

Hindrances to Mindfulness: Development and Validation of a Self-Report Measures for Young Adults

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Abstract

Meditation is known to support well-being, yet the factors hindering regular practice remain underexplored. Addressing this gap, the Hindrances to Mindfulness Scale (HMS) was developed in Urdu as a reliable, psychometrically robust tool for assessing barriers to mindfulness. In this study, scale items were developed from a literature review, traditional Buddhist frameworks on hindrances to mindfulness, and input from a focus group of 30 young adults. Five content experts reviewed the Initial 41-item pool for clarity, relevance and comprehensibility. Following Lynn's (1986) criteria, items with an I-CVI ≥ 0.78 were considered acceptable and thus included in the final scale. A pilot study with 60 young adults confirmed the normality of the items using the Kolmogorov–Smirnov test. Exploratory Factor Analysis (EFA) ($N = 350$; 180 males, 170 females) using Varimax rotation identified a three-factor structure—cognitive, emotional and motivational hindrance—explaining 45.01% of the total variance, indicating a well-fitting model. Confirmatory Factor Analysis (CFA) ($N = 500$; $n = 250$ males, $n = 250$ females) yield a refined 26-item model demonstrated strong fit indices: $\chi^2(296) = 528.2$, $p < .001$; $\chi^2/df = 1.78$; RMSEA = .04; GFI = .91; CFI = .96; TLI = .96. While a non-significant chi-square is ideal, the overall fit indices suggest the model is robust. Convergent validity was assessed using the Urdu-translated version of The Fears and Resistance to Mindfulness Scale (Naeem & Naz, 2025), with the HMS demonstrating robust convergent validity. The final scale and its subscales exhibited good reliability and strong validity, confirming the hindrance to mindfulness scale as a psychometrically sound tool for studying factors that impede mindfulness.

Keywords: Hindrances, Mindfulness, Psychometric Properties, Young Adults.

Introduction

Meditation is widely recognised as a mental training practice that enhances psychological and physical well-being (Kabat-Zinn, 1982, 2003), with mindfulness meditation being the most extensively studied form (Goldberg et al., 2022). Empirical research has documented benefits such as improved attention and concentration (Moore et al., 2012) and better physical health (Eberth & Sedlmeier, 2012). However, recent studies have highlighted potential challenges and adverse effects, including psychological distress, fear, and anxiety, which occur more frequently than previously acknowledged (Lindahl et al., 2017; Farias et al., 2020; Schlosser et al., 2019). Rapid and uncontrolled dissemination of meditation in clinical and commercial contexts has also contributed

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to misconceptions, inflated expectations, and reduced efficacy, potentially undermining the validity of practice and research (Van Dam et al., 2017; Monteiro et al., 2022; Sparby et al., 2024).

Despite well-documented benefits, little research has examined the psychological, cultural, and situational factors that hinder sustained practice. Notably, barriers identified in contemporary research—such as doubt, fatigue, restlessness, and frustration—mirror the five hindrances (*pañca nīvaraṇāni*) described in Buddhist literature as mental states obstructing meditation and life progress (Bodhi, 2005; Anālayo, 2013; Bhikkhu, 2005). These hindrances—sensual desire (*kāmacchanda*), ill-will (*vyāpāda*), sloth and torpor (*thīna-middha*), restlessness and worry (*uddhacca-kukkucca*), and doubt (*vicikicchā*)—impair attention, emotional regulation, and self-awareness (Hunt et al., 2020; Haakonsen et al., 2024).

Each hindrance reflects a specific mode of mental disturbance: sensory craving diverts attention toward external gratification, ill-will generates aversive reactions, sloth and torpor weaken motivation and energy, restlessness and worry induce cognitive and somatic agitation, and doubt undermines decisiveness and learning. When unacknowledged, these states dominate cognition and emotion, obstructing mindfulness and the development of wisdom. However, through mindful awareness and systematic practice, hindrances can be observed, examined, and gradually released, enhancing clarity, emotional regulation, and equanimity (Goldstein, 2013).

The five hindrances are conceptualised as generalizable mental patterns that affect motivation, attention, and well-being in everyday life (Anālayo, 2022). They are impermanent states that can be skillfully managed through sustained mindfulness, allowing practitioners to reduce their influence and cultivate concentration, emotional stability, and insight. Mindfulness, rooted in Buddhist philosophy, encompasses cognitive, emotional, social, and ethical dimensions, promoting awareness, ethical conduct, and insight into self-construction (Brito, 2014; Grossman, 2010; Mikulas, 2011; as cited in Monteiro et al., 2022; Haakonsen et al., 2024).

Literature Review

Empirical research on meditation hindrances remains limited (Sparby, 2022). While several instruments exist, none comprehensively assesses all five traditional Buddhist hindrances. For instance, Piron's Meditation Depth Questionnaire (MEDEQ; 2001, 2022) labels early meditative obstacles as "hindrances", including restlessness, a busy mind, laziness, and boredom, but this generalisation differs from Theravādin teachings, which describe the five hindrances as persistent obstacles throughout practice (Brasington, 2015; Poulain, 2016; Yates et al., 2015). Other tools include Haakonsen, Furnham, and Cuppello's (2024) Five Hindrances Scale (5HS), which showed acceptable reliability but modest factor structure, with age, but not gender or education, predicting hindrance levels. Van Dam et al. (2015) measured behavioural tendencies related to greed, hatred, and delusion via the Behavioural Tendencies Questionnaire, while Russ et al. (2017) developed the Early Meditation Hindrances Scale (EMH) to examine dropout factors, identifying affective avoidance and cognitive distraction overlapping with general traits like anxiety and attention deficits (Haakonsen et al., 2024; Sparby et al., 2024). Other validated instruments, such as the Determinants of Meditation Practice Inventory – Revised (DMPI-R; Williams et al., 2011; Hunt et al., 2020) and the Difficulties During Meditation Involving Immeasurable Attitudes Scale (DMIAS; Zeng et al., 2019; Haakonsen, Furnham & Cuppello, 2024; Monteiro et al., 2022), measure meditation barriers or prosocial attitudes but do not align with classical Buddhist frameworks.

Despite the centrality of the five hindrances in Buddhist psychology, no psychometrically validated measure has systematically operationalised them. To address this gap, the present study developed a novel self-report scale using a deductive approach informed by canonical Buddhist literature,

designed to assess the presence and intensity of each hindrance. This instrument provides a systematic framework for quantifying these constructs, linking traditional insights with modern scientific investigation, and holds potential to advance understanding of the mechanisms that impede mindfulness practice while informing interventions to enhance mental clarity, well-being, and contemplative outcomes.

Theoretical Framework

The five hindrances model of Buddhism aligns closely with the mindfulness model of Hölzel et al. (2011), which identifies four key mechanisms: attention regulation, development of body awareness, emotional regulation, and a shift in self-perspective. Examining which of these hindrances influences the mechanisms is a helpful indicator of mindfulness difficulties and potential areas of practice. For instance, the condition of sloth and torpor interferes with attentional control since drowsiness and mental lethargy render it problematic to be maintained. Similarly, restlessness and worry interfere with attention by fueling mental agitation and distraction, leaving the mind unfocused. Emotion regulation is particularly affected by ill will and sensual desire: ill will, expressed through anger, hostility, or resentment, intensifies negative affect and undermines compassion, while sensual desire strengthens craving and attachment, complicating the ability to respond to experiences with balance. Sloth and torpor also weaken body awareness by dulling sensitivity to physical sensations, posture, and movement. Finally, doubt diminishes the potential for a shift in self-perspective; when practitioners question their abilities, the practice itself, or their capacity for change, they struggle to reframe their understanding of themselves and their experiences. Addressing these hindrances can therefore strengthen mindfulness practice and support deeper self-knowledge and insight.

Methodology

The study was conducted to develop a culturally relevant Hindrance to Mindfulness Scale for young adults. The study further established the psychometric properties of the developed scale (reliability and validity). The research was carried out in five distinct phases, outlined below:

Phase I: Item Generation and Content Validation

An initial pool of 46 Urdu items was developed using a committee approach, drawing on Buddhist literature on hindrances and semi-structured interviews with 30 young adults (15 males, 15 females). Guided by Burisch's (1984) deductive and inductive principles, items reflected challenges such as self-judgment, distraction, and lack of time or awareness. After expert review, five overlapping items were removed, leaving 41 items. These were evaluated by five test construction experts on a 4-point Likert scale (1 = not relevant, 4 = highly relevant) following Clark and Watson (1995). Content validity was then assessed by five psychologists with mindfulness experience, calculating Item-Content Validity Index (I-CVI) scores (Lynn, 1986), with items scoring $\geq .78$ retained for the final scale (Table 1).

Table 1: Ratings of Experts, Numbers of Agreements and I-CVI for Hindrance to Mindfulness Scale

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	No. of Agreement	I-CVI
1	3	4	4	4	4	5	1
2	3	4	3	4	3	5	1
3	4	4	3	4	3	5	1
4	4	4	4	4	4	5	1
5	3	3	3	3	3	5	1
6	4	4	2	4	4	4	.83
7	3	3	3	3	3	5	1
8	4	4	4	4	4	5	1
9	3	3	3	3	3	5	1
10	4	4	4	4	4	5	1
11	3	3	3	3	3	5	1
12	4	4	4	4	4	5	1
13	3	3	3	3	3	5	1
14	4	4	4	4	4	5	1
15	3	3	3	3	3	5	1
16	4	4	4	4	4	5	1
17	3	3	2	3	3	4	.83
18	4	4	4	4	4	5	1
19	3	3	3	3	3	5	1
20	3	3	3	3	3	5	1
21	3	3	3	3	3	5	1
22	3	3	3	3	3	5	1
23	4	4	4	4	4	5	1
24	3	3	3	3	3	5	1
25	4	4	4	4	4	5	1
26	3	3	3	3	3	5	1
27	3	4	3	4	3	5	1
28	4	4	3	4	4	5	1
29	3	3	4	4	3	5	1
30	4	4	4	3	4	5	1
31	4	4	2	4	3	4	.83
32	3	3	3	3	3	5	1
33	4	3	4	3	4	5	1
34	3	3	3	3	3	5	1
35	4	4	4	4	4	5	1
36	3	4	3	4	3	5	1
37	4	4	3	4	4	5	1
38	3	3	4	4	3	5	1
39	4	4	4	3	4	5	1
40	4	4	2	4	3	4	.83
41	3	3	3	3	3	5	1

Note: Factor loadings >.78 in bold.

Table 1 presents the ratings of the scale items by five experts. The majority of them rated the items between 3 and 4, indicating strong relevance and clarity. Following the calculation of the individual

item content validity indices (I-CVI), the scale content validity index (S-CVI) was computed using the following formula:

S-CVI= Total items CVIs/ Total no of items

S-CVI= 40.49/41

S-CVI= .98

Phase II: Pilot study

A purposive sample of 60 young adults (30 males, 30 females; aged 18–26) from colleges and universities completed the 41-item pilot scale to assess clarity and comprehensibility. Following informed consent, items met normality assumptions (Kolmogorov–Smirnov test; Kline, 2023), no major ambiguities were reported, and five items were rephrased, with all 41 retained for Exploratory Factor Analysis.

Phase III: Factorial Validity

A purposive sample of 360 young adults (180 males, 180 females; aged 18–26) from diverse public and private institutions completed the scale to establish factorial validity using SPSS-21. Following informed consent, participants completed the anonymous 15–25 minute questionnaire and were invited to provide feedback on unclear items.

Table 2: Frequencies and Percentages of Demographic Variables

Variables		<i>f</i>	%
Gender	Male	180	50.0
	Female	180	50.0
Age groups	18-21 years old	169	46.9
	22-26 years old	191	53.1
Education	Undergraduate	169	46.9
	Postgraduate	191	53.1
Education Sector	Public	195	54.2
	Private	165	45.8
Status	Lower	58	16.1
	Middle	230	63.9
	Upper	72	20.0

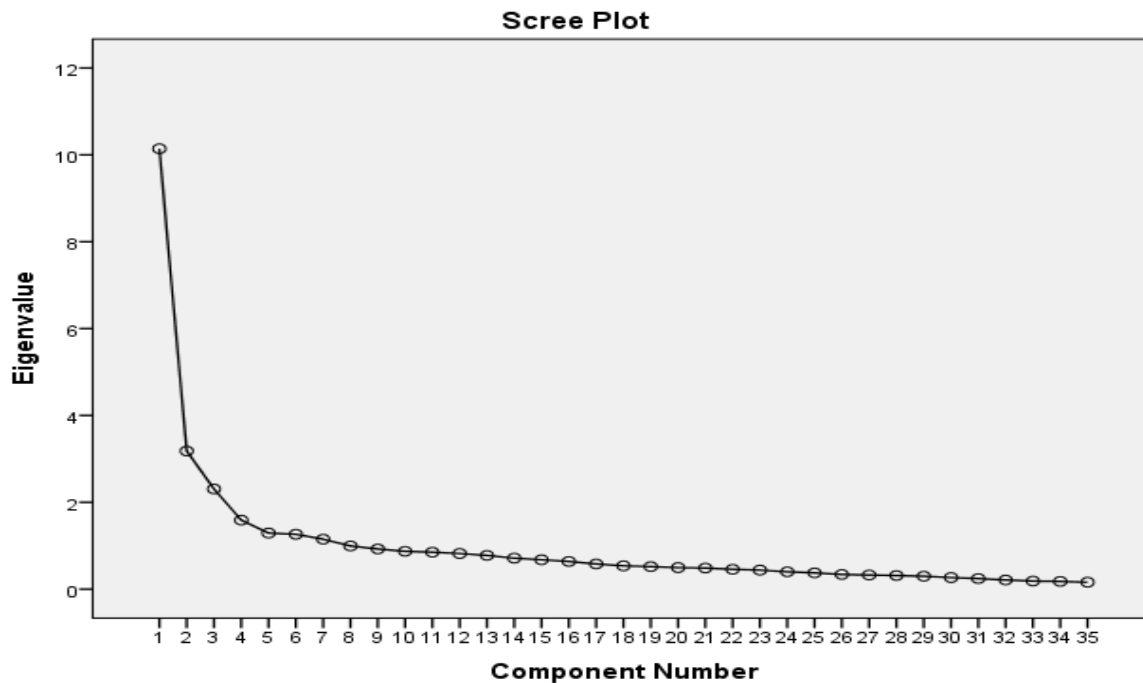
Note: N = 360; *f* = Frequency; % = Percentage

Prior to EFA, assumptions of sample adequacy, normality, outliers, inter-item correlations, and communalities were tested (Coak & Steed, 2003; Field, 2005). Sampling adequacy was confirmed (KMO = .87; Bartlett's $\chi^2(595) = 6050.53$, $p < .001$), normality was supported, no outliers were detected, and inter-item correlations were sufficient. Items with communalities $< .3$ were removed, while those between $.3$ and $.5$ were retained (Hair et al., 2011). EFA was conducted on the remaining 35 items, with a sample size exceeding the recommended 5:1 participant-to-item ratio (Field, 2005).

Table 3: Means, Standard Deviations and Rotated Factor Loadings for Hindrance to Mindfulness Scale

Old item Nos.	New item Nos.	<i>M</i>	<i>SD</i>	Factor loadings		
				1	2	3
25	1	3.10	1.48	.52	.14	.41
26	2	3.12	1.47	.62	-.07	.16
27	3	3.00	1.48	.62	.02	.16
28	4	2.96	1.43	.63	-.00	.08
29	5	3.01	1.50	.59	-.08	.05
30	6	3.10	1.45	.61	.03	.19
31	7	2.94	1.44	.64	-.01	.18
32	8	2.81	1.46	.57	.10	.18
33	9	2.95	1.42	.63	.05	.19
34	10	3.03	1.48	.57	.17	.13
35	11	3.14	1.47	.58	.34	.08
36	12	3.00	1.50	.63	.38	.21
37	13	3.02	1.44	.66	.29	.32
38	14	3.20	1.45	.61	.36	.22
39	15	3.11	1.46	.64	.27	.18
40	16	3.13	1.45	.66	.30	.44
41	17	3.10	1.38	.66	.28	.20
11	18	3.23	1.32	.02	.46	.37
12	19	3.21	1.36	-.09	.56	.34
13	20	2.97	1.37	.33	.64	.30
14	21	3.13	1.31	.22	.61	.14
15	22	3.46	1.20	.29	.62	-.02
16	23	3.14	1.31	.17	.62	-.05
17	24	3.19	1.29	.13	.60	-.09
18	25	3.28	1.20	-.04	.57	-.11
19	26	3.16	1.34	-.06	.62	.08
20	27	3.20	1.23	.12	.60	-.08
23	28	3.00	1.45	.09	.50	-.03
1	29	3.25	1.38	.08	.26	.56
2	30	3.18	1.34	.25	.28	.52
3	31	3.35	1.36	.22	.08	.49
6	32	3.01	1.38	.24	.18	.63
8	33	3.03	1.35	.18	.10	.58
9	34	2.99	1.32	.13	.21	.63
10	35	3.16	1.33	.19	.23	.58
Eigen Value				10.14	3.18	2.30

Note: Bold face indicates factor loadings >.3 in the relevant factors. Factor 1= Cognitive Hindrance, Factor 2= Emotional Hindrance, Factor 3=Motivational Hindrance. Old items are the items numbers before exploratory factor analysis and the new items are the items retained after exploratory factor analysis.

Figure 1: Scree plot

Factor Extraction and Structure

Principal Component Analysis (PCA) with Varimax rotation was conducted on data from 360 young adults to determine the factor structure of the Hindrance to Mindfulness Scale. Initial analysis of 35 items revealed six factors with eigenvalues >1.0 ; however, the scree plot (Cattell, 1966) supported a clearer three-factor solution (Figure 1).

Using a loading threshold of .30, most items loaded cleanly onto one factor, with loadings ranging from .46 to .66 (Table 3). The final structure included 17 items on Factor 1, 11 on Factor 2, and 7 on Factor 3. The eigenvalues and rotated sums of squares were: Factor 1 ($E=10.14$, $RS=7.12$), Factor 2 ($E=3.18$, $RS=4.90$), and Factor 3 ($E=2.30$, $RS=6.59$). Cumulative variance was deemed adequate (exceeding 50%), in line with Beavers et al. (2013) recommendations; Williams et al. (2010) further provide a stepped procedural guide for conducting EFA in social science contexts.

The three factors were conceptually and theoretically distinct, aligning with the intended domains of the Hindrance to Mindfulness Scale.

Table 4: Factors Labels, Relevant Items, and Percentage of Variance Accounted by Three Factors

Factors	Factor Label	Items	% of Variance
1	Cognitive Hindrance	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17	20.3%
2	Emotional Hindrance	18,19,20,21,22,23,24,25,26,27,28	14.0%
3	Motivational Hindrance	29,30,31,32,33,34,35	10.2%

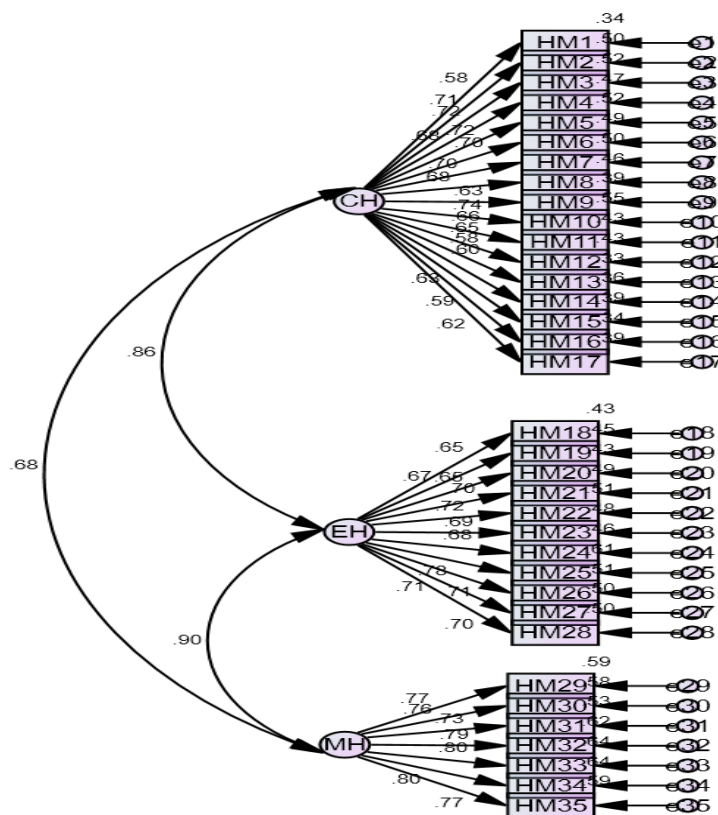
Exploratory Factor Analysis with Varimax rotation identified a three-factor structure for the Hindrance to Mindfulness Scale (Table 4), explaining 45.01% of the total variance suggesting a well-fitting model. The factors were labeled as Cognitive Hindrance (17 items, 20.3% variance), reflecting issues like intrusive thoughts and concentration difficulties; Emotional Hindrance (11

items, 14.0% variance), capturing emotional barriers such as anxiety and negative thinking; and Motivational Hindrance (7 items, 10.2% variance), reflecting challenges like impatience and lack of sustained effort.

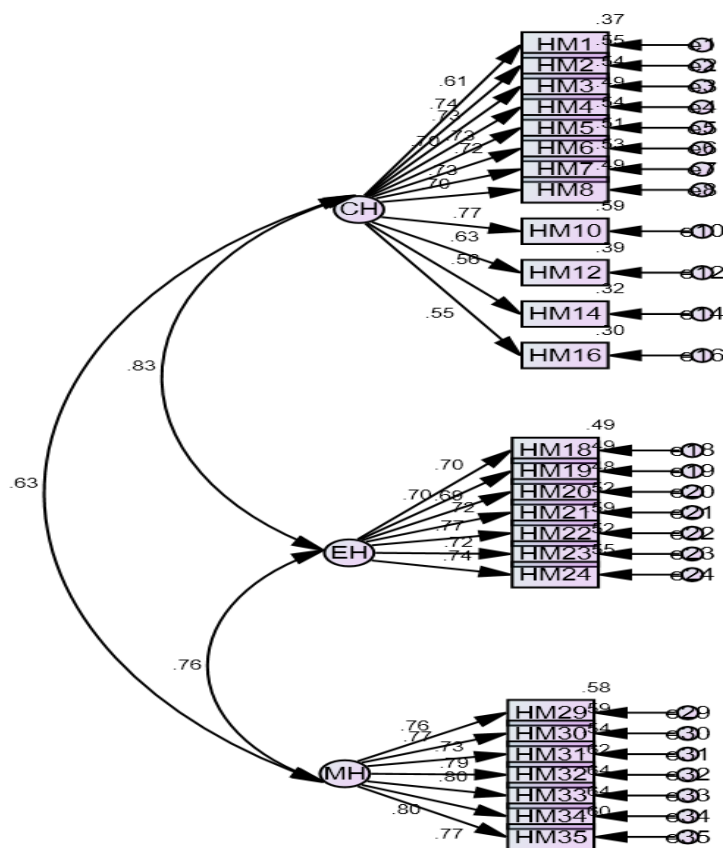
Phase IV: Confirmatory Factor Analysis (CFA) and Internal Consistency

The factor structure of the 26-item Hindrance to Mindfulness Scale was evaluated using CFA in AMOS 20, with reliability and internal consistency assessed via Cronbach's alpha and item-total/subscale correlations in SPSS 21. A purposive sample of 500 students (250 males, 250 females; aged 18–26) from public and private universities completed the scale, measuring Cognitive, Emotional, and Motivational Hindrances on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Model fit was assessed using CFI, AGFI, TLI, and RMSEA, with RMSEA < 0.05 and CFI, AGFI, TLI > 0.90 indicating good fit (Bentler, 1990; Browne & Cudeck, 1993; Jöreskog & Sörbom, 1989; McDonald & Ringo, 2002).

Figure 2: Initial Model Testing of Hindrance to Mindfulness Scale



Note: Confirmatory factor analysis of the initial three factors structure model of Hindrance to Mindfulness Scale. Factor 1 = Cognitive Hindrance, Factor 2= Emotional Hindrance and Factor 3= Motivational Hindrance.

Figure 3: Final Model of Hindrance to Mindfulness

Note: Confirmatory factor analysis of the final, three factors structure model of Hindrance to Mindfulness Scale, with good item loading on each factor, for testing Hindrance among general population.

Figure 2 is reporting the initial structure of three factors of scale and Figure 3 reports the final findings for three factors structure of Hindrance to Mindfulness Scale. Results support the distinctiveness of sub scales and factor loadings of items are above .40.

Table 5: The Factor Loading of Confirmatory Factor Analysis for Hindrance to Mindfulness Scale

Old item Nos.	New/final item Nos.	Factors		
		1	2	3
		Cognitive Hindrance	Emotional Hindrance	Motivational Hindrance
1	1	.61		
2	2	.74		
3	3	.73		
4	4	.70		

5	5	.73	
6	6	.72	
7	7	.73	
8	8	.70	
10	9	.77	
12	10	.63	
14	11	.58	
16	12	.55	
18	13		.70
19	14		.70
20	15		.68
21	16		.72
22	17		.77
23	18		.72
24	19		.74
29	20		.76
30	21		.77
31	22		.73
32	23		.79
33	24		.80
34	25		.80
35	26		.77

Note: Old items are the items numbers after EFA and the new items are the items retained after CFA. We assign them new numbers, so that items become more understandable for further analysis.

Table 6: Model Fit Indices of CFA for Hindrance to Mindfulness Scale

Models	χ^2	Df	χ^2/df	P	GFI	CFI	TLI	RMSEA
Initial Model	1569.7	557	2.81	.000	.80	.90	.90	.06
Final Model	528.2	296	1.78	.000	.91	.96	.96	.04

Tables 5 and 6, along with figures 2 and 3, display the cfa results for the hindrance to mindfulness scale. Items with factor loadings below .35, high error variances or cross-loadings with other factors were removed, leading to the exclusion of nine items (9, 11, 13, 15, 17, 25, 26, 27, 28), following the guidelines of Kline (2023), Brown (2015), and Byrne (2016). The refined 26-item model showed strong fit indices: $\chi^2 = 528.2$ (df = 296), $p < .001$; $\chi^2/df = 1.78$; RMSEA = .04; GFI = .91; CFI = .96; TLI = .96. While a non-significant chi-square (χ^2) is ideal for model fit, large sample sizes often produce significant values. In such cases, Hatcher and Barends (1996) recommend using the χ^2/df ratio (< 3) indicates acceptable fit our result of 1.78 falls well within the excellent range. Additionally, the RMSEA of .04 ($< .05$) further confirms a well-fitting model.

Reliability Analysis

In this step, internal consistency of the final 26 items scale obtained after CFA was calculated.

Table 7: Means, Standard Deviations, Alpha Reliabilities and Correlation Matrix of Total and Subscales of Hindrance to Mindfulness Scale

Variables	K	1	2	3	4	M	SD	Range		α
								Actual	Potential	
1.CH	12	----				33.98	10.0	17-59	17-60	.91
2. EH	7	.76**	-----			19.37	6.14	9-35	9-35	.88
3.MH	7	.58**	.67**	-----		19.82	6.59	8-35	8-35	.91
4.Total Scale	26	.92**	.90**	.82**	----	73.18	20.2	40-128	40-130	.95

Note: CH= Cognitive Hindrance, EH= Emotional Hindrance, MH= Motivational Hindrance. ** $p < .01$.

Table 7 demonstrates excellent internal consistency for the Hindrance to Mindfulness Scale subscales, with Cronbach's alpha values ranging from .88 to .91. Pearson correlations among subscales ($r = .76, .58, .67, p < .01$) and between each subscale and the total scale ($r = .82, p < .01$) indicate strong positive relationships and internal coherence. Mean scores suggest that young students in Pakistan experience moderate to high levels of mindfulness hindrance, highlighting the scale's relevance in this context.

Table 8: Item-total Correlations for Three Subscales of Hindrance to Mindfulness Scale

Item no's		r
Factor 1	1	.58
2		.71
3		.70
4		.67
5		.69
6		.68
7		.69
8		.66
9		.73
10		.57
11		.51
12		.50
Factor 2	13	.65
14		.65
15		.64
16		.67
17		.70
18		.66
19		.68
Factor 3	20	.72
21		.73
22		.70
23		.73
24		.74
25		.76
26		.73

Note: N=500, r = item-total correlation

Table 8 demonstrates strong corrected item–total correlations across all three subscales, affirming the scale’s internal consistency. Specifically, Factor 1 items showed correlations from .50 to .71, surpassing the commonly accepted threshold of .30 for item quality. Factor 2 coefficients ranged from .64 to .70, while Factor 3 exhibited the strongest item alignments, ranging between .70 and .76. These robust associations indicate that all items meaningfully contribute to their respective subscales, reinforcing the reliability and cohesiveness of the measure.

Phase V: Convergent and Discriminant Validity of Hindrance to Mindfulness Scale

Phase V of the study assessed the convergent and discriminant validity of the Hindrance to Mindfulness Scale (HMS). Convergent validity was evaluated using the Fears and Resistance to Mindfulness Scale, originally developed by Gilbert et al. (2023) and subsequently translated into Urdu by Naeem and Naz (2025). Discriminant validity was assessed using the Urdu version of the Barratt Impulsivity Scale, originally developed by Patton et al. (1995) and translated by Shagufta and Alam (2023). A purposive sample of 60 graduate and postgraduate students (30 male, 30 female; ages 18–26) from public and private sector colleges and universities in Pakistan participated in the study.

Instrument

Hindrance to Mindfulness Scale (HMS): An indigenously developed 26-item scale measuring cognitive hindrances (items 1–12), emotional hindrances (13–19), and motivational hindrances (20–26). Responses were recorded on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The scale demonstrated excellent internal consistency with a Cronbach’s alpha of 0.94.

Fears and Resistance to Mindfulness Scale (Urdu version): A 19-item self-report measure assessing fears and resistances during mindfulness practices. It comprises two subscales: Fear (items 1, 2, 3, 5, 6, 9, 10, 11, 14, 18) and Resistance (4, 7, 8, 12, 13, 15, 16, 17, 19). The scale uses a 5-point Likert format (1 = Not at all like me to 5 = Extremely like me) and has a Cronbach’s alpha of 0.84.

Barratt Impulsivity Scale (Urdu version): A 24-item scale measuring general impulsivity based on six first-order factors and three second-order factors: attention, motor, self-control, cognitive complexity, perseverance, cognitive instability, and attentional impulsiveness. Items 1, 7, 8, 9, 10, 12, 13, 15, 20, 29, and 30 were reverse-coded. The scale utilizes a 4-point Likert scale (1 = Never to 4 = Mostly) and has a Cronbach’s alpha of 0.86.

Procedure

Data collection was conducted across various public and private sector universities and colleges. Prior to administration, formal permission was obtained from institutional authorities, and suitable times were scheduled for administering the questionnaires. Participants were provided with consent forms and briefed on the study’s objectives. Assurances of confidentiality were given, and participants were informed that there were no right or wrong answers. The questionnaires, which took approximately 15–25 minutes to complete, were administered without time constraints. Data were analyzed using SPSS (Version 21.0) to assess convergent and discriminant validity. The instrument was first developed in Urdu to reflect the cultural and linguistic context of the intended population. To extend its reach and make it suitable for broader academic use, it was later translated into English. Offering the scale in both languages increases its accessibility for non-Urdu speakers and provides opportunities for cross-linguistic and cross-cultural comparisons, thereby strengthening its value for both national and international research. The completed version of the scale can be obtained upon request. Researchers and practitioners interested in using it for scholarly

or applied purposes may contact the corresponding author. Controlled distribution of the instrument ensures its appropriate use while also encouraging further testing, refinement, and application across different settings.

Table 9: Descriptive, Reliability and Correlations among Scales

Scales	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	<i>a</i>
1. HMS	66.76	24.05	---						.96
2. Factor 1	31.13	11.51	.98**	----					.94
3. Factor 2	18.13	7.11	.95**	.90**	----				.90
4. Factor 3	17.50	6.12	.96**	.93**	.89**	----			.85
5. FRM	48.00	15.08	.96**	.96**	.92**	.91**	----		.92
6. BIS	60.85	6.04	-.32*	-.32*	-.27*	-.32*	-.38**	----	.83.

Note: N= 60, HMS= Hindrance to Mindfulness Scale; Factor 1= Cognitive Hindrance; Factor 2= Emotional Hindrance; Factor 3= Motivational Hindrance; FRM= Fears and Resistance Mindfulness; BIS= Barratt Impulsivity Scale. ** $p < .01$; * $p < .05$.

Table 9 presents Pearson's correlations assessing the convergent and discriminant validity of the Hindrance to Mindfulness Scale (HMS). Strong positive correlations were found between the HMS and the Fears and Resistance to Mindfulness Scale ($r = .96^{**}$) and its subscales: cognitive hindrance ($r = .96^{**}$), emotional hindrance ($r = .92^{**}$), and motivational hindrance ($r = .91^{**}$), indicating robust convergent validity. Conversely, the Barratt Impulsivity Scale exhibited significant negative correlations with the HMS ($r = -.32^*$) and its subscales: Cognitive Hindrance ($r = -.32^*$), Emotional Hindrance ($r = -.27^*$), and Motivational Hindrance ($r = -.38^{**}$), supporting discriminant validity. These findings affirm that the HMS effectively measures the intended construct of mindfulness hindrances.

Discussion

Research has consistently demonstrated that barriers to mindfulness practice operate across multiple domains, encompassing both internal psychological factors and external sociocultural and practical constraints. Mindfulness, defined as the non-judgmental awareness of present-moment experiences (Kabat-Zinn, 1994), has gained substantial empirical support for its benefits in enhancing mental health, reducing stress, and promoting overall well-being. However, despite these documented benefits, individuals frequently encounter significant obstacles in developing and maintaining mindfulness practices. Notably, while qualitative investigations have identified various hindrances to mindfulness engagement (Sparby et al., 2024), quantitative research examining these barriers remains limited, particularly among younger populations.

To fill this important gap in the literature, the present study sought to design and validate a comprehensive hindrance to mindfulness scale. Based on insights from prior research and focus group discussions, three key factors were identified and categorised as: (1) cognitive hindrance, (2) emotional hindrance, and (3) motivational hindrance (table 6). This tripartite structure reflects the theoretical frameworks of the five hindrances model and aligns with Hölzel et al.'s (2011) mechanism.

The cognitive hindrance (Factor 1) dimension reflects well-documented cognitive challenges in mindfulness practice. Empirical evidence supports the view that mindfulness practice is often described as beneficial for enhancing attention regulation and emotional well-being. However, research highlights that cultivating mindfulness can itself present challenges. For example,

mindfulness exercises such as mindful breathing may heighten frustration when intrusive thoughts arise, as individuals initially struggle with adverse reactions to repetitive cognitions (Feldman et al., 2010). This difficulty is compounded by the fact that sustaining mindful awareness requires substantial cognitive effort, recruiting executive control networks that can increase cognitive load and temporarily strain mental resources (Tang et al., 2015). When working memory capacity is limited, these attentional demands become even more taxing, reducing the ability to refocus after distraction; mirroring how sloth, torpor, restlessness, and doubt from the five hindrances impair attention and cognitive engagement. However, mindfulness training has been shown to buffer these limitations by strengthening working memory and improving attentional recovery (Jha et al., 2010). This finding resonates with Sparby et al. (2024), who reported that practitioners frequently encounter obstacles, including restlessness, doubt, and emotional turbulence, which can temporarily obstruct mindfulness practice. Notably, Sparby et al. (2024) further highlight that such obstacles exist. However, interference-prone factors can be catalysts for greater innovation when approached positively—an understanding analogous to the subtle role of hindrances evident in the current factor structure.

On the other hand, individuals who have high intolerance for uncertainty may be especially at risk for these difficulties. Because they experience more distress when faced with ambiguity, uncertainty, or unpredictable thinking, they may view intrusive thoughts during mindfulness practice as dangerous or unacceptable (Buhr & Dugas, 2002). This cognitive hypersensitivity not only engenders maximum frustration but also increases the likelihood of worry and avoidance, potentially impeding progress in meditation. Taken together, these findings suggest that while mindfulness training can build resilience through better attentional control and tolerance for intrusive thoughts, its initial phases have the perverse effect of making subjects more distressed—particularly those with lean working memory or high uncertainty intolerance.

Emotional experiences such as shame and anger can entirely disrupt mindful observation by inducing self-critical or defensive responses that divert attention from moment-to-moment awareness (Gilbert, 2009). In line with this, Dahl et al. (2015) argue that mindfulness practice typically challenges firmly held aspects of self-concept, hence triggering threat responses when individuals become torn between their habitual self-identity and the deconstructive nature of meditation. This process of destabilising rigid self-representations can be transformative, yet it also generates psychological resistance, particularly when practitioners are confronted with established emotional patterns that feel threatening or destabilising. Neural evidence suggests that mindfulness shifts self-referential processing from a narrative to an experiential mode (Farb et al., 2007), paralleling the role of ill will and sensual desire in the Buddhist hindrances model, which amplify emotional reactivity and complicate balanced responses. Thus, confronting emotional challenges in mindfulness practice aligns with addressing these hindrances, enabling transformation and growth. Motivational Hindrance (Factor 3) encompasses barriers to sustained mindfulness engagement that are well documented across both foundational and contemporary scholarship. Early work, such as Kabat-Zinn's (2003) reflections on clinical applications of mindfulness, already noted that practitioners often approach meditation with scepticism regarding its efficacy, particularly when its benefits are not immediately tangible. This concern aligns with more recent critiques by Van Dam et al. (2017), who caution against exaggerated expectations and note that illusory hope can kill motivation when people do not perceive instant or spectacular results. Aside from these mindset barriers, real-world constraints—including competing demands, work pressures, and time scarcity in modern lifestyles—also interfere with frequent practice (Hülshager et al., 2013; Creswell, 2017). These everyday demands can undermine the perseverance needed for continued engagement,

particularly if mindfulness is seen as a "non-essential" activity. Cultural stories also get in the way: in Williams and Kabat-Zinn's (2013) opinion, mindfulness is sometimes framed as self-indulgent, overly individualistic, or even pseudoscientific, which might discourage individuals from giving it high priority or meaningfully introducing it into their lives. These findings resonate with the theoretical notion that doubt, sloth, and torpor undermine commitment and motivation in mindfulness practice, demonstrating how individual, social, and cultural factors converge to influence sustained engagement.

To establish the psychometric properties of the indigenously developed Hindrance to Mindfulness Scale (HMS), both convergent and discriminant validity were examined using established measures. The validation process yielded robust evidence supporting the scale's construct validity among university students. The HMS demonstrated strong convergent validity, evidenced by significant positive correlations with measures of fear and resistance to mindfulness practices. Empirical evidence indicates that individuals who exhibit greater apprehension about mindfulness—particularly regarding emotional exposure and present-moment awareness—consistently score higher on the HMS (Feldman et al., 2010; Shapiro et al., 2006). This relationship was substantiated by Rau and Williams (2016), who reported a substantial positive correlation ($r = 0.62$, $p < .01$) between HMS scores and the Fears of Mindfulness Scale (FMS). Complementary findings by Creswell et al. (2014) revealed that mindfulness resistance, operationalised as avoidance of non-judgmental awareness, significantly predicted higher HMS scores ($\beta = 0.48$, $p < .001$). The scale demonstrated appropriate discriminant validity, as indicated by its negative association with the Barratt Impulsiveness Scale (BIS-11; Stanford et al., 2009). Tang et al. (2015) found that highly impulsive individuals ($M = 72.3$, $SD = 8.1$) obtained significantly lower HMS scores ($r = -0.34$, $p < .05$), suggesting that trait impulsivity may either prevent sufficient engagement with mindfulness to recognise barriers or lead to dismissal of internal obstacles due to action-oriented cognitive styles. This inverse relationship is supported by neurocognitive research indicating that impulsive individuals demonstrate diminished meta-awareness of mindfulness-related challenges (Jha et al., 2010). These psychometric analyses confirm that the HMS effectively measures unique constructs related to mindfulness barriers while maintaining appropriate differentiation from conceptually distinct traits, such as impulsivity. The comprehensive validation process establishes the HMS as a reliable and valid instrument for assessing mindfulness hindrances among young university students. Collectively, the results support the conceptual link between the five hindrances model and Hölzel et al.'s mindfulness mechanisms, illustrating how cognitive, emotional, and motivational barriers reflect theoretically grounded impediments to attention regulation, body awareness, emotional regulation, and shifts in self-perspective. Understanding these connections provides a framework for targeting specific obstacles in mindfulness interventions and enhancing practice adherence.

Conclusion

In sum, the Hindrances to Mindfulness Scale (HMS) proved to be a psychometrically robust tool for assessing cognitive, emotional, and motivational barriers to mindfulness among young adults. Supported by expert review, factor-analytic evidence, and convergent validity, the scale provides a reliable framework for understanding obstacles to sustained mindfulness practice. The findings also align the identified hindrances from the traditional Buddhist framework with Hölzel et al.'s mindfulness mechanisms, offering a theoretically grounded basis for targeting specific barriers and enhancing intervention adherence.

Implications

The development and validation of the Hindrance to Mindfulness Scale (HMS) have substantial theoretical and practical value for research and practice. The HMS offers a theoretically grounded and empirically supported framework for understanding the hindrances individuals face in building mindfulness, including cognitive, emotional, and motivational factors. It fills an important gap in the mindfulness literature, which has long focused on practice benefits at the expense of the obstacles that impede it.

To the applied professional, the HMS is a generalizable assessment tool for mindfulness instructors, mental health practitioners, and program developers for institutions. By identifying areas of challenge—distractibility, emotional dysregulation, or not-relevant-as-seen—the scale lends itself to more specific, situationally tailored mindfulness interventions. For instance, educators can use the HMS to tailor curricula to participants' initial profiles, thereby increasing participation and retention in longer mindfulness courses. Clinical psychologists may integrate the scale into treatment settings to identify clients' psychological barriers and tailor mindfulness-based interventions as needed.

From a theoretical perspective, the HMS contributes to the diversification and decolonisation of mindfulness research. Developed with reference to traditional Buddhist frameworks and tested within a culturally specific population, the scale opens new pathways for exploring mindfulness obstacles across non-Western and cross-cultural contexts. It also offers a validated instrument for future empirical studies examining how various hindrances mediate or moderate mindfulness-related outcomes over time.

References

- Anālayo, B. (2013). Hindrances (Buddhist). In A. L. C. Runehov & L. Oviedo (Eds.), *Encyclopedia of sciences and religions* (pp. 987–989). Springer. https://doi.org/10.1007/978-1-4020-8265-8_1620
- Anālayo, B. (2022). Education and mindfulness: An early Buddhist contribution to the ongoing dialog. *Mindfulness*, 13(10), 2413–2419. <https://doi.org/10.1007/s12671-022-01921-8>
- Bhikkhu, B. (Ed.). (2005). *In the Buddha's words: An anthology of discourses from the Pāli Canon*. Wisdom Publishers.
- Bodhi, B. (2005). *In the Buddha's words: An anthology of discourses from the Pali canon*. Boston: Wisdom Publications.
- Brasington, L. (2015). *Right concentration: A practical guide to the jhānas*. Shambhala Publications.
- Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical considerations for using exploratory factor analysis in educational research. *Practical Assessment, Research & Evaluation*, 18(6), Article 6. <https://doi.org/10.7275/qv2q-rk76>
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238–246. <https://doi.org/10.1037/0033-2909.107.2.238>
- Brito, G. (2014). Rethinking mindfulness in the therapeutic relationship. *Mindfulness*, 5(4), 351–359. <https://doi.org/10.1007/s12671-012-0186-2>
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen and J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed., pp. 10–40). Guilford Press.
- Buhr, K., & Dugas, M. J. (2002). The intolerance of uncertainty scale: Psychometric properties of the English version. *Behaviour Research and Therapy*, 40(8), 931–945. [https://doi.org/10.1016/S0005-7967\(01\)00092-4](https://doi.org/10.1016/S0005-7967(01)00092-4)
- Burisch, M. (1984). Approaches to personality inventory construction: A comparison of merits. *American Psychologist*, 39, 214–277. <https://doi.org/10.1037/0003-066X.39.3.214>

- Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). Routledge. <https://doi.org/10.4324/9781315757421>
- Cattell, R. B. (1966). *The scree test for the number of factors*. *Multivariate Behavioral Research*, 1(2), 245–276. https://doi.org/10.1207/s15327906mbr0102_10
- Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7(3), 309–319. <https://doi.org/10.1037/1040-3590.7.3.309>
- Coakes, S. J., & Steed, L. G. (2003). *SPSS analysis without anguish (Version 11.0) for Windows*. Milton, Qld: John Wiley & Sons.
- Creswell, J. D. (2017). Mindfulness interventions. *Annual Review of Psychology*, 68, 491–516. <https://doi.org/10.1146/annurev-psych-042716-051139>
- Creswell, J. D., Pacilio, L. E., Lindsay, E. K., & Brown, K. W. (2014). Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress. *Psychoneuroendocrinology*, 44, 1–12. <https://doi.org/10.1016/j.psyneuen.2014.02.007>
- Dahl, C. J., Lutz, A., & Davidson, R. J. (2015). Reconstructing and deconstructing the self: Cognitive mechanisms in meditation practice. *Trends in Cognitive Sciences*, 19(9), 515–523. <https://doi.org/10.1016/j.tics.2015.07.001>
- Eberth, J., & Sedlmeier, P. (2012). The effects of mindfulness meditation: A meta-analysis. *Mindfulness*, 3(3), 174–189. <https://doi.org/10.1007/s12671-012-0101-x>
- Farias, M., Maraldi, E., Wallenkampf, K. C., & Lucchetti, G. (2020). *Adverse events in meditation practices and meditation-based therapies: A systematic review*. *Acta Psychiatrica Scandinavica*, 142(5), 374–393. <https://doi.org/10.1111/acps.13225>
- Field, A. P. (2005). *Discovering statistics using SPSS (2nd ed.)*. London, England: Sage Publications.
- Farb, N. A. S., Segal, Z. V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson, A. K. (2007). Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reference. *Social Cognitive and Affective Neuroscience*, 2(4), 313–322. <https://doi.org/10.1093/scan/nsm030>
- Feldman, G., Greeson, J., & Senville, J. (2010). Differential effects of mindful breathing, progressive muscle relaxation, and loving-kindness meditation on decentering and negative reactions to repetitive thoughts. *Behaviour Research and Therapy*, 48(10), 1002–1011. <https://doi.org/10.1016/j.brat.2010.06.006>
- Gilbert, P. (2009). *The compassionate mind: A new approach to the challenge of life*. London, England: Constable & Robinson.
- Gilbert, P., Basran, J., Plowright, P., Matos, M., Kirby, J., & Petrocchi, N. (2023). Fears and Resistances to Mindfulness: Development of a Self-Report Scale. *Mindfulness*, 14(8), 2602–2616. <https://doi.org/10.1007/s12671-023-02171-y>
- Goldstein, J. (2013). *Mindfulness: A practice guide to awakening*. Sounds True, Inc. Boulder, CO
- Grossman, P. (2010). Mindfulness for psychologists: Paying kind attention to the perceptible. *Mindfulness*, 1(2), 87–97. <https://doi.org/10.1007/s12671-010-0012-7>
- Haakonsen, J. M. F., Furnham, A., & Cuppello, S. (2024). Personality correlates of the five hindrances: A pilot study. *Mental Health, Religion & Culture*, 27(6), 545–556. <https://doi.org/10.1080/13674676.2024.2440487>
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: INDEED A SILVER BULLET. *Journal of Marketing Theory and Practice*, 19(2), 139–151. <http://www.jstor.org/stable/23033534>
- Hatcher, R. L., & Barends, A. W. (1996). Patients' view of the alliance in psychotherapy: Exploratory factor analysis of three alliance measures. *Journal of Consulting and Clinical Psychology*, 64, 1326–1336. <https://doi.org/10.1037/0022-006X.64.6.1326>
- Hülshager, U. R., Alberts, H. J., Feinholdt, A., & Lang, J. W. (2013). Benefits of mindfulness at work: The role of mindfulness in emotion regulation, emotional exhaustion, and job satisfaction. *Journal of Applied Psychology*, 98(2), 310–325. <https://doi.org/10.1037/a0031313>

- Hunt, C. A., Hoffman, M. A., Mohr, J. J., & Williams, A.-L. (2020). Assessing perceived barriers to meditation: The Determinants of Meditation Practice Inventory-Revised (DMPI-R). *Mindfulness*, 11(5), 1139–1149. <https://doi.org/10.1007/s12671-020-01308-7>
- Jha, A. P., Stanley, E. A., Kiyonaga, A., Wong, L., & Gelfand, L. (2010). Examining the protective effects of mindfulness training on working memory capacity and affective experience. *Emotion*, 10(1), 54–64. <https://doi.org/10.1037/a0018438>
- Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications*. SPSS Inc.
- Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry*, 4(1), 33–47. [https://doi.org/10.1016/0163-8343\(82\)90026-3](https://doi.org/10.1016/0163-8343(82)90026-3)
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. Hyperion.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156. <https://doi.org/10.1093/clipsy.bpg016>
- Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). New York: Guilford Press.
- Lindahl, J. R., Fisher, N. E., Cooper, D. J., Rosen, R. K., & Britton, W. B. (2017). The varieties of contemplative experience: A mixed-methods study of meditation-related challenges in Western Buddhists. *PLoS ONE*, 12(5), e0176239. <https://doi.org/10.1371/journal.pone.0176239>
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382–385. <https://doi.org/10.1097/00006199-198611000-00017>
- McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7(1), 64–82. <https://doi.org/10.1037/1082-989X.7.1.64>
- Mikulas, W. L. (2011). Mindfulness: Significant common confusions. *Mindfulness*, 2(1), 1–7. <https://doi.org/10.1007/s12671-010-0036-z>
- Monteiro, B., Galhardo, A., Cunha, M., & Pinto-Gouveia, J. (2022). The European Portuguese version of the Determinants of Meditation Practice Inventory-Revised (DMPI-R). *Mindfulness*, 13(9), 2257–2268. <https://doi.org/10.1007/s12671-022-01953-0>
- Moore, A. W., Gruber, T., Deroose, J., & Malinowski, P. (2012). Regular, brief mindfulness meditation practice improves electrophysiological markers of attentional control. *Frontiers in Human Neuroscience*, 6, Article 18. <https://doi.org/10.3389/fnhum.2012.00018>
- Naeem, S., & Naz, M. A. (2025). Translation and validation of Fears and Resistance to Mindfulness Scale. *Journal of Behavioural Sciences*, 35(2), 25–45. Retrieved from https://pu.edu.pk/images/journal/doap/PDF-FILES/2_V35-2-2025.pdf
- Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*, 51(6), 768–774. [https://doi.org/10.1002/1097-4679\(199511\)51:6](https://doi.org/10.1002/1097-4679(199511)51:6)
- Piron, H. (2001). The Meditation Depth Index (MEDI) and the Meditation Depth Questionnaire (MEDEQ). *Journal for Meditation and Meditation Research*, 1, 69–92. https://doi.org/10.1007/978-3-030-77644-2_41-1
- Poulain, A. (2016). *The graces of interior prayer*. Jeffersonville: Caritas Publishing.
- Rau, H. K., & Williams, P. G. (2016). Dispositional mindfulness: A critical review of construct validation research. *Personality and Individual Differences*, 93, 32–43. <https://doi.org/10.1016/j.paid.2015.09.035>
- Russ, S. L., Maruyama, G., Sease, T. B., & Jellema, S. (2017). Do early experiences matter? Development of an Early Meditation Hindrances Scale linked to novice meditators' intention to persist. *Psychology of Consciousness: Theory, Research, and Practice*, 4(3), 274–287. <https://doi.org/10.1037/cns0000129>
- Schlosser, M., Sparby, T., Vörös, S., Jones, R., & Marchant, N. L. (2019). Unpleasant meditation-related experiences in regular meditators: Prevalence, predictors, and conceptual considerations. *PLoS ONE*, 14(5), e0216643. <https://doi.org/10.1371/journal.pone.0216643>

- Shagufta, S., & Alam, H. (2023). Psychometric properties of Urdu version of Barratt Impulsiveness Scale. *Journal of Population Therapeutics and Clinical Pharmacology*, 30(18), 2312–2323. <https://doi.org/10.53555/jptcp.v30i18.3439>
- Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62(3), 373–386. <https://doi.org/10.1002/jclp.20237>
- Sparby, T., Eilinghoff-Ehlers, P., Lewandovski, N., Pachernegg, Y., Schnitzler, L., & Edelhäuser, F. (2024). Meditation hindrances and breakthroughs: A multilevel first-person phenomenological analysis. *Religions*, 15(7), 865. <https://doi.org/10.3390/rel15070865>
- Sparby, T. (2022). What stands in the way becomes the way: Dual and non-dual approaches to meditation hindrances in Buddhist traditions and contemplative science. *Religions*, 13(6), 840. <https://doi.org/10.3390/rel13090840>
- Tang, Y.-Y., Hölzel, B. K., & Posner, M. I. (2015). The neuroscience of mindfulness meditation. *Nature Reviews Neuroscience*, 16(4), 213–225. <https://doi.org/10.1038/nrn3916>
- Williams, A.-L., Dixon, J., McCorkle, R., & Van Ness, P. H. (2011). Determinants of Meditation Practice Inventory: Development, content validation, and initial psychometric testing. *Alternative Therapies in Health and Medicine*, 17(5), 16–23. PMID: 22314672.
- Williams, B., Brown, T., & Onsman, A. (2010). Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine*, 8(3). <https://doi.org/10.33151/ajp.8.3.93>
- Williams, J. M. G., & Kabat-Zinn, J. (Eds.). (2013). *Mindfulness: Diverse perspectives on its meaning, origins, and applications*. Routledge. <https://doi.org/10.4324/9781315874586>
- Van Dam, N. T., Brown, A., Mole, T. B., Davis, J. H., Britton, W. B., & Brewer, J. A. (2015). Development and validation of the Behavioral Tendencies Questionnaire. *PLOS ONE*, 10(11), e0140867. <https://doi.org/10.1371/journal.pone.0140867>
- Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., Fox, K., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A., & Meyer, D. E. (2017). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, 13, 36–61. <https://doi.org/10.1177/1745691617709589>
- Yates, J., Immergut, M., & Graves, J. (2015). *The mind illuminated: A complete meditation guide integrating Buddhist wisdom and brain science*. Pearce: Dharma Treasure Press
- Zeng, X., Wang, R., Chan, V. Y., Oei, T. P., & Leung, F. Y. (2019). The development of the Difficulties During Meditation Involving Immeasurable Attitudes Scale. *Mindfulness*, 10(5), 812–823. <https://doi.org/10.1007/s12671-018-1051-8>