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The Relationship between Mindfulness and Subjective Well-Being: Examining the Indirect Effects of Self-Connection and Meaning in Life

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Abstract

Over the past decade, support for the relationship between mindfulness and happiness has increased dramatically. The consensus is that people who are mindful also experience greater happiness. However, little is still known about how and why greater mindfulness leads one to be happier. The current research calls on recent theorizing to help understand the process by which this occurs. In particular, we studied the indirect effects of both self-connection and meaning in life on the relationship between mindfulness and subjective well-being. To this end, we compiled data collected in our lab over the past 3 years. A total of 2,929 participants provided cross-sectional data while 465 participated in longitudinal studies. Across both samples, the data supported our proposed model. Self-connection and meaning in life combined to mediate the relationship between mindfulness and the various aspects of subjective well-being. In all, it is clear that, although mindfulness is important, self-connection and meaning in life play key roles in one's subjective well-being. This suggests that more research and interventions should focus on ways to increase self-connection and meaning in life as ways to help people experience greater happiness.

Keywords Mindfulness · Self-Connection · Meaning in Life · Well-Being-Affect · Life Satisfaction

The search for happiness is often thought of as a fundamental part of being human. As a result, much research has focused on discovering ways in which individuals can become happier (Capaldi et al., 2014; Curry et al., 2018; Myers & Diener, 1995). Despite this plethora of research, people still struggle to find happiness in their everyday lives (World Health Organization, 2017). In part, this may be due to a lack of

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focus and consensus in the well-being literature (Bates, 2009; Ryan & Deci, 2001). Over the past century, research has suggested dozens of pathways to happiness. However, understanding which of these is most effective and/or how they may work together to truly facilitate happiness is yet to be accomplished.

In the current research, we focus on the relationship between mindfulness and happiness. In particular, we operationalize happiness as subjective well-being (SWB) that incorporates high positive affect and life satisfaction with low negative affect. Mindfulness has garnered significant support in the literature for its relationship to subjective well-being (Brown & Ryan, 2003; Keng et al., 2011). However, we don't yet know how mindfulness may lead to increased SWB. Additionally, there are two other variables often associated with greater well-being that may provide better understanding of this pathway. First, researchers have found support for finding meaning in life (MIL) as a way that people experience greater well-being (Jin et al., 2016). Another variable, self-connection, has recently established itself as another promising avenue to greater well-being (Klussman, Curtin et al., 2020). Considered together, it appears that MIL and self-connection may help better understand why mindfulness and SWB relate so strongly.

Subjective Well-being

Over the past few decades, researchers have struggled to operationalize well-being. Consequently, numerous related but distinct definitions currently exist within positive psychology. Ryff (1989) defined well-being as psychological well-being, focusing on autonomy, personal growth, acceptance, purpose in life, mastery, and positive relationships with others. Ryan and Deci (2001) centered their definition around the satisfaction of basic psychological needs. Meanwhile, Dodge et al. (2012) define well-being as a balance between psychological, social, and physical resources and challenges. Waterman (2008) provided a more generalized definition by conceptualizing well-being as the development of one's potential while living in ways that reflect oneself. In contrast, Vittersø and colleagues discussed well-being as a balance between pleasure, interest, and engagement with life (Vittersø et al., 2009, 2010). Finally, Fromm (2013), who viewed well-being through an Aristotelian lens, suggested that well-being requires going beyond needs and desires, rooting his theory of well-being within humans' intrinsic drive for 'something more'. Despite the many useful and applicable definitions of well-being offered to date, there remains no consensus on what well-being actually is.

Although a unified definition of well-being has eluded researchers and philosophers alike, SWB has consistently been acknowledged and accepted as an important and useful conceptualization of well-being (Diener, 1984; Larsen & Eid, 2008). Sometimes referred to as hedonic well-being, and often used interchangeably with happiness, SWB has been operationalized by numerous researchers as having high positive affect (e.g., joy, inspiration, and fulfillment), low negative affect (e.g., anger, fear, stress), and the sense that life is satisfying (Diener et al., 1998; Huta, 2015; Ryan & Deci, 2001). This operationalization of well-being focuses on the pleasures one experiences in their mind/body, with the goal of maximizing human pleasure

while minimizing pain (Ryan & Deci, 2001). From an evolutionary psychology perspective, SWB can be thought of as a psychological reward, internally signaling that problems are being solved (Hill & Buss, 2008). Thus, promoting SWB is a matter of identifying and fulfilling evolutionary defined desires (Buss, 2000).

SWB, or happiness, is often considered a desirable and worthy outcome on its own. Furthermore, the result of having high SWB is a host of positive outcomes, ranging from beneficial physiological responses (e.g., high immunity and living longer; Diener & Chan, 2011) to increased creativity and social relationships (Diener & Tay, 2017; Larsen & Eid, 2008). SWB also predicts workplace outcomes, such as performance and prosocial behavior (Diener & Tay, 2017). In addition, SWB negatively relates to perceived stress, anxiety, and depression (Li et al., 2019). Finally, a lack of SWB is related to an increased risk of school dropout, marital violence, unemployment or lower income, and some physical ailments (e.g., arthritis, asthma, diabetes and pain; Diener & Tay, 2017).

Due to the importance of SWB, researchers have spent the better part of the past two decades trying to ascertain how one experiences increased SWB (Capaldi et al., 2014; Curry et al., 2018; Myers & Diener, 1995). This has resulted in a variety of useful avenues by which one can increase SWB. For example, some research suggests that the fulfillment of one's basic needs strongly predicts SWB (Turkdogan & Duru, 2012). Other research points to the impact of individuals' personality (Anglim et al., 2020) or even religious orientation (Moltafet et al., 2010). Most relevant to the current research, mindfulness appears to lead to increases in all aspects of SWB (Bajaj & Pande, 2016). In fact, a recent meta-analysis suggests that trait mindfulness plays a key role in predicting SWB (Jin et al., 2020). Despite numerous calls to better understand predictors of SWB, the research is still unclear regarding the most effective ways to predict or promote SWB. That is, we have little information regarding how these may work together and the process by which SWB results from them.

Mindfulness

Mindfulness can be conceptualized as an active yet non-judgmental awareness of internal and external experiences of oneself as well as an attention to these (Bishop et al., 2004; Brown et al., 2007). Mindfulness, with its basis in Buddhist traditions, has become extremely popular over the years due to its consistent associations with increasing well-being (Brown & Ryan, 2003). Interventions that employ mindfulness constructs are used by practitioners and the general population alike to help promote a host of associated positive health and well-being outcomes across numerous populations (Grossman et al., 2004; Lomas et al., 2019).

Existing research supports the relationship between mindfulness and SWB (Bajaj & Pande, 2016; Jin et al., 2020; Keng et al., 2011). Brown and Ryan (2003) found that mindfulness predicts both affect and life satisfaction. Other research has found that mindfulness is a common predictor of affect in the general population (Lopez et al., 2016). Mindfulness also predicts SWB in quasi-experimental contexts (Bajaj & Pande, 2016). Finally, Mindfulness Based Stress Reduction interventions appear to both increase mindfulness as well as the associated outcomes of affect and overall

well-being (Gawrysiak et al., 2018). Consistent with extant research, we predict that mindfulness significantly relates to higher positive affect and life satisfaction and lower negative affect.

H1: The more mindful people are, the more subjective well-being they will experience.

Meaning in life

For years, MIL was considered to "exist in the eye of the beholder", and studies often broadly asked people if they felt their life had meaning and purpose (e.g., Steger, et al., 2006). However, more recent definitions specify that meaning involves believing that life has a direction (or purpose), is coherent (it makes sense), and is significant (it matters; George & Park, 2016; King et al., 2016; Martela & Steger, 2016). This tripartite view provides researchers and participants alike with a clearer understanding of what it means to have MIL. The presence of MIL is thought to prompt individuals to find motivation to work towards healthier lifestyles and behaviors. As a result, it promotes the experience of positive affect, increased social support, greater cognition, and improved physical capabilities (Zhang et al., 2018).

Similar to mindfulness, there is consistent support for the relationship between MIL and SWB (Jin et al., 2016). Specifically, research has found MIL promotes experiences of SWB and accounts for a significant amount of the variance in SWB (Doğan et al., 2012). MIL also predicts the individual components of SWB (i.e., more positive emotions, less negative emotions, and greater life satisfaction; Ju et al., 2013). Furthermore, meta-analytic evidence from China suggests that MIL has a strong positive correlation with SWB, as a whole, as well as with its three individual components (Jin et al., 2016). As such, we expect that greater MIL will relate to increased life satisfaction and positive affect and decreased negative affect.

H2: The more meaning in life individuals have, the greater subjective well-being they will experience.

Mindfulness to meaning theory states that mindfulness practices allow one the capacity to reappraise life events, focusing on the positive meaningful events as opposed to the negative (Garland et al., 2015). This theory further asserts that mindfulness practices provide individuals both the cognitive control and flexibility to re-evaluate life events as meaningful (Garland et al., 2015). Other theories suggest that actively paying attention to one's life will allow one to discover the meaning already there (Hooker et al., 2018). In support of these theories, mounting evidence suggests that mindfulness predicts MIL (Bloch et al., 2017; Carlson et al., 2016; Dobkin et al., 2016; Klussman, Nichols, & Langer, 2020). This includes multiple meta-analytic investigations that support a strong relationship between mindfulness and MIL (Chu & Mak, 2020; Klussman et al., under review).

Given the relationships between mindfulness, MIL, and SWB, it is reasonable to expect meaning mediates the effect of mindfulness and SWB. Consistent with

this assertion, MIL recently accounted for much of the relationship between SWB and other predictors (Ju et al., 2013; Womick et al., 2020; You & Lim, 2019; Zhao et al., 2019). For example, although narcissism is strongly related to SWB, this relationship completely disappears when MIL is accounted for (Womick et al., 2020). Similarly, MIL partially explains the relationship between stress and SWB (Arslan & Allen, 2021). Together, we expect that the association between mindfulness and SWB will be, in part, due to mindful individuals finding more meaning and that meaning ultimately leading to greater SWB.

H3: Meaning in life will mediate the mindfulness-subjective well-being relationship.

Self-Connection

Self-connection is a newer concept in positive psychology that has recently been receiving attention for its strong relationships with various aspects of mental health and well-being (Klussman, Curtin, et al., 2020; Klussman, Nichols, Langer, et al., 2020a; Klussman, et al., 2021). Self-connection is defined by individuals having self-awareness, self-acceptance, and self-alignment (Klussman, et al., 2022). For one to be self-connected, s/he must experience all three of these aspects together. For example, one who is self-aware, and acts in a way that is in alignment with that may be living authentically but they are not self-connected unless they unconditionally accept truths about themselves. Similarly, if people are self-aware, and accepting of themselves, but do not act consistently with that self, they may experience mindfulness, but not self-connection.

To date, self-connection has demonstrated strong and consistent relationships with various well-being outcomes. For example, self-connection is related to life satisfaction, flourishing, positive affect, and the presence of meaning in life, among others (Klussman, et al., 2021; Klussman, Nichols & Langer, 2020). Self-connection also appears to protect against anxiety, stress, and depression (Klussman, Langer et al., 2021; Klussman, Nichols et al., 2021). Greater self-connection is also related to less burnout (Klussman, Lindeman, et al., 2020). Finally, some evidence suggests that self-connection and positive aspects of SWB are highly related. This includes both life satisfaction and positive affect (Klussman, Langer et al., 2021; Klussman, Lindeman et al., 2020; Klussman, Nichols, Langer et al., 2020a). We thus expect greater self-connection to be related with lower negative affect and greater positive affect and life satisfaction.

H4: The more self-connected people are, the greater their subjective well-being will be.

Self-connection is important to understanding relationships between well-being and its various precursors. In particular, self-connection mediates the relationship between mindfulness and MIL (Klussman, Curtin, et al., 2020; Klussman, Nichols, & Langer, 2020). Specifically, self-connection theory purports that mindfulness

amplifies one's awareness and acceptance of the self—important aspects of self-connection (Klussman et al., 2022). Thus, when one is mindful, or participates in mindful practices, one should more readily become more self-connected. Furthermore, researchers hypothesize that the combination of this self-awareness, self-acceptance, and self-alignment will enable people to live lives that are more personally meaningful (Klussman, Nichols et al., 2021; Klussman, Nichols, et al., 2020). Given this support, we anticipate that self-connection will mediate the relationship between mindfulness and meaning.

H5: Self-connection will mediate the mindfulness-meaning in life relationship.

In all, we assert, in line with previous research, that mindfulness directly relates to SWB. Furthermore, we propose a model where this relationship is mediated by both self-connection and MIL. Greater mindfulness leads to increased self-connection. Then, this connection to oneself allows one to experience greater meaning in life, due to one's actions being perceived as more personally meaningful, or in alignment with their own values, goals, and motivations. Finally, experiencing greater meaning in life leads one to obtain an increased level of subjective well-being. That is, mindfulness leads to SWB through self-connection and MIL.

H6: The relationship between mindfulness and subjective well-being will be mediated by both self-connection and meaning in life.

In this research, we use data collected over the past three years to look at the question of how exactly mindfulness relates to SWB and to test our proposed model (Fig. 1). In Study 1, we cross-sectionally examine this model, and, in Study 2, we look at these relationships across four distinct time points. Overall, the research gives us insight into the strengths of these individual relationships as well as the way they work together to increase SWB.

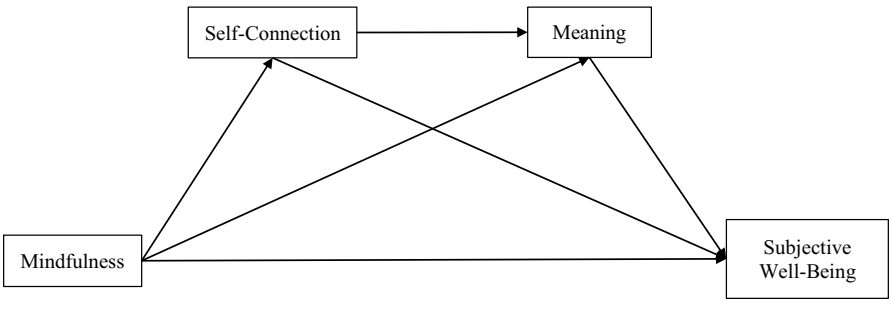

Fig. 1 Full Theoretical Model

Study 1

Method

Between October 2017 and October 2020, our lab conducted 14 independent studies with various samples using both online and local, in-person recruitment. For the current research, we compiled all of this data to examine the relationships among our variables of interest as well as to test the proposed model. In particular, we examine the cross-sectional data in Study 1. Specifically, we included data from any participant who either completed a cross-sectional (non-experimental) study, participated in a longitudinal study of any type, or participated in an experimental study. For those who participated in a longitudinal study, we used only their baseline data. For experimental participants who completed the relevant measures after assignment to a group, we retained only those from the control group.

Participants

Across all of the data, a total of 2,929 individuals participated in one of the surveys administered over the past three years. Of these, 2,672 answered demographic questions. These participants ranged from 18 to 80 years of age ($M = 33.80$, $SD = 10.42$). Of them, 42% identified as male, 45% as female, and 13% did not identify as male or female. The majority of these participants were White (79%), 9% reported being African American/Black, and 6% Asian/Asian American, Indian, and/or Pacific Islander (the remaining 6% were either multi-ethnic or did not respond).

Measures

Mindfulness We used the Cognitive and Affective Mindfulness Scale – Revised to measure mindfulness (CAMS-R; Feldman et al., 2007). This measure consists of 12 items measured on a four-point scale (1 = rarely/not at all; 4 = often/always). An example item is "I can accept things I cannot change". In this measure, higher values reflect more mindfulness ($N = 1031$, $M = 2.86$, $SD = 0.50$, $\alpha = 0.79$).

Self-Connection The Self-Connection Scale (SCS; Klussman, Nichols, Langer, 2020) was used to measure participants' feelings of self-connection. The SCS consists of 12 items rated on a 7-point scale (1 = strongly disagree; 7 = strongly agree; e.g., "I have a deep understanding of myself"). One item is reverse-scored so that higher values indicate more self-connection ($N = 2050$, $M = 5.00$, $SD = 0.82$, $\alpha = 0.83$).

Meaning in Life We used the Meaning in Life Questionnaire-Presence of Meaning subscale to measure MIL (MLQ-P; Steger et al., 2006). The complete MLQ consists of 10 items representing both the search for and presence of meaning (each 5 items). As such, participants completed 5 items on a 7-point scale (1 = absolutely untrue; 7 = absolutely true; e.g., "My life has a clear sense of purpose"). We reverse

scored one item so that higher values indicated more meaning ($N = 1820$, $M = 4.93$, $SD = 1.25$, $\alpha = 0.86$).

Subjective Well-Being To measure SWB, we used two separate measures targeted at the three components of SWB: positive affect, negative affect, and life satisfaction. This strategy has been widely used in SWB research as a way to look at the individual and global constructs of SWB (Bajaj & Pande, 2016; Liang & Zhu, 2015). First, we used the single-item Life Satisfaction measure validated by Cheung and Lucas (2014) to measure life satisfaction. Participants rated their feelings of satisfaction on a four-point Likert-type scale (1 = very satisfied; 4 = very dissatisfied; "In general how satisfied are you with your life?"). We reverse-scored the item so that higher valued reflected more life satisfaction ($N = 1795$, $M = 2.96$, $SD = 0.76$). To measure affect, we used the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Participants rated 10 positive and 10 negative emotions that they had recently felt (e.g., "Sadness": 1 = very slightly or not at all; 5 = extremely). Higher values reflect increased positive ($N = 1054$, $M = 3.16$, $SD = 0.79$, $\alpha = 0.85$) or negative affect ($N = 1054$, $M = 2.36$, $SD = 0.94$, $\alpha = 0.90$).

Analyses

We used the *R* statistical package to perform all analyses (R Core Team, 2020). To test Hypotheses 1, 2, and 4, we performed correlational analyses, using the *psych* package, to examine the bivariate relationships between all of the variables. We then used the sem function of the *lavaan* package to examine our mediation predictions (Hypotheses 3, 5, & 6). Specifically, to test Hypotheses 3, 5, and 6, we tested a model whereby mindfulness predicted both self-connection and SWB. In turn, mindfulness and self-connection predicted the presence of MIL and MIL predicted SWB. In addition, we added the direct relationship between self-connection and SWB to test if MIL is an important part of the relationship between mindfulness and SWB. In all, we requested the direct, indirect, and total effects of mindfulness on all three indicators of SWB (including direct, mediation, and serial mediation effects). All variables were entered as composite, observed, variables, and all predictor variables were first centered. In addition to the effect sizes, this also resulted in a test of the significance of each effect. Specifically, all effects were based on bootstrapped estimates. See Fig. 2 for the full set of resulting direct effects.

Results and Discussion

We first examined the correlations between our measured variables to test hypotheses 1, 2, & 4 (see Table 1). The relationships between mindfulness and all three SWB indicators were significant. Similarly, the relationships between MIL and these indicators were all statistically significant. Self-connection was also significantly related to each of the SWB indicators. Of note, both MIL and self-connection

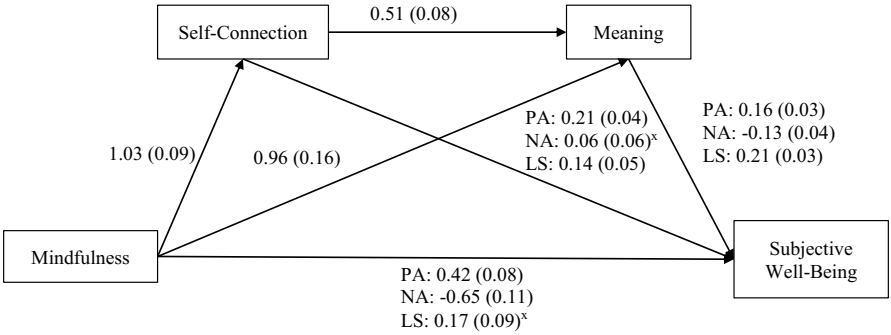

Fig. 2 Study 1 Results. *Note:* Numbers represent unstandardized estimates of direct effects; Effects noted with an "x" were $p > .05$

Table 1 Descriptive Statistics and Correlations for All Variables (Study 1)

Measure	1	2	3	4	5
1. Mindfulness					
2. Self-Connection	.58				
3. Meaning in Life	.53	.56			
4. Positive Affect	.48	.42	.36		
5. Negative Affect	-.42	-.07	-.16	.38	
6. Life Satisfaction	.37	.43	.53	.43	-.27

All correlations were significant at $p < .05$

resulted in nominally weaker relationships with negative affect than did mindfulness or than they did with positive affect and life satisfaction.

We next ran the completely mediated model to test Hypotheses 3, 5, and 6 (see Fig. 2). The relationship between mindfulness and MIL was significant. In addition, MIL demonstrated significant relationships with all three SWB outcomes. In support of hypothesis 3, the indirect relationships from mindfulness through MIL to SWB were all significant (PA: $b = 0.15$ [0.08,0.22], $SE = 0.04$, $p < 0.01$; NA: $b = -0.12$ [-0.20,-0.05], $SE = 0.04$, $p < 0.01$; LS: $b = 0.20$ [0.12,0.29], $SE = 0.04$, $p < 0.01$). In support of hypothesis 5, the association between mindfulness and self-connection was significant, self-connection and MIL were significantly related, and the relationship between mindfulness and MIL (through self-connection) was significant ($b = 0.53$ [0.34,72], $SE = 0.10$, $p < 0.01$).

Finally, we tested Hypothesis 6 by examining the full theoretical model. As shown in Fig. 2, mindfulness related significantly to self-connection. Self-connection, then related to MIL. As a result, MIL related to negative affect, positive affect, and life satisfaction. In support of hypothesis 6, all three indirect effects were significant (PA: $b = 0.08$ [0.04,0.12], $SE = 0.02$, $p < 0.01$; NA: $b = -0.07$ [-0.11,-0.02], $SE = 0.02$, $p < 0.01$; LS: $b = 0.11$ [0.06,0.16], $SE = 0.03$, $p < 0.01$). After controlling for these indirect effects, the direct relationship between mindfulness and life satisfaction became nonsignificant while the relationships between mindfulness and both

positive and negative affect remained significant. This pattern of results was consistent with self-connection and MIL partially mediating the relationships between mindfulness and affect and mediating the relationship with life satisfaction.

Study 2

Method

For Study 2, we examined only the data that longitudinally measured the variables of interest across at least two time-points. Specifically, we included data from any participant who participated in a longitudinal study of any type. This amounted to a total of five independent data collection efforts. For those who participated in an experimental longitudinal study, we used only the data from the control group to avoid any effects of the manipulation/intervention.

Participants

Across all of the data, a total of 465 individuals participated in one of the longitudinal studies conducted over the past three years. Of these, 348 responded to demographic questions. These participants were between 18 and 80 years of age ($M = 35.14$, $SD = 10.91$). Of them, 20% identified as male, 57% as female, and 23% either did not respond or did not identify as male or female. The majority of these participants were White (81%; 9% Asian/Asian American, Indian, and/or Pacific Islander; 3% African American/Black; 7% Mixed Race/Other/Did not respond).

Measures

The measures in this study were the same as the measures in Study 1, including the CAMS-R (Feldman, et al., 2007), SCS (Klussman, Nichols, Langer, 2020), MLQ-P (Steger et al., 2006), the single-item LS (Cheung & Lucas, 2014), and the PANAS (Watson et al., 1988). See Table 2 for all descriptive statistics.

Analyses

We performed similar analyses to those from Study 1. To test Hypotheses 1, 2, and 4, we performed correlational analyses, using the psych package, to examine the bivariate relationships between all of the variables. In the current study, we examined correlations across all four time-points. For example, we examined the correlations between mindfulness at time 1 and SWB at time 2, mindfulness at time 1 and SWB at time 3, mindfulness at time 1 and SWB at time 4, time 2 mindfulness and time 3 SWB, time 2 mindfulness and time 4 SWB, and time 3 mindfulness and time 4 SWB. We did the same for both self-connection and MIL.

Table 2 Descriptive Statistics for All Variables in Study 2 (Times 1–4)

	Time 1				Time 2				Time 3				Time 4			
	N	*M*	*SD*	α	*N*	*M*	*SD*	α	*N*	*M*	*SD*	α	*N*	*M*	*SD*	α
Mind	378	2.81	0.47	.79	221	2.75	0.48	.79	195	2.79	0.48	.79	164	2.82	0.51	.81
SC	418	5.06	0.84	.83	292	4.95	0.89	.82	238	5.14	0.87	.83	235	5.07	0.90	.83
MIL	407	4.75	1.26	.86	292	4.84	1.16	.79	241	5.01	1.13	.79	236	4.99	1.20	.80
PA	419	3.42	0.73	.85	291	3.41	0.82	.90	267	3.44	0.83	.79	236	3.53	0.76	.89
NA	419	2.46	1.00	.90	291	2.61	1.09	.94	267	2.59	1.10	.90	236	2.71	1.13	.96
LS	339	3.07	0.75	_	221	3.12	0.69	_	195	3.06	0.69	_	164	3.07	0.74	_

Mind = Mindfulness; SC = Self-Connection, MIL = Meaning in Life; PA = Positive Affect; NA = Negative Affect; LS = Life Satisfaction; N = sample size; M = mean; SD = standard deviation

To test Hypotheses 3, 5, and 6, we tested the same theoretical model from Study 1 but across time. We again performed this analysis using the sem function of the *lavaan* package. For this analysis, we only included data from participants who completed the measures across four different time-points. Specifically, we entered Mindfulness at time 1, Self-Connection at time 2, MIL at time 3, and SWB at time 4. Time 1 mindfulness predicted both time 2 self-connection and time 4 SWB. In turn, time 1 mindfulness and time 2 self-connection predicted time 3 MIL and time 3 MIL predicted time 4 SWB. In addition, we added the direct relationship between time 2 self-connection and time 4 SWB to test if MIL is an important part of the relationship between mindfulness and SWB. In all, we requested the direct, indirect, and total effects of mindfulness on all three indicators of SWB (through all paths). Again, all variables were entered as composite, observed, variables, and all predictor variables were first centered. In addition to the effect sizes, this also resulted in a test of the significance of each effect. Specifically, all effects were based on bootstrapped estimates.

Results and Discussion

We examined the relationships between our measured variables to test hypotheses 1, 2, & 4 (see Table 3). The relationships between mindfulness (at times 1–3) and all SWB indicators (at all future times—times 2–4) were significant. Similarly, the relationships between MIL (at times 1–3) and these SWB indicators (at all future times—times 2–4) were all statistically significant. Self-connection (at times 1–3) related significantly with positive affect and life satisfaction (at all future times—times 2–4) but demonstrated inconsistent relationships with negative affect.

We next ran the completely mediated model to test Hypotheses 3, 5, and 6 (see Fig. 3). The relationship between mindfulness (time 1) and MIL (time 3) was significant. In addition, time 3 MIL demonstrated significant relationships with all three time 4 SWB outcomes. In support of hypothesis 3, the indirect relationships from time 1 mindfulness through time 3 MIL to time 4 SWB were all significant (PA:

Table 3 Correlations among all variables and timepoints (Study 2)

	Time 1						*Time 2*						*Time 3*						*Time 4*				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Time 1																							
1. Mind																							
2. SC	.67																						
3. MIL	.58	.53																					
4. PA	.55	.59	.59																				
5. NA	-.36	-.11	-.18	.06^{x}																			
6. LS	.41	.43	.57	.56	-.46																		
Time 2																							
7. Mind	.63																						
8. SC	.38	.64					.61																
9. MIL	.34	.41	.74				.62	.70															
10. PA	.38	.45	.51	.77			.53	.66	.62														
11. NA	-.24	.03^{x}	-.20	.13	.88		-.41	-.04^{x}	-.15	.20													
12. LS	.36	.32	.42	.49	-.29	.69	.38	.39	.50	.51	-.28												
Time 3																							
13. Mind	.70						.79																
14. SC	.53	.64					.55	.80					.65										
15. MIL	.45	.30	.77				.60	.54	.83				.64	.61									
16. PA	.38	.40	.49	.73			.52	.62	.58	.82			.59	.61	.60								
17. NA	-.35	.08^{x}	-.20	.19	.89		-.50	.02^{x}	-.17	.24	.91		-.49	-.14	-.26	.15							
18. LS	.44	.34	.53	.51	-.32	.70	.49	.56	.63	.61	-.32	.85	.54	.59	.64	.63	-.35						
Time 4																							
19. Mind	.69						.80						.82										
20. SC	.58	.66					.63	.81					.61	.83					.66				

Table 3 (continued)

	Time 1						*Time 2*						*Time 3*						*Time 4*				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
21. MIL	.54	.39	.76				.61	.58	.84				.60	.59	.85				.67	.64			
22. PA	.46	.47	.49	.77			.47	.61	.53	.81			.49	.58	.57	.81			.57	.62	.58		
23. NA	-.45	.02^{x}	-.25	.13^{x}	.88		-.55	-.04^{x}	-.23	.19	.90		-.61	-.12^{x}	-.29	.10^{x}	.91		-.62	-.14	-.31	.12^{x}	
24. LS	.41	.34	.56	.61	-.30	.63	.46	.57	.66	.58	-.33	.82	.53	.52	.61	.57	-.33	.75	.49	.53	.58	.59	-.42

Mind = Mindfulness; SC = Self-Connection, MIL = Meaning in Life; PA = Positive Affect; NA = Negative Affect; LS = Life Satisfaction; N = sample size; M = mean; SD = standard deviation; $^{x} = p > .05$

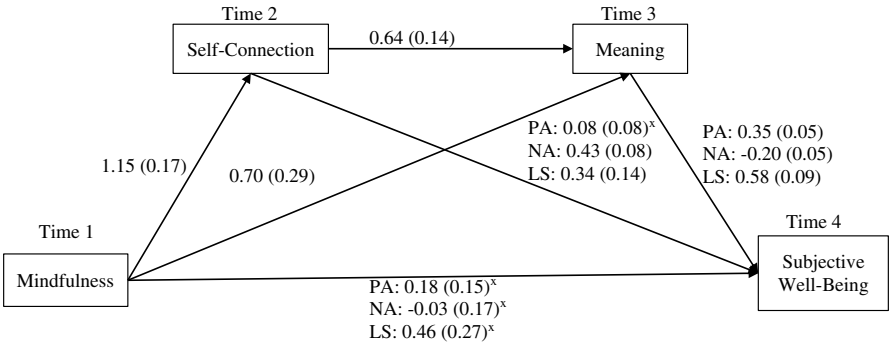

Fig. 3 Study 2 Results. ***Note:*** Numbers represent unstandardized estimates of direct effects; Effects noted with an "x" were $p > .05$

$b = 0.25$ [0.03,0.46], $SE = 0.11$, $p = 0.02$; NA: $b = -0.14$ [-0.28,-0.004], $SE = 0.07$, $p = 0.04$; LS: $b = 0.41$ [0.05,0.76], $SE = 0.18$, $p = 0.02$). In support of hypothesis 5, time 1 mindfulness and time 2 self-connection were significantly related, time 2 self-connection and time 3 MIL were significantly related, and the indirect effect of self-connection at time 2 on the relationship between time 1 mindfulness and time 3 MIL was significant ($b = 0.73$ [0.36,1.11], $SE = 0.19$, $p < 0.01$).

Finally, we tested Hypothesis 6 by examining the full theoretical model. As shown in Fig. 3, time 1 mindfulness related significantly to time 2 self-connection. Time 2 self-connection, in turn, related to time 3 MIL, and time 3 MIL related to positive and negative affect as well as life satisfaction at time 4. In support of hypothesis 6, all three indirect effects were significant (PA: $b = 0.26$ [0.11,0.41], $SE = 0.08$, $p < 0.01$; NA: $b = -0.15$ [-0.25,-0.04], $SE = 0.06$, $p < 0.01$; LS: $b = 0.43$ [0.17,0.69], $SE = 0.13$, $p < 0.01$). After accounting for these indirect effects, the direct relationships between time 1 mindfulness and time 4 SWB became nonsignificant, suggesting a pattern consistent with self-connection and MIL mediating these relationships.

General Discussion

Past research has suggested a strong relationship between mindfulness and SWB (Bajaj & Pande, 2016; Jin et al., 2020; Keng et al., 2011), yet a clear model of how this relationship occurs has eluded researchers. Some research has suggested that this may be through self-connection (Klussman, Langer et al., 2021; Klussman, Lindeman, et al., 2020; Klussman, Curtin et al., 2020) while others point to MIL as the mechanism (Doğan et al., 2012; Ju et al., 2013). Together, we examined the importance of both self-connection and MIL in the mindfulness-SWB relationship. Using data collected in our lab over the past three years, the present paper examined a model where mindfulness relates to SWB through self-connection and MIL.

Consistent with previous research and our hypotheses, mindfulness, MIL, and self-connection all independently and significantly related to SWB (Bajaj & Pande, 2016; Doğan et al., 2012; Jin et al., 2020; Ju et al., 2013; Keng et al., 2011;

Klussman, et al., 2021; Klussman, Lindeman, et al., 2020; Klussman, Curtin et al., 2020). In addition, the relationship between mindfulness and SWB, through MIL, was significant. Similarly, the indirect relationship between mindfulness and MIL, through self-connection, was significant. That is, mindfulness related to MIL, at least partly, because mindful people are more self-connected. Furthermore, mindfulness is related to SWB, to some extent, because mindful people experience more meaning in their lives.

When examining the full theoretical model, we additionally found support for the relationship between mindfulness and life satisfaction (one component of SWB) being mediated by self-connection and MIL (both cross-sectionally and across time). In the longitudinal data, self-connection and MIL also produced a pattern of effects consistent with mediating the relationship between mindfulness and affect. However, the pattern of effects in the cross-sectional data was consistent with self-connection and MIL only partially mediating the relationship between mindfulness and affect. One explanation for this difference could be that the effects of self-connection and MIL take time to develop. That is, the more time that passes, the more mindfulness increases self-connection, self-connection increases MIL, and MIL ultimately improves SWB.

Implications

Due to the popularity of mindfulness, it is important to understand why mindfulness and its associated practices impact individuals. Given that happiness is an outcome many strive for in their lives (i.e., Capaldi et al., 2014; Curry et al., 2018; Myers & Diener, 1995) and it is thought that mindfulness is an important key to SWB (Bajaj & Pande, 2016; Jin et al., 2020; Keng et al., 2011), it is imperative to investigate the underlying pathways that promote happiness. If self-connection and MIL mediate this relationship, as our results suggest, then the focus on mindfulness to increase SWB would benefit from supplementation. That is, identifying and promoting interventions aimed at increasing both self-connection and MIL may be more effective ways to ultimately improve SWB.

Further, our research has implications for practitioners (i.e., clinicians, coaches, etc.) whose clients are not responding well to mindfulness practices. The current research suggests that there may be other pathways to happiness. For instance, if someone is struggling with identifying their experiences mindfully, it might be useful to discuss self-connected and past meaningful moments to determine how they might be amplified in the future. Additionally, the concepts of self-connection and meaning in life may work hand in hand with values congruence. Helping one define their values may aid in the utilization of self-connection, and meaning in life, thus promoting increased happiness among those who struggle with mindfulness practices.

Limitations and Future Directions

Despite the power that resulted from compilation across thousands of participants, Study 1 still suffers from the drawbacks of any cross-sectional data. Although the

data from Study 2 somewhat alleviate those concerns, larger samples using longitudinal experiments are necessary to bring full confidence to these findings. Similarly, participants in our studies were relatively homogeneous. As a result, future research should focus on obtaining representative samples, ideally from outside of the USA, to better generalize these findings.

Due to the implications of self-connection and MIL potentially mediating the relationship between mindfulness and SWB, researchers must replicate this finding and experimentally manipulate the variables of interest to fully understand these various pathways to improve SWB. An important avenue for future researchers would be to develop an intervention aimed at efficiently increasing both meaning and self-connection. For example, one promising direction would be to employ the use of photography. Past work suggests that photographing meaningful events provides participants nonverbal ways of assessing their lives' meaning (Steger et al., 2013) and is effective at increasing satisfaction (Klussman, Nichols et al., 2021b; Van Zyl et al., 2019). Using this method, participants could photographically document the meaningful and self-connected moments in their lives, with the goal of increasing SWB. In general, identifying how individuals can promote their own happiness through self-connection and MIL should be a driving force for future researchers.

Another interesting avenue for exploration is to examine the relationship between self-connection, MIL and negative affect specifically. Our results suggested that self-connection had weaker relationships with negative affect than mindfulness (and somewhat MIL). One potential explanation for this relationship relies on the previous research that argues positive and negative affect are distinct constructs operating on different pathways as opposed to opposite ends of the same spectrum (Diener & Emmons, 1984). Additionally, past research on self-connection similarly suggests that self-connection does not relate to negative affect (Klussman, Nichols, Langer et al., 2020b) while self-disconnection does (Klussman, Langer et al., 2020). It is theorized that self-connection/disconnection functions similarly to affect, working on distinct pathways (Klussman et al., 2020b). Future research should examine this relationship further to understand the intricacies of the relationship between mindfulness, self-connection, and negative affect.

Conclusion

In all, this research illuminates the possibility that self-connection and MIL may account for the relationship between mindfulness and SWB. Across two studies, the proposed model supported the idea that self-connection and MIL mediate the relationship between mindfulness and SWB. This finding suggests a need for interventions aimed at promoting self-connection and MIL. These interventions would likely be useful and effective tools (potentially even more direct and effective than mindfulness-based interventions) in the eternal search for happiness.

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Declarations

Conflicts of interest/Competing interests The authors have no conflicts of interest to declare that are relevant to the content of this article.

Ethics approval All data presented in this paper was obtained after approval from IntegReview IRB.

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