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ORIGINAL ARTICLE

Does mindfulness facilitate letting be? A longitudinal investigation of nonattachment as a mediator in the association between mindfulness, well-being, and affect at trait and state levels

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Abstract

This research investigated the mediating role of nonattachment in the association between mindfulness and well-being. Study 1, a 2-week ecological momentary assessment (EMA) study with 2446 responses from 69 participants, showed that state mindfulness at time $(t) - 1$ was not significantly associated with nonattachment at t and (positive and negative) affect at $t + 1$. However, nonattachment at t significantly mediated the association between state mindfulness at t and (positive and negative) affect at t. Study 2, a 2-month study with three waves of measurement ($n = 224$), showed that trait mindfulness at baseline could not predict psychological well-being at 2-month follow-up through nonattachment at 1-month follow-up. However, this mediating relationship was significant when all these variables were measured at baseline. People who are mindful at one moment may experience higher nonattachment and better well-being at the same moment; the beneficial effect could not be

sustained over time among people who are largely non-meditators.

KEYWORDS

affect, ecological momentary assessment, longitudinal, mindfulness, nonattachment, well-being

INTRODUCTION

Mindfulness has received wide attention from psychological science since the development of the Mindfulness-based Stress Reduction Program by Kabat-Zinn in the 1980s (Kabat-Zinn, 1982). Mindfulness-based interventions have been widely applied as clinical interventions to alleviate psychological distress and various physical and mental health conditions and as an approach to promote mental health in different populations. Empirical evidence supported the effectiveness of these interventions on health promotion and reduction of psychological distress (e.g. Black & Slavich, 2016; Creswell, 2017; Galante et al., 2021; Goldberg et al., 2018, 2021).

In the psychological literature, mindfulness was first defined as the awareness that arises from paying attention in a particular way purposefully and nonjudgmentally in the present moment (Kabat-Zinn, 1990). It was also later considered as a two-component model by Bishop et al. (2004). Specifically, mindfulness involves a self-regulation of attention that facilitates moment-to-moment awareness of mental events and an adoption of an orientation with curiosity, openness, and acceptance toward one's experience in the present moment (Bishop et al., 2004). Such operational definitions of mindfulness laid the secular foundation for the development of measures for mindfulness to be empirically investigated (Baer et al., 2006; Brown & Ryan, 2003; Lau et al., 2006).

In general, measures of mindfulness can be categorized into mindfulness at the trait level and at the state level. The trait mindfulness scale captures one's dispositional pattern of mindfulness. Alternatively, it can be considered as the duration, frequency, and intensity with which an individual tends to have the states of mindfulness (Hülsheger et al., 2013). For instance, the observing facet of the Five Facet Mindfulness Questionnaire (FFMQ), one of the most popular trait measures of mindfulness, examines people's frequency of observing internal and external experiences, such as thoughts, feelings, bodily sensations, and sensory inputs in their daily lives. Other widely used trait mindfulness scales, such as the Mindfulness Attention Awareness Scale (MAAS) or the acting with awareness facet of FFMQ, measure the frequency of one's tendency to perform on automatic pilot, which is acting without conscious intention and can be considered the opposite of mindfulness. State mindfulness, on the other hand, refers to the extent to which an individual is currently aware of a stimulus occurring in the present moment (Brown & Ryan, 2003). The State Mindfulness Scale (Tanay & Bernstein, 2013), for example, investigates one's levels of present awareness of the body (e.g. I noticed physical sensations come and go) and the mind (e.g. I was aware of what was going on in my mind).

Although these two types of mindfulness were expected to be closely related, the empirical results were contrary to this expectation. Specifically, the State Mindfulness Scale did not significantly associate with MAAS and only moderately associated with the observing facet of FFMQ (Tanay & Bernstein, 2013). It is possible that non-meditators may lack a stable and sustained awareness of the present moment, which could be readily influenced by environmental factors.

Such variability may dampen the strength of the relationship between trait and state mindfulness. Moreover, considering that the MAAS measures mindfulness indirectly in a reverse manner, this discrepancy might further weaken the association between trait and state mindfulness. Alternatively, these findings could also suggest that trait and state mindfulness may be distinctive and implied that empirical investigations on both are warranted to provide a more complete picture on the effect of mindfulness.

NONATTACHMENT AS A MEDIATOR UNDERLYING THE EFFECT OF MINDFULNESS ON WELL-BEING

In recent decades, researchers have also proposed theoretical models, other mindfulness-related constructs, and associated measurements in an attempt to investigate the mechanisms of mindfulness that promote human wellness (e.g. Brown et al., 2007; Grabovac et al., 2011; Gu et al., 2015; Sahdra et al., 2010; Shapiro et al., 2006; Whitehead, Bates, & Elphinstone, 2018). One of the potential mechanisms underlying the effect of mindfulness on well-being is nonattachment (e.g. Ho et al., 2022; Moussa et al., 2022; Whitehead et al., 2019). Nonattachment can be defined as "a flexible, balanced way of relating to one's experience without clinging to or suppressing them" (Sahdra et al., 2016, p. 819).

While Western psychology often emphasizes secure attachment as crucial for healthy development and well-being (e.g. Bowlby, 1979), Buddhist psychology presents a different view. It suggests that attachment or clinging is a fundamental source of human suffering (Ekman et al., 2005). This perspective highlights that the source of human suffering stems from the tendency of people craving desirable experiences and rejecting undesirable one despite the ever-changing nature of all phenomena (e.g. Yu & Mak, 2023). Consequently, due to the transient nature of life, when people attach to desirable circumstances such as the presence of a loved one or are being aversive to undesirable circumstances such as the presence of a nuisance, they would experience suffering when these circumstances do not happen as they desire them to be (Van Gordon et al., 2015).

Given that attachment can result in suffering, the ability to be nonattached or let things be is therefore conducive to better well-being and lower distress. Past studies showed that nonattachment was positively associated with subjective and psychological well-being (Chao & Chen, 2013; Ju & Lee, 2015; Lamis & Dvorak, 2014; Whitehead, Bates, Elphinstone, Yang, & Murray, 2018), life satisfaction (Wang et al., 2016), and self-esteem (Sahdra et al., 2010, 2015). It was also negatively associated with poor mental health and psychological distress such as depression, anxiety, stress (Bhambhani & Cabral, 2016; Chio et al., 2018; Ciarrochi et al., 2020; Feliu-Soler et al., 2016; Sahdra et al., 2010; Wang et al., 2016; Whitehead, Bates, Elphinstone, Yang, & Murray, 2018; Yu et al., 2020), and suicidal ideation (Lamis & Dvorak, 2014). A qualitative study also found that individuals who self-reported higher levels of nonattachment were more capable of engaging mindfully with their life experiences, accepting these experiences, and experiencing a sense of ease and inner peace. They also tended to have less rigid goals in life. Additionally, these individuals were more likely to demonstrate perspective-taking, empathy, and compassion toward others in interpersonal relationships (Whitehead, Bates, & Elphinstone, 2018).

The practice of mindfulness is considered one of the primary ways to cultivate nonattachment (Thera, 1994). Specifically, mindfulness can facilitate an awareness of an individual's habitual reactions to clinging to pleasant feelings and rejecting unpleasant one, which are

elicited by favorable or unfavorable environmental or psychological stimuli (Grabovac et al., 2011). Developing this awareness is a crucial step in fostering nonattachment to these stimuli, thereby reducing suffering. The mediating role of nonattachment in the relationship between mindfulness and well-being or psychological distress has been supported in empirical research. Synthesizing data from more than 40 empirical cross-sectional studies, Ho et al. (2022) found that the association between mindfulness and well-being and psychological distress was significantly mediated by nonattachment. These findings lend empirical support to the theoretical connections among mindfulness, nonattachment, and well-being. However, the cross-sectional nature of the studies included in this meta-analysis presents inherent limitations. Although the results might imply a temporal sequence among the variables, there is a clear lack of longitudinal evidence. This highlights the need for longitudinal research to examine the temporal dynamics between the variables, which can enrich our understanding of the enduring effects of mindfulness on nonattachment and mental health.

THE PRESENT STUDY

To advance the evidence in the literature, we aimed to investigate the mediating role of nonattachment in the temporal association between mindfulness and well-being indicators through two studies: an ecological momentary assessment (EMA) and a 2-month longitudinal study investigating the effect of both trait and state aspects of mindfulness. Study 1 is a 2-week EMA study examining the associations among state mindfulness, nonattachment, and (positive and negative) affect. EMA studies involve intensive repeated measures of variables over time, tapping into one's current or a very recent state (e.g. did you feel happy in the past 15 min) (Shiffman et al., 2008). Because EMA studies usually prompt participants at random times, it can capture how one's experiences and behaviors naturally vary over time and across situations in real life (Shiffman et al., 2008). The data of EMA studies, therefore, have greater ecological validity than controlled experiments and studies using retrospective measures. In recent years, EMA has become more common in mindfulness research in examining the effect of mindfulness or mindfulness-based intervention on affect, craving-related behaviors (i.e. eating and cigarette craving), depression, rumination, anxiety, emotion lability, and nonsuicidal self-injury (Enkema et al., 2020). However, it has not been applied to investigate the relationship between mindfulness and nonattachment as well as the relationship between nonattachment and affect. In the present study, we hypothesized that, concurrently, nonattachment would mediate the association between state mindfulness and affect. Moreover, state mindfulness would be temporally associated with nonattachment at a subsequent time point, which would in turn be associated subsequently with a more positive affective state and a less negative affective state. Study 2 is a 2-month longitudinal study with three waves of measurement testing the same models as in Study 1. Instead of measuring the constructs at the state level, this study examines the associations among mindfulness, nonattachment, and psychological well-being at the trait level. Specifically, it was hypothesized that trait mindfulness (e.g. at Time 1) would predict a higher level of nonattachment after a month (e.g. at Time 2), which would in turn be predictive to the subsequent level of well-being (e.g. at Time 3). Meanwhile, it was also hypothesized that, concurrently, trait mindfulness would be associated with better well-being through nonattachment.

STUDY 1

Method

Participants

Sixty-nine participants (76.8% women; mean age = 22.2, *SD* = 4.48) were recruited from a public university in Hong Kong. Most of the participants indicated that they were undergraduate (70.8%) and postgraduate students (29.2%). For those who did not identify themselves as students (5.8%), two of them had a bachelor's degree and two had a master's degree or above. Forty-nine participants (71%) indicated that they did not have any mindfulness practice in the last 2 months before the start of the study. For the remaining participants (29%) who had mindfulness practice in the last 2 months prior to the start of the study, their practice time ranged from 2 to 30 min/day on average. The mean practice time of all participants was 3 min/day.

Procedure

Participants were recruited at the authors' university in Hong Kong. After registration, people who were qualified to participate in the study (i.e. 18 years old or above and being able to read Chinese) were invited to attend a briefing session in person in an experimental room. In the session, participants were first asked to complete basic demographic information, as described in the Measures section, introduced the procedure of the study, and provided informed consent to participate in the study. The 2-week EMA study started on the next day after the briefing session.

During the 2-week EMA, participants were required to complete a short questionnaire three times a day at random time points. Specifically, participants received three prompts from 10:00 a.m. to 10:00 p.m. randomly through WhatsApp or Signal, which are the common communication mobile applications in Hong Kong. Participants were instructed to finish the questionnaires within 1 hour after receiving the prompts. Because the study lasted for 2 weeks, each participant could complete the questionnaire up to 42 times. Participants who have completed 70 percent (30 times), 80 percent (34 times), and 90 percent or above (38 times or above) were compensated with HK$100, HK$150, and HK$200, respectively.

Measures

Demographics

The meditation duration every day before the message prompt was collected at each prompt. Daily meditation duration (on average) in the past 2 months, year of study/education level, age, and gender were collected during the briefing session. All the measures were administered in Chinese.

Mindfulness

Three self-developed items were used to measure people's ability to be mindful of their psychological states or physical sensations on a 5-point Likert scale from 0 (*never*) to 4 (*always*). The items are "In the past 15 minutes, I am able to be aware of my ... 1) bodily sensations 2) thoughts, and 3) feelings." The composite score was computed by averaging the scores of the three items, with higher scores indicating higher levels of mindfulness. The internal consistency of the scale was satisfactory (Cronbach's $\alpha = .82$).

Nonattachment

Three self-constructed items were used to measure people's ability to be nonattached from their internal sensations on a 5-point Likert scale from 0 (*never*) to 4 (*always*). The items are "In the past 15 minutes, I can let go and do not cling on to any ... 1) bodily sensations 2) thoughts, and 3) feelings." The composite score was computed by averaging the scores of the three items, with higher scores indicating higher levels of nonattachment. The internal consistency of the scale was satisfactory (Cronbach's $\alpha = .87$).

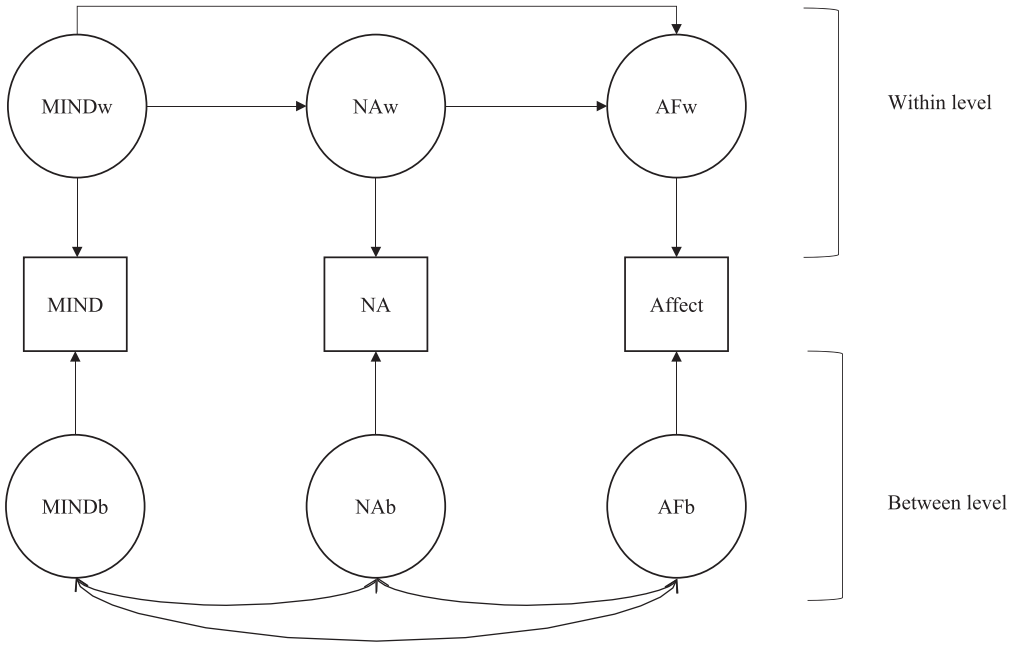
Affect

Four affects that are commonly used in EMA (viz., happy, sad, calm, and stressed) were used to measure participants' momentary affect. They were chosen based on the circumplex model along the valence and arousal dimensions (Brose et al., 2020). Participants rated on a 5-point Likert scale from 0 (*never*) to 4 (*always*) about the extent they felt (1) happy, (2) sad, (3) calm, and (4) stressed in the past 15 min. Each affect was considered as an independent construct in the model and was analyzed separately.

Data analyses

Bayesian multilevel path analysis was conducted to test the mediating effect of nonattachment in the relationship between mindfulness and affect using Mplus Version 8.9. In the present study, a 1-1-1 model was employed, meaning that all the independent variables (IV), mediators, and dependent variables (DVs) were measured at Level 1.

Given that the main interest of the present study is at the within-individual level, for the model studying the lagged association, mindfulness at $t - 1$ (i.e. one time point preceding that of the mediator), nonattachment at t, and affect-related outcomes (i.e. happy, sad, calm, and stressed) at $t + 1$ (i.e. one time point after that of the mediator) were treated as IV, mediator, and DVs, respectively, at the within part of the model (Figure 1). At the between level, covariances of mindfulness, nonattachment, and affect-related outcome variables were structured. Meditation practice duration before the message prompt was entered in the model as a Level 1 covariate. All the variables were group mean centered using latent mean centering. The direct and indirect effects were considered as statistically significant if their 95 percent credible intervals (CIs) excluded zero. The model testing the concurrent association is largely similar to the model investigating the lagged effect, except that all the variables included in the model were at the same time point.



MIND = mindfulness; NA = nonattachment; AF = affect. w = within; b = between.

FIGURE 1 Proposed multilevel mediation model of state mindfulness (MIND), nonattachment (NA), and affect (AF) of Study 1. b, between; w, within.

Intraclass correlation coefficient (ICC), which refers to the proportion of total variance that is accounted for by between-individual differences, was also computed. Based on the suggestion of LeBreton and Senter (2008), ICC of .01, .10, and .25 refers to small, medium, and large variance that can be accounted for by between-individual differences, respectively.

Results

Two thousand four hundred forty-six responses (out of 2898 responses at maximum) were collected from 69 participants, with a completion rate of 84.4 percent. The total response rates of participants ranged from 16 to 42 out of 42 possible responses in 2 weeks.

The results of the multilevel lagged mediation model (Table 1) showed that, at the within-individual level, mindfulness at $t - 1$ was not significantly associated with nonattachment at t ($b = .03$, $p = .062$, 95% CI [−.01 to .08]). Nonattachment at t, after controlling for mindfulness at $t - 1$, was also not significantly associated with any affect variables at $t + 1$ ($bs = .002$ to −.05). The meditation practice duration was only significantly associated with being happy at $t + 1$ ($b = .005$, $p = .02$, 95% CI [.002 to .009]) and calm at $t + 1$ ($b = .005$, $p < .001$, 95% CI [.002 to .008]). All the possible indirect effects were not significant. The result suggested that state mindfulness could not predict state nonattachment and affect-related variables at the subsequent time points in a largely non-meditator sample.

A multilevel concurrent-mediation model was tested to investigate the concurrent associations among mindfulness, nonattachment, and affect-related variables at the same time point

TABLE 1 Unstandardized results of mediation models at within-individual level of Study 1.

	Mindfulness → nonattachment	Nonattachment → DV	Mindfulness → DV	Indirect effect
Model of lagged effect				
Sad	.03 (−.01 to .08)	−.01 (−.05 to .03)	.001 (−.04 to .04)	.000 (−.002 to .001)
Happy		−.05 (−.11 to .01)	.04 (−.02 to .01)	−.001 (−.005 to .001)
Stressed	-	.002 (−.05 to .06)	.03 (−.03 to .08)	.000 (−.002 to .003)
Calm	-	.03 (−.02 to .08)	−.01 (−.06 to .04)	.001 (−.001 to .004)
Model of concurrent effect				
Sad	.36*** (.33 to .40)	−.25*** (−.29 to −.22)	.05** (.01 to .08)	−.09 (−.11 to −.08)
Happy	-	.38*** (.33 to .44)	.25*** (.19 to .30)	.14 (.11 to .16)
Stressed	-	−.44*** (−.49 to −.38)	.04 (−.02 to .09)	−.16 (−.18 to −.13)
Calm	-	.77*** (.73 to .80)	.10*** (.06 to .13)	.28 (.25 to .31)

Note: In the model of lagged effect, mindfulness, nonattachment, and the DVs were at time points $t-1$, t, and $t+1$, respectively. In the model of concurrent effect, all the variables were at the concurrent time points. All the results are unstandardized coefficients (b).

Abbreviation: DVs, dependent variables.

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

(t). The results showed that mindfulness was significantly associated with nonattachment ($b = .36$, $p < .001$, 95% CI [.33 to .40]). Nonattachment, after controlling for the effect of mindfulness, was also significantly associated with all affect-related variables (bs = −.25 to .77) in an expected direction. Specifically, nonattachment was positively associated with positive affect (i.e. calm and happy) and negatively associated with negative affect (i.e. sad and stressed). The indirect effects of mindfulness on affect-related variables through nonattachment were all significant (Table 1). The meditation practice duration was significantly associated with being happy ($b = -.004$, $p = .009$, 95% CI [−.007 to −.001]) and stressed ($b = .003$, $p = .002$, 95% CI [.000 to .007]).

As to the between-individual level, most of the variables were not significantly associated with one another, except the association of being calm with nonattachment and mindfulness in both lagged effect and concurrent effect models and the association of nonattachment with mindfulness in the concurrent effect model (Table 2). The results of the between-individual part of the models suggested that after separating the within-individual effects, mindfulness, nonattachment, and affect-related variables were almost not associated with one another in general. The ICCs for both models ranged from .004 to .013, suggesting that a very small variance explained could be attributed to between-individual differences (Table 2). This null association at the between levels could be partly contributed by the small variance of the variables at the between levels. Therefore, the results should be interpreted with caution.

STUDY 2

Participants

Responses were collected from 224 participants who reported that they did not have any mindfulness experience (67.9% women; mean age = 22.08 years, $SD = 6.62$) from a public university in Hong Kong. A total of 206 (92.5%) and 193 (86.7%) valid responses were collected from the same group of participants at 1- and 2-month follow-up assessments, respectively. Most of the participants reported that they had received tertiary education or above (84%) and did not have

TABLE 2 Covariance of latent variables at between-individual level of Model 1 and Model 2 of Study 1.

	Mindful	Nonattached	Happy	Sad	Stressed	Calm
Mindful	-	.008	.003	−.003	−.011	.013
Nonattached	.011*	-	−.001	−.005	−.004	.010*
Happy	.003	.000	-	.000	−.007	.002
Sad	−.005	−.007	.001	-	.007	−.005
Stressed	−.009	−.005	−.005	.006	-	−.008
Calm	.015**	.014**	.002	−.009	−.008	-
ICC	.013	.004	.005	.004	.005	.005

Note: The results in the upper diagonal matrix refer to the result of the model of concurrent effect, while the ones in the lower diagonal matrix refer to the result of the model of lagged effect. In the model of lagged effect, mindfulness, nonattachment, and the DVs were at time points $t - 1$, t, and $t + 1$, respectively. In the model of concurrent effect, all the variables were at the concurrent time points.

Abbreviations: DVs, dependent variables; ICC, intraclass correlation coefficient.

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

any religious affiliation (71.4%). Of those who had a religious affiliation, 49 (21.9%) identified themselves as Christians, followed by Buddhists (1.8%), Taoists (0.4%), and others (0.4%).

Procedure

The study participants were recruited from the researchers' institution using convenience sampling via mass email. Eligibility criteria included being 18 years or older and the ability to understand written Chinese. After giving informed consent, participants were asked to complete three sets of online questionnaires consisting of the measures of mindfulness, nonattachment, and psychological well-being over a 2-month period using Qualtrics, an online survey platform. The questionnaires were sent immediately after consent (T1), 1 month after T1 (T2), and 2 months after T1 (T3). Participants who completed at least two of the three assessments were entered into a random draw as compensation for their time and effort. The prizes included HK$1000 for three participants, HK$500 for five participants, and HK$300 for 15 participants. Ethical approval was obtained from the corresponding author's institution before data collection began. All the measures were administered in Chinese.

Measures

Mindfulness

The 15-item Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003) was used to assess the mindful level of an individual on a 6-point Likert scale from 1 (*almost always*) to 6 (*almost never*). Higher scores indicate higher levels of mindfulness. A sample item is "I find it difficult to stay focused on what's happening in the present." The internal consistency of the scale at baseline was satisfactory (Cronbach's $\alpha = .87$).

Nonattachment

The eight-item Nonattachment Scale—Short Form (NAS-SF) (Chio et al., 2018) is an abridged and validated version of the original 30-item scale developed by Sahdra et al. (2010). It was used to measure an individual's level of nonattachment on a 6-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*). Higher scores on the scale indicate higher levels of nonattachment. A sample item is "I am open to reflecting on my past mistakes and failings." The internal consistency of the scale at baseline and T2 was satisfactory (Cronbach's αs $= .91$ and .92).

Psychological well-being

The 18-item Psychological Well-being (PWB) Scale (Short Form; Ryff & Keyes, 1995) was used to measure psychological well-being on six aspects, including autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. Only the composite score of the scale was used in the present study, with higher scores indicating higher levels of psychological well-being. A sample item includes "When I look at the story of

my life, I am pleased with how things have turned out so far." The internal consistency of the scale at all three time points was satisfactory (Cronbach's αs = .84).

Data analysis

A path analysis was performed to investigate the mediating role of nonattachment in the relationship between mindfulness and psychological well-being, using Mplus Version 8.9. To align with the concurrent and lagged models investigated in Study 1, the model in Study 2 was structured in a way that consists of two parts: concurrent and longitudinal (Figure 2).

In the concurrent part, mindfulness, nonattachment, and psychological well-being, measured at baseline (T1), were structured as IV, mediator, and DV, respectively. A direct path from T1 mindfulness to T1 psychological well-being was also structured.

The longitudinal part of the model examined two indirect paths. Specifically, the first indirect path included T1 (IV) mindfulness to T3 psychological well-being (DV) through T2 nonattachment (mediator). The second indirect path included T1 mindfulness (IV) to T2 psychological well-being (DV) through T2 nonattachment (mediator). By structuring these two indirect paths, we were able to examine the consistency of indirect effects over time and provide more solid evidence supporting the mediating relationship. In the longitudinal part, mediators and DV measured at previous time points were also controlled. To provide stronger evidence for the unidirectional relationship suggesting that mindfulness predicts better well-being through nonattachment, we also structured paths from T1 well-being to T2 nonattachment and from T1 nonattachment to T2 well-being.

The model fit was assessed based on the goodness-of-fit indices, including the comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). The following fit criteria were used: CFI $\geq$ 0.95, TLI $\geq$ 0.95, RMSEA $\leq$ 0.06, and SRMR $\leq$ 0.08 for good fit and CFI $\geq$ 0.90, TLI $\geq$ 0.90, RMSEA $\leq$ 0.10, and SRMR $\leq$ 0.10 for acceptable fit (Hu & Bentler, 1999; Weston & Gore, 2006).

Result

Independent *t*-tests (for continuous variables) and chi-squared tests (for categorical variables) were first conducted to examine the difference between retained and dropped-out participants at T2 and T3 on their baseline levels of the variables of interest (i.e. mindfulness, nonattachment, and psychological well-being) and their demographic characteristics (i.e. age, gender, and education levels). No significant difference was observed.

Table 3 shows the descriptive statistics and intercorrelations among all the study variables. The model fit was excellent as reflected by the following indices: $\chi^2(1) = .49$, $p = .48$, CFI = 1.00, TLI = 1.00, RMSEA = 0.000, and SRMR = 0.003. Figure 2 shows the results of the path analysis. The results showed that, in the concurrent part, T1 mindfulness was associated with higher T1 nonattachment ($\beta = .30$, $p < .001$, 95% CI [.18 to .42]), which was in turn associated with higher levels of psychological well-being ($\beta = .48$, $p < .001$, 95% CI [.38 to .58]). The direct effect of T1 mindfulness on psychological well-being remained significant ($\beta = .26$, $p < .001$, 95% CI [.16 to .37]) after controlling for the effect of T1 nonattachment. The indirect effect of T1 mindfulness on T1 psychological well-being through T1 nonattachment was significant ($\beta = .14$, $p < .001$, 95% CI [.08 to .20]).

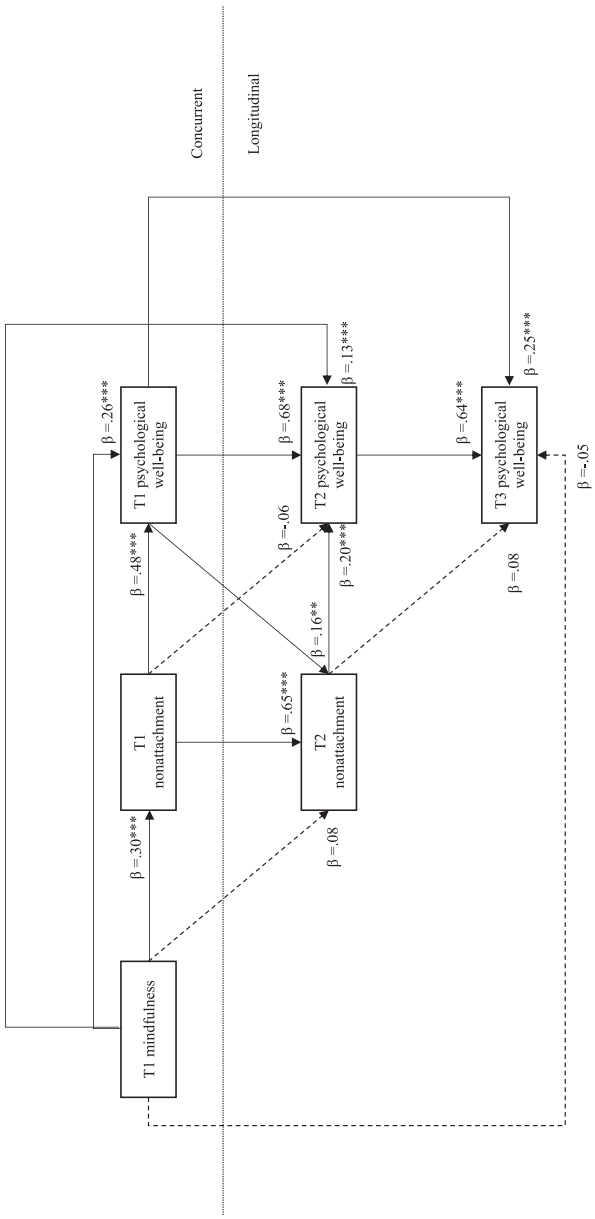


FIGURE 2 Standardized result of path analysis of Study 2. $^{***}p < .001$.

As to the longitudinal part, T1 mindfulness could not significantly predict T2 nonattachment ($\beta = .08$, $p = .11$, 95% CI [−.02 to .17]). Whereas T2 nonattachment was significantly associated with T2 psychological well-being ($\beta = .20$, $p < .001$, 95% CI [.08 to .32]), it could not predict the T3 psychological well-being ($\beta = .08$, $p = .08$, 95% CI [−.01 to .16]). The indirect effects of mindfulness on T2 ($\beta = .02$, $p = .15$, 95% CI [−.006 to .036]) and T3 ($\beta = .01$, $p = .24$, 95% CI [−.004 to .002]) psychological well-being through T2 nonattachment were not significant. However, it is worth noting that T1 psychological well-being significantly predicted T2 nonattachment ($\beta = .16$, $p = .003$, 95% CI [.06 to .27]) (Table 3).

DISCUSSION

The aim of the current study was to investigate the mediating role of nonattachment in the association between mindfulness and well-being indicators longitudinally through two studies. Study 1 showed that state mindfulness could only be associated with greater positive affect and lower negative affect through nonattachment only when all these variables were measured at the same time points. The lagged associations between the variables were not significant. Consistently, Study 2 found that trait mindfulness was associated with better psychological well-being through nonattachment only in the concurrent part. None of the paths in the longitudinal part were significant.

The study findings were partially consistent with extant literature on the beneficial effects of mindfulness on mental well-being or affects. Specifically, the concurrent models of both studies replicated the findings from cross-sectional studies on trait measures that people who were mindful at one moment tended to be more nonattached, which in turn is conducive to better well-being and lower distress at the same moment (Ho et al., 2022). The findings are also consistent with a past study that showed a general positive association of state mindfulness and nonattachment with affect and mental well-being (Stewart & Haaga, 2018; Whitehead et al., 2019). In addition, the finding of Study 1 provided momentary evidence supporting the Buddhist Psychological Model that mindfulness can potentially reduce negative affect and enhance positive affect through raising one's awareness of the habitual pattern of attaching to desired matter and through nonattachment (Grabovac et al., 2011).

However, it is important to note that the present studies only found support for concurrent, but not lagged, associations between mindfulness, nonattachment, and well-being or affect. The results of these studies indicated that participants who are mindful at a given moment may

TABLE 3 Descriptive statistics and correlations among study variables of Study 2.

	Mean	*SD*	1	2	3	4	5	6
1. T1 mindfulness	4.07	0.79	-	.296***	.330***	.406***	.451***	.381***
2. T1 nonattachment	3.73	0.94		-	.765***	.560***	.518***	.501***
3. T2 nonattachment	3.77	0.92			-	.561***	.584***	.567***
4. T1 well-being	3.98	0.63				-	.816***	.798***
5. T2 well-being	3.96	0.63					-	.868***
6. T3 well-being	3.94	0.63						-

Abbreviation: T, time.
***$p < .001$.

benefit from an immediate increase in nonattachment and well-being/positive state affect at that same moment. However, this beneficial effect cannot be sustained after a (short) lag of time. This may be particularly true among non-meditators or novices who may not have a stable and sustained awareness of the present moment. A previous mindful state might diminish when different circumstances and events occur. With a fluctuating state of mindfulness, the beneficial effects of mindfulness at a previous time may not carry over to the next time point if the person is unable to sustain awareness of the present moment. Similar to the findings of the present study, a previous study also found that the practice time of mindfulness was associated with psychological functioning measured on the same day, but more practice time was not associated with psychological functioning on the next day among a group of college students attending a mindfulness intervention course (Goldberg et al., 2020). Given that the practice of mindfulness is believed to be a crucial way to cultivate nonattachment, future studies can replicate these models in a sample of experienced meditators, compared with non-meditators, to investigate the potential moderating role of mindfulness practice in the association between mindfulness, nonattachment, and well-being indicators.

It is also worth noting that we observed a reciprocal effect of T1 psychological well-being on T2 nonattachment in Study 2. Nonattachment allows people to be less fixated on one's beliefs (Sahdra et al., 2010, 2016), enabling them to openly relate to different experiences, which could be conducive to psychological well-being. As such, past studies often assumed that nonattachment has a unidirectional relationship with psychological well-being, with nonattachment structured as an antecedence to well-being (e.g. Mak et al., 2023; Whitehead, Bates, & Elphinstone, 2018). Although previous studies have speculated about the potential reciprocal association between nonattachment and well-being, this relationship has not yet been tested (Whitehead et al., 2019). Findings of the present studies support the reciprocity between these constructs, suggesting that higher psychological well-being could, in turn, facilitate nonattachment. This implies that people who find life more meaningful may be more inclined toward nonattachment. This finding is reasonable, as individuals who feel fulfilled and have a clear purpose in life may be better able to let go of irrelevant thoughts or experiences that could confuse and bother them. Further research is needed to explore the reciprocal relationship between psychological well-being and nonattachment.

The present study has several limitations that warrant attention. First, causality for the relationship between the variables of interest could not be established. Experimental studies that specifically cultivate nonattachment and mindfulness are needed to study the associations between these two concepts and how they are beneficial to well-being and positive affect. Second, the sample recruited in the present study was dominantly non-meditators, women, and college students. This may limit the generalizability of the findings. Future studies should consider replicating the model in meditator samples and other different populations with balanced gender. Third, the items used in Study 1 only assessed participants' levels of mindfulness and nonattachment regarding their thoughts, feelings, and bodily sensations. Other aspects, such as nonattachment to certain life events and mindfulness of the external environment, were not captured. Therefore, interpretations of the results should not be generalized beyond mindfulness and nonattachment related to one's inner thoughts, feelings, and bodily sensations. Additionally, to avoid burdening participants during intensive measurement and to capture mindfulness and nonattachment at momentary levels, the items were specifically drafted by the authors for this study and have not undergone a validation process. Future studies should consider validating these measures. Despite these limitations, the present study complemented the literature by providing longitudinal and momentary evidence on the relationships between mindfulness, nonattachment, and well-being indicators at both state and trait levels.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

Data will be shared upon reasonable request.

ETHICS APPROVAL

Ethical standards set forth by the Survey and Behavioral Research Ethics Committee of the corresponding author's university are followed in conducting the study. The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

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