Journal of MENTAL HEALTH

http://tandfonline.com/ijmh
ISSN: 0963-8237 (print), 1360-0567 (electronic)

J Ment Health, 2019; 28(2): 168–174
 DOI: 10.1080/09638237.2017.1370633

Taylor & Francis
Taylor & Francis Group

Check for updates

ORIGINAL ARTICLE

Structural and discriminant validity of the tripartite model of mental well-being: differential relationships with the big five traits

Mohsen Joshanloo

Department of Psychology, Keimyung University, Daegu, South Korea

Abstract

Background: The tripartite model of mental well-being offers a comprehensive account of the nature of mental well-being. According to this model, mental well-being is composed of three distinct yet related dimensions of subjective (hedonic), psychological and social well-being.
Aims: The present study investigated the structural and discriminant validity of the three well-being factors.
Methods: A large American sample ($N = 2732$) was used. Data were analyzed using both Confirmatory Factor Analysis (CFA) and Exploratory Structural Equation Modeling (ESEM).
Results: It was found that the well-being variables loaded on three separate factors, indicating that the tripartite model was consistent with the data. Discriminant validity was further evidenced by moderate correlations between the latent factors, and differential relationships with the Big Five personality traits. ESEM proved to be a more appropriate approach for analyzing the data given the presence of cross-loadings.
Conclusions: These results support adequate structural and discriminant validity for the dimensions of the tripartite model.

Keywords

tripartite model, well-being, ESEM, personality, eudaimonic, discriminant validity

History

Received 3 December 2016
Revised 27 June 2017
Accepted 18 July 2017
Published online 4 September 2017

Introduction

The tripartite model of mental well-being posits that mental well-being encompasses three distinct yet related dimensions of subjective (also known as hedonic), psychological and social well-being (Joshanloo, 2016b; Keyes, 2002). Subjective well-being involves the presence of life satisfaction, high levels of positive emotions, and low levels of negative emotions (Keyes, 2002). In contrast, eudaimonic well-being is thought to be the result of self-actualization and meaningful activities rather than passive hedonic enjoyment (Vittersø, 2016). Psychological and social well-being represent the personal and social aspects of eudaimonia, respectively. Psychological well-being is mainly conceptualized based on optimal functioning in one's private life, consisting of strengths such as purpose in life and a sense of continued personal growth (Ryff, 1989). Social well-being captures optimal functioning in one's social life, as a member of broader society (Keyes, 1998). Social well-being embodies such qualities as having a sense of belonging to one's community, and a sense of worthiness as a member of society. Whereas many researchers tend to focus on a single dimension of mental well-being in their studies ignoring other dimensions, the tripartite model of mental well-being is a comprehensive model that considers all of the three dimensions to be necessary in conceptualizing and measuring well-being (Keyes, 2002). In this model, the three dimensions are regarded as positively related yet also optimally distinct to warrant separate factors.

The balance of empirical evidence produced across various cultures is generally in favor of the tripartite model (Gallagher et al., 2009; Joshanloo, 2016b; Joshanloo et al., 2016). However, criticisms have been raised concerning two aspects of the model. First, some researchers have pointed out that the correlations between the subjective and psychological elements of the model are very strong, which indicates undue redundancy (e.g. Kashdan et al., 2008). If the correlations between various elements of the model approach ± 1.00, parsimony would dictate considering them as a single general construct rather than separate constructs. This criticism has some merit, considering that the latent correlation between subjective and psychological well-being has been found to exceed 0.80 in some Confirmatory Factor Analysis (CFA) studies (e.g. de Carvalho et al., 2016).

Nonetheless, recent evidence across cultures suggests that the latent correlations between the three well-being dimensions have been overestimated in previous CFA studies. The main reason for the inflation of factor correlations in CFA is that, in simple structure CFA, all cross-loadings are fixed at zero despite the fact that many of them may be nonzero (Brown, 2015). Joshanloo (2016b) showed that considerably smaller factor correlations can be obtained in the tripartite

Correspondence: Mohsen Joshanloo, Department of Psychology, Keimyung University, 1095 Dalgubeol Boulevard, Dalseo-Gu, Daegu 42601, South Korea. Tel: +0082 53 580 5416. E-mail: mjoshanloo@hotmail.com

model if cross-loadings are not fixed at zero. The new method of Exploratory Structural Equation Modeling (ESEM; Asparouhov & Muthen, 2009) has proved to be particularly useful in this line of research. ESEM is an integration of exploratory and CFA, in which, all indicators are allowed to freely load onto all factors. Similar to exploratory factor analysis, ESEM utilizes rotation rather than zero constraints on cross-loadings. The ways in which cross-loadings are handled can greatly affect the size of factor correlations that play a critical role in drawing inferences concerning discriminant validity. In simple structure CFA, the zero-constrained cross-loadings do not assist in the estimation of factor correlations, resulting in the inflation of these correlations (Brown, 2015; Marsh et al., 2014). By relaxing these constraints and allowing indictors to load onto multiple factors, ESEM yields more accurate estimates of factor correlation (Asparouhov & Muthen, 2009). Hence, ESEM can be used to re-examine the magnitude of factor correlations in the tripartite model, while avoiding the undesirable influence of unnecessary zero constraints. Recent studies comparing CFA and ESEM have indicated that ESEM indeed produces considerably smaller factor correlations and better fit when used with well-being variables (Joshanloo, 2016a; Joshanloo & Lamers, 2016; Joshanloo et al., 2016, 2017).

The second criticism of the tripartite model concerns differential correlations between the three factors and other variables. Some previous results suggest that the well-being factors differentially relate to external variables (e.g. Keyes et al., 2002). However, Disabato et al. (2016) recently found similar relationships between subjective and psychological well-being and a number of positive psychology variables. This criticism merits further investigation with different sets of external variables. The present study investigated the relationships between the well-being factors and the Big Five personality traits. Personality traits are largely independent dimensions (McCrae, 2011) that capture broad domains of individual differences in behaviors, attitudes and feelings. The conceptual breadth and relative orthogonality of the personality traits make them good candidates for establishing the discriminant validity of many psychological constructs, including the three elements of the tripartite model.

The Big Five traits have shown moderate to strong correlations with subjective well-being (Steel et al., 2008). Among the Big Five traits, extraversion and neuroticism have been found to be the strongest predictors of subjective well-being, with agreeableness and conscientiousness coming next in order of importance (Lucas & Diener, 2015). Openness is not reliably correlated with subjective well-being (McCrae & Costa, 1991). Previous evidence has been scarce and inconclusive regarding the relationships between personality traits and social (e.g. Joshanloo & Nosratabadi, 2009; Joshanloo et al., 2012) and psychological well-being (e.g. Anglim & Grant, 2016; Schmutte & Ryff, 1997). Yet, two conclusions seem warranted. First, all of the five traits, including openness, are significantly correlated with psychological well-being. Second, social well-being exhibits generally weaker correlations with personality traits than do the subjective and psychological dimensions. It was expected that these general findings would be replicated in the present study.

Present study

This study used a large American sample to investigate the structural and discriminant validity of the tripartite model of mental well-being. The study sought to redress some of the existing gaps in the literature. For example, a majority of the previous studies have relied on CFA in which secondary loadings are automatically fixed at zero. Non-trivial secondary loadings if unaccounted for in the model can lead to biased estimates of factor correlations and associations with external variables. The present study uses ESEM, which is expected to yield more accurate estimates by virtue of its less restrictive assumptions concerning cross-loadings. Moreover, to investigate the discriminant validity of the dimensions of mental well-being, researchers have used variables from positive psychology that are conceptually linked with all of the dimensions of well-being (e.g. meaning in life and gratitude). The present study used the Big Five traits as the external criteria. Considering that the big five traits have low correlations among themselves (McCrae, 2011), and are not categorized as well-being variables, they offer a better opportunity to scrutinize the discriminant validity of the three well-being variables.

Methods

Participants

This study used the data produced during 2013 and 2014 in the third wave of the National Study of Midlife in the United States (MIDUS III; Ryff et al., 2016). The overall MIDUS III sample consists of 3294 respondents. Females constitute 54.9% of the sample. The mean age is 63.64 ($SD = 11.35$). Due to missing data on all of the variables of the study, 562 participants were excluded, leaving a final sample of 2732.

Measure

Subjective well-being

The 12-item negative and positive affect scale was used to measure affect (Joshanloo, 2017; Mroczek & Kolarz, 1998). Respondents indicated how often (from $1 = all$ to $5 = none\ of\ the\ time$) during the past 30 days, they felt six positive and six negative affective states. This scale has generally shown clearer factor structure than the widely used Positive and Negative Affect Schedule (PANAS; Joshanloo, 2017; Joshanloo & Bakhshi, 2016). The scale also offers the benefit of including low-arousal emotions that have been excluded from the PANAS, allowing a more inclusive assessment of affect (Joshanloo, 2017). Life satisfaction was assessed using five items about satisfaction with overall life, work, health, relationship with spouse/partner, and relationship with children. Each item was coded from *the worst possible* (0) to *the best possible* (10).

Psychological well-being

The 42-item version of Ryff's (1989) psychological well-being scale was used. Items are scored on a seven-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). The six dimensions are autonomy ($\alpha = 0.69$), environmental mastery ($\alpha = 0.79$), personal growth ($\alpha = 0.75$), positive

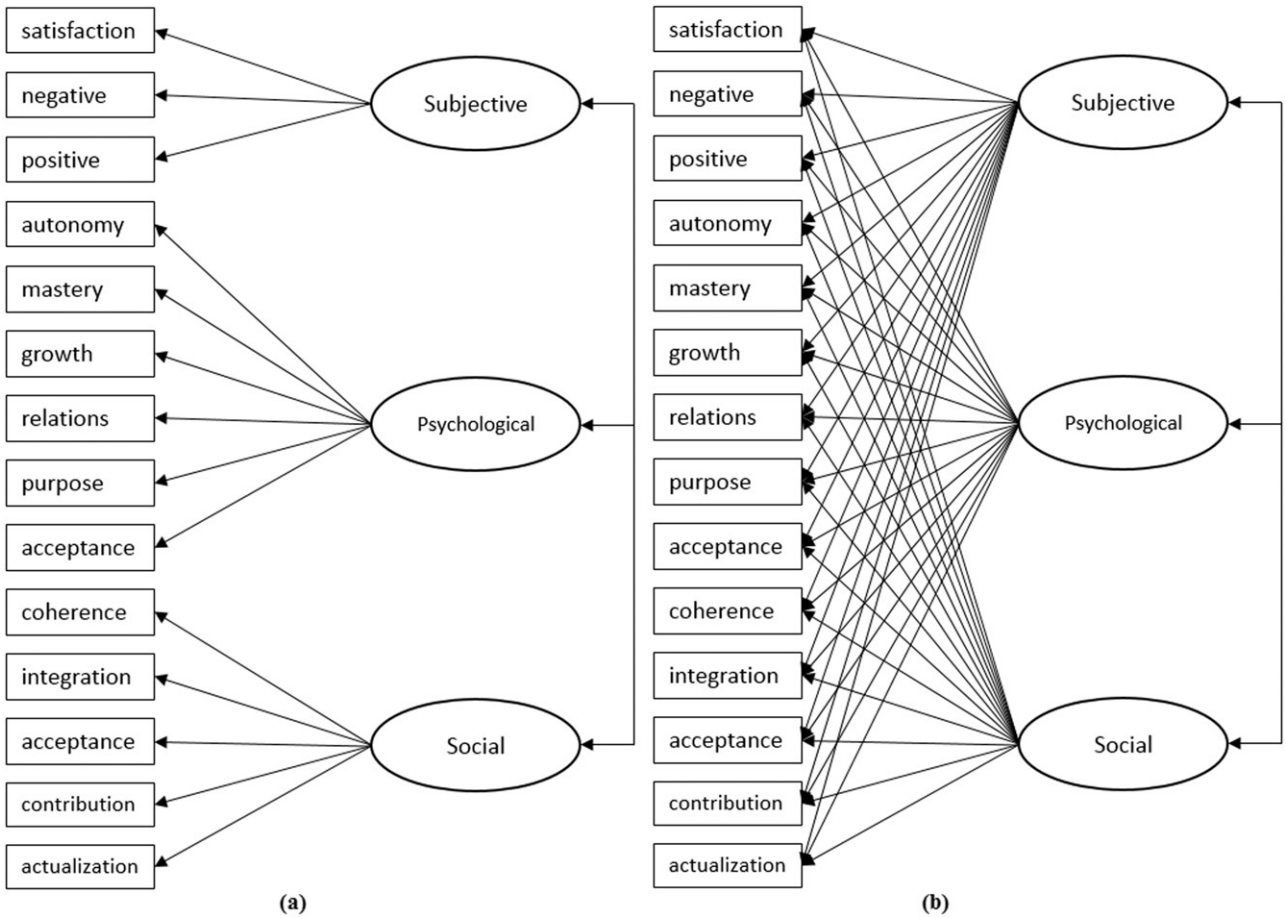

Figure 1. Three-factor CFA (a) and ESEM (b) models.

relations ($\alpha = 0.77$), purpose in life ($\alpha = 0.72$) and self-acceptance ($\alpha = 0.84$), each measured with seven items. Ryff's model of psychological well-being is recognized as the first and one of the most widely used empirically-based models of eudaimonic well-being (Vittersø, 2016). The model draws on key insights in eudaimonic thought agreed upon by many psychology and philosophy researchers.

Social well-being

The 15-item version of the Keyes' (1998) social well-being scale was used. Items are scored on a seven-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). The five dimensions include social coherence ($\alpha = 0.67$), social integration ($\alpha = 0.79$), social acceptance ($\alpha = 0.42$), social contribution ($\alpha = 0.72$) and social actualization ($\alpha = 0.70$), each measured with three items. Keyes's model of social well-being is a comprehensive model of social well-being that integrates many usually separately studied positive social qualities.

Personality traits

Respondents indicated how well 26 self-descriptive adjectives described them (Zimprich et al., 2012), on a scale from $1 = a\ lot$ to $4 = not\ at\ all$. The five scales include neuroticism (four items, $\alpha = 0.71$), extraversion (five items, $\alpha = 0.76$), openness (seven items, $\alpha = 0.77$), conscientiousness (five items, $\alpha = 0.69$) and agreeableness (five items, $\alpha = 0.77$).

Statistical analysis

Model fit was assessed in Mplus 7.4 with maximum likelihood estimation and full information maximum likelihood (FIML) for handling missing data. In ESEM, an oblique geomin rotation ($\varepsilon = 0.5$) was used. A minimum cutoff of 0.95 for Comparative Fit Index (CFI), a maximum cutoff of 0.08 for Root Mean Square Error of Approximation (RMSEA) and a maximum cutoff of 0.08 for Standardized Root Mean Square Residual (SRMR) were considered as indicative of acceptable fit (Browne & Cudeck, 1993; Weston & Gore, 2006). Models with smaller values of Akaike information criterion (AIC) and Bayesian information criterion (BIC) are preferred. The three-factor CFA and ESEM models are shown in Figure 1. Several alternative models were also tested, including a single-factor model where all the 14 well-being variables were specified to load on a single latent factor, and three two-factor CFA models in which the indicators of two of the dimensions were specified to load on a single factor. A two-factor ESEM model was also tested.

Results

The fit indices for the CFA and ESEM models are presented in Table 1. The one- and two-factor models were not consistent with the data, and thus are not further discussed in the present study. Between the two three-factor models, the ESEM model yielded better fit than did the CFA model. In

Table 1. Fit indices.

Model	χ^2	*df*	CFI	SRMR	AIC	BIC	RMSEA	90% CI for RMSEA Low	90% CI for RMSEA Up
1-factor ESEM/CFA	2955.6	77	0.838	0.068	188048.5	188296.8	0.117	0.113	0.121
2-factor CFA [subjective/psychological vs social]	2212.0	76	0.880	0.055	187306.9	187561.1	0.101	0.098	0.105
2-factor CFA [subjective vs psychological/social]	2524.0	76	0.863	0.063	187618.9	187873.1	0.109	0.105	0.112
2-factor CFA [subjective/social vs psychological]	2683.6	76	0.854	0.064	187778.4	188032.7	0.112	0.108	0.116
2-factor ESEM	1786.3	64	0.903	0.049	186905.2	187230.4	0.099	0.095	0.103
3-factor ESEM	970.6	52	0.948	0.030	186113.5	186509.6	0.080	0.076	0.085
3-factor CFA	1806.1	74	0.903	0.049	186905.0	187171.1	0.093	0.089	0.096
3-factor ESEM with covariates	2181.6	107	0.912	0.038	203421.0	204024.1	0.084	0.081	0.087
3-factor ESEM with predictors	2181.6	107	0.902	0.038	203421.0	204024.1	0.084	0.081	0.087

Note. All χ^2 values are significant at $p < 0.001$.

Table 2. Standardized Factor Loading (Three-Factor Models).

	ESEM			CFA
	Subjective	Psychological	Social	
Subjective				
Life satisfaction	**0.625*** **	−0.008	0.167***	**0.701*** **
Negative affect	**−0.614*** **	−0.051*	−0.095***	**−0.713*** **
Positive affect	**0.677*** **	0.015	0.096***	**0.740*** **
Psychological				
Autonomy	0.195***	**0.494*** **	−0.118***	**0.527*** **
Env. mastery	**0.581*** **	**0.373*** **	0.075***	**0.852*** **
Personal growth	0.056**	**0.714*** **	0.163***	**0.742*** **
Positive relations	**0.347*** **	**0.374*** **	0.196***	**0.732*** **
Purpose in life	0.208***	**0.645*** **	0.130***	**0.798*** **
Self-acceptance	**0.531*** **	**0.443*** **	0.079***	**0.880*** **
Social				
Social coherence	−0.031	**0.312*** **	**0.365*** **	**0.564*** **
Social integration	0.143***	0.177***	**0.443*** **	**0.656*** **
Social acceptance	0.080***	−0.120***	**0.677*** **	**0.504*** **
Social contribution	−0.087***	**0.472*** **	**0.383*** **	**0.686*** **
Social actualization	−0.001	−0.004	**0.645*** **	**0.524*** **

Note. Loadings larger than 0.30 are shown in boldface.
*$p < .05$; **$p < .01$; ***$p < .001$.

Table 3. Latent factor correlations.

	Subjective	Psychological	Social
Subjective	–	0.827	0.585
Psychological	0.488	–	0.739
Social	0.329	0.395	–

Note. CFA and ESEM correlations are presented above and below the diagonal, respectively.
All estimates are significant at $p < 0.001$.

particular, the fit index BIC plays a critical role in the comparison of the CFA and ESEM models, which are non-nested models. This is mainly because this index includes a rather severe penalty function to penalize model complexity (West et al., 2012). Yielding a BIC value equal to or smaller than that of the CFA model indicates that the fit advantage offered by ESEM is not merely due a larger number of free parameters. As can be seen in Table 1, ESEM yielded a substantially smaller BIC value, showing that the fit advantage of the less constrained ESEM model is large enough to offset the parsimony penalty.

Factor loadings are presented in Table 2. Factor loadings greater than 0.30 are generally considered salient, and are used in defining constructs (e.g. Joshanloo et al., 2017). All the indicators had salient loadings on their intended factors in CFA. Three ESEM factors emerged that clearly correspond to the three intended dimensions of the tripartite model. In ESEM too, all of the variables had salient loadings on their intended factors. However, ESEM revealed that there were also five salient non-target loadings. For example, three dimensions of psychological well-being had also salient loadings on subjective well-being. This pattern of loadings suggests that some indicators contribute to more than a single factor. As shown in Table 3, interfactor correlations were considerably smaller in ESEM ($M = 0.40$) than in CFA ($M = 0.71$), indicating that the factors are more distinct in ESEM. In sum, the ESEM model fitted the data better, produced smaller factor correlations, and uncovered a number of salient factor loadings which were masked in the CFA analysis. Hence, it can be concluded that ESEM outperformed CFA in the present study. Accordingly, the ESEM model was used in the consecutive analyses.

To investigate the differential relationships between the well-being factors and personality traits, two separate ESEM models were tested. In one model, the personality traits were added as covariates of the well-being factors. In the other one, the three well-being factors were regressed on the personality traits, to more elaborately investigate the unique contributions of the traits. The traits were allowed to covary with each other, and were included as manifest variables. The fit of the models was acceptable (Table 1). Covariance and regression estimates are reported in Table 4. Focusing on the standardized covariances (i.e. correlations), the results showed different relationships with personality traits for each of the well-being variables. For example, the correlations between neuroticism and subjective, psychological and social well-being were –0.582, –0.344 and –0.249, respectively. The correlations between openness and subjective, psychological and social well-being were 0.177, 0.545 and 0.223, respectively. The results of regression analysis also revealed differential relationships with the predictors. For instance, whereas neuroticism and extraversion were the strongest predictors of subjective well-being, the strongest predictors of psychological well-being were openness and conscientiousness. In sum, the magnitude of the associations with the personality traits varied for the three well-being

factors, attesting to acceptable discriminant validity of the factors.

Discussion

Factor correlations

Whereas mental well-being is predominantly regarded as a multidimensional construct, some researchers have raised concerns over its dimensionality (e.g. Ward & King, 2016). These concerns are largely grounded on the results showing greater than 0.80 correlations between subjective and psychological well-being (e.g. Disabato et al., 2016; Gallagher et al., 2009), given that factor correlations exceeding 0.80 or 0.85 are often considered as indicative of poor discriminant validity (Brown, 2015). Nevertheless, the fit of one-factor models of mental well-being has never been found to be better than that of three-factor models in the previous studies. Moreover, other CFA studies have yielded factor correlations considerably smaller than 0.80 (e.g. Linley et al., 2009). Hence, CFA research on the factor structure of mental well-being has yielded, at best, equivocal results.

Mental well-being is not the only research field where CFA has produced inconclusive results about the dimensionality of constructs. Across various fields, it has increasingly become clear that CFA usually produces inaccurate factor correlations in the presence of cross-loadings (Marsh et al., 2014). To meet the unrealistic constraints imposed by CFA on cross-loadings, too much of the correlation between indicators needs to be channeled through the factors, leading to elevated correlation estimates (Brown, 2015). Previous research across cultures has shown that the restriction of zero cross-loadings imposed by CFA is not tenable in the measurement model of mental well-being (e.g. for a review see, Joshanloo, 2016b). Therefore, a mere reliance on CFA to estimate the factor overlap in the tripartite model is methodologically questionable. ESEM is better equipped to handle cross-loadings, and not surprisingly it tends to yield factor correlations considerably lower than the cut-off point of 0.80. In keeping with the previous results, in the present study, the ESEM correlations ranged from 0.329 to 0.488, whereas CFA correlations ranged from 0.585 to 0.827 (Table 3). In sum, the ESEM results from the present study and previous studies lend support to the notion that three distinct yet related well-being factors can best represent well-being data.

Factor structure and factor loadings

Both in CFA and ESEM, a three-dimensional model of mental well-being was supported over the one- and two-factor models, and ESEM provided better fit than CFA. Researchers generally rely on post hoc modifications to improve the fit of ill-fitting CFA models. Some may argue that the present three-factor CFA model is actually misspecified, and can be respecified for better fit. However, making exploratory use of CFA is a questionable practice under most conditions. In particular, when the initial model is markedly different from the true model, post hoc adjustments are unlikely to lead to the correct measurement model (Brown & Moore, 2012; MacCallum, 1986). Additionally, constraining all non-zero factor loadings to zero can make the discovery of truly misspecified loadings even more difficult. Furthermore, in practice, many researchers prefer to modify the models by permitting indicator residual covariances rather than specifying cross-loadings (Joshanloo et al., 2017). Even when the analyst chooses to permit cross-loadings in CFA, there is no guarantee that all the cross-loadings are eventually specified considering that post hoc modification is generally meant to improve the fit until an acceptable level is achieved, using as few modifications as possible. ESEM usually provides better-fitting models in the first place, reducing researchers' reliance on post hoc modifications.

The three emerging factors in the ESEM analysis clearly corresponded to the three dimensions of the tripartite model, and all of the variables had salient loadings on their target factor. Thus, the a priori three-dimensional model of well-being was replicated in its generality in the present ESEM analysis. ESEM revealed a large number of significant and five salient cross-loadings. These cross-loadings were concealed in the CFA analysis, although such information is crucial in understanding the indicators, concepts, and their relationships. As shown in Table 2, subjective well-being was largely composed of its three target variables, but it also had salient loadings from three psychological well-being variables: environmental mastery, self-acceptance and positive relationships. These results are largely in line with previous findings. Environmental mastery and self-acceptance have been found to have a salient secondary loading on subjective well-being across cultures (Bobowik et al., 2015; Joshanloo, 2016b; Joshanloo et al., 2016; Keyes et al., 2002). Positive relations has also been found to have nearly salient secondary loadings on subjective well-being (Joshanloo, 2016b; Joshanloo et al., 2016). Hence, environmental mastery and self-acceptance (followed by positive relationships) contribute considerably to the subjective well-being construct, indicating their crucial role in determining people's hedonic experiences.

Psychological well-being was predominantly defined by its target indicators. However, social contribution and social coherence also had salient secondary loadings on psychological well-being. Social contribution has been found to have salient loadings on psychological well-being in previous research (Bobowik et al., 2015; Joshanloo, 2016b; Joshanloo et al., 2016), possibly because it reflects an individual's private feelings of efficacy (Joshanloo, 2016b). Finally, social well-being was predominantly defined by its target indicators, with no salient non-target loadings. Overall, these results suggest that some of the indicators in the tripartite model have meaningful relationships with non-target factors, and if not constrained, they can contribute to defining more than a single factor.

It should be recognized that cross-loadings are far from rare in psychological models and measures. In fact, as Asparouhov et al. (2015) put it, ''although 'pure' indicators of a single construct may exist, we surmise that such indicators remain at best a convenient fiction...'' (p. 1563). Using techniques such as CFA and bifactor analysis (which is a type of CFA) that turn a blind eye to cross-loadings can result in undesirable side effects, such as inaccurately estimated factor correlations, masking a large portion of the information on indicator–construct relationships, and erroneous conclusions

Table 4. The Big Five as Covariates and Predictors.

		Analysis with predictors	
	Standardized Covariance	R^2	Standardized Coefficient
Subjective		0.476***	
Neuroticism	−0.582***		−0.521***
Extraversion	0.366***		0.334***
Openness	0.177***		−0.103***
Conscientiousness	0.323***		0.204***
Agreeableness	0.148***		-0.054**
Psychological		0.478***	
Neuroticism	−0.344***		−0.236***
Extraversion	0.478***		0.217***
Openness	0.545***		0.285***
Conscientiousness	0.478***		0.261***
Agreeableness	0.317***		0.023
Social		0.131***	
Neuroticism	−0.249***		−0.199***
Extraversion	0.302***		0.199***
Openness	0.223***		0.043
Conscientiousness	0.137***		−0.013
Agreeableness	0.218***		0.087**

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

concerning the dimensionality and nature of the well-being constructs.

Relationships with personality traits

Another type of evidence required to establish discriminant validity is to demonstrate differential relationships with external criteria. Correlation and regression models in the present study showed that the three well-being factors held different relationships with the Big Five traits. This provides extra evidence to support the notion that the three well-being factors represent optimally distinct constructs. Consistent with the findings of previous meta-analyses (e.g. Steel et al., 2008), neuroticism and extraversion, followed by conscientiousness, were the strongest predictors of subjective well-being. Psychological well-being was associated with all of the traits, but in the regression model, where the covariance between the traits is taken into account, agreeableness was found to be a non-significant predictor Consistent with previous findings (Schmutte & Ryff, 1997), openness was an especially strong predictor of psychological well-being. Neuroticism and extraversion, followed by agreeableness, were the main predictors of social well-being, whereas the contribution of openness and contentiousness was small. These results indicate that the three well-being factors can be differentiated by their unique patterns of relationship with personality traits.

The findings were in keeping with the two insights gleaned from the previous research on the topic (as reviewed in the introduction). First, consistent with previous evidence (Anglim & Grant, 2016; Joshanloo & Nosratabadi, 2009), openness was a stronger correlate of psychological than subjective well-being. This is an important finding, given that openness is generally dismissed as an important determinant of mental well-being. Second, as shown in Table 4, the associations with personality traits were weaker for social well-being than subjective and psychological well-being (Joshanloo & Nosratabadi, 2009; Joshanloo et al., 2012). However, some of the previous findings were not replicated in the present study. For example, studies with observed variables, smaller samples, but longer personality measures have found that personality traits are generally better predictors of psychological than subjective well-being (Anglim & Grant, 2016). The results of the present study, however, indicate that the traits explain about 47% of the variance in both of the factors (Table 4). Whereas agreeableness and conscientiousness are usually regarded as equally important predictors of well-being, the present regression results indicate that agreeableness is a remarkably weaker predictor of well-being than conscientiousness.

In addition to the scales used, the way in which cross-loadings are handled affects the content of the constructs and their associations with external variables. The present well-being constructs are slightly different from constructs emerging in CFA analyses where cross-loadings are fixed. Thus, the different measures used and differences in analytical strategies may have contributed to some of the differences with the previous results.

Limitations, future directions and concluding remarks

A number of limitations need to be considered in the interpretation of the results. For example, the personality scale used here is among the briefest Big Five scales. Thus, the present study inevitably focused on the broad personality factors, and a facet level of analysis was not possible. Personality facets have been found to provide a significant increment in explained variance over the general personality factors (Anglim & Grant, 2016). Thus, a fruitful avenue for future research would be to study the relationships between personality facets and well-being factors using ESEM. Although the present study employed widely used measures of well-being, it is acknowledged that there are other psychological models offering relatively different formulations of the concepts studies here (Vittersø, 2016). For example, Deci and Ryan's self-determination theory (Ryan & Deci, 2001) and Waterman's eudaimonic identity theory (Waterman, 2008) provide relatively different formulations and measurement tools for eudaimonic well-being. Thus, future research will need to examine how using alternative models and measurement tools will affect the conclusions drawn here.

Despite these limitations, this study provides fresh evidence on the structural and discriminant validity of the tripartite model of mental well-being, thereby contributing to the ongoing controversies over the dimensionality of well-being. The results showed that the 14 well-being indicators loaded on three distinct latent factors, and the correlations between the factors were not high enough to justify collapsing them into a single broad factor. Adequate discriminant validity was further evidenced by differential relationships with personality traits. Thus, subjective, psychological and social dimensions of mental well-being constitute distinct factors, with a substantial amount of unshared variance. Once again, ESEM proved to outperform CFA in representing the factor structure of mental well-being. Therefore, for more accurate results and to avoid invalid conclusions, well-being

researchers are encouraged to use ESEM in addition to CFA whenever feasible.

Declaration of interest

The author reports no conflicts of interest. The author alone is responsible for the content and writing of this article.

ORCID

Mohsen Joshanloo http://orcid.org/0000-0001-9350-6219

References

Anglim J, Grant S. (2016). Predicting psychological and subjective well-being from personality: Incremental prediction from 30 facets over the Big 5. J Happiness Stud, 17, 59–80.

Asparouhov T, Muthen B. (2009). Exploratory structural equation modeling. Struct Eq Model, 16, 397–438.

Asparouhov T, Muthén B, Morin AJ. (2015). Bayesian structural equation modeling with cross-loadings and residual covariances comments on Stromeyer et al. J Manage, 41, 1561–77.

Bobowik M, Basabe N, Paez D. (2015). The bright side of migration: Hedonic, psychological, and social well-being in immigrants in Spain. Soc Sci Res, 51, 189–204.

Brown TA. (2015). Confirmatory factor analysis for applied research. 2nd ed. New York: Guilford Press

Brown TA, Moore MT. (2012). Confirmatory factor analysis. In: Hoyle RH, ed. Handbook of structural equation modeling. New York: Guilford Press, 361–79

Browne MW, Cudeck R. (1993). Alternative ways of assessing model fit. In: Bollen KA, Long JS, eds. Testing structural equation models. Beverly Hills, CA: Sage, 136–62.

de Carvalho JS, Pereira NS, Pinto AM, Marôco J. (2016). Psychometric properties of the mental health continuum-short form: A study of Portuguese speaking children/youths. J Child Fam Stud, 25, 2141–54.

Disabato DJ, Goodman FR, Kashdan TB, et al. (2016). Different types of well-being? A cross-cultural examination of hedonic and eudaimonic well-being. Psychol Assess, 28, 471–82.

Gallagher MW, Lopez SJ, Preacher KJ. (2009). The hierarchical structure of well-being. J Pers, 77, 1025–50.

Joshanloo M. (2016a). A new look at the factor structure of the MHC-SF in Iran and the United States using exploratory structural equation modeling. J Clin Psychol, 72, 701–13.

Joshanloo M. (2016b). Revisiting the empirical distinction between hedonic and eudaimonic aspects of well-being using exploratory structural equation modeling. J Happiness Stud, 17, 2023–36.

Joshanloo M. (2017). Factor structure and criterion validity of original and short versions of the Negative and Positive Affect Scale (NAPAS). Personal Individ Diff, 105, 233–7.

Joshanloo M, Bakhshi A. (2016). The factor structure and measurement invariance of positive and negative affect across gender and cultural groups: A study in Iran and the USA. Eur J Psychol Assess, 32, 265–72.

Joshanloo M, Bobowik M, Basabe N. (2016). Factor structure of mental well-being: Contributions of exploratory structural equation modeling. Personal Individ Diff, 102, 107–10.

Joshanloo M, Jose PE, Kielpikowski M. (2017). The value of exploratory structural equation modeling in identifying factor overlap in the Mental Health Continuum-Short Form (MHC-SF): A study with a New Zealand sample. J Happiness Stud, 8, 1061–74.

Joshanloo M, Lamers SMA. (2016). Reinvestigation of the factor structure of the MHC-SF in the Netherlands: Contributions of exploratory structural equation modeling. Personal Individ Diff, 97, 8–12.

Joshanloo M, Nosratabadi M. (2009). Levels of mental health continuum and personality traits. Soc Indic Res, 90, 211–24.

Joshanloo M, Rastegar P, Bakhshi A. (2012). The Big Five personality domains as predictors of social wellbeing in Iranian university students. J Soc Person Relation, 29, 639–60.

Kashdan TB, Biswas-Diener R, King LA. (2008). Reconsidering happiness: The costs of distinguishing between hedonics and eudaimonia. J Positive Psychol, 3, 219–33.

Keyes CLM. (1998). Social well-being. Soc Psychol Quart, 61, 121–40.

Keyes CLM. (2002). The mental health continuum: From languishing to flourishing in life. J Health Soc Behav, 43, 207–22.

Keyes CL, Shmotkin D, Ryff CD. (2002). Optimizing well-being: The empirical encounter of two traditions. J Pers Soc Psychol, 82, 1007–22.

Linley PA, Maltby J, Wood AM, et al. (2009). Measuring happiness: The higher order factor structure of subjective and psychological well-being measures. Personal Individ Diff, 47, 878–84.

Lucas RE, Diener E. (2015). Personality and subjective well-being: Current issues and controversies. In: Mikulincer M, Shaver PR, Cooper ML, Larsen RJ, eds. APA handbook of personality and social psychology, vol. 4. Washington, DC: American Psychological Association, 577–99.

MacCallum RC. (1986). Specification searches in covariance structure modeling. Psychol Bull, 100, 107–20.

Marsh HW, Morin AJS, Parker PD, Kaur G. (2014). Exploratory structural equation modeling: An integration of the best features of exploratory and confirmatory factor analysis. Annu Rev Clin Psychol, 10, 85–110.

McCrae RR. (2011). Personality traits and the potential of positive psychology. In: Sheldon KM, Kashdan TB, Steger MF, eds. Designing positive psychology. New York: Oxford University Press, 193–206.

McCrae RR, Costa PT. (1991). Adding Liebe und Arbeit: The full five-factor model and well-being. Pers Soc Psychol Bull, 17, 227–32.

Mroczek DK, Kolarz CM. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. J Personal Soc Psychol, 75, 1333–49.

Ryan RM, Deci ED. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. Annu Rev Psychol, 52, 141–66.

Ryff CD, Almeida D, Ayanian J, Binkley N, et al. (2016). National Survey of Midlife Development in the United States (MIDUS 3), 2013–2014. ICPSR36346-v4. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor]. Available from: http://dx.doi.org/10.3886/ICPSR36346.v4

Ryff CD. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological wellbeing. J Personal Soc Psychol, 57, 1069–81.

Schmutte PS, Ryff CD. (1997). Personality and well-being: Reexamining methods and meanings. J Pers Soc Psychol, 73, 549–59.

Steel P, Schmidt J, Shultz J. (2008). Refining the relationship between personality and subjective well-being. Psychol Bull, 134, 138–61.

Vittersø J. (2016). The most important idea in the world: An introduction. In: Vittersø J, ed. Handbook of eudaimonic well-being. Switzerland: Springer International Publishing, 1–24.

Ward SJ, King LA. (2016). Socrates' dissatisfaction, a happiness arms race, and the trouble with eudaimonic well-being. In: Vittersø J, ed. Handbook of eudaimonic well-being. Switzerland: Springer International Publishing, 523–30.

Waterman AS. (2008). Reconsidering happiness: A eudaimonist's perspective. J Positive Psychol, 3, 234–52.

West SG, Taylor AB, Wu W. (2012). Model fit and model selection in structural equation modeling. In: Hoyle RH, ed. Handbook of structural equation modeling. New York, NY: Guilford Press, 209–31.

Weston R, Gore PA. (2006). A brief guide to structural equation modeling. Couns Psychol, 34, 719–51.

Zimprich D, Allemand M, Lachman ME. (2012). Factorial structure and age-related psychometrics of the MIDUS personality adjective items across the life span. Psychol Assessment, 24, 173–86.