



Conceptualising and measuring mindfulness during worship and prayer: Scale development and initial validation of the Mindfulness during Worship Scale (MWS)

Omar Yousaf^{a,*}, Steven Love^b, Peter Hampson^c, James Hedderly^a, Monica Rogers^a

^a Department of Psychology, Newton Park Campus, Bath Spa University, Bath BA2 9BN, UK

^b Road Safety Research Collaboration, University of the Sunshine Coast, 90 Sippy Downs Dr, Sippy Downs, Queensland, 4556, Australia

^c Blackfriars Hall, Oxford, UK

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ABSTRACT

Objective: To propose a three-factor framework for conceptualising and measuring mindfulness during worship, and to develop and validate a new scale using existing scales of mindfulness and spirituality.

Methods: A shortlist of scale items was developed and administered online to 521 Christians from the United Kingdom in three independent studies.

Results: The studies confirmed a three-factor structure of the new 15-item *Mindfulness during Worship Scale* (MWS) with an overall internal reliability range of $\alpha = 0.81\text{--}0.87$: a) *concentration during worship*, which contains reverse-scored items capturing the tendency for attention to slip towards unrelated activities during worship, b) *presence during worship*, which includes items relating to an increased awareness to thoughts and feelings as they relate to the engagement of worship, and c) *absorption during worship*, which includes items relating to an increased feeling of awareness and absorption in worship. Concurrent validity was confirmed, as the total MWS and subscale scores were positively associated with existing measures of mindfulness (FFMQ-15 and MAAS) and spirituality (ISS). Moreover, worship frequency predicted higher scores on all three MWS subscales, higher Scripture reading frequency predicted greater focus on religious thoughts during worship, and regular meditation practice was associated with a greater absorption during worship. The frequency of performing communal religious activities was not associated with mindfulness during worship.

Conclusions: The MWS is the first scale that measures mindfulness specifically within the context of worship and prayer, and can be used within any religious community that engages in prayers.

1. Introduction

As our understanding of the role that mindfulness can play in our performance of daily activities is deepening, we are increasingly appreciating the range of benefits of high states of mindfulness for psychological health and well-being (Tomlinson, Yousaf, Vittersø, & Jones, 2018). This popularity of mindfulness research and its therapeutic application has also entered the field of religion and spirituality, where it has been argued to be either a useful supplement to religious or spiritual practices or an existing feature, albeit in a slightly different form to the popular Buddhist version, of Abrahamic religions, of which Christianity is the most widely studied in the psychological literature (e.g., Cortois, Aupers, & Houtman, 2018). The most commonly used

definition of mindfulness within the psychological research literature is “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” which Kabat-Zinn (1994) developed for use in clinical research settings after studying Buddhist meditation for several years.

In recent years, there have emerged studies on using *centering prayer* as an alternative to mindfulness-based practices within religious communities (Knabb, 2012). In such meditative praying (e.g., as described by Pennington, 1980), the worshipper typically uses principles similar to the Buddhist traditions (Conze, 2003) such as quietening the mind and bringing the attention back whenever the mind wanders. However, the focus of the attention is usually a divine phrase or word which can be repeated, similarly to a mantra in the Hindu tradition (Gonda, 1963).

* Corresponding author.

E-mail addresses: o.yousaf@bathspa.ac.uk (O. Yousaf), slove@usc.edu.au (S. Love), peter.hampson@bfriars.ox.ac.uk (P. Hampson).

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Outside of the Christian context, mindfulness during worship has been studied in Muslim samples, where higher levels of mindfulness during the *salah* (Islamic prayer) have been shown to be associated with better mental health (Ijaz, Khalily, & Ahmad, 2017).

While such studies on mindfulness during prayers provide valuable insights into the possible links between the prayer, mindfulness, and psychological health outcomes, they have not used standardised measures specifically related to: a) the various attentional lapses that one experiences during worship, b) the ways in which one feels a sense of presence, and c) the extent to which one is absorbed in the prayer. In this article, we argue that the study of mindfulness during worship can be improved if such a measure is developed because it would allow researchers to better understand the ways in which individuals differ in their experience of worship. Moreover, such a measure would allow for a more nuanced investigation of the links between mindfulness during worship and other personality traits, habits, and health and well-being outcomes. Hence, the objective of this article is two-fold: a) to conceptualise mindfulness during worship and b) to develop and validate a new measure of mindfulness during worship that can be used within any religious community that engages in worship, regardless of the nature of the rituals and the context in which they are performed.

1.1. Mindfulness during worship: a three-component model

Paying attention during acts of worship is important for a meaningful experience of devotion and connection with the Divine. Giardini (1987) has argued that *active* attention, *receptive* attention, and *ecstatic* attention all contribute to the immersive experience of prayer. A pre-requisite for achieving such a sense of immersion is that the attention is maintained as much as possible. Paying attention in this way during prayer has by Bourgeault (2009) been described as *concentration of affectivity*, suggesting that the attention may be driven by an emotional involvement (this was termed *attention of the heart* in the title of the article). However, in order to achieve such a level of concentration, the attentional lapses that worshippers experience, must be minimised. Without such a high state of concentration, the prayer might be perceived as less effective by the worshipper, and may not be associated with the various health and well-being benefits usually found in the literature (e.g., Breslin & Lewis, 2008; Maltby, Lewis, & Day, 2008; Whittington & Scher, 2010). Therefore, including a measure of attentional lapses, or the level of concentration, when studying mindfulness during worship is of importance, and as such constitutes the first component of this model.

The second component is a sense of presence during worship, which tends to be deeper than the presence that the worshipper feels during the performance of other activities, possibly because of the spiritual experience of perceiving a closeness to God (Monroe & Jankowski, 2016). This sense of presence can be understood within a *relational spirituality* framework (Sandage & Shults, 2007) where the worshipper relates to the sacred or Divine in a way that can be transformative. A presence in this sense is more than just being attentive or concentrating (and this is how it differs from the first component above); indeed, it is a profound way of relating to the activity of worship. Such a relational presence is typically achieved through engaging both the mind and the body. Van Cappellen, Cassidy, and Zhang (2021) have recently shown how different prayer postures are associated with different types of arousal and emotions. They also found that the experience of a sense of submission among worshippers of different Christian denominations was higher when adopting particular postures. Again, this could be understood in light of a relational approach to the Divine through a deep sense of presence, which is an important component of mindfulness during worship, that facilitates a connection with the Divine, and as such makes worship more meaningful. *Presence* differs from the first component of *attention* in that the latter is about paying attention to the stimuli that are part of the worship ritual (such as the religious text, song or movement) whereas presence is construed as a sense of connection with one's thoughts, feelings, and bodily states.

The third component of our proposed model of mindfulness during worship is that of *absorption* in the prayer. Such a state of mind refers to a deep immersion in the act of worship where one becomes oblivious to the environment, experiences mental imagery, and loses track of time. Such experiences have been well-documented throughout the ages, and perhaps most famously narrated in the modern era by William James in his seminal book 'The Varieties of Religious Experience' (James, 1961), and more recently by Astley (2020). Luhrmann and Morgia (2012) refer to such spiritual experiences during prayer as *inner sense cultivation*, which they studied through interviews with Christians. They found two key themes in cataphatic prayers: 1) use of sensory imagery and 2) attributing significance to inner sensations. These findings are, in fact, similar to what is found in mental imagery research in the fields of music and athletics (Jones & Stuth, 1997; Keller, 2012) where such imagery strategies serve motivational, performance enhancement, and arousal regulation purposes. As we have seen above, for example, in the study of Van Cappellen et al. (2021), prayers in most religious communities consist of certain movements that embody the content of the prayer and may facilitate the desired mental state. Such a state of absorption, where one feels deeply immersed in a task in a high state of concentration and with a low level of self-consciousness (i.e., in the sense of being pre-occupied with one's appearance or how one is perceived by others in a given situation), is also known as *flow state* (Csikszentmihalyi & Csikszentmihalyi, 1992). When studying mindfulness during worship, this component of absorption can help us to appreciate some of the deeper states of awareness that ensue when one is attentive and present in the prayer, and thereby more likely to be in a state of mind that is conducive to mental imagery, bodily sensations that complement the prayer, and a detachment from the physical environment where one performs the worship. In this study, a new scale on mindfulness during worship, which included items related to these three components of attentional lapses (or concentration), presence, and absorption, was tested and validated.

2. Overall method

2.1. Participants and procedure

Three separate phases of recruitment were conducted for the purpose of validating the new scale of mindfulness during worship: The *Mindfulness during Worship Scale* (MWS). All three studies were approved through the institutional ethics review process. Each study consisted of an online survey containing items relating to: demographics, items of the MWS, and items relating to meditation, prayer, Scripture reading, and religious community activities frequency. Further, each phase also contained an additional measure to be used for testing concurrent validity. Specifically, phase one included the measure *Mindful Attention and Awareness Scale* (MAAS; Brown & Ryan, 2003), phase two included the *Five Facet Mindfulness Questionnaire* (FFMQ-15; Gu et al., 2016), and phase three included the *Intrinsic Spirituality Scale* (ISS; Hodge, 2003). The study was split among three data collection phases to: a) to test and re-test the internal validity of the scale, and b) reduce survey fatigue among the responses. Table 1 outlines the characteristics of each sample.

2.2. Instrument

2.2.1. Mindfulness during worship

The measure being tested (the MWS) was a questionnaire designed during this study with the intention of measuring the extent to which religious individuals are mindful during acts of worship. The items were developed around three themes, based on the framework presented above: attentional lapses/concentration, sense of presence, and absorption. The MAAS (Brown & Ryan, 2003), the FFMQ-15 (Gu et al., 2016), and the *flow state* construct (Csikszentmihalyi & Csikszentmihalyi, 1992) were all reviewed during the item generation process, so that the MWS items were informed in line with well-established measures

Table 1
Characteristics of each sample included in the study.

Descriptor	Variable	Sample 1	Sample 2	Sample 3
Sample size	N	225	155	141
Sex	Male	55.1%	62.6%	60.3%
	Female	44.9%	37.4%	39.7%
Age	Mean	53.33	30.28	53.33
	SD	16.33	12.17	16.33
Introduction to religion	From birth	66.7%	75.5%	64.5%
	Converted	33.3%	24.5%	35.5%
	Very strongly	81.3%	72.9%	78.0%
Belief in God	Strongly	13.3%	14.8%	14.2%
	Moderately	2.7%	8.4%	7.1%
	Somewhat or less	2.7%	3.9%	0.7%
	Very important	83.1%	69.0%	79.4%
Importance of prayer	Moderately important	10.7%	12.3%	13.5%
	Somewhat important	4.9%	14.2%	7.1%
	Unimportant	1.3%	4.5%	0.0%
Meditation frequency	More than weekly	16.8%	19.3%	10.7%
	Weekly	6.7%	8.4%	3.5%
	Less than weekly	6.7%	9.7%	9.9%
	Never	69.8%	62.6%	75.9%

of mindful awareness and task absorption. Two psychology of religion professors, as well as two clergymen collectively generated a shortlist of 20 items which were developed with each of the three components of attention/lapses in concentration, presence, and absorption in mind. The four individuals were asked to brainstorm relevant items using their experience of studying and practicing prayer/worship, as well as consulting relevant literature and measures. Each item was scored on a five-point Likert scale (1 = *disagree very much*, 2 = *disagree*, 3 = *not sure*, 4 = *agree*, and 5 = *strongly agree*), with higher scores indicating a stronger tendency to engage in worship mindfully. A five-point Likert scale was chosen as a method of scoring, because it is a minimum recommendation in new scales for creating the necessary variance across items and scales; and determining adequate coefficient alphas (Hinkin, Tracey, & Enz, 1997).

2.3. Construct validity measures

2.3.1. Facets of mindfulness

Mindfulness was measured using the 15-item version of the FFMQ (Gu et al., 2016), which is a shortened version of the 39-item FFMQ (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The FFMQ-15 is split into five subscales of mindfulness: observing the present moment (FFMQ-OBS), describing thoughts and feelings (FFMQ-DES), acting with awareness (FFMQ-AA), non-judging of thoughts and feelings (FFMQ-NJ), and non-reactivity to inner experience (FFMQ-NR). For the purpose of validating the MWS subscales, only the three subscales that related to mindful awareness were of interest and used in the current study (FFMQ-OBS; FFMQ-AA; FFMQ-DES). Each statement (e.g., “*I pay attention to sensations, such as the wind in my hair or sun on my face*”) is scored on a scale of 1 (“*never or rarely true*”) to 5 (“*very often or always true*”), with higher scores representing higher levels of mindful practices. The FFMQ-15 has shown a comparable model fit to its predecessor, and good reliability ($\alpha = 0.75$ to 0.87 ; Baer et al., 2006; Gu et al., 2016).

2.3.2. Mindful attention and awareness

To measure mindfulness from a different perspective, the MAAS (Brown & Ryan, 2003) was used. The MAAS is a 15-item scale designed to measure the lack of mindfulness states in everyday life across: cognitive, emotional, physical, interpersonal, and general domains. Each statement (e.g., “*I do jobs or tasks automatically without being aware of what I am doing*”) is scored on a 6-point scale, ranging from 1 (“*almost always*”) to 6 (“*almost never*”), with higher scores indicating a higher

level of mindful awareness. The MAAS has been widely used in mindfulness research and has demonstrated a good internal consistency ($\alpha = 0.85$; Brown & Ryan, 2003).

2.3.3. Intrinsic spirituality

To measure the degree which participants intrinsically valued religious spirituality, the ISS (Hodge, 2003) was used. The ISS is a six-item scale containing items that are formatted using the phrase completion methodology. As such, participants are presented with a phrase (e.g., “*in terms of the questions I have about life, my spirituality answers...*”) and an option of responses along an 11-point scale to complete this phrase (e.g., 0 = “*no questions*”; 10 = “*absolutely all my questions*”). The ISS has shown excellent internal consistency in its original validation ($\alpha = 0.96$), and in subsequent studies with samples of Alzheimer's caregivers ($\alpha = 0.92$; Gough, Wilks, & Prattini, 2010) and Muslims ($\alpha = 0.89$ to 0.95 ; Hodge, Zidan, & Husain, 2015).

2.3.4. Demographical and general information

Participants' demographic information was also recorded to identify the characteristics of the sample, including: gender, age, religion, country of residence, and initiation to religion (i.e., being born into it; having converted into religion). Furthermore, questions were designed to question participants on: a) how often they currently engaged in: meditation practices, prayer/worship, reading or listening to scripture, and communal religious activities (e.g., church attendance); b) how strongly they believed in God (on a four-point scale; 1 = *Somewhat or less*, 4 = *Very strongly*); and c) how important prayer/worship was to them (on a four-point scale; 1 = *Unimportant*, 4 = *Very important*).

3. Stage 1

The research aim of the first stage was to develop and test the internal validity of the MWS. Specifically, two aims were constructed: first, it was aimed to test the factorial structure through *principal components analysis* (PCA); and second, we aimed to test the internal consistency of the final factors using reliability analyses.

4. Method

4.1. Procedure

The data from sample one were transferred into SPSS (version 27). PCA, being a comprehensive method of reduction (Costello & Osborne, 2005), was conducted on the initial 20-item MWS scale. We aimed for a minimum sample of 200 for PCA, based on Pearson and Mundform's (2010) suggestions, which would also correspond to a 10:1 ratio of participants to items. The Kaiser-Meyer-Olkin measure and inter-item correlations were examined for suitability of the data. Factor retentions and loadings were based on suggestions by Howard's (2016) review on factor analytical procedures, which entailed eigenvalues >1 and scree plot variance for factor retentions, minimum factor loadings of 0.40, maximum alternative factor loadings of 0.30 and a 0.20 difference between primary and alternative loadings. Item retention was also based on items with communalities higher than 0.40 (Costello & Osborne, 2005).

5. Results

5.1. Research Aim 1: factor structure and reliability of the MWS

An initial inspection of the data showed that the means of the MWS items ranged from 2.87 to 3.96 (SD = 0.66 to 1.09) and indicated that no significant skew (< 2.00) or kurtosis (< 7.00) was present in the data (Byrne, 2010; Hair, Black, Babin, & Anderson, 2010). An initial PCA was run on the 20-item MWS and determined that the measure of sampling accuracy was good (Kaiser-Meyer-Olkin (KMO) = 0.840, $p < .001$).

While Eigenvalues suggested five factors were plausible, an inspection of the scree plot indicated a three-factor solution explained the largest portion of the variance. Due to some items loading on multiple factors, the theoretical relatedness between items, and multiple inter-factor correlations being present, a Promax rotation was then used in a subsequent PCA, forcing a three-factor extraction. Adhering to the data cut-off intervals described, five items were removed (2, 4, 6, 13, 20) due to a combination of low communalities scores, and mixed or low factor loadings.

The final factor structure revealed 15 items equally spread across three factors: a) *concentration during worship* (MWS-CW; factor 1), which involved reverse-scored items related to experiencing thoughts unrelated to worship during the practice of worship; b) *absorption into worship* (MWS-AW; factor 2), which included items describing the tendency to experience increased mindfulness of the present experience during worship; and c) *presence during worship* (MWS-PW; factor 3), which contained items relating to being aware, controlling cognition and being present during worship. The sampling adequacy (KMO = 0.822, $p < .001$), Scree plot, Eigenvalues (≥ 1.38) and explained variance ($\geq 9.18\%$) of each factor indicated that the data supported this structure. One item (item 15) scored relatively low on its communality score (0.390), however, as suggested by Field (2013), communalities above 0.300 are acceptable considering the inter-item correlations are also above 0.30, which was the case.

Reliability analyses indicated that all three subscales had adequate internal consistencies: MWS-CW = 0.78; MWS-AW = 0.75; MWS-PW = 0.71, as well as the total scale ($\alpha = 0.81$). The component correlation matrix showed that the subscales had small to moderate positive correlations ($r = 0.17$ to 0.36). Composite reliability scores and the average variance extracted values were also calculated and showed that MWS-CW ($\lambda = 0.84$), MWS-AW ($\lambda = 0.82$), and MWS-PW ($\lambda = 0.79$) were all acceptable, as outlined by Hair, Howard, and Nitzl (2020). The communalities, factor loadings, explained variance and reliability coefficients are displayed in Table 2.

6. Stage 2

The aim of the second stage was to confirm the MWS's psychometric properties in two subsequent samples of Christians (samples two and three). Specifically, we aimed to test the factorial structure of the MWS using confirmatory factor analysis, and to retest the internal consistency

Table 2
Communalities, factor loadings, Eigenvalues, explained variance and reliability coefficients of the final MWS items.

Item	Communalities	Factor 1 (MWS-CW)	Factor 2 (MWS-AW)	Factor 4 (MWS-PW)
11	0.626	0.799		
3	0.560	0.758		
1	0.551	0.738		
10	0.563	0.674		
15	0.390	0.626		
17	0.664		0.855	
16	0.578		0.761	
18	0.443		0.647	
9	0.521		0.608	
19	0.409		0.559	
8	0.544			0.798
5	0.512			0.633
14	0.529			0.622
7	0.413			0.612
12	0.477			0.611
α	–	0.782	0.745	0.705
Eigenvalues		4.22	2.18	1.38
% Variance	–	28.14	14.53	9.18

Note: Factor loadings < 0.30 not shown. MWS-CW = concentration during worship; MWS-AW = awareness during worship; MWS-PW = presence during worship.

of the MWS subscales using reliability analyses.

6.1. Procedure

The combined sample used in stage two consisted of 296 Christians from the United Kingdom. Of the total sample, 61.7% were males, and the mean age was 42.34 ($SD = 20.23$). 70.3% were born into religion (opposed to being converted). The response data were imported into SPSS AMOS (version 27) where a CFA model was drawn representing the factor structure found in the PCA. Statistical fit values were based previously established guidelines (Byrne, 2010; Hu & Bentler, 1999), including: a) RMSEA, values < 0.06 = good fit, < 0.08 = acceptable fit, and > 0.08 to 0.10 = marginal fit; b) *good fit index* (GFI), *comparative fit index* (CFI) and *Tucker-Lewis index* (TLI), values ≥ 0.95 = good fit, and ≥ 0.90 = acceptable fit; and c) *standardised root mean square residual* (SRMR), values (SRMR < 0.08). Finally, SPSS (version 27) was used to test internal consistency using reliability analyses.

7. Results

The results showed that initially, the 15-item three-factor model was significantly different from the data ($\chi^2 = 265.45$, $Df = 87$, $p < .001$). However, given the total sample was relatively large, chi square was expected to be significant (Schumacker & Lomax, 2004), and therefore, the alternative fit indices were examined. Based on these indices, the raw model demonstrated to be a questionable fit to the data (GFI = 0.889, TLI = 0.853, CFI = 0.878, RMSEA = 0.083, SRMR = 0.062). However, to adjust for the covariance within the subscales, modification indices were examined, and with respect to the theoretical similarities between the indicated items, several covariance restraints were placed on variable errors within the concurring latent constructs. Specifically, error correlations with modification values over 3.84 were considered, as this value corresponds with a significant change in the model fit at the 0.05 level. These included covariance between items (of the revised MWS): 1 and 4, 4 and 7, 7 and 13, 2 and 14, 5 and 14, 6 and 12, and 6 and 15. The analyses was then re-run and the revised model (Fig. 1) with covariances showed that the model was a good fit to the data ($\chi^2 = 161.92$, $Df = 80$, $p < .001$, GFI = 0.932, TLI = 0.945, CFI = 0.944, RMSEA = 0.059, SRMR = 0.053). Factor loadings of the final model were also acceptable, ranging from 0.53 to 0.76 for MWS-CW, 0.45 to 0.79 MWS-PW, and 0.61 to 0.77 for MWS-AW. Fig. 1 illustrates the model structure, standardised estimates and correlated errors of the CFA.

Finally, reliability tests were performed on the final factor solution, which showed an adequate internal consistency for: MWS-CW ($\alpha = 0.82$), MWS-AW ($\alpha = 0.78$), and the total MWS scale ($\alpha = 0.87$), but only average for MWS-PW ($\alpha = 0.69$). However, as this subscale deals with multiple processes (i.e., cognitive control, cognitive awareness; cognitive presence) under one theoretical aggregate construct, this statistic was considered sound as a preliminary test of internal consistency. The final questionnaire is displayed in Table 3.

8. Stage 3

The third stage aimed to investigate concurrent validity of the MWS with existing measures relating to mindfulness (i.e., the FFMQ and the MAAS). Secondly, it was investigated how much of the variance in intrinsic spirituality (ISS) could be accounted for by the MWS. Thirdly, we explored how meditation frequency, frequency of religious practices, attitudes towards the importance of prayer, and the strength of belief in God were associated with higher scores in the MWS. Finally, we aimed to examine the differences in the MWS subscales across demographic factors (gender, age group, religious introduction [i.e., born into the faith or converted]).

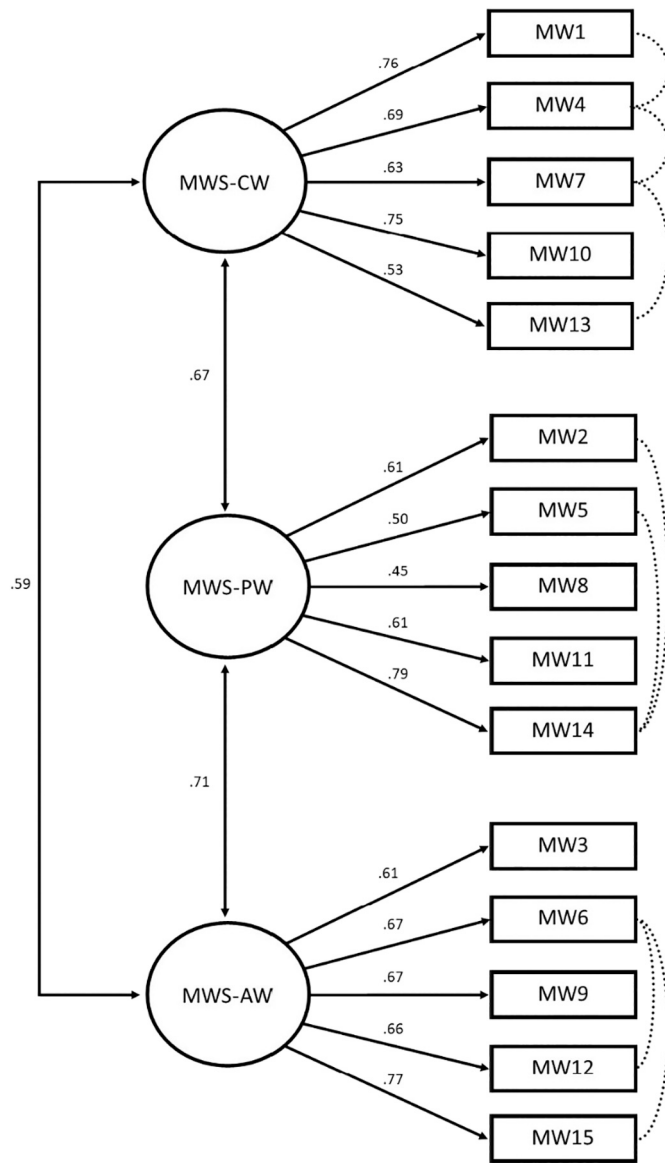


Fig. 1. The factor structure and factor loadings of the CFA performed on the MWS.

9. Method

9.1. Procedure

All three samples were used for the third stage. The sample used for analysis consisted of a combination of all three data sets, depending on which variables were being analysed. The data were then computed into their corresponding variables for correlational analyses. Explore function was used to assess normality and showed that all variables were adequate for analysis. First, bivariate correlations were run to test concurrent validity of the MWS. Interpretations were made based on suggestions by Cohen (1988), and Cohen, Cohen, West, and Aiken (2003): Pearson's *r* as 0.10 = small, 0.30 = medium, and 0.50 = large. Multiple regressions were also used to investigate: a) the contributions that the MWS subscales had towards ISS, and b) the level to which meditation frequency, the frequency of religious practices (worship, Scripture reading, participating in communal religious activities), the strength of belief in God, and attitude strength towards prayer/worship predicted the MWS subscales. Effect size margins were interpreted as: Cohens *f*² (0.10 = small, 0.25 = medium, 0.40 = large); and partial *r*

Table 3

The Mindfulness during Worship Scale. Participant instructions: For each sentence below, please rate how much you agree or disagree. While 'worship' can be understood differently by people, the meaning of 'worship' in this questionnaire relates to acts of ritual prayers or worship services where one either recites verses, praises God, or addresses God directly.

Metacognitive processes	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
1. When I am engaged in worship, my mind wanders frequently to other topics (R)	1	2	3	4	5
2. I am usually very aware of how worship affects me mentally when it is taking place	1	2	3	4	5
3. During worship, I feel more present than I am the rest of the time	1	2	3	4	5
4. During most acts of worship, I am thinking about other, non-religious things at least some of the time (R)	1	2	3	4	5
5. I am usually attentive to what physical sensations arise in me during worship	1	2	3	4	5
6. Compared to when I am doing other things, my awareness of the present moment is higher when I am in worship	1	2	3	4	5
7. Often, during worship I am thinking about what I will be doing afterwards (R)	1	2	3	4	5
8. The emotional effects of worship when it is taking place are usually not clear to me (R)	1	2	3	4	5
9. I often find myself in a heightened state of mindfulness during worship	1	2	3	4	5
10. At times, during worship, I engage my thoughts in matters unrelated to the worship (R)	1	2	3	4	5
11. If my attention goes to other things during worship, I am usually quick to bring it back	1	2	3	4	5
12. When I am worshipping, the environment fades into the background	1	2	3	4	5
13. Frequently during worship, I catch myself solving other problems in my mind (R)	1	2	3	4	5
14. I feel that I am very present during most acts of worship	1	2	3	4	5
15. As I get more into the worship, my mind becomes increasingly more aware of the divine	1	2	3	4	5

Scoring: Take the average of all 15 items for the total score, or the average of each of the subscales for individual use. All items in the CW subscale are reversed. And item 8 from PW is also reversed.

Concentration during Worship; **MWS-CW** – 1R, 4R, 7R, 10R & 13R.

Presence during Worship; **MWS-PW** – 2, 5, 8R, 11 & 14.

Absorption during Worship; **MWS-AW** – 3, 6, 9, 12 & 15.

squared (small = 0.02, medium = 0.13, large = 0.26), as suggested by Cohen (1988), and Cohen et al. (2003). Finally, ANOVAs were used to assess differences in the MWS subscales among demographic and situational variables (i.e., gender, age group and initiation into religion).

9.2. Research aim 1: concurrent validity of the MWS

Bivariate correlations were run on the MWS's subscales with: FFMQ-AA, FFMQ-OBS, FFMQ-DES, MAAS, and ISS. Firstly, medium to large positive correlations were present between the MWS subscales ($r = 0.38$ to 0.53). Evidence of concurrent validity of all MWS subscales was evident, in that: a) MWS-CW, which had reverse scored items relating to the engagement of unrelated thoughts, was positively related to FFMQ-AA ($r = 0.32$), FFMQ-DES ($r = 0.18$), MAAS ($r = 0.42$), and ISS ($r = 0.25$); b) MWS-PW, which contained items relating to the an awareness and presence during worship, was positively related to FFMQ-AA ($r = 0.25$), FFMQ-OBS ($r = 0.24$), FFMQ-DES ($r = 0.28$), MAAS ($r = 0.28$), and ISS ($r = 0.58$); and c) MWS-AW, which contained items relating to the absorption during worship and an increased level of awareness, was positively related to FFMQ-DES ($r = 0.18$) and ISS ($r = 0.52$). The total MWS also demonstrated positive relationships with FFMQ-AA ($r = 0.26$), FFMQ-DES ($r = 0.25$), MAAS ($r = 0.31$), and ISS ($r = 0.55$). Although some of the correlations were small, it is likely this is because mindfulness can be task dependent, and as demonstrated in a study adapting the FFMQ to sexual activity (Adam, Heeren, Day, & de Sutter, 2015), being mindful in a specific task does not necessarily strongly translate to being mindful in general everyday life. Notably, preliminary evidence for divergent validity was also present within the correlations, in that MWS-AW was not strongly related to any of the mindfulness measures (as these items were more concerned with the absorption in the moment, as opposed to directing and observing of thoughts), and MWS-CW was had little to no significant relationships with FFMQ-OBS and FFMQ-DES (given these items were more concerned with directing attention than observing thoughts). Relationships ranged from small to large in size. Descriptive statistics, correlations and reliability coefficients can be found in Table 4.

9.3. Research aim 2: contributions of the MWS towards intrinsic spirituality

The intrinsic spirituality scale (ISS; Hodge, 2003) is a measure of the extent to which spirituality acts as a key motivational force. The scale has been validated in different religious (as well as non-religious but spiritual) populations, including Christians in the original article and subsequently in Muslims (Hodge et al., 2015), and has shown positive associations with *intrinsic religiosity* (Allport & Ross, 1967) which measures the degree to which religious beliefs and behaviours are driven by an intrinsic motivation (i.e., as an end rather than as a means). Given that higher scores on the MWS are expected to be indicative of a deep intrinsic motivation cultivated through a deep involvement with the prayer and thereby with God, we expected positively associations between the ISS and the MWS. Therefore, a regression was run with the MWS variables as independent variables and ISS as the dependent

variable to determine the variance predicted in the importance of spirituality as a key motivation in the religious samples tested. Assumptions of linearity, and collinearity were deemed acceptable after inspection of the VIF, Durban-Watson, and tolerance values, and residual plots. The results showed that the main effect was large in size (Cohen's $f^2 = 0.61$), significant ($F(3, 154) = 30.67, p < .001$), and explained 37.9% of the total variance. Coefficients indicated that MWS-CW ($\beta = 0.44, t = 5.18, p < .001, r^2 = 0.15$) and MWS-PW ($\beta = 0.28, t = 3.28, p < .001, r^2 = 0.07$); were significant predictors, with large individual effects. The results of the regression are displayed in Table 4.

9.4. Research aim 3: behavioral practices and beliefs/attitudes associated with mindfulness during worship

To examine whether meditation frequency and the quantity of religious practices were associated with increased mindfulness during worship, bivariate correlations were run on the data. Again, assumptions of linearity, and collinearity were deemed acceptable after inspection of the VIF, Durban-Watson, and tolerance values, and residual plots. For the regression predicting MWS-CW, the results showed that the main effect was small in size (Cohen's $f^2 = 0.20$), significant ($F(4, 520) = 17.35, p < .001$), and explained 16.8% of the total variance. Coefficients indicated that belief in God ($\beta = 0.21, t = 3.35, p < .001, r^2 = 0.02$) and reading Scripture ($\beta = 0.22, t = 4.44, p < .001, r^2 = 0.04$); were unique significant predictors, with small individual effects. Secondly, for the regression predicting MWS-PW, the results showed that the main effect was medium in size (Cohen's $f^2 = 0.30$), significant ($F(4, 520) = 25.76, p < .001$), and explained 23.1% of the total variance. Coefficients indicated that belief in God ($\beta = 0.21, t = 4.88, p < .001, r^2 = 0.04$) and worship frequency ($\beta = 0.12, t = 3.11, p = .002, r^2 = 0.01$) were unique significant predictors, with small individual effects. Finally, for the regression predicting MWS-AW, the results showed that the main effect was also small in size (Cohen's $f^2 = 0.12$), significant ($F(3, 520) = 10.01, p < .001$), and explained 10.5% of the total variance. Coefficients indicated that belief in God ($\beta = 0.21, t = 3.65, p < .001, r^2 = 0.03$) and meditation frequency ($\beta = 0.07, t = 3.28, p = .001, r^2 = 0.01$) were unique significant predictors, although effects were again small in size. The results of the regression are also displayed Table 5.

9.5. Research aim 4: differences in MWS scores between sex, age, and religious introduction

A final research aim was to assess the differences in the MWS subscales across demographic (gender and age) and situational (born or converted into religion) variables. Three ANOVAs were run to test these differences. In regard to gender differences, the results showed that only MWS-AW was shown to be significantly different across gender ($F(1, 519) = 9.31, p = .002, \eta^2 = 0.02$), with males scoring slightly higher on reported levels of absorption into the activity of worship. In regard to age group comparisons, only MWS-CW was shown to be significantly different across age groups ($F(3, 520) = 9.31, p = .002, \eta^2 = 0.02$). However, Bonferroni post-hoc comparisons revealed that there were only significant differences between the youngest age group (18–30

Table 4
Descriptive statistics and bivariate correlations of the variables.

Variable	N	M	SD	α	MWS-CW	MWS-PW	MWS-AW	Total MWS
MWS-CW	521	3.19	0.79	0.80	–			
MWS-PW	521	3.83	0.55	0.70	0.45***	–		
MWS-AW	521	3.51	0.67	0.77	0.38***	0.53***	–	
Total MWS	521	3.47	0.49	0.81	0.81***	0.79***	0.79***	–
FFMQ-AA	141	3.24	0.65	0.64	0.32***	0.25**	0.03	0.26**
FFMQ-OBS	141	3.30	0.80	0.61	–0.01	0.24**	0.06	0.13
FFMQ-DES	141	3.48	0.85	0.87	0.18*	0.28***	0.18*	0.25**
MAAS	224	4.12	0.71	0.87	0.42***	0.28***	–0.03	0.31***
ISS	155	7.25	2.41	0.92	0.25***	0.58***	0.52***	0.55***

Table 5
Multiple regressions with the MWS subscales predicting the ISS and religious practices, beliefs, and attitudes.

Dependents	Predictors	B	SE	β	t	r	p	R ²	F
ISS (n = 155)	MWS-CW	-0.27	0.28	-0.07	-0.95	-0.07	<0.001	0.379	30.67
	MWS-PW	1.64	0.32	0.44	5.18	0.39	<0.001		
	MWS-AW	0.90	0.27	0.28	3.28	0.26	<0.001		
MWS-CW (n = 521)	Belief in God	0.21	0.06	0.18	3.35	0.15	<0.001	0.168	17.35
	Importance of prayer/worship	0.05	0.07	0.04	0.68	0.03	0.498		
	Meditation	0.03	0.02	0.05	1.29	0.06	0.197		
	Worship frequency	0.03	0.06	0.04	0.56	0.02	0.578		
	Scripture reading	0.22	0.05	0.25	4.44	0.19	<0.001		
MWS-PW (n = 521)	Religious community activities	-0.03	0.04	-0.03	-0.67	-0.03	0.504	0.231	25.76
	Belief in God	0.21	0.04	0.26	4.88	0.21	0.000		
	Importance of prayer/worship	0.07	0.05	0.09	1.47	0.07	0.141		
	Meditation	0.03	0.02	0.06	1.64	0.03	0.102		
	Worship frequency	0.12	0.04	0.19	3.11	0.12	0.002		
MWS-AW (n = 521)	Scripture reading	0.02	0.03	0.04	0.73	0.02	0.463	0.105	10.01
	Religious community activities	-0.02	0.03	-0.03	-0.58	-0.02	0.560		
	Belief in God	0.20	0.06	0.21	3.65	0.16	<0.001		
	Importance of prayer/worship	-0.01	0.06	-0.01	-0.19	-0.01	0.853		
	Meditation	0.07	0.02	0.14	3.28	0.14	0.001		
MWS-AW (n = 521)	Worship frequency	0.09	0.05	0.12	1.78	0.08	0.076	0.178	
	Scripture reading	0.04	0.04	0.06	0.96	0.04	0.339		
	Religious community activities	-0.05	0.03	-0.07	-1.35	-0.06	0.178		
	Belief in God	0.20	0.06	0.21	3.65	0.16	<0.001		
	Importance of prayer/worship	-0.01	0.06	-0.01	-0.19	-0.01	0.853		

years old) and the two oldest age groups (46–60 years old, $\Delta M = -0.26$, $p = .035$; more than 60 years old, $\Delta M = -0.26$, $p = .024$), with younger participants experiencing more distraction during worship. Finally, in regard to religious introduction type, the results demonstrated significant differences were only present in MWS-CW ($F(1, 519) = 10.07$, $p = .002$, $\eta^2 = 0.02$), with participants who were converted into Christianity having fewer distracted thoughts during worship. The means and statistics from the ANOVAs are illustrated in Table 6.

10. Discussion

The aim of this research was to develop and validate the new *Mindfulness during Worship Scale* (MWS) as the first instrument to specifically capture the extent to which worshippers are mindful during the act of worship/prayer. The results across three studies have shown the 15-item MWS to be a three-dimensional measure, consisting of *concentration, presence, and absorption*. The scale has shown good internal reliability, ranging from 0.81 (study 1) to 0.87 (studies 2 and 3), and fits well with our three-factor model of mindfulness during worship which

Table 6
Differences in the MWS subscales across gender, age, and religious introduction.

Variable	Group	MWS-CW		MWS-PW		MWS-AW	
		M	SD	M	SD	M	SD
Sex	Male	3.22	0.78	3.85	0.50	3.58	0.65
	Female	3.17	0.80	3.80	0.62	3.40	0.68
	F	0.60		1.16 ^{BF}		9.31	
	p	0.439		.301 ^{BF}		0.002	
	η^2	0.00		0.00 ^{BF}		0.02	
Age	18–30	3.03	0.82	3.77	0.66	3.59	0.78
	31–45	3.17	0.80	3.79	0.55	3.52	0.64
	46–60	3.29	0.75	3.85	0.52	3.47	0.65
	>60	3.29	0.77	3.89	0.45	3.46	0.58
	F	3.63		1.39 ^{BF}		1.15 ^{BF}	
	p	0.013		0.245 ^{BF}		0.329 ^{BF}	
	η^2	0.02		0.01 ^{BF}		0.01 ^{BF}	
Introduction	Born	3.13	0.79	3.81	0.56	3.48	0.67
	Converted	3.36	0.77	3.89	0.52	3.57	0.66
	F	10.07		2.38		2.14	
	p	0.002		0.124		0.144	
	η^2	0.02		0.00		0.00	

differentiates between the three factors based on previous literature on the psychology of prayer. In terms of concurrent validity, the MWS has shown high positive correlations with the relevant subscales of the FFMQ-15 (Gu et al., 2016) and the unidimensional MAAS (Brown & Ryan, 2003), two of the most widely used measures of mindfulness. Moreover, the MWS has shown a high positive association with the intrinsic spirituality scale (ISS; Hodge, 2003), which has further validated it as a measure predictive of a deep sense of connection with one's spirituality and the divine. That it, higher scores on the MWS which are indicative of a higher state of concentration, presence, and absorption in the prayer are expected to be associated with deeper and more meaningful spiritual experiences, as well with a higher motivation for experiencing such states.

While there was a significant association between the absorption facet of the MWS and frequency of meditation practice, no such association was found for the other two facets. Most likely, this seems to be because the number of participants who engaged in meditation (as separate from prayer and worship) was low and these frequencies were not normally distributed across the three samples. Alternatively, it might have been the case that those participants who meditated regularly were more practiced in entering meditative states, and the absorption in prayer might constitute such a state for them. Future studies should explore this link between meditation practice and the concentration and presence facets of the MWS further. Finding Christian participants (or samples from the other Abrahamic religions of Judaism and Islam) who independently of their religious prayers regularly engage in meditation practices which have shown to improve attention, concentration and awareness (e.g., MacLean et al., 2010 who used the Samatha form of Buddhist meditation practice) might prove difficult. Indeed, some of the participants of the present three studies expressed their reluctance to try out the more popular Buddhist types of meditations because they felt that their own religious tradition offered them something similar but devotional instead of secular (which is how Buddhist meditation is often viewed in the West). As we saw above in the introduction, Knabb (2012) and others have argued that Christian traditions have good alternatives to the Buddhist meditation. However, so far, there is not enough research on the cognitive and emotional benefits of such religious forms of meditation and centering prayers, at least not compared to the amount of psychological research on Buddhist meditation.

This study extends research on the psychology of worship identifying a new phenomenon, the involvement of mindfulness in prayer. It shows what might be the necessary if not sufficient psychological substrates for a sustained prayer episode, at least for *certain prayer forms*. It is important to be clear what is and is not being claimed here. It is to overclaim to suggest mindfulness is essential for, or even implicated in, *all types* of prayer and contemplation. More importantly, for prayer forms where it does appear to be beneficial, it is a classic reductionist fallacy and to lapse into *psychologism* to claim that such prayer or worship is *nothing but* the activity of mindfulness under a different cultural guise. We think of prayer as a complex bio-psycho-social, but also as a religio-spiritual practice. To reduce it by *fiat* to just one part of one of this, the cognitive activity accompanying prayer, not only begs the question of the nature of prayer's associated phenomena, but also demonstrates an ontological opacity and lack of awareness of wider interdisciplinary questions that implicate issues on the interface of science and philosophical theology (Nelson, 2009).

Correlations established in this study signpost a deeper connection with another important sub-field, the *cognitive* psychology of religion. The attentional aspects identified here strongly suggest the causal involvement of so-called *Executive Function* (EF) skills of which cognitive flexibility, working memory and inhibitory control are key (Zelazo, 2015). Flexibility is needed to engage with wanted and unwanted thought patterns, inhibitory control to keep the unwanted in check, and working memory and metacognitive capacity in general to engage in reflection and iterative reprocessing of thought forms. Zelazo (2015) notes that mindfulness implicates EF. Thus, for some types of prayer at least, for mindful prayer to be successful, EF skills may be essential. It follows that interference with such skills, or their diminution through fatigue or stress say, would be expected to impair the quality of the believer's worship experience, while anything that enhances them should improve it.

Finally, if it is shown that mindfulness and its sub-skills are not only necessary but potentially sufficient to assure prayerfulness for believers (though see reservations below), it would make sense for practitioners, clergy as well as lay people, with vested interests in successful prayer to improve their mindfulness skills with relevant training techniques.

10.1. Limitations

The study is potentially limited in scope, however, by its focus on formal, ritualistic, typically verbal prayer. In various traditions prayer and worship appear to take a variety of forms, some non-verbal, some contemplative, which may even shade off into extra-ecclesial appreciations of God expressed through Creation and the everyday. Some have a repetitive, quasi-automated aspect, others are more free form or open-ended (Astley, 2020; Nelson, 2009; Turner, 2002 for further discussion). The MWS is generated with regard to prayer in worship. As stated above, we cannot assume it will be relevant to or applicable across all prayer forms.

Two specific questions then arise. First, to what extent does the *experiential quality* of a prayer episode actually matter when viewed from a wider (religious or theological) perspective? The answer to this varies across and within religious traditions, but it cannot be universally assumed that a particular feeling or emotional or cognitive state is needed nor is any guarantee of closeness to God or the divine. Theologian Denys Turner is quite clear on this, "Prayer is not any state of mind at all. That of course is why prayer is possible in any state of mind." (Turner, 2002, p. 98). Instead, he sees prayer as an act of will, not intellection or affect, where 'will' is understood in its pre-modern sense as that which we desire or wish for. This raises the question of the relevance of 'absorption' or 'presence' as an indication of prayer quality or spirituality in general. Psychology is obviously not equipped to adjudicate on what are knotty theological issues, nor to rule on the efficacy of prayer, but, and precisely for this reason, it should exercise caution before accepting as given what may be merely cultural

conventions, but which are actually the locus of theological debate,

This leads directly to a second caveat. A factor of concentration was identified and seen as important for the control of distractions in worship. Once again, taking a wider view of prayer, it is not clear whether well-controlled attention and resistance to distraction are needed in all prayer contexts. Distractions may not necessarily be problematic if they reveal deep seated desires that could usefully be brought into a prayerful context. (McCabe, 2002; Turner, 2002). Hence, concentration and control may be less relevant in some situations, irrelevant perhaps in others.

In summary, although psychometrically reliable and valid within its frame of reference, the MWS should be used with caution in other religious or spiritual settings. Ultimately, a fuller functional account is needed to do justice to the wide, lived-experience of believers, and to be sensitive to accompanying theological debates not simply to received wisdom about them. Such an account needs to consider not only relevant psychological issues such as mindfulness, but also their interaction with the varieties of worshipful religious experiences. The extent, limits, and utility of mindfulness in prayer can then be more accurately determined.

10.2. Future directions

Future research could explore the links between religious orientations (Allport & Ross, 1967) and MWS scores. Previous studies (e.g., Maltby, Lewis, & Day, 1999) have linked prayer frequency with religious orientation and psychological well-being. Mindfulness during prayer, as measured by the MWS, might explain some of these relationships better given that a deeper involvement with the prayer might be a better predictor of well-being than simply praying frequency. Also, studies could be conducted on the role of feelings of inadequacy and religious guilt (e.g., Yousaf & Gobet, 2013) in one's ability to be mindful during worship. Such negative feelings might impede one's ability to be attentive and mindful, and as such their investigation could be important in furthering our understanding of the factors that contribute to mindfulness and absorption during worship. Another area of research that the MWS could be used in is how attention is sometimes paid selectively to meet certain task-irrelevant motivational goals, such as maintaining a positive self-concept (e.g., Yousaf & Gobet, 2016, who studied selective information processing in Christians). Within the context of mindfulness during worship, especially in communal forms of prayer, attention might sometimes be paid outwardly, either because of the interactional element of the prayer or because of self-presentational concerns. As a result, the extent to which the worshipper is mindful of the prayer content and experience might be compromised. This might particularly be the case for those who score highly on *extrinsic religiosity* (also known as *religion as means*, by Allport & Ross, 1967) as opposed to *intrinsic religiosity*.

Further work could also examine the relation of the components examined here and the 'Quest' dimension (Batson, Schoenrade, & Ventis, 1993) which measures how open-minded the religious individual is with regards to their religious experience and persuasions. Is it more likely that those scoring highly on *presence* and *absorption* of the MWS, for example, will also be more open to the contingent and incidental spiritual experiences presumed to accompany their search for religious meaning, and hence who score highly on Quest? Or, and counter intuitively perhaps, is the converse true? Are persons high in Quest those who have been typically unable to gain much psychological comfort or benefit from formal prayer, precisely because they *lack* mindfulness skills, and so are those who then embark on a wider, extra religious search for spiritual meaning?

Finally, the MWS was developed with a focus on the attention/concentration, presence/awareness, and absorption aspects of mindfulness. Two other dimensions of mindfulness often explored in the literature, including in the FFMQ (Baer et al., 2006), are *non-judgment* of and *non-reactivity* to distractions and negative thoughts. These two facets were not included in the MWS because there is no evidence to date, as far as

we are aware, that these are related to the quality of the prayer or to it being conducive to a deep sense of absorption or connection. However, if these two dimensions are in the future shown to be related to worship in some way, in terms of playing a role in the worshipper's experience during the prayer, there would be an argument to include these in a measure of mindfulness during worship.

CRedit authorship contribution statement

Dr. Omar Yousaf: Conceptualisation, design, data collection supervision, manuscript preparation of the Introduction and Discussion sections.

Dr. Steven Love: Data analysis and manuscript preparation of the Method and Results sections.

Prof. Peter Hampson: Conceptualisation, item generation, manuscript preparation of the Discussion section.

Mr James Hedderly: Data collection and data cleaning.

Ms Monica Rogers: Data collection and data cleaning.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.j.paid.2022.111683>.

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