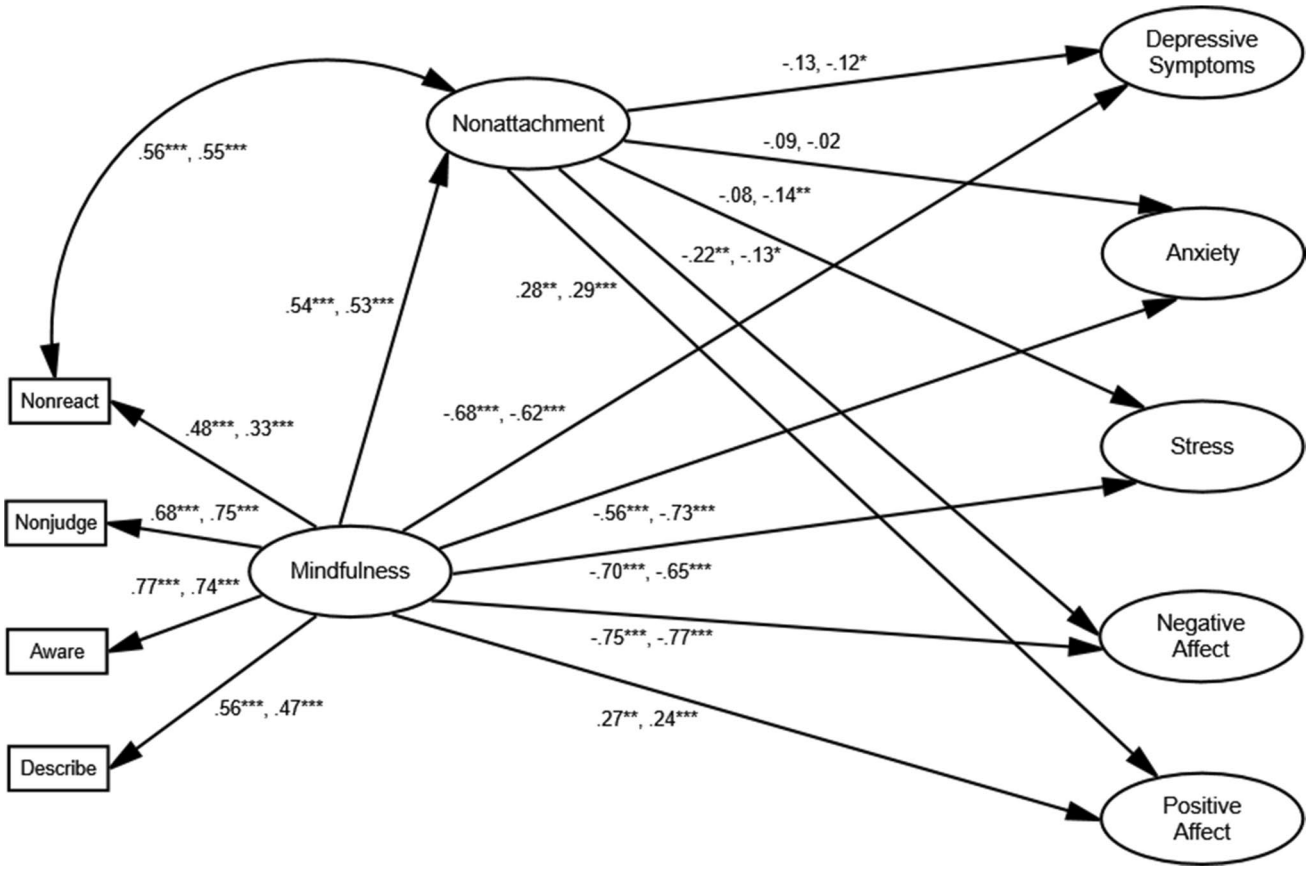

Fig. 1 Structural equation model to investigate the mediating effect of nonattachment in the UAE and Australian samples respectively. Note: *$p < .05$, **$p < .01$, ***$p < .001$. Each path shows the result in the UAE sample followed by the Australian sample result

anxiety, stress, and negative affect. Increased nonattachment was directly associated with greater positive affect and reduced negative affect in both samples. Nonattachment was not directly associated with anxiety in either sample and was directly associated with reduced stress in the Australian sample only. The results for covariances in the model indicated that nonattachment and the nonreactivity facet of the FFMQ (see Fig. 1) were significantly associated in both samples. For the remaining covariances, as shown in Table 4, in the UAE sample, female respondents reported higher levels of anxiety, negative affect, and mindfulness than male respondents. Older respondents reported higher

Table 4 Covariances from the structural equation model in the UAE and Australian samples

	1	2	3	4	5	6	7	8	9
1. Gender (0 = male, 1 = female)	-	-	.00	.15**	.12*	.38***	−.08	−.05	.09*
2. Age	-	-	.10*	.16***	−.01	.11	−.01	.01	.32***
3. Depressive symptoms	.14	.01	-	.59***	.52***	.27**	−.18**	-	-
4. Stress	.13	.19**	.56***	-	.75***	.44***	.11	-	-
5. Anxiety	.17*	−.05	.56***	.69***	-	.35***	.14*	-	-
6. Negative affect	.38**	.15	.38**	.39**	.46***	-	.37***	-	-
7. Positive affect	−.06	.02	−.09	.27**	.16*	.32*	-	-	-
9. Nonattachment	.03	.09	-	-	-	-	-	-	-
10. Mindfulness	.14*	.04	-	-	-	-	-	-	-

*$p < .05$, **$p < .01$, ***$p < .001$. Results for the UAE sample are shown below the diagonal, Australian sample results are above the diagonal

scores on stress. The well-being measures were intercorrelated, with the exception of a non-significant relationship between depressive symptoms and positive affect. In the Australian sample, female respondents reported greater stress, anxiety, and negative affect, and also higher scores on mindfulness. Older respondents reported greater depressive symptoms and stress, and increased mindfulness. All well-being measures were intercorrelated except for the relationship between stress and positive affect.

Indirect Effects.

As shown in Table 5, mindfulness was significantly indirectly associated with reduced negative affect and greater positive affect via nonattachment in both samples. In the UAE sample, mindfulness was not indirectly associated with depressive symptoms, anxiety, or stress. However, in the Australian sample, mindfulness was significantly indirectly associated with reduced depressive symptoms and stress, but not anxiety. Therefore, with consideration given to the significant direct effects, it appears that nonattachment partially mediated the relationship between mindfulness and both positive and negative affect in both samples, and the relationship between mindfulness and each of depressive symptoms and stress in the Australian sample.

Discussion

The aim of this study was to establish the model fit of the FFMQ and NAS-7 in Emirati and Australian samples and to examine the invariance of the measures across the two cultures as well as the potential mediating role of nonattachment in the relationship between mindfulness and the outcome measures of the PANAS and DASS. Overall, results support a four-factor model for the FFMQ and a mediating role of nonattachment. In accordance with previous findings in non-meditating samples (e.g., Baer et al., 2008; Harnett et al., 2016), the Observe facet of the FFMQ appeared to be problematic due to displaying correlations with greater negative affect, stress, anxiety, and depressive symptoms. Additionally, five-factor models including Observe were a poor fit in both samples, with adequate fit in the UAE and Australian samples provided by a four-factor model excluding Observe, similarly to previous findings (e.g., Haas & Akamatsu, 2019; Jensen et al., 2019). There appeared to be little difference between hierarchical or correlated four-factor models, but the addition of a covariance between two Describe items was required to improve model fit to an adequate level. This model appeared to be invariant across both samples. Conversely, the NAS-7 was non-invariant, and despite providing adequate model fit in the Australian sample, this was not replicated in the UAE sample. While the lack of invariance for all measures except the FFMQ prevented the comparison of mean scores across samples, a similar pattern of results emerged in the mediation analyses.

Table 5 Indirect effects from mindfulness to each of the following variables in the UAE and Australian samples

	Indirect effect (UAE)	Indirect effect (Australia)
Depressive symptoms	−.07	−.06*
Anxiety	−.05	−.01
Stress	−.04	−.08**
Negative affect	−.12**	−.07*
Positive affect	.15**	.15***

*$p < .05$, **$p < .01$, ***$p < .001$

Despite the difference in findings between samples, additional findings show that nonattachment at least partially mediates relationships between mindfulness and well-being similarly to previous findings across a range of countries (e.g., Sahdra et al., 2010; Whitehead et al., 2018). In both samples, higher scores on both the FFMQ and NAS-7 were initially correlated with greater well-being (lower levels of stress, anxiety, depression, and negative affect, and greater levels of positive affect). The mediation models similarly indicated that increased mindfulness was directly associated with greater nonattachment and also greater well-being. Due to the variance accounted for by mindfulness, nonattachment was no longer significantly associated with reduced anxiety or stress in the UAE sample. Accordingly,only in the Australian sample did the indirect effects indicate that mindfulness was weakly indirectly associated with reduced depressive symptoms and stress. In both samples, the indirect paths, which suggested that greater mindfulness contributed to reduced negative affect and greater positive affect via increased nonattachment, were significant.

The intricacies of the Emirati culture may explain the difference in the present UAE sample from previous findings in an Australian sample which found that nonattachment mediated the relationship of mindfulness to depression, anxiety, and stress (Whitehead et al., 2018). The constitution of the UAE designates Islam as the nation's official religion. Consequently, the Emirati sample consisted primarily of individuals who identified as Muslims. Islamic societies are less likely to manifest distress as anxiety and stress because of the fundamental feature of Islamic life which emphasizes mindfulness, giving control over to God, and accepting one's destiny. This can help explain why nonattachment was no longer significantly associated with reduced anxiety or stress in the UAE sample due to the variance accounted for by mindfulness.

The word Islam can be described as the faithful surrender to God's will which may result in *salam* (translated as peace), and peace of mind. One of the six central tenants of the Islamic faith is Qadr (divine predestination) which can

also encourage an acceptance of events including sickness and health as being part of the divine will (Al-Darmaki, 2011; Sayed et al., 1998). The Holy Quran also encourages acceptance and patience in many verses ("After hardship comes ease," Holy Qur'an 94:5). The centrality of acceptance is also evident in daily discourse where a frequently used term in all Arabic conversations is *Insha'Allah* meaning "If God wills" or Ma sha Allah "what God wills." Both phrases convey a sense of letting go and that all things ultimately are beyond the control of the individual. This is not a total fatalism as the attitude is also balanced by exhortations to be dutiful and conscientious. This idea is captured in the famous saying attributed to the Prophet Muhammed (Peace Be Upon Him): "Trust in Allah but tether your camel" (Al-Tirmidhi, 1900). The Emirati (Gulf Arab) culture is profoundly influenced by Islam (Abd-Allah, 2004). Levels of religiosity among Emirati citizens are notably high, far higher than those observed among non-Emirati residents of the UAE (Thomas & Barbato, 2020). It could be argued therefore that the Emirati participants may already have elements of nonattachment implicitly embedded within their culture, although future studies could formally investigate this claim in more depth. Additionally, Emirati religio-cultural norms may help promote mindfulness more generally. Mindfulness practice lies at the heart of many Islamic acts, for example, the idea of khushu' (mindfulness) in daily prayer. There is also an Islamic ideal of bringing an awareness of God to mundane activities such as eating, dressing, washing, and walking. Invocations such as *BismAllah* (in the name of God) are often cited at the beginning and end of these activities to promote daily mindfulness (Thomas & Furber, 2015).

A more formal Islamic practice that has been conceived of as promoting mindfulness is *Muraqaba* (watching over), an Islamic contemplative exercise (Haque et al., 2016; Isgandarova, 2019). Muraqaba involves observation of feelings, thoughts, and bodily sensations and techniques such as imagination, contemplation of creation, and contemplation of God's attributes, resulting in presence, focused attention, and connection with self, nature, and God (Isgandarova, 2019). While all Muslims may not practice muraqaba, there are numerous opportunities for religious practice to promote mindfulness. Further explorations of the relationship between Islamic religious practice, nonattachment, and mindfulness are merited.

Limitations and Future Research

There are several limitations in the current study. The non-invariance in the NAS-7 and PANAS may have been due to differences in the interpretations of items emanating from cultural differences in language. The Arabic language is a rich language which relies heavily on the use of metaphors when communicating emotions and these may not be captured in item wordings (Al-Darmaki & Sayed, 2009) of the measures used, especially since they were all provided in English to both Australian and Emirati samples. While participants in this study were bilingual, and acceptance into a major requires a score of at least 6 on the International English Language Testing System (Thomas et al., 2016a), some students could have experienced difficulty in understanding the intricacies of some of the terms used. Future studies could consider the use of available Arabic versions of measures (e.g., FFMQ, PANAS, and DASS-21), and the creation of an Arabic translation of the NAS-7, for which no current Arabic versions are available yet. Another limitation concerns the use of self-report questionnaires as the only measurement method in the study, thus pausing a risk of method bias. This could potentially bias the strength of the relationships between the constructs being measured as well as estimates of the variance accounted for by constructs (Podsakoff et al., 2012). Future studies could consider using different sources to obtain predictor and criterion measures or introducing a separation of the items in the questionnaire to remove proximity effect. This in turn can help control method bias and decrease the risk of social desirability, dispositional mood state, attrition, and response bias (Podsakoff et al., 2012).

The generalizability of the current findings is also limited by the use of self-selected volunteer student samples. The findings may not be generalizable to individuals who are not interested in research or do not have any prior interest in topics such as mindfulness. Additional studies could account for a wider and more representative community sample. In addition, the use of a student sample who did not receive formal mindfulness training—as opposed to a sample of meditators who have had training—may also limit the generalizability of the current findings. Students may have difficulty responding to some of the items on the self-report mindfulness scale as they may not be familiar with the mindfulness terms used. They may also differ in their metacognitive awareness and ability to recognize mind wandering and lapses in attention when answering items on the scale (Van Dam et al., 2009). Future studies could control for these variables to limit bias and increase the generalizability of the findings.

Another limitation is the cross-sectional nature of the study and the gender imbalance in the Emirati sample which may have influenced the results. The gender imbalance in the Emirati sample may be in part linked to the government's initiative to support women in their education and career which could have resulted in a higher female enrollment and subsequent gender imbalance in university (Al-Darmaki & Sayed, 2009). The predominantly female sample may have also influenced the results with female participants displaying a higher occurrence of anxiety and negative affect than their counterparts. This could be due to women experiencing

greater restrictions (Thomas et al., 2016b) and social pressures (Al-Darmaki & Sayed, 2009) as cited by previous studies conducted on Emirati students from the same university surveyed in this study. Future studies could carry out comparisons with female Emirati and Australian samples and investigate the ways in which they manage insight and whether Emirati women are more likely to manage life stressors by handing over their fate to Allah as the writer of their destiny.

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Author Contribution MMM designed and executed the study, collected data, wrote the methods section, and wrote part of the literature review and the discussion sections. BE collected data, wrote part of the literature review and the discussion sections, analyzed the data, and wrote the results section. JT, MB, EWH, and RW assisted in the design of the study, collected data, and collaborated in the writing and editing of the final manuscript. GB assisted in the design and execution of the study, collected data, and collaborated in the writing and editing of the final manuscript. All authors commented on previous versions of the manuscript and approved the final version of the manuscript for submission.

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Data Availability All data are available at the Open Science Framework (https://osf.io/4uj8f/).

Declarations

Ethics Approval Full ethical clearance was received from the Research Ethics Committees of Zayed University (Application ZU19_135_F), United Arab Emirates University (Application ERS_2020_6181), and Swinburne University (SUHREC Project 2013/310). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Consent to Participate All persons gave their informed consent prior to their inclusion in the study. The manuscript does not contain clinical studies or patient data.

Conflict of Interest The authors declare competing interests.

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