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Distinct Longitudinal Within-Person Links of Mindfulness with Anxiety and Depression

Yuping Liu
Beijing Normal University
Bingtao Zhou
China University of Political Science and Law
Fengxu Qiang
Zunyi Medical University
Qianguo Xiao
Zunyi Medical University
Qinhong Xie
747326522@qq.com

Zunyi Medical University

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Abstract

Background

Mindfulness is reliably associated with lower anxiety and depression, yet the longitudinal within-person dynamics and potential differences between these two forms of emotional distress remain largely unknown.

Methods

A total of 1,138 participants completed five waves of self-report assessments at two-week intervals. Mindfulness, anxiety, and depression were measured at each wave. Random-intercept cross-lagged panel models were used to separate stable between-person differences from within-person fluctuations and to examine longitudinal cross-lagged effects.

Results

Mindfulness showed significant negative associations with both anxiety and depression at the between-person level and at the concurrent within-person level. Longitudinal within-person analyses revealed differential patterns: mindfulness and anxiety showed significant bidirectional cross-lagged effects across time, whereas no significant cross-lagged effects were observed between mindfulness and depression.

Conclusions

Although mindfulness is broadly linked to lower anxiety and depression, its temporal within-person dynamics differ across the two. Mindfulness appears to be more strongly involved in reciprocal short-term regulation of anxiety, while depressive symptoms may be less responsive to short-term fluctuations in mindfulness. These findings support a mechanism-differentiated view of mindfulness-related emotional regulation and suggest the need for tailored intervention strategies.

Introduction

Mindfulness, characterized by present-moment awareness and an accepting attitude toward one's experiences, has been widely applied in psychological interventions and has demonstrated robust effectiveness in alleviating negative emotions (Kabat-Zinn, 2003; Wu et al., 2022). A substantial body of research suggests that mindfulness is an effective strategy for reducing negative emotional experiences. For example, higher levels of mindfulness have been consistently associated with lower levels of depression and anxiety, as well as greater psychological well-being (Bränström et al., 2011; Lu & Ran, 2025; Tamagawa et al., 2013). Individuals with greater mindfulness also tend to exhibit less emotional dysregulation and lower emotional exhaustion in daily life (Hülsheger et al., 2013; McLaughlin et al., 2019). Evidence from diary studies further indicates that on days when individuals report higher mindfulness, they experience fewer negative emotions (Brockman et al., 2017). Among adults with attention-deficit/hyperactivity disorder, lower levels of mindfulness are associated with more severe anxiety and depressive symptoms (Kandeğer et al., 2024). Longitudinal research with college students additionally suggests that mindfulness predicts lower future levels of depression, highlighting its buffering effect against the development of depressive symptoms over time (Altan-Atalay et al., 2024). Meta-analytic evidence further corroborates these findings, demonstrating that higher trait mindfulness is strongly associated with lower perceived stress, negative affect, anxiety, and depression (Keng et al., 2011; Mesmer-Magnus et al., 2017).

The above research demonstrates a robust association between mindfulness and negative emotions, with the majority of studies focusing on the shaping or regulatory effects of mindfulness on negative emotional experiences. However, mindfulness is not a static trait but a dynamic capacity that can fluctuate over time and be shaped by emotional states. Mindfulness involves sustaining attention on present-moment experiences with a nonjudgmental and accepting attitude (Shapiro et al., 2006). In contrast, core characteristics of negative emotions—such as heightened arousal, attentional capture, and strong avoidance motivations—are often incompatible with this mindful stance (Harmon-Jones et al., 2014; Russell & Carroll, 1999). When individuals are overwhelmed by intense negative emotions, attentional resources are heavily consumed by emotional processing, making it difficult to disengage from ruminative emotional cycles and to observe experiences in a calm and objective manner.

Several theories of emotion and emotion regulation further suggest a potential influence of negative emotions on mindfulness. For example, Emotion Regulation Theory (Gross, 2015) posits that individuals experiencing negative emotional states often rely on avoidance or suppression strategies to reduce awareness of unpleasant experiences. Although these strategies may provide short-term relief, they ultimately consume cognitive resources and undermine sustained awareness and acceptance of the present moment (Coffey et al., 2010; Gross & John, 2003). Similarly, from an emotional–cognitive perspective, emotions systematically shape attention, memory, and judgment (Kahneman & Tversky, 1979; Vuilleumier, 2005). Negative emotions tend to narrow attentional focus toward potential threats, thereby diverting cognitive resources

away from open and receptive present-moment awareness (Ashby et al., 1999). Consistent with this view, individuals experiencing anxiety often show attentional narrowing and reduced sensitivity to broader environmental cues (Eysenck et al., 2007). Fredrickson's broaden-and-build theory (1998, 2001) further suggests that negative emotions, such as anxiety or sadness, constrain attentional breadth and limit cognitive flexibility, which may in turn undermine mindful awareness.

Taken together, these perspectives suggest that negative emotions may exert a detrimental influence on mindfulness by trapping individuals in automatic, emotion-driven cognitive patterns. In this sense, negative emotions may operate as a "bottom-up" force that reduces individuals' capacity for mindful attention and acceptance. Despite these theoretical implications, empirical research examining this reverse pathway remains limited. Therefore, the first aim of the present study is to examine the bidirectional predictive relationship between mindfulness and negative emotions.

Anxiety and depression are two widely studied forms of negative affect that share substantial overlap yet differ fundamentally in their core pathology, cognitive processes, and emotional experiences (Mineka et al., 1998). Anxiety is primarily characterized by heightened arousal and physiological hyperactivation, whereas depression is typically marked by low-arousal features such as persistent low mood, anhedonia, and fatigue. Cognitively, depression is associated with repetitive rumination focused on past events, whereas anxiety is more closely linked to catastrophic worry about future threats (Desrosiers et al., 2013). Given these distinctions, anxiety and depression may relate to mindfulness through partially distinct mechanisms, and examining them as a single category of negative affect may obscure their unique associations—particularly in the context of mindfulness, which involves attentional focus and emotional regulation in the present moment.

Empirical evidence supports this differentiation. For example, Desrosiers et al. (2013) examined associations between multiple facets of mindfulness (i.e., observing, describing, acting with awareness, nonjudging, and nonreactivity) and symptom dimensions of anxiety and depression (e.g., anxious arousal, general distress, and anhedonia) using cross-sectional data. Their results revealed distinct patterns of association for anxiety and depression. Specifically, worry significantly mediated the relationship between mindfulness and anxiety symptoms, whereas reappraisal uniquely mediated the relationship between mindfulness and depressive symptoms. Moreover, the nonreactivity facet of mindfulness was negatively associated with general anxiety symptoms, whereas the describing facet was more strongly related to depressive symptoms. Consistent with these findings, other studies have reported that mindfulness exerts a stronger protective effect against depressive symptoms than against anxiety symptoms (Zvolensky et al., 2006).

Taken together, these findings suggest that anxiety and depression may differ meaningfully in their associations with mindfulness. However, most existing research has not explicitly compared these two forms of negative affect or examined their differential relationships with mindfulness within a unified analytic framework. Accordingly, the second aim of the present study is to directly compare the similarities and differences in how anxiety and depression are associated with mindfulness.

In addition, most existing studies on the relationship between mindfulness and negative emotions have relied on cross-sectional designs or traditional cross-lagged panel models (e.g., Bergen-Cico & Cheon, 2014; Jury & Jose, 2019), both of which have important methodological limitations (Hamaker et al., 2015; Lucas, 2023). Cross-sectional designs can only capture contemporaneous associations and are unable to establish temporal ordering or causal direction. Similarly, traditional cross-lagged panel models often conflate between-person differences with within-person processes, thereby obscuring the dynamic mechanisms that operate at the individual level. These limitations restrict our understanding of the temporal dynamics between mindfulness and negative emotions and reduce the potential translational value of such findings for clinical intervention.

In longitudinal research, the choice of an appropriate timescale is also critical, as intervals that are too long or too short may fail to accurately capture meaningful psychological change (Hopwood et al., 2022). In studies of emotional dynamics—particularly anxiety and depression—a two-week interval is commonly adopted, as it corresponds to the typical fluctuation cycle of these emotional states and better reflects the natural rhythm of emotional variation (e.g., Niu et al., 2023). Accordingly, the third aim of the present study is to investigate the longitudinal within-person relationships between mindfulness and anxiety and depression using longitudinal data and a random-intercept cross-lagged panel model (RI-CLPM, Hamaker et al., 2015; Mulder & Hamaker, 2021) with two-week measurement intervals.

Overall, current research on mindfulness and negative emotions remains largely cross-sectional, overlooking their potential bidirectional and dynamic associations—especially the reverse influence of negative emotions on mindfulness. Moreover, few studies have explicitly differentiated or directly compared anxiety and depression, two closely related yet theoretically distinct forms of negative affect with different manifestations and underlying mechanisms. Together, these gaps limit our understanding of how mindfulness dynamically interacts with anxiety and depression from a longitudinal, within-person perspective.

In this study, a total of 1,193 undergraduates were assessed five times over an eight-week period at two-week intervals. At each wave, levels of mindfulness, anxiety, and depression were measured. Using a Random Intercept Cross-Lagged Panel Model (RI-CLPM; Hamaker et al., 2015; Mulder & Hamaker, 2021), we examined the longitudinal dynamic relationships between mindfulness and negative emotions, and compared the similarities and differences in its associations with anxiety and depression. We hypothesized that mindfulness at time *t* would negatively predict

anxiety and depression at time *t + 1*, and that negative emotions at time *t* would, in turn, negatively predict mindfulness at time *t + 1*. Furthermore, we expected that the strength and direction of these bidirectional effects would differ between depression and anxiety, and we aimed to explore the specific nature of these differences.

Methods

Participants and Procedure

Participants were recruited through online advertisements. The questionnaire was disseminated through an online platform by scanning a QR code. In the initial survey (T1), participants were required to provide information on their gender and age. A total of 1,193 individuals participated in the initial survey. We conducted a total of five surveys in 8 weeks, at intervals of 2 weeks (T1 to T5). This study was approved by the Ethics Committee of the corresponding author's institution [masked for review] ([2025]1–038). All participants electronically signed the informed consent form and voluntarily took part in the questionnaire survey. Upon completion of the questionnaire, participants were awarded the "Student Volunteer Service Record Certificate" in recognition of their participation. After excluding those with nearly identical responses and those with significantly shorter response times, the final sample consisted of 1,138 participants (67.9% female) at Time 1 (T1). The participants aged from 17 to 24 years (M = 18.95 ± 1.05). There were 669, 560, 607, and 603 valid participants in T2-T5, respectively. Anxiety, depression, and mindfulness levels at Time 1 did not differ significantly between participants who dropped out and those who completed all assessments ($p > 0.05$; Table 1), suggesting a random data missing pattern.

Table 1
The Differences between Participants and Dropouts

	No Missing(458)		**Missing(680)**		t/x^2	*p*
	M	**SD**	**M**	**SD**		
t1_depress	10.64	3.85	10.85	3.77	-0.90	0.371
t1_anxiety	11.83	3.60	12.05	3.788	-1.01	0.311
t1_mindful	59.84	9.69	59.56	10.32	0.46	0.646
Age	18.85	1.00	19.01	1.083	-2.50	0.013
Gender	1.71	0.45	1.66	0.474	3.24	0.072

Measure

Depression Anxiety and Stress Scale (DASS-21)

DASS-21 (Antony et al., 1998) consists of 21 items, with three subscales: depression, anxiety, and stress with a 0–3 Likert scale. A higher score indicates a greater level of the respective emotion. The Chinese version was translated and validated by Gong et al., (2010). In this study, only two subscales, anxiety and depression were measured. In this study, McDonald's omega coefficients across the five time points ranged from .860 to .879 for the depression subscale and from .796 to .824 for the anxiety subscale.

Mindful Attention Awareness Scale (MAAS)

MAAS (Brown & Ryan, 2003) consists of 15 items to measure mindfulness with a 1–6 Likert scale. A high score reflects a higher level of mindfulness. The Chinese version was translated and validated by Chen et al., (2012). In this study, McDonald's omega coefficients across the five time points ranged from .856 to .887.

Analyses

We used the Random Intercept Cross-Lagged Panel Model (RI-CLPM; Hamaker et al., 2015) to examine the within-person reciprocal relationships between mindfulness and both depression and anxiety. Taking mindfulness and anxiety as an example, two random intercepts were estimated based on anxiety and mindfulness across five time points. These random intercepts capture stable between-person differences in anxiety and mindfulness. The deviations from these intercepts at each time point (T1–T5) represent within-person variations, reflecting how an individual's scores differ from their own average at a given time. This approach allows us to separate stable between-person differences from within-person fluctuations, providing a more accurate estimation of within-person relationships. The model includes concurrent associations, autoregressive effects, and cross-lagged effects, with the cross-lagged effects serving as the primary indicators of interest to describe the mutual longitudinal

relationship between mindfulness and anxiety. The same model was subsequently replicated by replacing anxiety with depression to examine the relationships between depression and mindfulness.

We used the lavaan package in the R-studio to conduct RI-CLPMs and employed Full Information Maximum Likelihood (FIML) to address missing values. Model was considered fit well if the CFI ≥ 0.90, SRMR ≤ 0.08 and RMSEA ≤ 0.08 (Bentler & Bonett, 1980; Hu & Bentler, 1999).

Results

Correlation analysis

The correlations among depression, anxiety, and mindfulness are presented in Table 2. Across all waves, anxiety and depression were significantly positively correlated, while both were significantly negatively correlated with mindfulness.

Table 2
Correlations Between the Variables Across Time

DEP1	**DEP1**	**DEP2**	**DEP3**	**DEP4**	**DEP5**	**ANX1**	**ANX2**	**ANX3**	**ANX4**	**ANX5**	**MIN1**	**MIN2**	**MIN3**	**MIN4**	**MIN5**
	1.00														
DEP2	.66	1.00													
DEP3	.67	.74	1.00												
DEP4	.63	.69	.74	1.00											
DEP5	.62	.69	.72	.80	1.00										
ANX1	.78	.60	.63	.56	.55	1.00									
ANX2	.55	.73	.60	.55	.55	.68	1.00								
ANX3	.57	.62	.75	.61	.56	.69	.75	1.00							
ANX4	.53	.59	.63	.77	.64	.64	.68	.71	1.00						
ANX5	.53	.57	.58	.65	.74	.65	.68	.69	.77	1.00					
MIN1	− .54	− .53	− .49	− .51	− .51	− .50	− .48	− .45	− .45	− .48	1.00				
MIN2	− .48	− .56	− .50	− .51	− .48	− .51	− .56	− .50	− .49	− .49	.72	1.00			
MIN3	− .48	− .52	− .55	− .55	− .53	− .48	− .52	− .54	− .55	− .50	.61	.72	1.00		
MIN4	− .47	− .52	− .49	− .55	− .51	− .49	− .49	− .49	− .53	− .50	.66	.73	.69	1.00	
MIN5	− .46	− .47	− .44	− .50	− .53	− .45	− .48	− .44	− .49	− .51	.64	.72	.72	.79	1.00

Note. DEP = depression; ANX = anxiety; MIN = mindfulness. All correlations were significant at p < .001.

Random Intercept Cross-Lagged Models

The results of RI-CLPM between anxiety and mindfulness (Model 1) are shown in Table 3 and illustrated in Fig. 2. The model exhibited a good fit (CFI = 0.986; SRMR = 0.041; RMSEA = 0.042, 95% CI = [0.033, 0.051]). At the between-person level, there was a significant negative correlation between anxiety and mindfulness (r = -0.68, p < .001), indicating that individuals with higher levels of anxiety have lower levels of mindfulness.

We observed a significant concurrent within-person correlation between anxiety and mindfulness at the within-person level (r = -0.26 to -0.13, p < .05). There was a significant autoregressive effect of anxiety (β = 0.15 to 0.17, p < .05), a significant autoregressive effect of mindfulness (β = 0.13 to 0.17, p < .05). Most importantly, we found significant cross-lagged effects from anxiety to mindfulness (β = -0.07 to -0.05, ps < .05) and from mindfulness to anxiety (β = -0.07 to -0.06, ps < .05). These results indicate a bidirectional within-person relationship between anxiety and mindfulness: when an individual's mindfulness level is above their personal average at one time point, the anxiety at the subsequent time point tends to be lower than the average, and vice versa.

Table 3
Parameter Estimates for Mindfulness and Anxiety

Parameters	Est	95% CI	*SE*	Std.Est
Between-person parameters				
Covariance between Anxiety and Mindfulness	-16.81***	[-18.96, -14.66]	1.10	-0.68
Within-person parameters				
Autoregressive effects				
Anxiety	0.15***	[0.09, 0.21]	0.03	0.15 to 0.17
Mindfulness	0.15***	[0.09, 0.21]	0.03	0.13 to 0.17
Cross-lagged effects				
Anxiety→Mindfulness	-0.02	[-0.04, -0.01]	0.01	-0.07 to -0.05
Mindfulness→Anxiety	-0.18	[-0.32, -0.01]	0.08	-0.07 to -0.06
Concurrent relations				
Covariance between Anxiety and Mindfulness (T1)	-2.80***	[-4.12, -1.48]	0.67	-0.20
Covariance between residuals of Anxiety and Mindfulness (T2 to T5)				-0.26 to -0.12

Notes. Std.Est = standardized estimate; Est = estimate; 95% CI = 95% confidence interval of nonstandard coefficients; SE = standard error. For nonstandard coefficients of autoregressive and cross-lagged relations, we reported only one value because these were constrained to be equal across the waves. Then we report the range of their standard coefficients; each time point's exact value can be found in Fig. 1. Within-wave covariances were freely estimated, we only report the range of their standard coefficients(equal to correlation coefficient, see Fig. 1). *** $p < .001$.

The results of RI-CLPM between depression and mindfulness (Model 2) are shown in Table 4 and illustrated in Fig. 3. The model exhibited a good fit (CFI = 0.983; SRMR = 0.044; RMSEA = 0.046, 95% CI = [0.037, 0.055]). At the between-person level, there was a significant negative correlation between anxiety and mindfulness (r = -0.69, p < .001), indicating that individuals with higher levels of depression have lower levels of mindfulness.

We observed a significant concurrent within-person correlation between depression and mindfulness at the within-person level (r = -0.28 to -0.13, p < 0.01). There was a significant autoregressive effect of depression (β = 0.16 to 0.19, p < .05), a significant autoregressive effect of mindfulness (β = 0.15 to 0.18, p < 0.05). However, the depression-mindfulness (β = 0.03 to 0.04, p = 0.216) and mindfulness-depression cross-lag effects (β = -0.03 to -0.02, p = 0.467) were not significant(Table 4). These results indicate that depression and mindfulness exhibit concurrent covariations but the longitudinal effect of mutual influence is insignificant.

Table 4
Parameter Estimates for Mindfulness and Depression

Parameters	Est	95% CI	*SE*	Std.Est
Between-person parameters				
Covariance between Depression and Mindfulness	-17.42***	[-19.63, -15.20]	1.13	-0.69
Within-person parameters				
Autoregressive effects				
Depression	0.16***	[0.11, 0.22]	0.03	0.16 to 0.19
Mindfulness	0.15***	[0.09, 0.21]	0.03	0.13 to 0.18
Cross-lagged effects				
Depression→Mindfulness	-0.01	[-0.03, 0.01]	0.01	-0.03 to -0.02
Mindfulness→Depression	-0.05	[-0.20, 0.09]	0.07	-0.04 to -0.03
Concurrent relations				
Covariance between Depression and Mindfulness (T1)	-4.28***	[-5.71, -2.85]	0.73	-0.28
Covariance between residuals of Depression and Mindfulness (T2 to T5)				-0.24 to -0.13

Notes. Std.Est = standardized estimate; Est = estimate; 95% CI = 95% confidence interval of nonstandard coefficients; SE = standard error. For nonstandard coefficients of autoregressive and cross-lagged relations, we reported only one value because these were constrained to be equal across the waves. Then we report the range of their standard coefficients; each time point's exact value can be found in Fig. 2. Within-wave covariances were freely estimated, we only report the range of their standard coefficients(equal to correlation coefficient, see Fig. 2). *** $p < 0.001$.

Discussion

The present research examined within-person longitudinal associations between mindfulness, depression, and anxiety among undergraduate students using a RI-CLPM. The results revealed significant negative associations between mindfulness and both anxiety and depression at the between-person level as well as at the concurrent within-person level. Consistent with prior studies, higher levels of mindfulness are reliably linked to lower levels of anxiety and depression and to better positive emotional functioning (e.g., Xu et al., 2018; Du et al., 2019; Raes et al., 2014; Davis et al., 2024). These findings further support the robust inverse relationship between mindfulness and negative emotional states.

We further examined the within-person cross-lagged effects between mindfulness and both depression and anxiety, and the results revealed an important distinction between the two forms of negative affect. On the one hand, a significant bidirectional cross-lagged effect was observed between mindfulness and anxiety, suggesting that mindfulness and anxiety mutually influence each other over time through a negative feedback loop. On the other hand, depression did not show significant within-person cross-lagged effects with mindfulness. This divergence highlights meaningful differences between anxiety and depression. Anxiety is typically future-oriented and characterized by anticipatory worry, and thus present-focused mindful attention may be especially effective in alleviating anxious symptoms. In contrast, depression is less strongly defined by future-oriented temporal features and is more closely tied to persistent negative mood and rumination, which may limit the short-term regulatory impact of present-focused mindfulness.

These findings are also consistent with the state-dependence hypothesis of depression, which proposes that depressive states are more strongly driven by stable cognitive pattern—particularly negative self-schemas—than by short-term fluctuations in immediate psychological states (Teasdale, 1988). Cognitive theory likewise emphasizes that negative self-schema plays a central role in the development and maintenance of depression (Beck & Haigh, 2014). Such maladaptive cognitive schemas are typically consolidated through repeated reinforcement across development, forming relatively stable memory structures that persist across time and contexts.

Evidence from research on neural plasticity further supports this distinction. Mindfulness training has been shown to rapidly strengthen regulatory control of amygdala activity by the anterior cingulate cortex (Kirlic et al., 2022), and amygdala reactivity is closely linked to anxiety symptoms. This neural mechanism may help explain why mindfulness can produce relatively immediate reductions in anxiety. In contrast, the overactivation of schema-related cognitive networks associated with depression (Hamilton et al., 2015) typically reflects more deeply entrenched cognitive structures and therefore requires more sustained and intensive intervention to modify. Consequently, although mindfulness may covary with depressive symptoms at the concurrent within-person level, short-term fluctuations in mindfulness are likely insufficient to overcome the cognitive rigidity characteristic of depression, thereby yielding nonsignificant cross-lagged effects across time points.

More broadly, the present findings suggest that anxiety and depression may rely on partially distinct cognitive processing systems. Anxiety-related fluctuations are more closely tied to rapid, automatic threat-monitoring processes (Mogg & Bradley, 2018). Mindfulness may therefore exert relatively immediate regulatory effects on anxiety by strengthening the engagement of controlled, reflective processing systems (Cosme & Wiens, 2015), resulting in reciprocal within-person influences over time. In contrast, the persistence of depression appears to depend more heavily on entrenched negative cognitive biases within controlled processing systems (Joormann & Tanovic, 2015). Such deep-seated cognitive patterns are less likely to be altered by modest short-term variation in mindfulness states, which may account for the absence of significant cross-lagged effects between mindfulness and depression.

These results indicate that although mindfulness is broadly associated with lower overall and momentary levels of anxiety and depression, its longitudinal within-person dynamics differ across the two conditions. This divergence suggests that mindfulness-based interventions should adopt differentiated practical strategies when targeting anxiety versus depression.

For anxiety, prioritizing mindfulness-based regulatory techniques may be especially beneficial, given the observed bidirectional within-person effects. Mindfulness appears capable of interrupting self-reinforcing anxiety cycles through reciprocal regulation, suggesting that even short-term mindfulness practices may produce meaningful reductions in anxiety symptoms. Brief, easily implemented exercises—such as mindful breathing, body scanning, and nonjudgmental emotional awareness—may therefore serve as practical tools for managing stress and emotional reactivity in everyday contexts.

In contrast, although mindfulness-based approaches may produce short-term improvements in depressive mood, these effects may be less stable when implemented in isolation. Interventions targeting depression should therefore extend beyond enhancing state mindfulness and incorporate methods that directly address entrenched maladaptive cognitive patterns, such as cognitive restructuring. Integrative approaches, such as Mindfulness-Based Cognitive Therapy (MBCT, Sipe et al., 2012), provide structured protocols that combine mindfulness training with systematic modification of negative cognitive schemas and may therefore be particularly well suited for addressing depressive vulnerability. Overall, these findings contribute to a more differentiated understanding of the psychological processes linking mindfulness with anxiety and depression and offer a more precise conceptual basis for designing and tailoring mental health interventions across populations.

In conclusion, this study shows that mindfulness is consistently linked to lower anxiety and depression at both the general and concurrent levels, but its longitudinal effects differ across the two. Mindfulness and anxiety influence each other over time, whereas the link with depression appears more concurrent than predictive. These findings highlight important differences in underlying mechanisms and underscore the value of tailoring mindfulness-based approaches to different forms of emotional distress.

Declarations

Author Contribution

Y.L. drafted the main manuscript.B.Z. conducted the primary data analyses.F.Q. was responsible for data collection and organization.Q. Xiao managed and implemented the project.Q. Xie supervised the study and led the overall project design and conceptualization.All authors reviewed and approved the final manuscript.

Data Availability

The data will be available from the corresponding author upon reasonable request.

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Figures

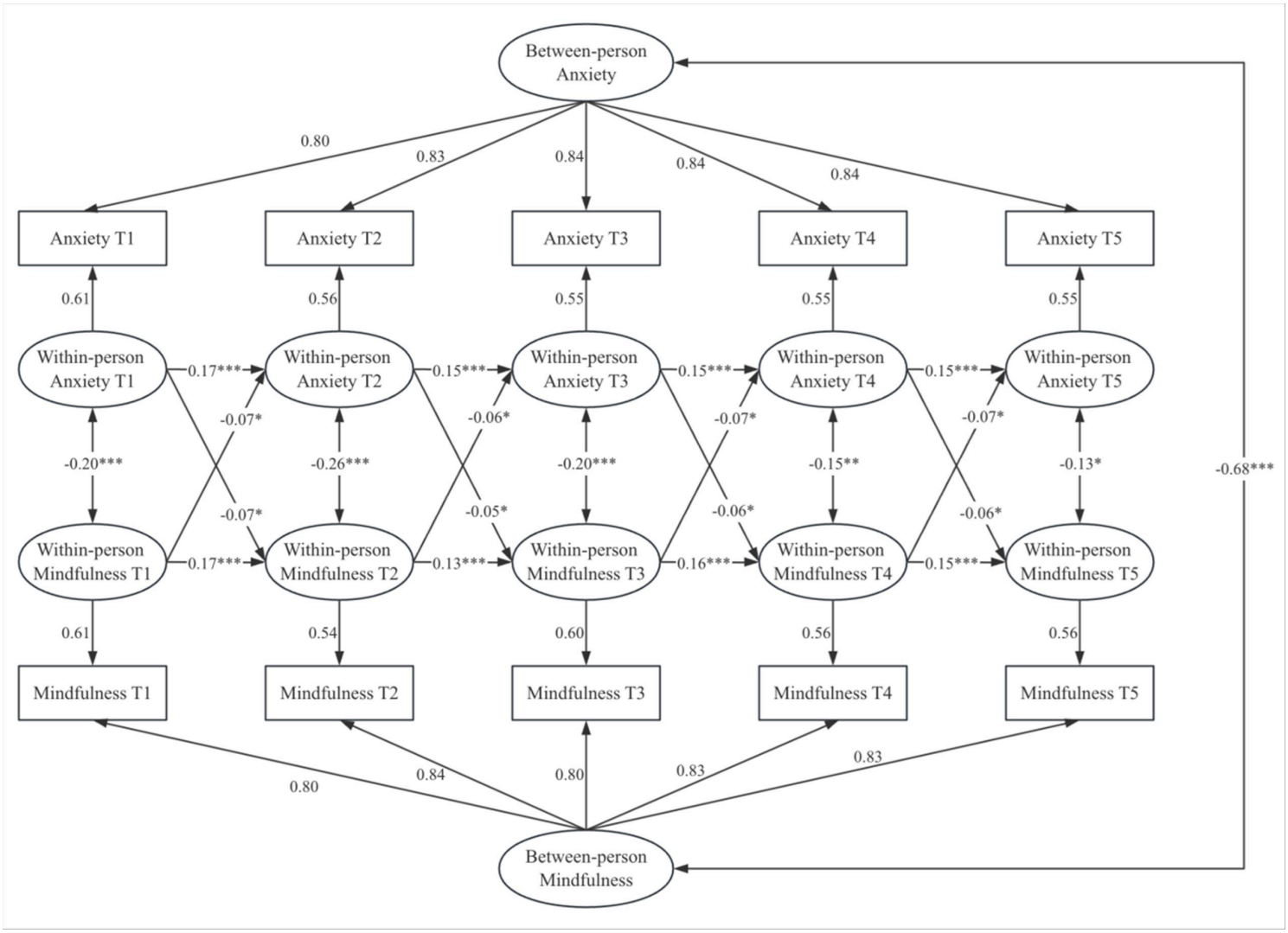


Figure 1

A five-wave random intercept cross-lagged panel model for anxiety and mindfulness (M1). Circles represent latent variables, and rectangles represent observed variables. We constrained autoregressive and cross-lagged paths to be time-invariant, and within-wave covariances were freely estimated. T1 to T5 = assessment Time 1 to 5. Standardized estimates are shown. Table 2 provides the unstandardized estimates and SE for each of these parameters. * p < 0.05, *** p <0.001.

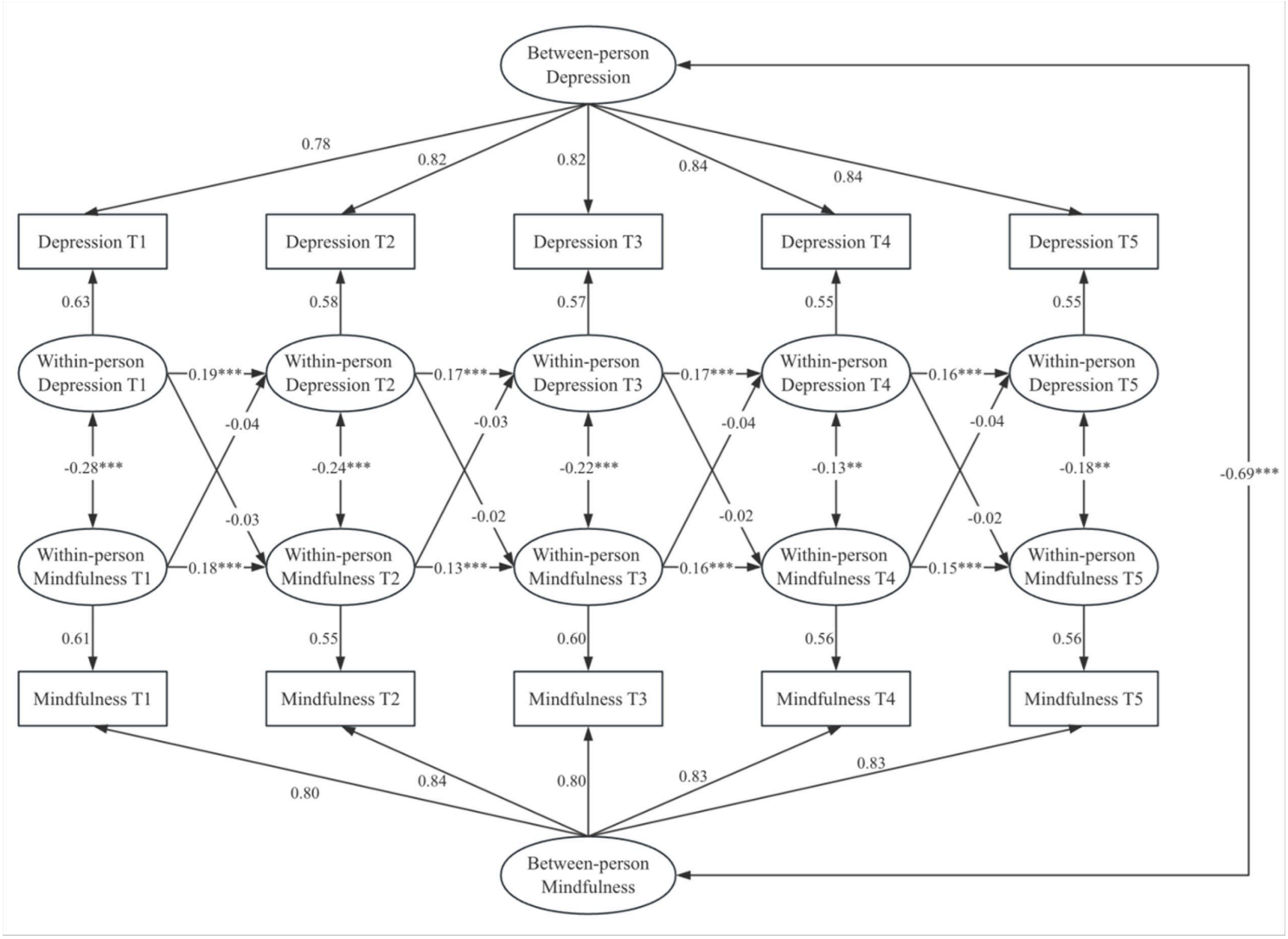


Figure 2

A five-wave random intercept cross-lagged panel model for depression and mindfulness (M2). Circles represent latent variables, and rectangles represent observed variables. We constrained autoregressive and cross-lagged paths to be time-invariant, and within-wave covariances were freely estimated. T1 to T5 = assessment Time 1 to 5. Standardized estimates are shown. Table 3 provides the unstandardized estimates and SE for each of these parameters. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.