Journal of Happiness Studies (2020) 21:2827–2850
https://doi.org/10.1007/s10902-019-00201-y

RESEARCH PAPER

The Contribution of Meaningfulness and Mindfulness to Psychological Well-Being and Mental Health: A Structural Equation Model

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Published online: 9 November 2019
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Abstract
Experiencing meaning in life and practicing mindfulness in daily life are desirable features of a healthy and satisfactory life. However, the relationships among meaningfulness, mindfulness, psychological well-being and mental health outcomes remains elusive. The aim of this study was to investigate the relationship between mindfulness and meaning in life and to analyse how these variables are connected with life satisfaction, happiness, mental health and affect scores, regarded as outcome variables, after controlling for the effects of socio-demographic variables and religious attitudes. The data from a questionnaire survey ($N = 1628$), including measures of the presence of meaning in life, dispositional mindfulness, life satisfaction, happiness, mental health and affect, were analysed using correlation analyses, multiple regression analyses and structural equation modelling. Mindfulness and meaningfulness were significantly associated with one another. A structural equation model revealed that compared to mindfulness, meaningfulness was more strongly associated with positive well-being (i.e., life satisfaction, happiness and positive affect). Mindfulness, however, had a stronger relationship with negative well-being (i.e., negative affect and mental health issues). Moreover, meaningfulness was found to mediate the relationship between mindfulness and both positive and negative well-being. These findings provide new insights for psychological interventions promoting well-being and enhancing mental health through mindfulness- and meaningfulness-based approaches.

Keywords Mindfulness · Meaning in life · Well-being · Life satisfaction · Happiness · Mental health

1 Introduction

Mindfulness and meaning in life are associated with mental health and well-being (Gu et al. 2015; Steger 2017, 2018). However, little is known about how these constructs are connected to each other and to positive outcomes. Mindfulness involves (1) the self-regulation

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of attention, keeping it focused on the present moment and immediate experiences, and (2) a particular orientation towards one's experiences in the present moment, characterised by curiosity, openness and acceptance (Bishop et al. 2004). In contrast, meaning in life refers to assessments about the significance, purpose, and coherence in a person's life (George and Park 2016; Martela and Steger 2016).

1.1 Connections Between Mindfulness and Meaning in Life

Research has suggested that mindfulness may provide a pathway to meaning in life (Littman-Ovadia and Niemiec 2016), with mindfulness and meaning in life being positively correlated (Allan et al. 2015; Bloch et al. 2017; Hanley et al. 2015; Jacobs et al. 2011). From a theoretical perspective, mindfulness has been proposed to foster assessments about meaning in life, which, in turn, can lead to eudaemonic well-being (Bellin 2015; Garland et al. 2015; Wong 2012). Similarly, Shapiro et al. (2006) identified 'values clarification', i.e., a person's recognition of what is meaningful and what truly matters in life, among the mechanisms through which mindfulness leads to positive outcomes. Empirical research has also shown that training in mindfulness-based meditation is connected with enhanced feelings of meaningfulness and higher levels of well-being (Ando et al. 2011). Jacobs et al. (2011) have reported that changes in one's sense of purpose in life (i.e., an aspect of meaningfulness) significantly mediate the effects of intensive mindfulness-based meditation training on positive cognition and negative emotions. Similarly, Carmody et al. (2009) found that changes related to having a general sense of meaning, purpose, and goal-directedness in life partially mediated the relationship between changes in mindfulness and changes in psychological symptoms after participation in mindfulness-based training. According to Shonin and Van Gordon (2016), these findings suggest that mindful awareness helps clarify purpose in life, which, in turn, leads to enhanced mental health.

1.2 Meaning in Life, Well-Being and Mental Health

Feeling meaning in life is associated with positive outcomes throughout one's lifetime (Scannell et al. 2002; Steger et al. 2006, 2009; Steger and Kashdan 2007). Having a purpose in life makes people experience more satisfaction with life (Cotton Bronk et al. 2009). Those who view the world as comprehensible, manageable, and meaningful tend to report a higher quality of life and a positive subjective state of health (Eriksson and Lindström 2006, 2007). Greater positive affect is also linked to stronger perceptions of meaning in life (Hicks et al. 2012). In addition, meaningfulness mediates the relationships among personality variables and subjective well-being indicators such as happiness, life satisfaction, and affect balance (Compton 2000). In contrast, lower levels of meaningfulness appear to be associated with depression, hopelessness, anxiety, psychological stress, rumination, and other psychological symptoms (Glaw et al. 2017) and negative affect (King et al. 2006; Machell et al. 2015).

According to Zika and Chamberlain (1992), feeling there is meaning in life is more highly connected with positive than negative dimensions of well-being. Schnell (2009) confirmed that meaningfulness is associated with indicators of positive well-being (satisfaction with life and positive affect), while experiencing a crisis of meaning in life (i.e., the evaluation of life as being frustratingly empty and lacking meaning) is related to negative well-being (depression and anxiety).

1.3 Mindfulness, Well-Being and Mental Health

Similar to meaningfulness, mindfulness has been associated with a wide range of positive outcomes and well-being indicators, such as greater satisfaction with life; fewer symptoms of depression and anxiety; enhanced physical well-being; and more self-reported autonomy, relatedness, vitality and competence (Bowlin and Baer 2012; Brown and Ryan 2003). Psychotherapeutic approaches based on training mindfulness skills have demonstrated efficacy in the treatment of psychological problems, especially in depression, anxiety and stress-related disorders (Chiesa and Serretti 2011; Grossman et al. 2004; Khoury et al. 2013). Beyond the clinical context, Killingsworth and Gilbert (2010) found that mind-wandering was linked to lower levels of happiness, whereas focusing on the present moment when performing daily life activities was associated with higher happiness scores. Dispositional, i.e., trait-like, mindfulness, is also strongly related to positive states of mind and lower levels of depression and anxiety (Bränström et al. 2011).

Various mechanisms have been proposed to account for the positive outcomes associated with mindfulness. For instance, Hölzel et al. (2011) suggested that mindfulness can activate self-regulation processes such as attentional regulation; increased body awareness; emotional regulation through reappraisal, exposure, extinction and reconsolidation; and change in one's perspective of the self. Although meaning in life has also been suggested to play a role (Shapiro et al. 2006; Shonin and Van Gordon 2016), empirical research analysing the mediating effects of meaningfulness on the relationships between mindfulness and psychological outcomes is needed.

1.4 The Role of Socio-demographic Variables and Religious Attitudes

Socio-demographic variables, such as age, gender, education, and labour status, may be related to meaningfulness (Pedersen et al. 2018; Schnell 2009; Steger and Dik 2009; Steger et al. 2006) and mindfulness (Baer et al. 2008). Previous literature has also connected religiosity with experiencing meaning in life (Newton and McIntosh 2013; Pedersen et al. 2018; Park 2005; Steger and Frazier 2005) and mindfulness (Crescentini et al. 2014). Moreover, both socio-demographic variables (Dolan et al. 2008; Fernández-Ballesteros et al. 2001) and religious attitudes (Abdel-Khalek 2006; George et al. 2002; Hackney and Sanders 2003; Lee and Newberg 2005; Park and Slattery 2013; Seybold and Hill 2001; Steger and Frazier 2005) have also been found to be associated with psychological well-being and mental health. Therefore, these are aspects worth considering in analyses aiming to clarify the associations among mindfulness, meaningfulness, and well-being.

1.5 The Present Study

The separate relationships that both meaningfulness and mindfulness have with well-being, mental health and affect have been extensively reported. However, some questions remain open. As previous theoretical proposals (Shapiro et al. 2006; Shonin and Van Gordon 2016) and empirical results (Carmody et al. 2009; Jacobs et al. 2011) suggest, testing whether meaningfulness may be among the mechanisms that explain the connections between mindfulness and beneficial outcomes is a relevant issue. Empirically based models that include both mindfulness and meaningfulness could help deepen our knowledge of

how these constructs contribute to well-being and whether they are distinctively associated with positive or negative well-being. In this regard, our study aims to test the following hypotheses:

Hypothesis 1 (H1) A positive association between dispositional mindfulness and meaningfulness is expected, with higher levels of mindfulness being associated with a higher presence of meaning in life.

Hypothesis 2 (H2) Both mindfulness and meaningfulness are expected to be significant predictors of happiness, satisfaction with life, mental health, and positive and negative affect. Higher levels of mindfulness and meaningfulness are expected to be associated with higher levels of life satisfaction, happiness, and positive affect (H2.1) and with lower levels of psychological symptoms and negative affect (H2.2). We also expect that both meaningfulness and mindfulness will be positively associated with 'positive well-being' and negatively connected with 'negative well-being' (H2.3). The 'positive well-being' latent (i.e., unobserved) variable will be constructed from happiness, satisfaction with life and positive affect, which are observed (i.e., directly measured) variables, and the 'negative well-being' latent variable will be constructed from assessments of mental health status based on potential symptoms and negative affect. In addition, the strength of the associations among mindfulness, meaningfulness, and the proposed outcome variables will be explored.

Hypothesis 3 (H3) Meaningfulness is expected to mediate the associations between mindfulness and the outcome variables.

Finally, a model representing the relationships among meaningfulness and mindfulness and both 'positive well-being' and 'negative well-being' will be tested. Such a model is intended to provide a comprehensive view of the complete pattern of the relationships among the study's main variables.

In all the abovementioned relationships, the influence of socio-demographic and religious attitudes should be controlled for, as these variables could be potential confounders.

2 Materials and Methods

2.1 Participants

Our sample was composed of 1628 adults (87.3% women) with a mean age of 40.2 years (SD = 15.99), ranging from 18 to 70 years of age. Participants came from a total of 18 Latin American Spanish-speaking countries and from Spain. Venezuela, Colombia, Argentina, Uruguay, Mexico and Spain were the most represented countries, providing 38.8%, 13.9%, 12%, 6.4%, 4.9% and 3.9% of respondents, respectively. Other countries providing respondents were Chile (2.9%), Peru (2.8%), Nicaragua (2.7%), the Dominican Republic (2.5%), Paraguay (2.0%), Bolivia (1.7%), Salvador (1.7%), Ecuador (1.4%), and Guatemala, Honduras, Costa Rica, and Cuba (each representing less than 1%). Concerning their education, 14.9% of the participants had reached the postgraduate level, and 42.6% had completed graduate studies. Professional training and high-school education had been acquired by 21.4% and 16.7% of participants, respectively, whereas those who had completed elementary studies comprised 4.5% of the sample. Almost half of the participants

(45%) were active workers, 14.4% were unemployed, 18.3% were students without a job allowing for economic autonomy, 11.6% were retirees, and 10.7% reported other labour situations. With respect to participants' attitudes towards religion, most of them (55.1%) characterised themselves as being 'non-practising believers', 26% reported being believers involved in religious practice, and 18.9% defined themselves as being 'non-believers' (i.e., atheist, agnostic or indifferent concerning religious belief).

2.2 Procedure

An online questionnaire was used to collect data from February to May 2017. The recruitment of participants was carried out using advertisements on online social networks. The recruitment message included a link to the questionnaire website and informed potential participants that this research focused on Spanish-speaking individuals living in Latin America and Spain who were over 18 years old. To maximise the recruitment process, when social network platforms allowed it, the recruiting message was delivered to people interested in topics such as psychology, emotions, and mindfulness. In addition, a snowball strategy was used, with potential participants being encouraged to forward the recruiting message to their contacts.

Respondents were informed that this study was part of a research project aiming to gather more information, from a psychological perspective, about feeling meaning in life, mindful living, health and well-being. The questionnaire did not request any data that would allow the identification of particular individuals, and before starting the survey, participants were also told that all responses would be treated anonymously. To prevent missing values, all items in the survey were forced-response items. Completing the questionnaire was voluntary, with no monetary or material compensation and/or incentive for participants. Informed consent was collected for each individual participant. All procedures performed in this study were in accordance with the ethical standards of the Pontifical University of Salamanca Research Ethics Committee.

A total of 1791 questionnaires were received; however, 163 were discarded, as they were duplicates (i.e., the same participant erroneously submitted his/her responses several times; 39 questionnaires) or responses were from individuals who were outside the age range included in this research, i.e., younger than 18 years old (83 questionnaires) or over 70 years old (41 questionnaires). Therefore, valid answers represented 90.9% of the received questionnaires.

2.3 Instruments

Feeling meaning in life was measured using the Spanish translation of the Presence of Meaning subscale of the Meaning in Life Questionnaire (MLQ) (Steger et al. 2006; Spanish translation, developed by Steger and Zaccagnini, available at the original author's website: http://www.michaelfsteger.com/wp-content/uploads/2013/03/MLQ-Spanish.doc). The MLQ's Presence of Meaning subscale comprises 5 items aiming to assess to what extent the respondents feel their lives have meaning. An example item is 'I have a good sense of what makes my life meaningful'. Participants responded to each item on a 7-point Likert-type scale in which 1 = Absolutely untrue and 7 = Absolutely true. A total score for each participant was calculated by averaging the 5 items of the subscale, with higher scores (ranging from 1 to 7) representing experiencing higher levels of meaning in life. The internal consistency reliability for the presence of meaning items was $\alpha = 0.84$.

Our study focused on mindfulness as a disposition or trait, i.e., as an ability not related to any specific training, exercise, or practice (i.e., state-mindfulness). In this regard, mindful living was assessed using a Spanish version of the Five Facets of Mindfulness Questionnaire (FFMQ) (Baer et al. 2006; Cebolla et al. 2012). As some researchers have noted, the FFMQ is a comprehensive scale that integrates other validated mindfulness questionnaires (Baer et al. 2006; Bergomi et al. 2013; Sauer et al. 2013). The FFMQ is a 39-item instrument designed to evaluate the respondents' general tendency to be mindful in daily life. The FFMQ assumes a multidimensional view of mindfulness, considering five aspects of this construct, and therefore, the included items referred to the respondents' ability to (1) observe their own thoughts, bodily sensations and emotions; (2) describe their feelings; (3) act with awareness; and approach inner experiences in a (4) non-judgemental and (5) non-reactive way. An example item is 'When I do things, my mind wanders off and I'm easily distracted' (reverse scored). Participants responded on a 5-point Likert-type scale in which 1 = Never or very rarely true and 5 = Very often or always true. A unique global scale score was calculated by averaging the respondents' answers to the 39 items. Higher scores (ranging from 1 to 5) were indicative of a higher tendency to be mindful in daily life. The internal consistency reliability was $\alpha = 0.89$.

The Satisfaction with Life Scale (SWLS) was used to assess participants' global feelings of life satisfaction (Diener, Emmons, Larsen, and Griffin; Spanish adaptation by Vázquez et al. 2013). The SWLS consists of 5 items representing statements indicative of contentment with one's life and its conditions. An example item is 'In most ways, my life is close to my ideal'. The response format is a 7-point Likert-type scale, ranging from 1 = Strongly disagree to 7 = Strongly agree. The scale's total scores were calculated by averaging answers to the 5 items, with higher scores (ranging from 1 to 7) indicating greater satisfaction with life. The reliability according to Cronbach's alpha was 0.85.

The Subjective Happiness Scale (SHS) is a 4-item scale aiming to measure the participants' global level of perceived happiness (Lyubomirsky and Lepper 1999; Spanish version by Extremera and Fernández-Berrocal 2014). Two items ask respondents to report the extent to which they consider themselves to be a happy or an unhappy person, in absolute terms and relative to other people (e.g., 'Compared to most of my peers, I consider myself: less happy/more happy'). The other two items present descriptions of happy and unhappy people, and respondents are requested to indicate the extent to which each description applies to them (e.g., 'Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterisation describe you? Not at all/A great deal'). All items were rated on a 7-point Likert-type scale. Total scores were calculated for each participant, averaging their responses to the four items (ranging from 1 to 7), with higher scores indicating higher levels of perceived happiness. The internal consistency reliability was $\alpha = 0.81$.

The Spanish version of Goldberg's 12-item General Health Questionnaire (GHQ-12) was used as a measure of possible disturbances concerning psychological well-being (Goldberg and Williams 1988; Rocha et al. 2011). The GHQ-12 is a screening instrument designed to identify individuals with possible diagnosable psychological disorders. An example item is 'Over the past few weeks, have you lost much sleep over worry?' Participants are asked to respond to each question on a 4-point Likert-type scale, from 0 to 3, with higher scores indicating that the symptoms/problems have been recently present more than usual. A total score (ranging from 0 to 3) was calculated for each participant by averaging the individual's responses to the twelve items. Cronbach's alpha was 0.91.

The Mental Health subscale of the SF-36 Health Survey (Ware et al. 1993; Spanish adaptation by Alonso et al. 1995) was used to identify possible symptoms of depression

(e.g., 'Have you felt downhearted and blue?') and anxiety (e.g., 'Have you been a very nervous person?'). This subscale comprises 5 items and uses a 5-point Likert-type response format. Total scores were obtained following instructions provided by Ware et al. (1993). A higher total score (ranging from 1 to 5) indicated a better self-assessment of mental health status. The internal consistency reliability was $\alpha = 0.85$.

The extent to which the participants experienced positive and negative feelings during the few weeks prior to answering the questionnaire was assessed by the corresponding scales of the Positive Affect Negative Affect Schedule (PANAS) (Watson et al. 1988; Spanish adaptation by Sandín et al. 1999). This instrument consists of 10 items representing positive moods (e.g., interested, enthusiastic, inspired) and 10 items representing negative moods (e.g., irritable, upset, afraid). Participants were asked to rate the extent to which they had recently experienced each of the twenty feelings or emotions on a 5-point Likert-type scale, ranging from 1 = Very slightly or not at all to 5 = Extremely. Two separate total scores corresponding to positive and negative affect were obtained for each participant. Total scores (ranging from 1 to 5) were calculated by averaging each respondent's answers to the ten items included in the positive/negative affect scales, with higher scores indicating experiencing more positive/negative moods. Cronbach's alpha, representing internal consistency, was $\alpha = 0.91$ for the positive affect scale and $\alpha = 0.92$ for the negative affect items.

Participants also reported their age, gender (male or female), education level (elementary studies, high school, professional training, graduate studies, or postgraduate studies), and current labour status (student without employment allowing for economic autonomy, unemployed, active employment, retiree, or other labour situations). Moreover, we requested participants to indicate their attitude towards religious belief (non-believer, i.e., atheist, agnostic or indifferent to religion; non-practising believer; or practising believer).

2.4 Data Analysis

Descriptive statistics (frequencies, means and standard deviations) were calculated for the study variables. Possible group differences in meaningfulness and mindfulness were analysed by independent samples *t*-tests and ANOVA. Alternatively, when the homogeneity of variance assumption of ANOVA was not met, the Brown–Forsythe robust F was reported. Pearson's r correlations were used to analyse bivariate associations between measures. To compare differences between pairs of correlations, z-tests for dependent samples were used.

A series of multiple regression analyses (block-wise procedure, method: forced entry) were carried out to test the relationships among socio-demographic variables, meaning in life and mindfulness (considered as predictors) and psychological well-being, affect, and mental health measures (regarded as outcome variables). To avoid potential multicollinearity problems, all quantitative variables were standardised prior to conducting the regression analyses. The variance inflation factor (VIF), tolerance values, and condition indexes were then used to check the assumption of no multicollinearity. As all VIF values were below 10, no tolerance values were below 1, and the condition indexes were below 15, we safely concluded that there was no collinearity in the data, according to the usual criteria (Field 2009; Hair et al. 2010).

Following Hayes (2009, 2013), a bootstrapping-based method was used to test mediation effects involving mindfulness as the independent variable, meaningfulness as the mediator, and the outcome variables. The indirect (mediated) effects represent the effects of mindfulness on the proposed outcome variables through meaningfulness. Point estimates and 95%

bias-corrected and accelerated (*BCa*) bootstrap confidence intervals for the indirect (mediated) effects were calculated using 5000 bootstrap samples. A statistically significant mediated effect, different from zero with 95% confidence, was obtained if zero did not occur between the lower and upper bounds of the *BCa* confidence interval.

Finally, structural equations were used to test a model depicting the complete pattern of relationships among variables. Critical ratios (z) for parameter differences were used to compare the regression weights of the pairs of paths in the structural equation model (SEM). Critical ratio statistics were evaluated in terms of statistical significance, with a z score below 1.96 indicating that the hypothesis that the two regression weights were equal in the population could not be rejected at the 0.05 level (Arbuckle 1995). To test mediation hypotheses involving positive well-being and negative-well-being latent variables, 95% bias-corrected percentile method confidence intervals (*BC*) were calculated for the indirect effects of mindfulness on the outcomes through meaningfulness.

All the abovementioned tests were conducted using a two-tailed significance level, which is more conservative than a one-tailed test. Data analyses were carried out using the statistical software IBM SPSS 19 and AMOS 16 (IBM, Armonk, NY, USA).

3 Results

Overall, our participants reported moderate levels of both the presence of meaning in their lives and mindfulness (Table 1). No gender differences were observed for these variables (Table 2). Remarkably, meaningfulness and mindfulness were significantly associated with the participants' age, yielding a medium effect-size correlation, which points to higher levels of meaningful and mindful living as one's age increases (Table 3). The extent to which the participants rated their lives as being meaningful and mindful also differed by education level, with participants who had obtained a postgraduate degree reporting higher levels of both meaningfulness and mindfulness (Table 2). Differences in these variables were also found based on the participants' labour status. Unemployed persons and students reported feeling significantly less meaning in life than persons in active employment, retirees and people reporting other labour situations (Table 2). A similar pattern was found for differences in mindfulness by labour status, with unemployed persons and students reporting lower levels of mindful living.

Table 1 Descriptive statistics (Means and Standard deviations) for the study variables

Variable	Range of scoring	Mean	Standard deviation	95% CI for the mean	
				Lower bound	Upper bound
Meaningfulness	1–7	5.12	1.43	5.05	5.19
Mindfulness	1–5	3.45	0.56	3.42	3.48
Satisfaction with life	1–7	4.48	1.40	4.41	4.55
Happiness	1–7	4.81	1.34	4.75	4.88
Perceived mental health	1–5	3.39	0.94	3.34	3.43
Psychological symptoms (GHQ-12)	0–3	1.25	0.71	1.22	1.29
Positive affect	1–5	3.52	0.90	3.48	3.56
Negative affect	1–5	2.43	0.98	2.38	2.48

Table 2 Descriptive statistics (Means and Standard deviations) for meaningfulness and mindfulness, by socio-demographic categories

	N	Meaningfulness			Mindfulness		
		Mean	*SD*	Between-group tests	Mean	*SD*	Between-group tests
Gender				$t_{1626} = -0.14$			$t_{1626} = -1.03$
Female	1422	5.12	1.45		3.44	0.57	
Male	206	5.13	1.32		3.48	0.53	
Education				$F_{4,576.10} = 5.29$***			$F_{4,1627} = 14.29$***
Elementary studies	73	5.00	1.67		3.31	0.58	
High school	272	4.99	1.50		3.38	0.52	
Professional training	348	5.18	1.39		3.46	0.53	
Graduate	693	5.03	1.43		3.40	0.57	
Post-graduate	242	5.49	1.26		3.68	0.54	
Labour status				$F_{4,1121.55} = 30.40$***			$F_{4,1121.90} = 40.36$***
Active employment	733	5.32	1.36		3.53	0.57	
Unemployed	234	4.78	1.50		3.33	0.53	
Students	298	4.47	1.44		3.16	0.48	
Retirees	189	5.56	1.26		3.67	0.52	
Not defined labour status	174	5.39	1.32		3.53	0.52	
Religious belief				$F_{2,977.18} = 52.38$***			$F_{2,985.91} = 17.14$***
Non-believers	307	4.72	1.53		3.45	0.61	
Non-practicing believers	897	4.99	1.40		3.39	0.55	
Practicing believers	424	5.69	1.24		3.58	0.52	

***$p < .001$

Table 3 Correlations (Pearson's *r*) among age, meaningfulness, mindfulness, satisfaction with life, happiness, mental health measures, and affect

	1	2	3	4	5	6	7	8
1. Age								
2. Meaningfulness	.32							
3. Mindfulness	.38	.54						
4. Satisfaction with life	.27	.63	.48					
5. Happiness	.22	.59	.57	.62				
6. Perceived mental health	.26	.49	.54	.52	.63			
7. Psychological symptoms (GHQ-12)	−.27	−.54	−.59	−.56	−.65	−.74		
8. Positive affect	.18	.56	.53	.53	.61	.60	−.65	
9. Negative affect	−.32	−.46	−.58	−.46	−.57	−.73	.73	−.51

Correlations $r \geq .05$ are significant at $p < .05$; correlations $r > .08$ are significant at $p < .01$

Furthermore, religious attitudes also appeared to play a role in meaningfulness and mindfulness. The level of reported meaningfulness varied across practising believers, non-practising believers, and non-believers. Concerning mindful living, practising

believers reported significantly higher scores than either non-practising believers or atheist individuals, agnostic individuals or those uninterested in religion (Table 2).

As shown in Table 3, the presence of meaning in life and mindfulness were strongly associated with one another, with a Pearson's r indicating that 29.2% of the variance among these variables was shared. Moreover, mindfulness was a significant predictor of the presence of meaning in life after controlling for socio-demographic and religious attitudes ($\beta = .47$, $p < .001$). This result provides support for Hypothesis 1.

Both meaningfulness and mindful living were moderately to strongly correlated with life satisfaction, happiness, mental health measures, and affect. The greater the presence of meaning and mindfulness in daily life, as reported by participants, the more they were satisfied with life, felt happy, perceived better mental health, and experienced positive moods. Conversely, higher scores in meaningfulness and mindfulness corresponded to lower levels of psychological symptoms and fewer negative moods (Table 3). Interestingly, in terms of the effect size, meaning in life was the variable most strongly associated with life satisfaction, with a shared variance of 39.7%. The correlation between meaningfulness and satisfaction with life was significantly stronger than the association between mindfulness and life satisfaction ($z = 8.20$, $p < 0.001$). No significant differences were found, however, when examining the differences between the correlations between positive affect and meaningfulness and mindfulness ($z = 1.16$, $p > .05$) or the differences between the correlations between happiness and meaningfulness and mindfulness ($z = 1.53$, $p > .05$). The correlations between mindfulness and perceived mental health, psychological symptoms and negative affect were stronger than the correlations between meaningfulness and perceived mental health ($z = -2.52$, $p = 0.011$), psychological symptoms ($z = 2.76$, $p = 0.005$) and negative affect ($z = 6.39$, $p < 0.001$).

Socio-demographic variables included in the series of regression analyses yielded further interesting results concerning outcome variables (Tables 4, 5, 6). Age was a significant predictor of life satisfaction, happiness, mental health, and affect. In particular, as age increased, participants tended to report higher levels of psychological well-being and fewer mental health issues, and they experienced positive more emotions and fewer negative moods. Women showed slightly higher levels of psychological symptoms, considering their GHQ scores, and negative moods than men. Positive emotions were more frequently experienced by men than by women. Participants' education levels were also associated with outcome variables. In particular, having completed postgraduate studies predicted greater satisfaction with life and happiness compared with those having completed only elementary studies. Furthermore, participants with education beyond the elementary level had better affectivity and mental health scores. Moreover, our data revealed that employment status must also be considered a relevant predictor. Unemployed persons, compared with active workers, reported significantly lower levels of life satisfaction and happiness. Levels of mental health and positive affect also increased among employed people compared to unemployed persons and retirees. Unemployed persons and retirees also reported higher levels of negative affectivity than active workers.

Remarkably, participants' attitudes towards religion seems to be a significant predictor of life satisfaction, happiness, mental health, and affect. Compared with non-religious persons, practising believers reported higher levels of life satisfaction, happiness and positive mood. Moreover, they assessed their mental health more positively and experienced psychological symptoms and negative emotions to a lesser extent. Furthermore, non-practising believers also reported slightly higher life satisfaction and happiness, in contrast with atheist individuals, agnostic individuals and people uninterested in religion.

However, socio-demographic variables included in the series of regression analyses could only explain a low to moderate proportion of the variance in the outcome variables (Tables 4, 5, 6). For instance, the regression models including gender, age, education, labour status and religious beliefs accounted for just 12.5%, 9.5% and 14% of the variance of life satisfaction, happiness and negative emotions, respectively. As expected, according to Hypothesis 2, after controlling for socio-demographic variables and religious beliefs, meaningfulness and mindfulness were positively associated with satisfaction with life, happiness (Table 4), mental health (Table 5), and positive affect (Table 6) and were negatively associated with psychological symptoms (Table 5) and negative affect (Table 6). Hypotheses 2.1 and 2.2 were therefore supported.

Table 4 Satisfaction with life and happiness regressed on socio-demographic variables, religious belief, meaningfulness and mindfulness

	DV: satisfaction with life			DV: happiness		
	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		.075	.075***		.049	.049***
Gender	.01			−.00		
Age	.28***			.22***		
Step 2 (education)		.085	.010**		.064	.015***
High school	.02			.04		
Professional training	.05			.11*		
Graduate	.08			.14*		
Post-graduate	.14**			.17***		
Step 3 (labour status)		.101	.016***		.078	.014***
Unemployed	−.13***			−.12***		
Student	−.06			−.08*		
Retiree	−.01			−.06*		
Not-defined labour status	.00			.00		
Step 4 (religious belief)		.125	.024***		.095	.017***
Non-practising believers	.08*			.07*		
Practising-believers	.20***			.17***		
Step 5a (meaningfulness)		.419	.294***		.363	.268***
Meaning in life	.59***			.57***		
Step 6a (mindfulness)		.441	.022***		.447	.083***
Meaning in life	.51***			.40***		
Mindfulness	.19***			.36***		
Model variation						
Step 5b (mindfulness)		.271	.145***		.340	.244***
Mindfulness	.42***			.55***		
Step 6b (meaningfulness)		.441	.170***		.447	.107***
Mindfulness	.19***			.36***		
Meaning in life	.51***			.40***		

Education categories are compared against 'elementary studies'; Labour status categories are compared against 'active workers'; and Religious belief categories are compared against 'non-believers'

*$p < .05$; **$p < .01$; ***$p < .001$

Table 5 Mental health measures regressed on socio-demographic variables, religious belief, meaningfulness and mindfulness

	DV: perceived mental health			DV: General Health Questionnaire		
	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		.069	.069***		.075	.075***
Gender	.04			−.07**		
Age	.26***			−.27***		
Step 2 (education)		.076	.008**		.087	.012***
High school	.12*			−.11*		
Professional training	.14**			−.15**		
Graduate	.17**			−.17**		
Post-graduate	.17***			−.19***		
Step 3 (labour status)		.093	.016***		.113	.026***
Unemployed	−.13***			.16***		
Student	−.05			.04		
Retiree	−.08**			.08**		
Not-defined labour status	−.03			−.01		
Step 4 (religious belief)		.099	.007**		.121	.008**
Non-practising believers	.03			−.03		
Practising-believers	.10**			−.11**		
Step 5a (meaningfulness)		.268	.168***		.325	.204***
Meaning in life	.45***			−.49***		
Step 6a (mindfulness)		.361	.093***		.435	.110***
Meaning in life	.28***			−.31***		
Mindfulness	.38***			−.42***		
Model variation						
Step 5b (mindfulness)		.310	.211***		.374	.253***
Mindfulness	.51***			−.56***		
Step 6b (meaningfulness)		.361	.050***		.435	.062***
Mindfulness	.38***			−.42***		
Meaning in life	.28***			−.31***		

Education categories are compared against 'elementary studies'; Labour status categories are compared against 'active workers'; and Religious belief categories are compared against 'non-believers'

*$p < .05$; **$p < .01$; ***$p < .001$

Including both meaningfulness and mindfulness in the regression models significantly improved the amount of explained variance in the outcome variables. When these variables were entered into the complete regression models (i.e., Step 6), the amount of explained variance for life satisfaction, happiness, psychological symptoms and positive affect exceeded 40%. Moreover, regarding self-assessed mental health and negative emotions, the percentage of variance accounted for by Step 6 of the regression models was higher than 36%. Taken together, meaningfulness and mindfulness substantially contributed to explaining the variance in psychological well-being, mental health and affect. Therefore, we analysed the relative efficacy of meaningfulness and mindfulness as predictors of the outcome

Table 6 Positive and negative affect regressed on socio-demographic variables, religious belief, meaningfulness and mindfulness

	DV: positive affect			DV: negative affect		
	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		.041	.041***		.109	.109***
Gender	.10***			−.06*		
Age	.19***			−.33***		
Step 2 (education)		.061	.020***		.116	.006*
High school	.16***			−.13**		
Professional training	.23***			−.14**		
Graduate	.24***			−.15**		
Post-graduate	.26***			−.15**		
Step 3 (labour status)		.090	.028***		.131	.016***
Unemployed	−.16***			.12***		
Student	−.05			.07*		
Retiree	−.11***			.08**		
Not-defined labour status	−.01			.04		
Step 4 (religious belief)		.102	.012***		.140	.009***
Non-practising believers	.05			−.01		
Practising-believers	.14***			−.10**		
Step 5a (meaningfulness)		.340	.238***		.258	.117***
Meaning in life	.53***			−.38***		
Step 6a (mindfulness)		.414	.074***		.381	.124***
Meaning in life	.38***			−.18***		
Mindfulness	.34***			−.44***		
Model variation						
Step 5b (mindfulness)		.319	.217***		.361	.221***
Mindfulness	.52***			−.52***		
Step 6b (meaningfulness)		.414	.095***		.381	.020***
Mindfulness	.34***			−.44***		
Meaning in life	.38***			−.18***		

Education categories are compared against 'elementary studies'; Labour status categories are compared against 'active workers'; and Religious belief categories are compared against 'non-believers'

*$p < .05$; **$p < .01$; ***$p < .001$

variables in terms of effect size (i.e., amount of explained variance in the outcome variable). Observing increases in R^2 in both versions of Step 5 in the regression models, we found that meaningfulness (Tables 4, 6, Step 5a), compared with mindfulness (Tables 4, 6, Step 5b), produced more substantial improvements in the proportion of explained variance for life satisfaction, happiness and positive affect. Moreover, Step 6b of the regression analyses indicated that meaningfulness was able to account for an additional 17%, 10.7% and 9.5% of the variance in life satisfaction, happiness and positive affect scores, respectively, beyond the amount of variance accounted for by mindfulness (Tables 4, 6).

Conversely, mindfulness yielded larger increases in R^2 at Step 5b than those of meaningfulness (at Step 5a) for the mental health variables and for negative affect (Tables 5, 6). Concerning these outcome variables, mindfulness (Step 6a) was able to account for an

additional 9.3%, 11.0% and 12.4% of the variance in perceived mental health, psychological symptoms, and negative affect, respectively, beyond the amount of variance explained by meaningfulness.

The structural equation model depicting the complete pattern of relationships among variables confirmed that both meaningfulness and mindfulness were significant predictors of both latent variables, i.e., positive well-being and negative well-being (Fig. 1), which provides support for Hypothesis 2.3. Fit indexes indicated that the model adequately

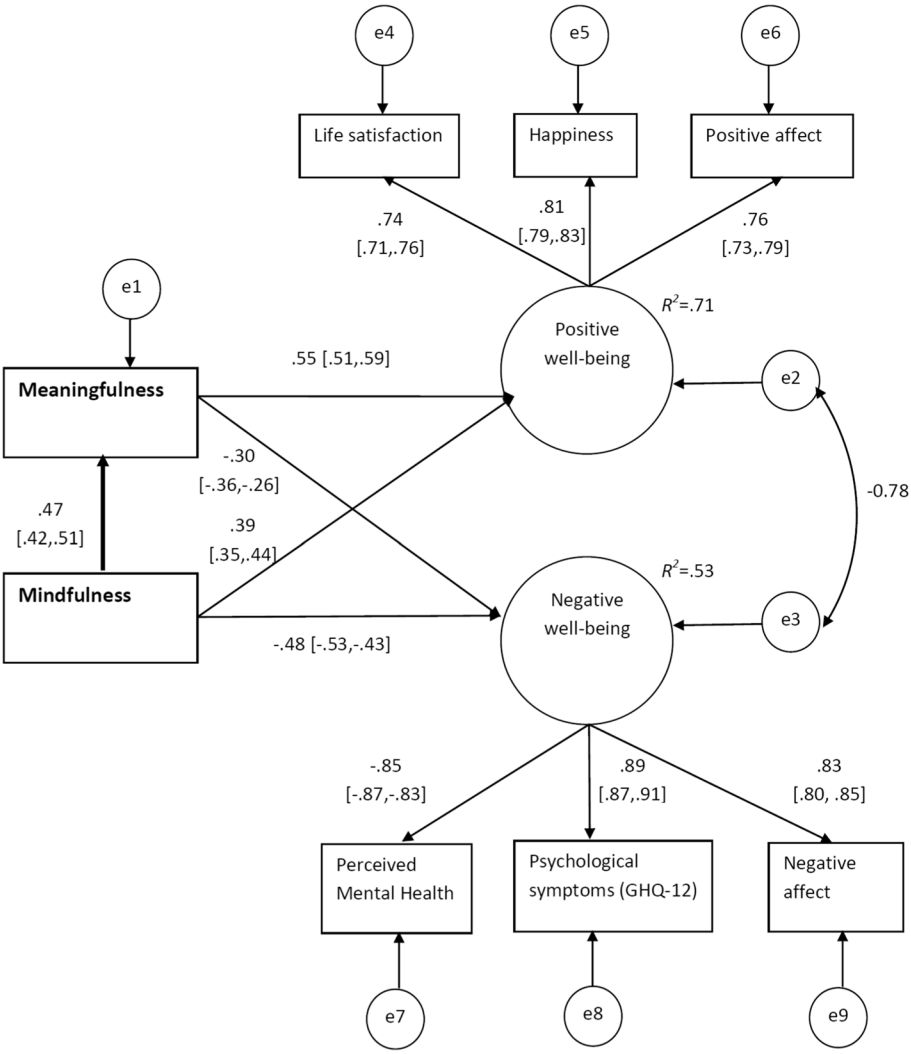

Fig. 1 Structural equation model representing the relationships among meaningfulness, mindfulness, positive well-being and negative well-being. *Notes*: Standardised regression weights are presented. All the estimates depicted were significant at $p < .001$. The effects of gender, age, education level, labour status and religious attitudes on meaningfulness, mindfulness, positive well-being and negative well-being were controlled for; control variables are not depicted to provide a clearer model

adjusted to the data ($\chi^2 = 339.94$, $df = 64$, $p < .05$; CFI = 0.98; GFI = 0.98; NFI = 0.98; SRMR = 0.018; RMSEA = 0.05). The proposed model was able to explain 71% of the variance in the positive well-being latent variable and 53% of the variance in the negative well-being latent variable (Fig. 1).

As the unequal distribution of gender in the sample could be cause for concern, additional group analyses comparing males and females were carried out. The results revealed that gender groups were not different at the model level ($\chi^2 = 35.12$, $df = 42$, $p > .05$). In addition, there were no differences between gender groups at the path level. Indeed, $z = 0.56$ for the path from mindfulness to meaningfulness; $z = 0.89$ and $z = -1.23$ for the paths from meaningfulness to positive and negative well-being, respectively; and $z = 0.19$ and $z = 0.67$ for the paths from mindfulness to positive and negative well-being, respectively (in all cases, $p > .05$).

Furthermore, SEM analysis confirmed that compared with mindfulness, meaningfulness was more strongly associated with positive well-being. The regression weights for the path connecting meaningfulness and positive well-being and the path connecting mindfulness and positive well-being were significantly different ($z = -4.11$, $p < .001$). However, compared with meaningfulness, mindfulness had a stronger relationship with negative well-being. In this regard, the regression weight for the path from mindfulness to negative well-being was significantly larger than the regression weight for the path from meaningfulness to negative well-being ($z = -4.26$, $p < .001$). Moreover, regression weights for the paths connecting meaningfulness with positive well-being and negative well-being were significantly different ($z = -20.26$, $p < .001$). Similarly, the regression weight for the path from mindfulness to positive well-being was significantly different from the regression weight for the path linking mindfulness to negative well-being ($z = -20.98$, $p < .001$).

As expected in Hypothesis 3, meaning in life significantly mediated the effect of mindfulness on satisfaction with life (*point estimate* = .24; *BCa* = .20, .27), happiness (*point estimate* = .19; *BCa* = .16, .22), perceived mental health (*point estimate* = .13; *BCa* = .10, .16), psychological symptoms as measured by the GHQ (*point estimate* = −.14; *BCa* = −.17, −.12), positive affect (*point estimate* = .18; *BCa* = .15, .21), and negative affect (*point estimate* = −.08; *BCa* = −.11, −.06).

Results from the SEM model provided additional evidence for our mediation hypotheses. The standardised indirect effect of mindfulness (i.e., mediated through meaning in life) on the latent variable positive well-being was .26 [*BC* = .23, .29]. Meaning in life also significantly mediated the effect of mindfulness on negative well-being (*point estimate* = −.14; *BC* = −.17, −.12).

4 Discussion

A relevant contribution of our study was the identification of a strong association between meaningfulness and mindfulness. Persons reporting a higher tendency towards mindfulness also appear to perceive more meaning in life. This result was consistent with previous theoretical suggestions and studies analysing the effects of training mindfulness capacity (Ando et al. 2011; Garland et al. 2015; Lander and Nahon 2016). Mindfulness, by enhancing awareness and helping one savour life experiences, could, in turn, facilitate meaning-related processes, such as comprehending life more fully, identifying significant experiences and sources of meaning, and recognising valuable purposes.

This research also provides further evidence for the associations among mindfulness, meaningfulness, and beneficial outcomes. This finding was consistent with previous findings connecting meaningfulness and life satisfaction (Steger and Kashdan 2007), happiness (Baumeister et al. 2013), affectivity (Machell et al. 2015) and mental health (Glaw et al. 2017); this work was similarly congruent with research reporting links between mindfulness and happiness (Coo and Salanova 2018), life satisfaction and affect (Bajaj and Pande 2016), and positive states of mind and lower levels of psychological symptoms (Bränström et al. 2011).

Furthermore, our results suggest that although both meaningfulness and mindfulness are related to the outcome variables, meaningfulness seems to play a larger role as a factor fostering positive well-being. In terms of effect size, meaningfulness produced larger relative increases in the amount of explained variance in life satisfaction, happiness and positive affect. Mindfulness, however, appeared to be involved in protection against negative outcomes, such as negative moods or health disturbances, with larger relative increases in the amount of explained variance in negative affect, as well as in mental health measures. SEM analysis confirmed this suggestion, revealing that meaningfulness is more closely linked to positive well-being outcomes, whereas mindfulness is more strongly related to reduced negative well-being, indicated by comparisons between regression weights of the model's paths. These findings are in line with those of Schnell (2009), Scannell et al. (2002), and Zika and Chamberlain (1992), who showed that meaningfulness, or affective meaning in life (i.e., feeling that one's life has meaning), may relate to positive well-being (i.e., life satisfaction, happiness, positive affect, spiritual growth, self-esteem) more than it relates to negative well-being (i.e., psychological symptoms). Presumably, meaning in life could trigger processes linked to positive well-being. For instance, the presence of meaning in life may be a rewarding experience in itself. In addition, one's life purpose may point to rewarding, significant and valuable goals that guide and activate a person's behaviour. Mindfulness, alternatively, is mainly focused on increasing awareness and non-judgemental attitudes, which may contribute to a person's exposure to and reappraisal of negative inner experiences, thereby helping to reduce negative moods such as those related to anxiety or depressive symptoms.

Finally, the results provided empirical support for the suggestion that mindfulness indirectly affects well-being through meaningfulness. As mentioned above, a higher capacity for mindfulness is associated with feeling more meaning in life, which, in turn, may lead to higher positive well-being and reduced negative well-being. This chain-like effect helps explain, to some extent, how mindfulness may also be connected with positive outcomes. The mediation effects of meaningfulness also increase our knowledge on the various mechanisms through which the effects of mindfulness could arise, among which increased meaning has been rarely considered (Hölzel et al. 2011). This study provides evidence for theoretical proposals suggesting that the effects of mindfulness on psychological outcomes can be explained, at least partially, by meaningfulness. For instance, our results are coherent with the model suggested by Shapiro et al. (2006) in which 'values clarification' (i.e., recognising what is meaningful in life) is proposed to be among the mechanisms mediating the beneficial outcomes of mindfulness, as well as with the mindfulness-to-meaning theory (Garland et al. 2015) and the conceptual approaches presented by Wong (2012) and Bellin (2015). Moreover, the results from the mediation analyses performed in this work are consistent with those of previous empirical research in which meaning in life has already been considered as a mediating variable (Carmody et al. 2009; Jacobs et al. 2011).

Interestingly, our study found that the joint contribution of socio-demographic and attitudinal variables to well-being, health and affectivity was rather low. Most notably, the

explained variance in the dependent variables was dramatically higher when meaningfulness and mindfulness were included in the regression models. This finding indicates that the presence of meaning in life and living mindfully may significantly contribute to a person's life satisfaction, happiness, health and emotional state beyond the contribution made by his/her age, gender, education, labour status and religious attitudes.

However, some findings concerning our control variables may be of interest for research involving mindfulness, meaningfulness, and well-being. Age was correlated with both meaningfulness and mindfulness, which is consistent with previous studies showing that elderly people report experiencing more meaning in life (Steger et al. 2009) and higher levels of mindfulness (Raes et al. 2015). According to Reker et al. (1987), elderly people may look back on their past and experience meaning based on life accomplishments and fulfilled purpose, whereas young adults may still be searching for a meaningful purpose or may be striving to attain their life goals. Interestingly, Shapiro et al. (2006) proposed that changes occur during the developmental process, with people progressively becoming increasingly more able to adopt a decentred perspective and to disidentify themselves from their inner and outer experiences, i.e., developing a higher capacity for mindfulness. Furthermore, age appeared to play a positive role, as our participants showed higher life satisfaction, more happiness, better self-assessed mental health and better moods.

Women reported more negative affect and experienced more psychological symptoms, as measured by the GHQ, than men. Although previous literature has not found an unambiguous explanation, this finding could reflect gender differences in the emotional expression of negative emotions, which could derive from gender socialisation processes (Madden et al. 2000). However, despite their statistical significance, in our study, standardised beta coefficients for gender predicting negative affect and psychological symptoms were low and rather negligible considering that large samples yield significant results even when effect sizes are, in fact, small. No gender differences were found for happiness or life satisfaction. This apparently paradoxical result—i.e., women reporting more negative emotions but the same happiness level-has also been found by previous studies (Fujita et al. 1991).

Participants' education level and their current labour status also appeared to be associated with well-being, mental health and affectivity. In general, participants who were less educated and unemployed persons reported worse outcome measures, which is consistent with previous research (Easterbrook et al. 2016; Paul and Moser 2009). For many people, unemployment is a stressful situation. Similarly, a low educational level may entail higher vulnerability and fewer resources when coping with life's challenges, which may explain these findings.

Remarkably, participants' attitudes towards religion seemed to be a significant predictor of life satisfaction, happiness, mental health, and affect. For instance, practising believers were more satisfied with their lives, were happier and reported better mental health and better emotional states than non-believers. Previous research has also yielded similar results (Hackney and Sanders 2003; Abdel-Khalek 2006; Steger and Frazier 2005). Somehow, religious practice may involve elements that favour well-being, such as belonging to a community, receiving social support and imbuing life with meaning and purpose.

4.1 Limitations and Future Research Suggestions

However, this study also had some limitations, and therefore, the results should be cautiously interpreted. First, assumptions of causality cannot be explicitly derived from our data, as a correlational approach was followed. Experiencing meaning in life and living

mindfully may have an effect on the participants' well-being, mental health and emotions. However, alternative interpretations, i.e., that psychological well-being, mental health and affectivity have an influence on meaningfulness and mindfulness, are also plausible. Similarly, concerning the association between mindfulness and meaning in life, we hypothesised that higher levels of mindfulness may lead to increased meaningfulness, but from a purely statistical perspective, a model with a path from meaning to mindfulness, or even a model with a bidirectional path between these variables, would also be plausible (Stelzl 1986). However, the analysis of mediation effects requires, beyond statistical significance, a theoretical rationale for the suggested direction of the paths. In this regard, drawing from previous literature, we proposed mindfulness as the independent variable and meaningfulness as the mediator variable (Ando et al. 2011; Bellin 2015; Carmody et al. 2009; Garland et al. 2015; Jacobs et al. 2011; Shapiro et al. 2006; Wong 2012). To shed light on alternative views of causality, future research using longitudinal and controlled designs is advisable. This type of methodology could help identify how changes in mindfulness and meaningfulness can produce changes in positive and negative well-being. For instance, the previously mentioned research by Jacobs et al. (2011) is a good example of how meditation training can involve changes in mindfulness and one's sense of purpose in life, which, in turn, may lead to changes in positive cognition and emotional negativity.

Second, a self-selected sample was used, and therefore, this sample may not be representative of the broader population. Our sample covered a wide range of ages. Most of the respondents were female, and the participants came from various countries, which may be a limitation. Moreover, as participants were recruited through online social networks, all of them were Internet users, which may entail representativeness problems (e.g., higher education and socio-economic status, higher social connectedness, etc.). Presumably, the recruitment advertisement was distributed among people interested in psychology, emotions and mindfulness to maximise participation and the number of returned questionnaires, but this factor could also entail a motivational bias. In addition, the online survey procedure that was used did not allow us to gather some interesting information, such as the total number of people who received the invitation to participate in this research and how many individuals started to answer the questionnaire but did not complete it. Despite the abovementioned concerns, which mostly arise from our use of a self-selected sample, our results are consistent with those of previous research, and we mainly focused on the relationships among variables after controlling for socio-demographic variables, such as gender and age, and attitudes (i.e., religious beliefs) rather than aiming to generalise results to broader populations. Third, self-reported measures, which may be influenced by the participants' subjectivity (e.g., errors in recalling or social desirability), were used. However, most studies investigating the antecedents of variables such as satisfaction with life, positive and negative affect, and perceived health involve subjective evaluation. Many of the scales used in our study are self-reported measures that fall under the umbrella of the subjective well-being concept (SWB; Diener et al. 1985, 2002), which refers to a person's cognitive and affective evaluation of his or her own life. Therefore, the obtained results can be considered valid and adequate.

Finally, in large samples, statistical significance may be reached despite low effect sizes. To provide a reliable interpretation of our results, we therefore paid attention to effect sizes (i.e., R^2, ΔR^2), which were moderate or high for our main findings.

Despite these possible limitations, our research also had several strengths. First, the combined and separate connections of meaningfulness and mindfulness were analysed with respect to positive and negative well-being for the first time. Second, this study contributed to the study of meaningfulness and mindfulness in the Spanish-speaking

context, for which research on this topic is just emerging. Third, as presented, our results were consistent with those of previous research and, therefore, contributed to strengthening and extending evidence for some of the relationships analysed. Fourth, we presented a comprehensive model of the relationships among variables, which could potentially be useful for researchers and clinical/health psychologists/practitioners. Some questions remain open for future research. For instance, our knowledge on the relationship between mindfulness and meaningfulness could be deepened by analysing how the facets of mindfulness (i.e., observing, describing, acting with awareness, non-judgement of inner experience, and non-reactivity to inner experience) are related to components of meaningfulness (i.e., comprehension, mattering and purpose) and sources of meaning. Further explorations of the mechanisms connecting mindfulness and meaningfulness would be interesting. Likewise, identifying variables that connect mindfulness and meaningfulness with these outcomes would also be a compelling line of research.

4.2 Practical Relevance of Findings

Deepening our knowledge regarding the relationships among meaningfulness, mindfulness, well-being, health outcomes and affectivity may lead to interesting contributions in the field of clinical and health psychology, especially concerning interventions promoting psychological growth and well-being and those aiming to prevent negative emotional states and psychological symptoms. Our findings can easily be integrated into the current framework of approaches including Acceptance and Commitment Therapy (ACT) (Hayes et al. 2013) and the Mindful Self-Compassion (MSC) training (Germer and Neff 2013; Neff and Germer 2013), both of which include both mindfulness- (e.g., being present, acceptance) and meaningfulness-related (e.g., value clarification) components. In particular, our results may provide an empirically based background for positive psychology interventions that explicitly aim to integrate mindfulness and the presence of meaning in life, such as the Mindfulness-Based Strengths Practice (MBSP) (Littman-Ovadia and Niemiec 2016).

Beyond clinical and health-related applications, implications for the general population may also be derived from our results. One's ability to be mindful can be trained, for instance, by means of meditation exercises and other practices, and this ability could be a protective factor against negative emotions and psychological distress. Moreover, practising mindfulness exercises may also promote positive well-being in the general population, either through its effects on meaningfulness or by exerting a direct effect on positive outcomes. Interestingly, mindfulness training may be a strategy that could be used to increase the presence of meaning in life. As suggested, enhanced awareness and attitudes towards inner experiences promoted during mindfulness practice could foster a comprehension and an appreciation of life, which could boost a sense of meaning.

In summary, the integration of mindfulness and meaningfulness in positive psychology interventions could represent a promising strategy to enhance well-being.

Acknowledgements We would like to thank anonymous Reviewers for their insightful comments on this research. We also thanks Ms. Radwa Khalil for her support.

Funding Dr. Ahmed A. Karim was funded by the Ministry of Science, Research and Art, Baden Württemberg, Germany (Project number 02L14A093).

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Research Involving Human Participants All procedures performed in this study were in accordance with the ethical standards for research involving human participants.

Informed Consent Informed consent was obtained from all participants.

References

Abdel-Khalek, A. M. (2006). Happiness, health, and religiosity: Significant relations. *Mental Health, Religion and Culture, 9*(1), 85–97. https://doi.org/10.1080/13694670500040625.

Allan, B. A., Bott, E. M., & Suh, H. (2015). Connecting mindfulness and meaning in life: Exploring the role of authenticity. *Mindfulness, 6*(5), 996–1003. https://doi.org/10.1007/s12671-014-0341-z.

Alonso, J., Prieto, L., & Antó, J. M. (1995). La versión española del SF-36 Health Survey (Cuestionario de Salud SF-36): un instrumento para la medida de los resultados clínicos. *Medicina Clínica, 104*(20), 771–776.

Ando, M., Natsume, T., Kukihara, H., Shibata, H., & Ito, S. (2011). Efficacy of mindfulness-based meditation therapy on the sense of coherence and mental health of nurses. *Health, 3*(02), 118. https://doi.org/10.4236/health.2011.32022.

Arbuckle, J. L. (1995). *Amos 16.0 User's Guide*. Chicago: SPSS.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45. https://doi.org/10.1177/1073191105283504.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., et al. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329–342. https://doi.org/10.1177/1073191107313003.

Bajaj, B., & Pande, N. (2016). Mediating role of resilience in the impact of mindfulness on life satisfaction and affect as indices of subjective well-being. *Personality and Individual Differences, 93,* 63–67. https://doi.org/10.1016/j.paid.2015.09.005.

Baumeister, R. F., Vohs, K. D., Aaker, J. L., & Garbinsky, E. N. (2013). Some key differences between a happy life and a meaningful life. *The Journal of Positive Psychology, 8*(6), 505–516. https://doi.org/10.1080/17439760.2013.830764.

Bellin, Z. J. (2015). The meaning connection between mindfulness and happiness. *The Journal of Humanistic Counseling, 54*(3), 221–235. https://doi.org/10.1002/johc.12013.

Bergomi, C., Tschacher, W., & Kupper, Z. (2013). The assessment of mindfulness with self-report measures: Existing scales and open issues. *Mindfulness, 4*(3), 191–202. https://doi.org/10.1007/s12671-012-0110-9.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., et al. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*(3), 230–241. https://doi.org/10.1093/clipsy.bph077.

Bloch, J. H., Farrell, J. E., Hook, J. N., Van Tongeren, D. R., Penberthy, J. K., & Davis, D. E. (2017). The effectiveness of a meditation course on mindfulness and meaning in life. *Spirituality in Clinical Practice, 4*(2), 100. https://doi.org/10.1037/scp0000119.

Bowlin, S. L., & Baer, R. A. (2012). Relationships between mindfulness, self-control, and psychological functioning. *Personality and Individual Differences, 52*(3), 411–415. https://doi.org/10.1016/j.paid.2011.10.050.

Bränström, R., Duncan, L. G., & Moskowitz, J. T. (2011). The association between dispositional mindfulness, psychological well-being, and perceived health in a Swedish population-based sample. *British Journal of Health Psychology, 16*(2), 300–316. https://doi.org/10.1348/135910710X501683.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822.

Carmody, J., Baer, R. A., Lykins, E. L. B., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology, 65*(6), 613–626. https://doi.org/10.1002/jclp.20579.

Cebolla, A., García-Palacios, A., Soler, J., Guillen, V., Baños, R., & Botella, C. (2012). Psychometric properties of the Spanish validation of the Five Facets of Mindfulness Questionnaire (FFMQ). *The European Journal of Psychiatry, 26*(2), 118–126. https://doi.org/10.4321/S0213-61632012000200005.

Chiesa, A., & Serretti, A. (2011). Mindfulness based cognitive therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Research, 187*(3), 441–453. https://doi.org/10.1016/j.psychres.2010.08.011.

Compton, W. C. (2000). Meaningfulness as a mediator of subjective well-being. *Psychological Reports, 87*(1), 156–160. https://doi.org/10.2466/pr0.2000.87.1.156.

Coo, C., & Salanova, M. (2018). Mindfulness can make you happy-and-productive: A mindfulness controlled trial and its effects on happiness, work engagement and performance. *Journal of Happiness Studies, 19*(6), 1691–1711. https://doi.org/10.1007/s10902-017-9892-8.

Cotton Bronk, K., Hill, P. L., Lapsley, D. K., Talib, T. L., & Finch, H. (2009). Purpose, hope, and life satisfaction in three age groups. *The Journal of Positive Psychology, 4*(6), 500–510. https://doi.org/10.1080/17439760903271439.

Crescentini, C., Urgesi, C., Campanella, F., Eleopra, R., & Fabbro, F. (2014). Effects of an 8-week meditation program on the implicit and explicit attitudes toward religious/spiritual self-representations. *Consciousness and Cognition, 30,* 266–280. https://doi.org/10.1016/j.concog.2014.09.013.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13.

Diener, E., Oishi, S., & Lucas, R. E. (2002). Subjective well-being: The science of happiness and life satisfaction. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 63–73). Oxford and New York: Oxford University Press.

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology, 29*(1), 94–122. https://doi.org/10.1016/j.joep.2007.09.001.

Easterbrook, M. J., Kuppens, T., & Manstead, A. S. (2016). The education effect: Higher educational qualifications are robustly associated with beneficial personal and socio-political outcomes. *Social Indicators Research, 126*(3), 1261–1298. https://doi.org/10.1007/s11205-015-0946-1.

Eriksson, M., & Lindström, B. (2006). Antonovsky's sense of coherence scale and the relation with health: A systematic review. *Journal of Epidemiology and Community Health, 60*(5), 376–381. https://doi.org/10.1136/jech.2005.041616.

Eriksson, M., & Lindström, B. (2007). Antonovsky's sense of coherence scale and its relation with quality of life: A systematic review. *Journal of Epidemiology and Community Health, 61*(11), 938–944. https://doi.org/10.1136/jech.2006.056028.

Extremera, N., & Fernández-Berrocal, P. (2014). The Subjective Happiness Scale: Translation and preliminary psychometric evaluation of a Spanish version. *Social Indicators Research, 119*(1), 473–481. https://doi.org/10.1007/s11205-013-0497-2.

Fernández-Ballesteros, R., Zamarrón, M. D., & Ruiz, M. Á. (2001). The contribution of socio-demographic and psychosocial factors to life satisfaction. *Ageing and Society, 21*(1), 25–43. https://doi.org/10.1017/S0144686X01008078.

Field, A. (2009). *Discovering statistics using SPSS*. London: Sage.

Fujita, F., Diener, E., & Sandvik, E. (1991). Gender differences in negative affect and well-being: The case for emotional intensity. *Journal of Personality and Social Psychology, 61*(3), 427.

Garland, E. L., Farb, N. A., Goldin, P. R., & Fredrickson, B. L. (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry, 26*(4), 293–314. https://doi.org/10.1080/1047840X.2015.1064294.

George, L. K., Ellison, C. G., & Larson, D. B. (2002). Explaining the relationships between religious involvement and health. *Psychological Inquiry, 13*(3), 190–200. https://doi.org/10.1207/S15327965PLI1303_04.

George, L. S., & Park, C. L. (2016). Meaning in life as comprehension, purpose, and mattering: Toward integration and new research questions. *Review of General Psychology, 20*(3), 205–220. https://doi.org/10.1037/gpr0000077.

Germer, C. K., & Neff, K. D. (2013). Self-compassion in clinical practice. *Journal of Clinical Psychology, 69*(8), 856–867. https://doi.org/10.1002/jclp.22021.

Glaw, X., Kable, A., Hazelton, M., & Inder, K. (2017). Meaning in life and meaning of life in mental health care: An integrative literature review. *Issues in Mental Health Nursing, 38*(3), 243–252. https://doi.org/10.1080/01612840.2016.1253804.

Goldberg, D. P., & Williams, P. (1988). *A user's guide to the General Health Questionnaire*. New York: NFER-NELSON.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*(1), 35–43. https://doi.org/10.1016/S0022-3999(03)00573-7.

Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review, 37,* 1–12. https://doi.org/10.1016/j.cpr.2015.01.006.

Hackney, C. H., & Sanders, G. S. (2003). Religiosity and mental health: A meta–analysis of recent studies. *Journal for the Scientific Study of Religion, 42*(1), 43–55. https://doi.org/10.1111/1468-5906.t01-1-00160.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Advanced diagnostics for multiple regression: A supplement to multivariate data analysis*. Upper Saddle River, NJ: Prentice Hall.

Hanley, A., Warner, A., & Garland, E. L. (2015). Associations between mindfulness, psychological well-being, and subjective well-being with respect to contemplative practice. *Journal of Happiness Studies, 16*(6), 1423–1436. https://doi.org/10.1007/s10902-014-9569-5.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication monographs, 76*(4), 408–420. https://doi.org/10.1080/03637750903310360.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press.

Hayes, S. C., Levin, M. E., Plumb-Vilardaga, J., Villatte, J. L., & Pistorello, J. (2013). Acceptance and commitment therapy and contextual behavioral science: Examining the progress of a distinctive model of behavioral and cognitive therapy. *Behavior Therapy, 44*(2), 180–198. https://doi.org/10.1016/j.beth.2009.08.002.

Hicks, J. A., Trent, J., Davis, W. E., & King, L. A. (2012). Positive affect, meaning in life, and future time perspective: an application of socioemotional selectivity theory. *Psychology and Aging, 27*(1), 181. https://doi.org/10.1037/a0023965.

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science, 6*(6), 537–559. https://doi.org/10.1177/1745691611419671.

Jacobs, T. L., Epel, E. S., Lin, J., Blackburn, E. H., Wolkowitz, O. M., Bridwell, D. A., et al. (2011). Intensive meditation training, immune cell telomerase activity, and psychological mediators. *Psychoneuroendocrinology, 36*(5), 664–681. https://doi.org/10.1016/j.psyneuen.2010.09.010.

Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., et al. (2013). Mindfulness-based therapy: A comprehensive meta-analysis. *Clinical Psychology Review, 33*(6), 763–771. https://doi.org/10.1016/j.cpr.2013.05.005.

Killingsworth, M. A., & Gilbert, D. T. (2010). A wandering mind is an unhappy mind. *Science, 330,* 932. https://doi.org/10.1126/science.1192439.

King, L. A., Hicks, J. A., Krull, J. L., & Del Gaiso, A. K. (2006). Positive affect and the experience of meaning in life. *Journal of Personality and Social Psychology, 90*(1), 179. https://doi.org/10.1037/0022-3514.90.1.179.

Lander, N. R., & Nahon, D. (2016). Mindfulness and meaningfulness with a twist from an integrity model perspective. *International Journal of Existential Psychology and Psychotherapy, 6*(1), 16.

Lee, B. Y., & Newberg, A. B. (2005). Religion and health: A review and critical analysis. *Zygon, 40*(2), 443–468. https://doi.org/10.1111/j.1467-9744.2005.00674.x.

Littman-Ovadia, H., & Niemiec, R. M. (2016). Character strengths and mindfulness as core pathways to meaning in life. In P. Russo-Netzer, S. E. Schulenberg, & A. Batthyany (Eds.), *Clinical perspectives on meaning: Positive and existential psychotherapy* (pp. 383–405). Cham: Springer.

Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46*(2), 137–155. https://doi.org/10.1023/A:1006824100041.

Machell, K. A., Kashdan, T. B., Short, J. L., & Nezlek, J. B. (2015). Relationships between meaning in life, social and achievement events, and positive and negative affect in daily life. *Journal of Personality, 83*(3), 287–298. https://doi.org/10.1111/jopy.12103.

Madden, T. E., Barrett, L. F., & Pietromonaco, P. R. (2000). *Sex differences in anxiety and depression: Empirical evidence and methodological questions* (pp. 277–298). Gender and emotion: Social psychological perspectives.

Martela, F., & Steger, M. F. (2016). The three meanings of meaning in life: Distinguishing coherence, purpose, and significance. *The Journal of Positive Psychology, 11*(5), 531–545. https://doi.org/10.1080/17439760.2015.1137623.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology, 69*(1), 28–44. https://doi.org/10.1002/jclp.21923.

Newton, T., & McIntosh, D. N. (2013). Unique contributions of religion to meaning. In J. A. Hicks & C. Routledge (Eds.), *The experience of meaning in life: Classical perspectives, emerging themes, and controversies* (pp. 257–269). Dordrecht: Springer, Netherlands.

Park, C. L. (2005). Religion and meaning. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (pp. 295–314). New York, NY: Guilford Press.

Park, C. L., & Slattery, J. M. (2013). Religion, spirituality, and mental health. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality* (pp. 540–559). New York: Guilford Press.

Paul, K. I., & Moser, K. (2009). Unemployment impairs mental health: Meta-analyses. *Journal of Vocational Behavior, 74*(3), 264–282. https://doi.org/10.1016/j.jvb.2009.01.001.

Pedersen, H. F., Birkeland, M. H., Jensen, J. S., Schnell, T., Hvidt, N. C., Sørensen, T., et al. (2018). What brings meaning to life in a highly secular society? A study on sources of meaning among Danes. *Scandinavian Journal of Psychology, 59*(6), 678–690. https://doi.org/10.1111/sjop.12495.

Raes, A. K., Bruyneel, L., Loeys, T., Moerkerke, B., & De Raedt, R. (2015). Mindful attention and awareness mediate the association between age and negative affect. *The Journals of Gerontology: Series B, 70*(2), 179–188. https://doi.org/10.1093/geronb/gbt074.

Reker, G. T., Peacock, E. J., & Wong, P. T. (1987). Meaning and purpose in life and well-being: A life-span perspective. *Journal of Gerontology, 42*(1), 44–49. https://doi.org/10.1093/geronj/42.1.44.

Rocha, B. K., Pérez, C., Rodríguez Sanz, M., Borrell i Thió, C., & Obiols Llandrich, J. (2011). Propiedades psicométricas y valores normativos del General Health Questionnaire (GHQ-12) en población general española. *International Journal of Clinical and Health Psychology, 11*(1), 0125–139.

Sandín, B., Chorot, P., Lostao, L., Joiner, T. E., Santed, M. A., & Valiente, R. M. (1999). Escalas PANAS de afecto positivo y negativo: validación factorial y convergencia transcultural. *Psicothema, 11*(1), 37–51.

Sauer, S., Walach, H., Schmidt, S., Hinterberger, T., Lynch, S., Büssing, A., et al. (2013). Assessment of mindfulness: Review on state of the art. *Mindfulness, 4*(1), 3–17. https://doi.org/10.1007/s12671-012-0122-5.

Scannell, E. D., Allen, F. C., & Burton, J. (2002). Meaning in life and positive and negative well-being. *North American Journal of Psychology, 4,* 93–112.

Schnell, T. (2009). The sources of meaning and meaning in Life Questionnaire (SoMe): Relations to demographics and well-being. *The Journal of Positive Psychology, 4*(6), 483–499. https://doi.org/10.1080/17439760903271074.

Seybold, K. S., & Hill, P. C. (2001). The role of religion and spirituality in mental and physical health. *Current Directions in Psychological Science, 10*(1), 21–24. https://doi.org/10.1111/1467-8721.00106.

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*(3), 373–386. https://doi.org/10.1002/jclp.20237.

Shonin, E., & Van Gordon, W. (2016). The mechanisms of mindfulness in the treatment of mental illness and addiction. *International journal of mental health and addiction, 14*(5), 844–849. https://doi.org/10.1007/s11469-016-9653-7.

Steger, M. (2017). Meaning in life and wellbeing. In M. Slade, L. Oades, & A. Jarden (Eds.), *Wellbeing, recovery and mental health* (pp. 75–85). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781316339275.008.

Steger, M. F. (2018). Meaning and well-being. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being*. Salt Lake City, UT: DEF Publishers.

Steger, M. F., & Dik, B. J. (2009). If one is looking for meaning in life, does it help to find meaning in work? *Applied Psychology: Health and Well-Being, 1*(3), 303–320. https://doi.org/10.1111/j.1758-0854.2009.01018.x.

Steger, M. F., & Frazier, P. (2005). Meaning in life: One link in the chain from religiousness to well-being. *Journal of Counseling Psychology, 52*(4), 574. https://doi.org/10.1037/0022-0167.52.4.574.

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The Meaning in Life Questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53,* 80–93. https://doi.org/10.1037/0022-0167.53.1.80.

Steger, M. F., & Kashdan, T. B. (2007). Stability and specificity of meaning in life and life satisfaction over one year. *Journal of Happiness Studies, 8*(2), 161–179. https://doi.org/10.1007/s10902-006-9011-8.

Steger, M. F., Oishi, S., & Kashdan, T. B. (2009). Meaning in life across the life span: Levels and correlates of meaning in life from emerging adulthood to older adulthood. *The Journal of Positive Psychology, 4*(1), 43–52. https://doi.org/10.1080/17439760802303127.

Stelzl, I. (1986). Changing a causal hypothesis without changing the fit: Some rules for generating equivalent path models. *Multivariate Behavioral Research, 21*(3), 309–331. https://doi.org/10.1207/s15327906mbr2103_3.

Vázquez, C., Duque, A., & Hervás, G. (2013). Satisfaction with life scale in a representative sample of Spanish adults: Validation and normative data. *The Spanish Journal of Psychology, 16*(82), 1–15. https://doi.org/10.1017/sjp.2013.82.

Ware, J.E, Snow, K.K., Kosinski, M., & Gandek, B. (1993). SF-36 Health Survey. *Manual and Interpretation Guide*. Boston MA: The Health Institute, New England Medical Center.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063.

Wong, P. T. P. (2012). Toward a dual-systems model of what makes life worth living. In P. T. P. Wong (Ed.), *The human quest for meaning: Theories research and applications* (2nd ed., pp. 3–22). New York: Routledge.

Zika, S., & Chamberlain, K. (1992). On the relation between meaning in life and psychological well-being. *British Journal of Psychology, 83*(1), 133–145.

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