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ORIGINAL RESEARCH

Centrality and Dimensionality of 14 Indicators of Mental Well-Being in Four Countries: Developing an Integrative Framework to Guide Theorizing and Measurement

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Abstract
The primary objective of this research is to develop an integrative framework for distinguishing and classifying well-being variables. Towards this end, rigorous data-descriptive methods are used to examine the centrality of well-being variables and to explore the underlying dimensions along which these variables differ. The study uses 14 well-being variables as postulated in the tripartite model of mental well-being, including variables from 3 clusters of hedonic, psychological and social well-being. Samples from Korea, Canada, Iran and the USA are used. Centrality is conceptualized and examined under a latent variable framework. Multidimensional scaling is used to examine the underlying dimensions in the structure of well-being variables. Results show that self-acceptance, environmental mastery and purpose in life are the most central variables, whereas the most peripheral variables are autonomy, social actualization and social coherence. Multidimensional scaling uncovered 2 dimensions underlying the well-being variables: "hedonic versus eudaimonic" and "personal versus social", facilitating a dimensional understanding of well-being. The results contribute to building a consensus in the field of well-being to advance knowledge while avoiding reductionism. The findings have implications for creating, refining and broadening well-being theories, clarifying some of the conceptual and empirical confusions in the field, selecting well-being variables for different research purposes, developing new well-being scales and constructing well-being interventions.

Keywords Well-being · Centrality · Culture · Tripartite model · Multidimensional scaling · Factor analysis

1 Introduction

There is much variation in how people and cultures define mental well-being (Delle Fave et al. 2016; Joshanloo 2014). Researchers across different fields have identified and studied many variables capturing various aspects of the construct of well-being (e.g., Hone

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et al. 2014). This wide and growing diversity of variables in the field of mental well-being is regarded as necessary and useful (e.g., Delle Fave et al. 2011), reflecting the diversity of lay and scientific understandings of mental well-being and the complexity of the construct itself. The existence of this wide range of variables in the field of mental well-being intensifies the need for effective ways to systematize these variables into broader concepts, extract underlying dimensions along which these variables and concepts vary and identify central and peripheral variables in the structure of their associations. All these steps are necessary for developing a complete understanding of a construct as broad and complex as mental well-being.

There is a pressing need to develop a common conceptual framework that integrates and clarifies existing approaches and provides a comprehensive account of the structure of well-being variables across existing models and disciplines. (Jaccard et al. 2010). Multidimensional modeling has not received much attention in well-being research and consequently, the structural features of well-being variables remain largely unknown. Moreover, the relative centrality of individual variables in well-being structures has escaped researchers' attention. To fill these gaps, the present study used a large number of well-being variables and applied latent variable modeling and multi-dimensional scaling to determine how central or peripheral each variable is and to uncover the underlying latent dimensions. The principal purpose of the study was to take a step towards consensus on how well-being variables and clusters that originate from various models are structured, while avoiding reductionism. The study relied on the tripartite model of mental well-being as a guiding framework for variable selection, as this model is among the most comprehensive and extensively studied models of mental well-being. Samples from four countries were included to enable the investigation of both culture-specific and universal aspects of well-being.

2 The Tripartite Model of Mental Well-Being

This model posits that mental well-being has three facets of hedonic, psychological and social well-being (Joshanloo 2016; Keyes 2013). Hedonic (or subjective) well-being is focused on the preponderance of pleasant experiences over unpleasant experiences (Waterman 2013). In psychology, hedonic well-being is usually theorized to consist of three elements of life satisfaction, positive affect and the absence of negative affect (Diener et al. 2003). These three variables are largely personal and subjective in that their measurement tools focus on how a person feels and thinks about his or her own life (i.e., assessing satisfaction with one's personal life and private emotional experiences).

Whereas hedonic well-being is predominantly focused on the frequency of certain emotional experiences and attitudes towards life, eudaimonic well-being concerns the functional aspects of well-being. It involves the cultivation of "personal resources and strengths through commitment to valuable activities and through the pursuit of both individual and collective goals" (Delle Fave 2014, p. 2000). Psychological well-being is an important aspect of eudaimonic well-being. As formulated by Ryff (1989), psychological well-being consists of six elements: autonomy, environmental mastery, personal growth, positive relations, purpose in life and self-acceptance. These variables capture the points of convergence in developmental, clinical, existential and personality psychology on the optimal human functioning (Ryff 2016). Given that the six elements of psychological well-being

are primarily focused on personal domains of functioning, psychological well-being is thought to measure the personal aspect of eudaimonia (Keyes et al. 2009).

The final facet of the tripartite model is social well-being. Social well-being is defined as optimal functioning in social tasks encountered by adults in their public lives (Cicognani 2014; Keyes 1998). Based on Keyes (1998) model, social well-being is comprised of the five elements of social integration, social contribution, social coherence, social actualization and social acceptance. These five elements "indicate whether and to what degree individuals are overcoming social challenges and are functioning well in their social world (alongside neighbors, coworkers and fellow citizens)" (Cicognani 2014, p. 6195). Social well-being captures the social aspect of eudaimonic well-being (Joshanloo 2016; Keyes et al. 2009).

Scales for the 14 elements of the tripartite model have been extensively used across cultures (Joshanloo 2019c; Vittersø 2016). In factor analysis studies conducted with the tripartite model, hedonic, social and psychological well-being have been found to form related yet distinct factors (for a review, see Joshanloo 2019c). Therefore, factor analysis has largely supported the factorial validity of the tripartite model. There is a good level of consensus among researchers on the key elements of eudaimonic well-being, despite the availability of many scales to measure eudaimonia. The 11 eudaimonic dimensions used in the present study (psychological and social well-being variables) appear in many major conceptualizations of eudaimonic well-being. The tripartite model includes both the eudaimonic and hedonic elements, rather than reducing well-being to either hedonia or eudaimonia. This model has gained increasing popularity in the social sciences (Joshanloo 2019c; Keyes 2013).

The tripartite model was chosen mainly because of its comprehensiveness. In this study, the grouping of the variables into three clusters of hedonic, psychological and social is not of interest per se. This aspect of the model has been extensively studied in previous factor analysis studies. What makes this model a suitable framework for this study is that it includes variables from all major domains of well-being. Although not exhaustive, this collection of variables adequately represents much of the vast diversity in mental well-being variables as recognized by psychologists and philosophers.

3 Centrality

Similar to the majority (if not all) of other psychological constructs (Hallquist et al. 2019), a latent variable structure is inherent to mental well-being data (Joshanloo 2016). Thus, variable centrality is best construed within a latent variable framework. Accordingly, to calculate a centrality score for each variable, exploratory factor analysis was used. Factor analysis is a framework for representing the structure of correlations among observed variables. A latent variable is an unobservable variable that contributes to two or more of the variables in a battery of observed variables. In other words, latent variables account for the shared variance in the observed variables. The observed variables are also influenced by unique factors. These are unobservable sources of influence, including biases, random errors and legitimate causal influences that do not affect other variables in the battery. Simply put, the unique factors represent the portion of the variance for each observed variable that is not accounted for by the extracted latent variable(s) (Fabrigar et al. 2011; Gorsuch 1974; Pett et al. 2003). In the present study, communalities are used as measures of centrality. The communality of a variable in a factor analysis model is an estimate of the

proportion of its variance that can be accounted for by the extracted latent variable(s) (Gorsuch 1974). For example, in a single-factor model, a communality of 0.60 for a variable means that the extracted latent variable explains 60% of that variable's observed variance. Variables with higher communalities have more in common with the extracted latent variable. In contrast, variables with lower communalities share less variance with other variables in the battery and have larger unique variances.

The purpose of this study was to examine the centrality of each of the variables in the whole system of well-being variables. Hence, a general latent factor of well-being was extracted in each nation that captures the shared variance among all 14 indicators of well-being in that nation. It is noteworthy that first- or second-order three-factor models would not serve the purpose of the study as they would result in centrality estimates for each variable not in the whole system of well-being but within its own cluster. Single-factor models are justifiable given that the three dimensions of well-being (i.e., hedonic, psychological and social well-being) are significantly correlated (Joshanloo 2016). This conceptualization of centrality emphasizes the amount of shared variance between variables. The central variables have stronger correlations with the rest of the variables than noncentral variables. The variables with lower communalities are non-central in the sense that they have more unique variance and less shared variance. In other words, they have smaller correlations with the rest of the variables. By averaging the communalities across the four nations, a global centrality score for each variable was calculated, together with an estimate of cross-national variability (as indicated by the *SDs* of the 4 national communalities for each variable).

4 Multi-Dimensional Modeling

A central goal in this study is to develop a framework to understand the relational patterns in well-being data. Although factor analysis is a valuable and powerful tool for extracting latent factors from observed variables, researchers do not usually use all of the capabilities of this statistical technique. The main goal in many factor analytic studies is to determine how many factors underlie the data and estimate the correlations between these factors. Factor analysis-based multi-dimensional plots of variables can be output in various statistical programs for visual inspection of dimensionality, yet these plots are barely noticed, reported and interpreted. Consequently, factor analysis studies usually present relatively limited insights into the structures of variables.

Researchers in many other fields have shown interest in the structural characteristics of the variables they study. For example, two-dimensional models (e.g., circumplex models) have been used fruitfully in the study of variables such as human values (Schwartz et al. 2012), religiosity (Krauss et al. 2013), emotions (Posner et al. 2005), negotiation and social conflict (Gelfand et al. 2005) and human goals (Grouzet et al. 2005) for investigating the structure of the variables. Multi-dimensional models tend to reveal much more information than traditional approaches on how variables are related to each other and the dimensions along which variables may differ. For example, researchers in the fields of human values (e.g., Schwartz et al. 2012) and religious orientations (e.g., Krauss et al. 2013) have used two-dimensional conceptual maps to uncover the underlying structures among variables and variable clusters and the resulting insights have been crucial in advancing these fields.

A popular statistical technique for dimensional analysis is multidimensional scaling (MDS), which was used in this study. Exploratory MDS is a data reduction technique

that facilitates the exploration and interpretation of the data by generating a visual representation of the intercorrelations among the observed variables. The purpose of MDS is to identify a set of continuous latent dimensions that can account for the interrelationships between variables. This technique provides information on the associations between any single variable and all other variables as well as identified clusters of variables in the data (Hout et al. 2013). By making the data accessible to visual scrutiny and showing the pairwise relationships between all observed variables, MDS uncovers structures and dimensions that may remain hidden and unnoticed with an exclusive reliance on correlation and factor analysis (Borg et al. 2005). Thus, MDS could help to close some of the existing knowledge gaps in the field of well-being and generate supplementary and more holistic insights into the structure of mental well-being variables.

Two prior studies have used MDS to investigate the structure of well-being variables. Joshanloo and Weijers (2019) investigated the structure of nine well-being variables including the hedonic and psychological well-being variables used in the present study in Iranian, American and Japanese samples. They identified two underlying dimensions across cultures: "eudaimonic well-being versus hedonic well-being" and "existential relatedness versus epicurean independence". In a study utilizing a short scale of well-being where each variable was measured using a single item, Joshanloo (2020) sought to examine the structure of 14 well-being indicators stipulated by the tripartite model of well-being. The results showed that the items of the scale varied along two dimensions: "hedonic versus eudaimonic" and "personal versus social". Thus, the hedonic versus eudaimonic dimension was replicated in the two studies. A closer look at the second latent dimension in both studies suggests that this dimension essentially distinguishes variables based on their personal versus social contents. Thus, a dimension of "personal versus social" also seems to be a replicable dimension of well-being variables. The main drawback of Joshanloo and Weijer's (2019) analysis was the absence of social well-being variables. The main drawbacks of Joshanloo's (2020) study were that well-being variables were measured with single items, negative affect was not measured and participants were from a single country. The present study sought to expand this line of research by redressing these gaps and additionally investigating the centrality of the well-being variables. The two dimensions of hedonic versus eudaimonic and personal versus social were expected to emerge in the present study.

Expanding the dimensional understanding of well-being variables by unearthing a social versus personal dimension from empirical data has been a contribution of MDS to the well-being sciences. The social aspects of well-being have not received much attention in psychological research. Leading formulations tend to portray well-being as essentially a private phenomenon (Keyes 1998). Social aspects of well-being beyond interpersonal relationships are not considered in many dominant well-being models. However, from an evolutionary perspective, our sociality is an (if not the most) important part of who we are.

> Our sociality is woven into a series of bets that evolution has laid down again and again throughout mammalian history. These bets come in the form of adaptations that are selected because they promote survival and reproduction. These adaptations intensify the bonds we feel with those around us and increase our capacity to predict what is going on in the minds of others so that we can better coordinate and cooperate with them… To the extent that we can characterize evolution as designing our modern brains, this is what our brains were wired for: reaching out to and interacting with others. (Lieberman 2013, p. 9).

Thus, no comprehensive understanding of mental well-being is possible without taking into account our social nature and the quality of our interactions with the small and large social groups we belong to (Sirgy 2019). Certain perceptions of one's social and professional environments can facilitate or hinder the development of personal well-being (Dambrun et al. 2011). This is in keeping with the World Health Organization's (2001, p. 1) emphasis on the social aspect of health, defining health as "a state of complete physical, mental and social well-being". Therefore, by including social well-being variables, the present study sought to expand and enrich the current understanding of the social versus personal dimension along with the commonly studied hedonic versus eudaimonic dimension.

5 The Relationship Between Centrality and Dimensionality

In this study, two-dimensional MDS analyses were run to infer underlying dimensions in the matrix of inter-variable relationships. In MDS, variables that are located near the ends of each dimension are emphasized in the interpretation and naming of that dimension. In other words, the interpretation of a dimension is aided by identifying the differences between the two groups of variables at the two ends of that dimension (Davison et al. 2000). In contrast, the variables that lie around the center of the dimensions, are not weighted as much in the interpretation and naming of the dimensions. It was expected that the central variables identified by the centrality analysis in this study would lie near the center of the axes, indicating their interconnections with the rest of the variables from both axes. Peripheral variables, on the other hand, were expected to lie closer to the ends of the axes. Hence, the peripheral variables were expected to contribute more significantly to the interpretation of the dimensions. Thus, both the central and peripheral variables play important roles in the structural interpretation of the variables and peripheral is not identical to insignificant, unnecessary, or redundant, in any sense of the word.

6 Methods

6.1 Participants

Descriptive information about the samples of the study is provided in Table 1.

Table 1 Descriptive characteristics and stress-1 values

	Sample size	% Missing	% Female	Age		Survey Language	Stress 1
				M	*SD*		
Korea	1310	0.0	50.8	40.024	10.92	Korean	.151
Canada	414	0.0	55.6	49.3	15.5	English	.150
Iran	320	3.7	59.1	22.03	2.503	Persian	.167
USA	2610	3.0	53.2	52.16	14.270	English	.160

The missing rate is the percentage of participants that have one or more missing values in the 14 variables of the study

6.1.1 Korea

The sample consisted of 1,310 Korean adults who responded to an online survey, collected by a Korean data-collection agency. The participants received monetary compensation for their participation. The 1,310 participants correctly answered the three attention check questions included in the survey. The data set was part of the larger data set used in a previous study to answer a different research question (Joshanloo et al. 2021).

6.1.2 Canada

The sample consisted of 414 Canadian adults who responded to an online survey, collected by a Canadian data-collection agency. The participants received monetary compensation for their participation. The 414 participants correctly answered the three attention check questions included in the survey.

6.1.3 Iran

The Iranian sample consisted of 320 university students studying at universities in Tehran. The study was voluntary and anonymous, administered via a paper-and-pencil survey. A part of the data was used by Joshanloo et al. (2019) to investigate the structure of psychological and hedonic well-being.

6.1.4 USA

Data from the MIDUS Refresher study was used (Ryff et al. 2017), consisting of a national probability sample of 3577 people. However, 967 participants did not respond to any of the scales used in the present study and were excluded, leaving a final sample of 2610. Detailed information regarding participant recruitment and data collection procedures can be found at midus.wisc.edu.

6.2 Statistical Power

Statistical significance is irrelevant in the analyses conducted in this study. The sample sizes across the countries are considerably higher than the minimum sample size recommendations provided by Mundfrom et al. (2005) to ensure adequate power for factor analysis (with a single factor, 14 or fewer indicators and moderate or high communalities). There are not many recommendations regarding the appropriate sample size for MDS. However, MDS does not generally require larger sample sizes than factor analysis does (Büyükkurt et al. 1990).

6.3 Measures

6.3.1 Affect

The 12-item negative and positive affect scale (Joshanloo 2017; Mroczek et al. 1998) was used to measure positive and negative affect in all four countries. Respondents indicated how often (from 1 = *all of the time* to 5 = *none of the time*) during the past 30 days, they felt six positive and six negative affective states. The negative affect variable reflects the absence of negative affect. Positive affect items were recoded such that higher scores indicate a higher frequency of positive affect.

6.3.2 Life Satisfaction

Life satisfaction was assessed in the USA using the 6-item MIDUS life satisfaction scale. The items measure satisfaction with overall life, financial situation, work, health, relationship with spouse/partner and relationship with children. Each item is coded from *the worst possible* (0) to *the best possible* (10). In, Korea, Canada and Iran the Satisfaction With Life Scale (SWLS) was used to measure life satisfaction (Diener et al. 1985). Each of the five items of this measure is rated on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7).

6.3.3 Psychological Well-Being

In the USA and Canada, a 42-item version of Ryff's psychological well-being scales (Ryff, 1989) was used to measure the six elements of psychological well-being. In Iran, the 54-item version of the scale was used (Ryff 1989). Items are scored on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). In Korea , the Korean version of the scale (Kim et al. 2001) was used. The Korean version of the measure has 46 items, including seven to eight items per subscale. Each item is rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Following Joshanloo et al. (2021), Item 15 (related to autonomy) was left out as its correlation with the autonomy scale was almost zero.

6.3.4 Social Well-Being

The 33-item version of Keyes's (1998) social well-being scale was used to measure social well-being in Korea, Canada and Iran. In the USA, the 14-item version of the scale was used (Keyes et al. 2004). Items are scored on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

Table 2 Alphas, Communalities and Cultural Variability Estimates

		Korea		Canada		Iran		USA		Global Centrality		Cultural variability	
		α	Com	α	Com	α	Com	α	Com	Average communality	Rank	*SD*	Rank
Hedonic													
	Positive	.922	.506	.924	.577	.847	.387	.919	.445	.479	7	.082	7
	Satisfaction	.907	.493	.903	.501	.878	.320	.717	.395	.427	9	.086	5
	Negative	.882	.381	.883	.468	.803	.414	.876	.395	.415	10	.038	13
Psychological													
	Self-acceptance	.871	.697	.876	.791	.815	.633	.856	.736	.714	1	.066	9
	Environmental mastery	.764	.610	.846	.726	.715	.698	.804	.706	.685	2	.051	10
	Purpose	.803	.641	.724	.533	.708	.591	.741	.631	.599	3	.049	11
	Personal relations	.832	.586	.812	.542	.810	.423	.789	.521	.518	6	.069	8
	Growth	.731	.435	.772	.472	.650	.439	.733	.529	.469	8	.043	12
	Autonomy	.713	.150	.797	.190	.686	.226	.717	.199	.191	14	.031	14
Social													
	Social integration	.864	.636	.888	.600	.704	.621	.755	.311	.542	4	.155	1
	Social contribution	.861	.695	.794	.555	.751	.532	.704	.334	.529	5	.149	2
	Social acceptance	.791	.429	.853	.335	.788	.377	.466	.162	.326	11	.116	4
	Social coherence	.710	.418	.688	.289	.656	.331	.642	.218	.314	12	.084	6
	Social actualization	.813	.418	.794	.410	.776	.246	.686	.149	.306	13	.131	3

Com. = extraction communality. The average communalities and *SD*s are calculated using the four national communalities for each variable. The most central variable is ranked 1. The largest *SD* is ranked 1

6.4 Reliabilities

Cronbach's alphas are shown in Table 2. Reliabilities were generally acceptable, averaging 0.786 across the four countries. Fifty two of the alphas were 0.69 or higher. The other three alphas were 0.47, 0.64 and 0.65. The lowest alpha belonged to the 3-item social acceptance scale in the USA.

6.5 Missing Data Management

As can be seen in Table 1, the Korean and Canadian data sets had no missing values and the missing rates in Iran and the USA were very small (< 5%). Given the ignorable missing rates, various missing data management strategies are not likely to return substantially different results (Tabachnick et al. 2013). Thus, listwise deletion was used in the present study.

7 Results

7.1 Centrality Analysis

In all the countries, an exploratory factor analysis (i.e., principal axis factoring) model was tested, where all the 14 indicators of well-being were specified as the indicators of a single factor. The extraction communalities were of interest in this study, which are reported in Table 2. The communalities were averaged across nations to form a global centrality score for each variable. As shown in Table 2 and Fig. 1, self-acceptance was the most central variable, followed by environmental mastery and purpose in life. The

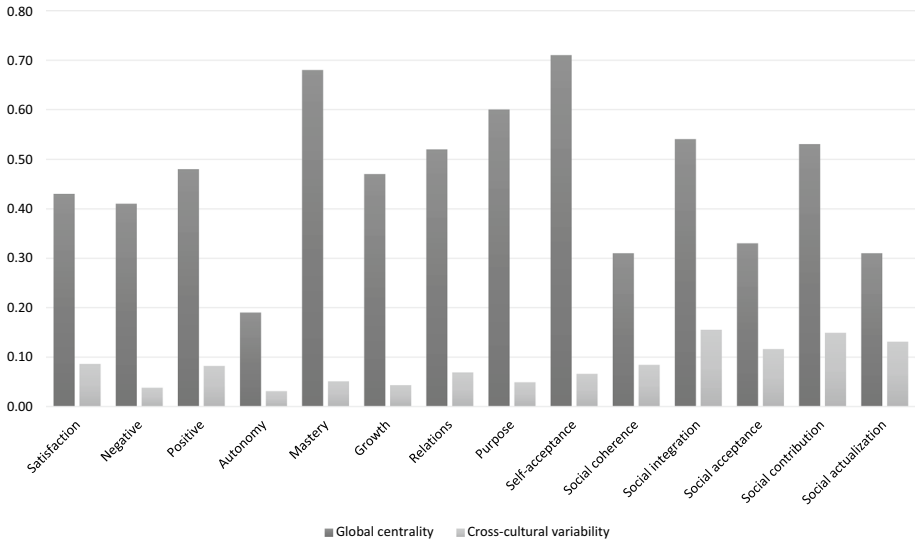

Fig. 1 Global centrality and cross-cultural variability estimates based on Table 2

Table 3 Communality rankings within countries

	Korea	Canada	Iran	USA
Satisfaction	8	8	12	7.5
Negative	13	10	8	7.5
Positive	7	4	9	6
Autonomy	14	14	14	12
Mastery	5	2	1	2
Growth	9	9	6	4
Relations	6	6	7	5
Purpose	3	7	4	3
Self-acceptance	1	1	2	1
Social coherence	11.5	13	11	11
Social integration	4	3	3	10
Social acceptance	10	12	10	13
Social contribution	2	5	5	9
Social actualization	11.5	11	13	14

The columns provide size rankings of the communality estimates for each country. Communality estimates in each country can be found in Table 2

least central variables were autonomy, social actualization and social coherence. Table 3 presents the size ranking of the communalities in each nation. Table 4 and Fig. 2 present the centrality estimates within each well-being cluster (i.e., hedonic, psychological and social) based on separate factor analyses for each cluster. Positive affect was the most central variable among the three hedonic variables. Self-acceptance and social integration were the most central among psychological and social well-being variables, respectively. It is noteworthy that the size rankings of communality and its variation provided in this study are not precise enough to allow fine-tuned variable-by-variable comparisons with certainty. However, the differences in centrality and variability between variables at the top and bottom of the rankings do seem to be remarkable.

7.2 Multidimensional Scaling

The data in the present study were analyzed through metric PROXSCAL (Commandeur et al. 1993) in SPSS 26, which is one of the most up-to-date and widely used MDS algorithms (Borg et al. 2013). In compliance with the common recommendations for best practice (Bilsky et al. 2011; Borg et al. 2013; Davison et al. 2000), the analysis was based on squared Euclidean distances and Z transformation with Torgerson initials. A two-dimensional solution was specified for the following reasons: the relatively small number of variables (i.e., 14); to achieve greater parsimony; to increase the chances of replicability of the findings in future research and the generalizability of the findings to other cultural samples; and to facilitate interpretation and communication of the results (Borg et al. 2013; Davison et al. 2000). Model-data fit was assessed using Kruskal's Stress-1, with stress-1 values greater than 0.20 indicating unacceptable fit (Kruskal et al. 1978). As can be seen in Table 1, stress-1 values in this study were below 0.20, indicating an acceptable fit. The resulting plots are shown in Figs. 3, 4, 5 and 6. In Korea and

Table 4 Communalities within three well-being clusters

		Korea		Canada		Iran		USA		Within-Cluster Centrality	
		Com	Rank	Com	Rank	Com	Rank	Com	Rank	Average communality	Rank
Hedonic											
	Positive	.775	1	.850	1	.766	1	.645	1	.759	1
	Negative	.414	3	.518	3	.456	2	.588	2	.494	2
	Satisfaction	.559	2	.593	2	.356	3	.445	3	.488	3
Psychological											
	Self-acceptance	.685	2	.771	1	.655	3	.766	1	.719	1
	Environmental mastery	.580	3	.702	2	.715	1	.718	2	.679	2
	Purpose	.756	1	.615	3	.684	2	.659	3	.679	3
	Growth	.481	5	.510	5	.475	4	.559	4	.506	4
	Personal relations	.554	4	.533	4	.391	5	.541	5	.505	5
	Autonomy	.203	6	.270	6	.307	6	.275	6	.264	6
Social											
	Social integration	.686	1	.663	1	.822	1	.404	2	.643	1
	Social contribution	.681	2	.629	2	.575	2	.420	1	.578	2
	Social actualization	.568	3	.611	3	.374	4	.397	3	.487	3
	Social acceptance	.551	4	.472	4	.478	3	.346	4	.462	4
	Social coherence	.505	5	.305	5	.357	5	.260	5	.358	5

Com. = extraction communality. Three separate factor analyses were run in each county. The average communalities are calculated using the four national communalities for each variable

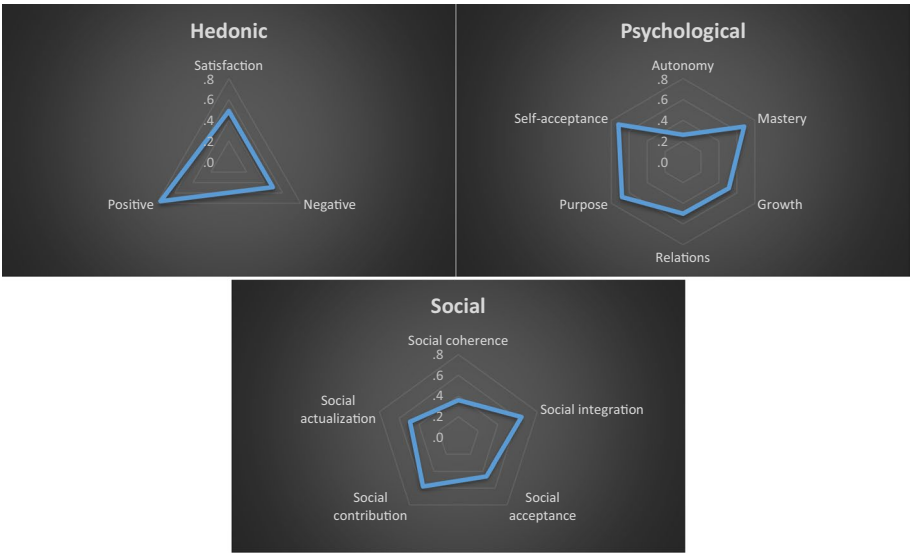

Fig. 2 Within-cluster centralities based on Table 4

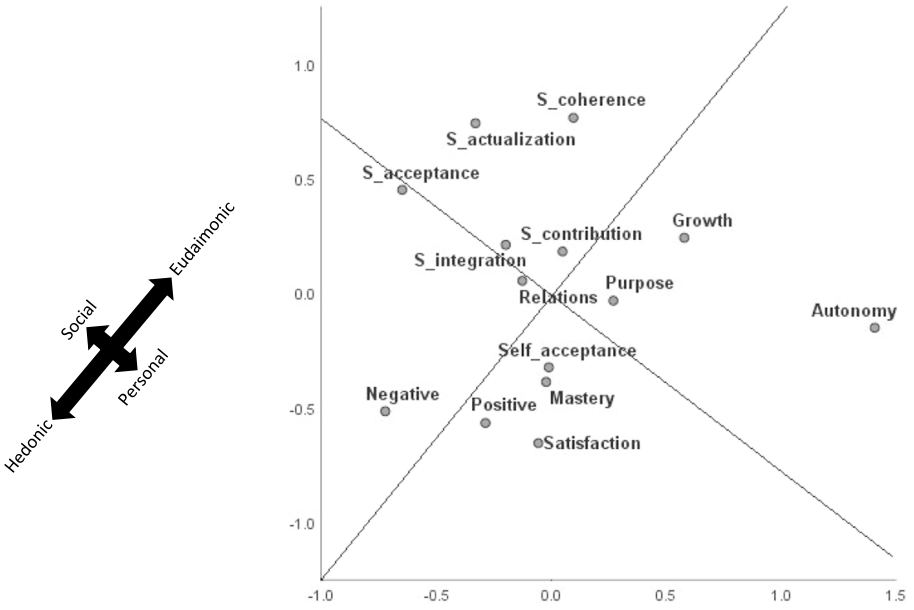

Fig. 3 MDS Plot for Korea

Iran, an orthogonal rotation was used to facilitate the interpretation of the dimensions. Rotating the configuration is permissible in MDS because "the configuration is based on the distances between the points. These distances do not change when the configuration is rotated, so they contain no information whatsoever as to what rotational position is

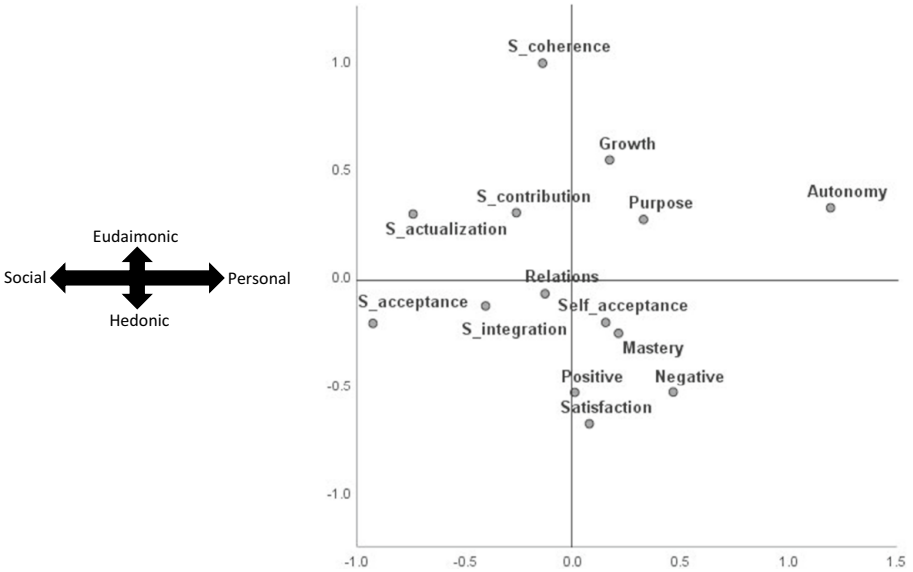

Fig. 4 MDS Plot for Canada

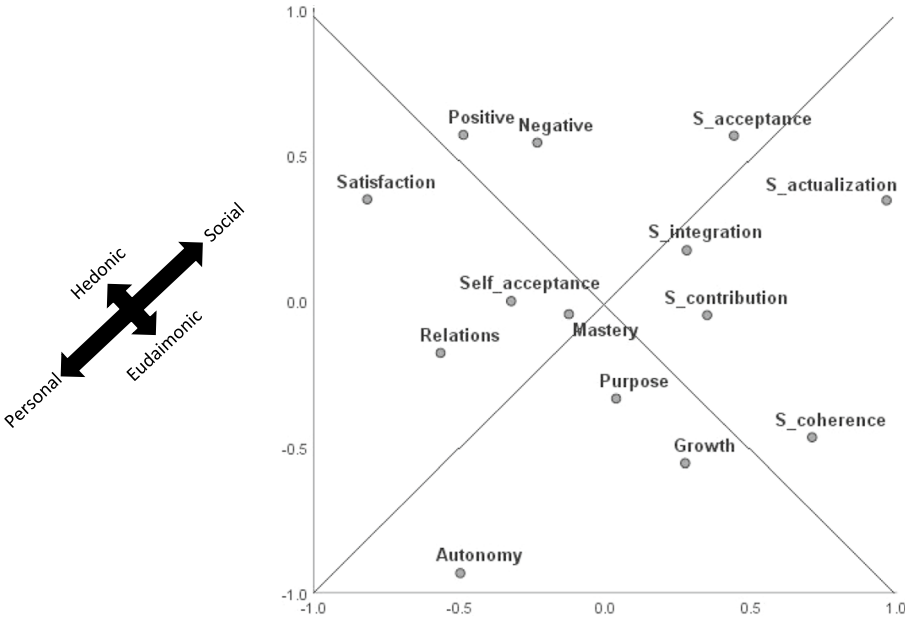

Fig. 5 MDS Plot for Iran

'correct' for the configuration… Since the configuration may be freely rotated, the coordinate axes have no special significance and are no more meaningful than lines in any other direction" (Kruskal et al. 1978, pp. 34–35).

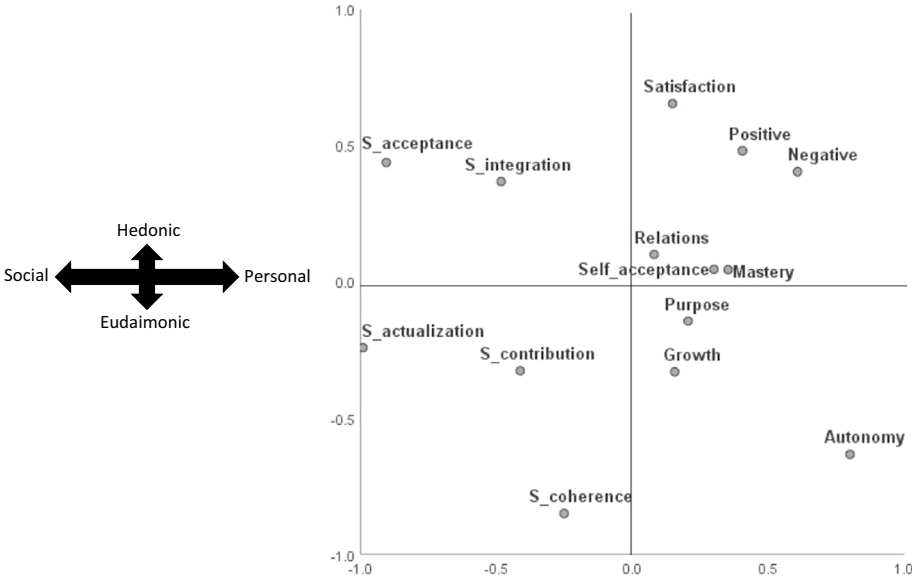

Fig. 6 MDS Plot for USA

Figures 3, 4, 5 and 6 show that the variable configurations are consistent with the theoretical clustering of variables into hedonic, psychological and social, as the variables occupied three non-overlapping regions of the two-dimensional planes. As expected variables with high centrality scores (e.g., self-acceptance) appeared around the centers of the variable configurations, whereas peripherical variables (e.g., autonomy) were located around the borders of the configurations. Peripheral variables are weighted more in the interpretation and naming of the dimensions given their more unique content.

In one of the dimensions, hedonic variables (i.e., life satisfaction, positive affect and negative affect) are located on one side, whereas eudaimonic variables such as personal growth and social coherence lie on the other side. Therefore, a "hedonic versus eudaimonic" dimension can be inferred. One end of the second dimension is occupied by autonomy in all four cultures, whereas the social well-being variables (e.g., social acceptance and social actualization) lie on the other side of the dimension. Therefore, a "personal versus social" dimension can be inferred. The cross-cultural consistency of the emerging structure is remarkable, despite the few point-by-point inconsistencies across the countries.

8 Discussion

The present study sought to compare the well-being variables' centralities based on their shared and unique variances and to identify the underlying dimensions in the data by simplifying the relational patterns.

8.1 Centrality

Centrality scores were largely consistent across the four countries as shown in Table 2 and 3. For example, self-acceptance's centrality rank was 1 or 2 in all the countries. Thus, self-acceptance seems an especially central variable. Increasing self-acceptance has been recognized as a central goal of many branches of psychotherapy including client-centered and humanistic approaches (Hooley et al. 2017) and acceptance and commitment therapy (Hayes et al. 2009). On the contrary, autonomy's rank was 14 in three countries and 12 in one, indicating its low centrality. The average centrality scores for the hedonic, psychological and social well-being variables were 0.44, 0.53 and 0.40, suggesting that psychological well-being variables were the most and social well-being variables were the least central, with hedonic variables being slightly more central than social well-being. The least central psychological variable was autonomy. Social integration and contribution were the most central aspects of social well-being. These results are consistent with the MDS findings, with psychological well-being variables (except autonomy) and social integration and contribution lying closer to the center of the plots, whereas other variables are generally more distant from the center.

Although central variables are more strongly correlated with the rest of the variables, peripheral variables are less strongly correlated with the other variables. One implication of this may be that central variables are less likely to have potentially contrastive or oppositional relationships with the other variables. For example, trying to enhance a central variable such as self-acceptance is less likely to be at odds with trying to enhance other aspects of well-being. Thus, striking a balance between central variables and other variables should be easier. However, trying to simultaneously maintain and enhance peripheral variables may be more challenging given that they may have contrastive influences on each other to varying degrees. The MDS results indicate which variables may have more potentially oppositional relationships with each other. These variables are located at the opposite ends of each dimension. For example, whereas autonomy involves functioning independently from the group and relying on one's own ideas rather than group pressures, social actualization/acceptance involves trusting the group and society when making decisions. Although autonomy and social actualization/acceptance are both important, reaching a balance between them could be more challenging than for example reaching a balance between personal growth and meaning in life. Such nuanced information on the dynamics between well-being variables can be effectively used in psychotherapy and when constructing interventions to enhance well-being.

Central variables have higher associations with other well-being variables. Therefore, if a study needs to choose a limited number of well-being variables (e.g., due to space constraints) as a proxy for general mental well-being, central variables are preferable. Although the study is correlational, the results have implications for designing inventions. For example, it seems reasonable to suggest that psychologists should target central before peripheral variables at earlier stages of their interventions. This is justifiable for two reasons. Firstly, central variables have stronger associations with a larger set of well-being variables and thus, focusing on them may prove to be an easier, quicker and more effective strategy towards improving global well-being in earlier stages of intervention. Secondly, these variables are less likely to have contrastive relationships with other intervention goals hence, striking a balance between central variables would be easier than striking a balance between peripheral variables. Therefore, developing central skills (such as self-acceptance and purpose in life) may pave the way for acquiring more complicated skills

such as autonomy. Individuals may first need to gain a better understanding of and be at peace with their selves and lives before they can desirably balance their personal choice and constraints of reality, as involved in autonomous functioning. It is acknowledged that these suggestions need to be empirically tested in future longitudinal studies, given that the present data are cross-sectional. In addition, views vary on how centrality measures can inform theory and practice (Bringmann et al. 2019; Hallquist et al. 2019). Therefore, additional data are needed to support any of the potential applications of these measures. The centrality estimates presented in this study help to inform future research in this area.

These findings also have implications for self-determination theory. This theory assumes that "individuals have a limited set of basic psychological needs, the satisfaction of which is essential for flourishing and well-being. Although the list of psychological needs is and has always been open for additions, the current set is limited to three: autonomy, competence and relatedness." (Vansteenkiste et al. 2020, p. 3). The findings of the present study as well as those of Joshanloo (2018) and Joshanloo (2020) show that indeed relatedness (personal relationships) and competence (environmental mastery) are more central than peripheral. They have strong relationships with other well-being variables and are less likely to have oppositional relationships with other well-being variables. However, autonomy is a peripheral well-being variable with weaker associations with the rest of the variables and hence it is likely to have potentially contrastive relationships with some well-being variables. Variables such as purpose in life seem to be more central and "basic" than autonomy. At any rate, the present results suggest that among the three basic psychological needs postulated by self-determination theory, two of them are more central than the other.

8.2 Dimensional Structure

The results converge with those of Joshanloo et al. (2018) and Joshanloo (2020) to suggest a systematic understanding of well-being variables along the two dimensions of hedonic versus eudaimonic and personal versus social. Thus, any well-being variable can be described in terms of its placements along these two continua. The difference between hedonic and eudaimonic variables has been recognized as a fundamental distinction in well-being research (Ryan et al. 2001; Vittersø 2016). Factor analytic studies across cultures have confirmed the distinction between these two domains (for a review see Joshanloo 2016). Consistent with factor analytic findings, in the MDS studies conducted to date, hedonic and eudaimonic well-being variables have been found to occupy different regions of the two-dimensional plots. Furthermore, a dimension has emerged in all MDS studies to distinguish variables based on their hedonic and eudaimonic contents. The emergence of this basic distinction across various studies with diverse methodologies and national samples shows its robustness and salience for understanding well-being.

As expected, another distinct ordering of variables by their personal versus social contents also emerged. Factor analytic studies with the tripartite model of mental well-being do suggest that social well-being variables form a distinct factor from hedonic and psychological well-being. This finding was replicated in the present study as well as in a previous MDS study (Joshanloo 2020), given that social well-being variables occupied a distinct region in the two-dimensional planes. The intuitive distinction between personal and social variables and its implications have not been the focus of attention in well-being research where researchers have largely concentrated on personal and private variables. Highlighting the personal versus social dimension is a unique contribution of MDS studies, showing that psychological and hedonic well-being share a focus on private qualities of well-being.

Positive relationships turned out to be closer to the center of the axis than the social end. This shows that measuring relational well-being is crucial but not enough. Social well-being is not identical to having quality interpersonal relationships. Instead, it concerns a person's perceptions of and relationships with broader social groups, social institutions and societal mores (Keyes 1998; Larson 1993). Notably, an underappreciated aspect of the Aristotelian conceptualization of eudaimonia in modern psychology is that for him eudaimonia was socio-political (i.e., a way of life centered on the Greek city-state), not merely personal (Holowchak 2004).

There is currently some theoretical confusion surrounding certain well-being variables. For example, life satisfaction has been described as both a hedonic and eudaimonic variable (Feldman 2008). Yet, in the present empirically-based analysis, life satisfaction emerged clearly in the hedonic zone. Thus, life satisfaction (as it is currently measured in psychology) is empirically more of a hedonic than eudaimonic variable. Confusion also exists surrounding variables such as hope, vitality and feelings of interest. Theoretically and empirically, researchers have treated these variables as hedonic or eudaimonic variables in previous studies (e.g., Clark et al. 2011; Keyes 2013; Klar et al. 2009; Vittersø et al. 2011). Researchers who favor empirical methods to partly clear up these confusions may include these variables in future MDS studies to clarify their standings on the dimensions.

Researchers need to be mindful of which aspects of well-being they are measuring in their research and avoid equating well-being with a single variable or cluster of variables. For example, if a study measures well-being via a scale of life satisfaction, it should be kept in mind that life satisfaction is on the hedonic and personal sides of the dimensions, indicating that social and eudaimonic aspects of well-being are not adequately measured in that study. Thus, the results of any single study should be interpreted keeping in mind the included and excluded contents. Findings based on one domain of well-being cannot be automatically generalized to other domains. Ample evidence indicates that the three domains of well-being have partly differential nomological networks (Huta 2016; Joshanloo 2019c). For example, psychological and hedonic variables have the strongest and weakest relationships with self-control and long-term orientation, respectively, whereas social well-being shows a relatively moderate association with these variables (Joshanloo et al. 2021). In addition, longitudinal studies suggest that eudaimonic well-being (psychological and social well-being) is a better predictor of future hedonic well-being than the other way around (Joshanloo 2018, 2019a; Joshanloo et al. 2018). Thus, a multidimensional understanding of the structure of well-being variables seems more useful than the reductionist approaches that try to reduce well-being to one of its components. A sheer focus on a single domain of well-being at the expense of marginalizing the rest of well-being is of limited scientific and applied value. Inclusive frameworks such as the one that emerged in this study will help researchers to keep perspective on the domains of well-being not measured in their research and the potential consequences of their exclusion.

Another important implication of the results is to promote a continuous rather than categorical understanding of well-being variables. MDS clearly shows that some social and psychological variables are more eudaimonic (e.g., growth, social coherence and autonomy) and some are more hedonic (mastery and social acceptance). Factor analytic studies also confirm that cross-loadings are the norm rather than the exception in the structure of well-being variables across cultures (Joshanloo 2016, 2019c). Therefore, both factor analysis and MDS results suggest that there are grey areas between the domains of well-being. Accordingly, a dimensional view of well-being seems preferable to a categorical view. In other words, it is more useful to consider the relative standings of variables along the two axes rather than forming fixed categories of variables. This will contribute to resolving the

existing confusion over the large set of variables that researchers use as proxies to measure eudaimonic or hedonic well-being.

8.3 Cross-Cultural Differences

Up to this point, the discussion has focused on the general patterns that emerged in all of the countries. In fact, there is a high level of cultural congruency in the structural features of the variables under study. Yet, cross-cultural differences should not be ignored. As shown in Table 2 and Fig. 1, social well-being variables showed the highest level of cross-cultural variability in their centrality. In contrast, negative affect and psychological well-being variables showed the lowest level of cross-cultural variability. A close inspection of the patterns suggests that social well-being variables are less central in the USA than in the other three countries (particularly integration and contribution). In other nations, the centrality of social and personal aspects of well-being is relatively more balanced. This may indicate that well-being has been more extensively privatized in the USA, which has led to a sharper distinction between social and private well-being variables than in other nations. However, the different demographic compositions of the samples might also have contributed to these national differences.

Two cultural differences in the structural organization of the variables deserve attention. Firstly, positive relations was relatively closer to the personal end of the dimension in Iranian than the other samples, suggesting that this variable is more personal than societal in Iran. Thus, the quality of personal relationships is relatively less associated with the quality of people's connections with and perceptions of the social groups in Iran. This may be explained by some of Iran's complex cultural features. Although Iran has a very high score on in-group collectivism ("the degree to which individuals express pride, loyalty and cohesiveness in their organizations or families"), its score on institutional collectivism ("the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action") is low (House et al. 2004, p. 12). Given Iran's socio-political context, it seems that for Iranian people, interpersonal and societal relationships are more distinct than in other countries. And given personal relations' relatively smaller distance from autonomy in Iran, it seems that the autonomy gap between interpersonal relationships and societal relationships is relatively larger in Iran than in other countries. However, this difference can also be explained in the light of demographic differences between the samples. For example, the Iranian sample was considerably younger than the other three groups. The relationship between well-being variables may differ in various age groups. For example, perceptions of being treated with respect have stronger associations with well-being in younger than older adults (e.g., Joshanloo et al. 2018). Carlquist et al. (2016) found that younger people are more likely to endorse internal and psychological conceptualizations of well-being (e.g., emphasizing internal emotions and self-perceptions), whereas older people are more likely to endorse external conceptualizations (e.g., emphasizing community and society). Therefore, younger individuals' perceptions of personal and personal relationships may be different from older adults, which could also be responsible for the different results obtained for the Iranian sample.

Secondly, negative affect was more personal in Canada and the USA whereas it was more social in Korea and Iran. Thus, the absence of negative affect is more likely to co-occur with positive societal factors in Asian than North American countries. In other words, it seems that group-level interactions and perceptions have more emotional consequences in Asian countries. This may suggest that negative relationships with and negative

perceptions of society and social institutions are more likely to be the source of negative emotions in Asian countries than in North America where personal challenges and problems are more strongly aligned with experienced negative affect. In general, Koreans and Iranians show higher levels of subjective dissatisfaction with the functioning of their governments and social institutions than North American countries (Legatum Institute 2017). In Asian countries that endorse collectivistic values more strongly (Hofstede et al. 2010), interactions with the social groups are more strongly weighted which may intensify negative emotions generated in societal interactions.

8.4 Study Limitations

Some of the limitations of the study need to be acknowledged. The internal consistencies for a few of the scales were unacceptable (e.g., the 3-item social acceptance scale in the USA). There were some differences in the demographic characteristics of the four national samples. For example, the Iranian sample was a student sample, whereas for the other three countries, adult samples were used. Additionally, some of the scales used in the four nations were not identical in terms of the number and composition of the items. The most remarkable difference was in the life satisfaction scale. In the USA, the scale was a combination of general and domain satisfaction items, but in the other countries, the scales captured merely general life satisfaction. Notably, Joshanloo et al. (2018) repeated their MDS analyses in Japan using both general and domain satisfaction scales, with the results being almost identical. Given the general cross-cultural consistency in the emerging structures, the differences in the scales and samples do not seem to have considerably affected the results. However, it would be worth replicating the results with completely identical instruments and matched samples in future studies. The study relied on the tripartite model of well-being as a reference for variable selection. Other models of well-being present overlapping but partly different conceptualizations of well-being (e.g., Ng et al. 2018; Waterman et al. 2010). There are also many alternative measures of well-being concepts (e.g., VanderWeele et al. 2020). Future studies will need to include scales and concepts from various theoretical frameworks.

The high degree of cross-cultural consistency in the present study is partly because the scales of the study have originated from western cultures and the study did not include concepts that have originated from Asian cultures. Examples of measurable concepts originating from non-western cultures are equanimity (Chan et al. 2014) and peace of mind (Lee et al. 2012). A fruitful avenue for future studies is to include non-western concepts in MDS studies not only to make the studies more relevant to non-western cultures, but also to provide more insights on the standing of these concepts in the larger conceptual scheme of well-being.

9 Conclusion

This study aimed at examining the complex matrix of relationships between 14 well-being variables to build a conceptual framework of well-being that is applicable across various fields of research. The centrality and dimensionality findings presented here can contribute to building a consensus in the field of well-being to advance knowledge without losing perspective on the inherent complexities of the construct of well-being. Particularly, this study sought to demonstrate the paralyzing impacts of reducing well-being to a single variable or

domain and ignoring the breadth and diversity of well-being variables. It is hoped that the approach introduced and the insights generated in this study are useful in creating, refining and broadening well-being theories, clarifying some of the conceptual and empirical confusions in the field, selecting well-being variables for different research purposes, developing new well-being scales, constructing well-being interventions and better understanding emerging well-being concepts.

Declarations

Conflict of interest The author declares that he has no conflict of interest.

Ethical Approval The studies were conducted in compliance with all ethical standards.

Informed consent Informed consent was obtained from participants.

References

Bilsky, W., Janik, M., & Schwartz, S. H. (2011). The structural organization of human values: Evidence from three rounds of the European Social Survey (ESS). *Journal of Cross-Cultural Psychology, 42*, 759–776.

Borg, I., & Groenen, P. J. (2005). *Modern multidimensional scaling: Theory and applications*. Springer.

Borg, I., Groenen, P. J. F., & Mair, P. (2013). *Applied multidimensional scaling*. Springer.

Bringmann, L. F., Elmer, T., Epskamp, S., Krause, R. W., Schoch, D., Wichers, M., Wigman, J. T. W., & Snippe, E. (2019). What do centrality measures measure in psychological networks? *Journal of Abnormal Psychology, 128*(8), 892–903. https://doi.org/10.1037/abn0000446

Büyükkurt, B. K., & Büyükkurt, M. D. (1990). Robustness and small-sample properties of the estimators of probabilistic multidimensional scaling (PROSCAL). *Journal of Marketing Research, 27*(2), 139–149.

Carlquist, E., Ulleberg, P., Delle Fave, A., Nafstad, H. E., & Blakar, R. M. (2016). Everyday Understandings of Happiness, Good Life and Satisfaction: Three Different Facets of Well-being. *Applied Research in Quality of Life, 12*(2), 481–505. https://doi.org/10.1007/s11482-016-9472-9

Chan, C. H. Y., Chan, T. H. Y., Leung, P. P. Y., Brenner, M. J., Wong, V. P. Y., Leung, E. K. T., & Chan, C. L. W. (2014). Rethinking well-being in terms of affliction and equanimity: Development of a holistic well-being scale. *Journal of Ethnic & Cultural Diversity in Social Work, 23*(3–4), 289–308. https://doi.org/10.1080/15313204.2014.932550

Cicognani, E. (2014). Social well-being. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 6193–6197). Springer, Netherlands.

Clark, A. E., & Senik, C. (2011). Is happiness different from flourishing? Cross-country evidence from the ESS. *Revue D'économie Politique, 121*, 17–34.

Commandeur, J. J. F. and Heiser, W. J. (1993). *Mathematical derivations in the proximity scaling (PROXSCAL) of symmetric data matrices* (Tech. Rep. No. RR-93–03). Leiden, The Netherlands: Department of Data Theory, Leiden University.

Dambrun, M., & Ricard, M. (2011). Self-centeredness and selflessness: A theory of self-based psychological functioning and its consequences for happiness. *Review of General Psychology, 15*(2), 138–157. https://doi.org/10.1037/a0023059

Davison, M. L., & Sireci, S. G. (2000). Multidimensional scaling. In H. E. A. Tinsley & S. Brown (Eds.), *Handbook of multivariate statistics and mathematical modeling* (pp. 325–349). American Psychological Association.

Delle Fave, A. (2014). Eudaimonic and hedonic happiness. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 1999–2004). Springer, Netherlands.

Delle Fave, A., Brdar, I., Freire, T., Vella-Brodrick, D., & Wissing, M. P. (2011). The eudaimonic and hedonic components of happiness: Qualitative and quantitative findings. *Social Indicators Research, 100*(2), 185–207.

Delle Fave, A., Brdar, I., Wissing, M. P., Araujo, U., Castro Solano, A., Freire, T., & Soosai-Nathan, L. (2016). Lay definitions of happiness across nations: The primacy of inner harmony and relational connectedness. *Frontiers in Psychology, 7*, 1–30. https://doi.org/10.3389/fpsyg.2016.00030

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71–75.

Diener, E., Oishi, S., & Lucas, R. E. (2003). Personality, culture and subjective well-being: Emotional and cognitive evaluations of life. *Annual Review of Psychology, 54*(1), 403–425.

Fabrigar, L. R., & Wegener, D. T. (2011). *Exploratory factor analysis*. Oxford University Press.

Feldman, F. (2008). Whole life satisfaction concepts of happiness. *Theoria, 74*, 219–238.

Gelfand, M., Duan, L., & Pinkley, R. (2005). When, where and how: The use of multidimensional scaling methods in the study of negotiation and social conflict. *International Negotiation, 10*(1), 79–96.

Gorsuch, R. L. (1974). *Factor analysis*. W. B. Saunders Co.

Grouzet, F. M. E., Kasser, T., Ahuvia, A., Dols, J. M. F., Kim, Y., Lau, S., Ryan, R. M., Saunders, S., Schmuck, P., & Sheldon, K. M. (2005). The Structure of Goal Contents Across 15 Cultures. *Journal of Personality and Social Psychology, 89*(5), 800–816. https://doi.org/10.1037/0022-3514.89.5.800

Hallquist, M. N., Wright, A. G. C., & Molenaar, P. C. M. (2019). Problems with Centrality Measures in Psychopathology Symptom Networks: Why Network Psychometrics Cannot Escape Psychometric Theory. *Multivariate Behavioral Research*. https://doi.org/10.1080/00273171.2019.1640103

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2009). *Acceptance and commitment therapy*. American Psychological Association.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind*. McGraw-Hill.

Holowchak, M. A. (2004). *Happiness and Greek ethical thought*. Continuum.

Hone, L. C., Jarden, A., Schofield, G. M., & Duncan, S. (2014). Measuring flourishing: The impact of operational definitions on the prevalence of high levels of wellbeing. *International Journal of Well-being, 4*(1), 62–90. https://doi.org/10.5502/ijw.v4i1.4

Hooley, J. M., Butcher, J. N., Nock, M., & Mineka, S. (2017). *Abnormal psychology* (17th ed.). . Pearson.

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (Eds.). (2004). *Culture, leadership and organizations: The GLOBE study of 62 societies*. Sage.

Hout, M. C., Papesh, M. H., & Goldinger, S. D. (2013). Multidimensional scaling. *Wiley Interdisciplinary Reviews: Cognitive Science, 4*(1), 93–103.

Huta, V. (2016). Eudaimonic and hedonic orientations: Theoretical considerations and research findings. In E. J. Vittersø (Ed.), *Handbook of eudaimonic well-being* (pp. 215–231). Springer.

Jaccard, J., & Jacoby, J. (2010). *Theory construction and model-building skills: A practical guide for social scientists*. Guilford Press.

Joshanloo, M. (2017). Factor structure and criterion validity of original and short versions of the Negative and Positive Affect Scale (NAPAS). *Personality and Individual Differences, 105*, 233–237.

Joshanloo, M. (2014). Eastern conceptualizations of happiness: Fundamental differences with western views. *Journal of Happiness Studies, 15*(2), 475–493.

Joshanloo, M. (2016). Revisiting the empirical distinction between hedonic and eudaimonic aspects of well-being using exploratory structural equation modeling. *Journal of Happiness Studies, 17*(5), 2023–2036.

Joshanloo, M. (2018). Longitudinal associations between subjective and psychological well-being in Japan: A four-year cross-lagged panel study. *Personality and Individual Differences, 134*, 289–292.

Joshanloo, M. (2019a). Investigating the relationships between subjective well-being and psychological well-being over two decades. *Emotion, 19*(1), 183–187.

Joshanloo, M. (2019b). Factor structure and measurement invariance of the MHC-SF in the USA. *European Journal of Psychological Assessment, 35*(4), 521–525.

Joshanloo, M. (2019c). Structural and discriminant validity of the tripartite model of mental well-being: Differential relationships with the Big Five traits. *Journal of Mental Health, 28*(2), 168–174. https://doi.org/10.1080/09638237.2017.1370633

Joshanloo, M. (2020). The structure of the MHC-SF in a large American sample: contributions of multidimensional scaling. *Journal of Mental Health, 29*(2), 139–143. https://doi.org/10.1080/09638237.2018.1466044

Joshanloo, M., & Jovanović, V. (2018). Similarities and differences in predictors of life satisfaction across age groups: A 150-country study. *Journal of Health Psychology*. https://doi.org/10.1177/1359105318819054

Joshanloo, M., & Weijers, D. (2019). A two-dimensional conceptual framework for understanding mental well-being. *PLoS ONE, 14*(3), e0214045. https://doi.org/10.1371/journal.pone.0214045

Joshanloo, M., Jovanović, V., & Park, J. (2021). Differential relationships of hedonic and eudaimonic well-being with self-control and long-term orientation. *Japanese Psychological Research, 63*(1), 47–57. https://doi.org/10.1111/jpr.12276

Joshanloo, M., Sirgy, M. J., & Park, J. (2018). Directionality of the relationship between social well-being and subjective well-being: Evidence from a 20-year longitudinal study. *Quality of Life Research, 27*(8), 2137–2145.

Keyes, C. L. M. (1998). Social well-being. *Social Psychology Quarterly, 61*, 121–140.

Keyes, C. L. M. (2013). Promoting and protecting positive mental health: Early and often throughout the lifespan. In C. L. M. Keyes (Ed.), *Mental well-being: International contributions to the study of positive mental health* (pp. 3–28). Springer, Netherlands.

Keyes, C. L. M., & Shapiro, A. D. (2004). Social well-being in the United States: A descriptive epidemiology. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we?A national study of well-being at midlife* (pp. 350–372). Univ. of Chicago Press.

Keyes, C. L., & Annas, J. (2009). Feeling good and functioning well: Distinctive concepts in ancient philosophy and contemporary science. *The Journal of Positive Psychology, 4*(3), 197–201.

Kim, M. S., Kim, H. W., & Cha, K. H. (2001). Analyses on the construct of psychological well-being (PWB) of Korean male and female adults. *Korean Journal of Social and Personality Psychology, 15*(2), 19–39.

Klar, M., & Kasser, T. (2009). Some benefits of being an activist: Measuring activism and its role in psychological well-being. *Political Psychology, 30*, 755–777.

Krauss, S. W., & Hood, R. W., Jr. (2013). *A new approach to religious orientation: the commitment-reflectivity circumplex*. Rodopi.

Kruskal, J. B., & Wish, M. (1978). *Multidimensional scaling*. Sage.

Larson, J. S. (1993). The measurement of social well-being. *Social Indicators Research, 28*(3), 285–296. https://doi.org/10.1007/bf01079022

Lee, Y.-C., Lin, Y.-C., Huang, C.-L., & Fredrickson, B. L. (2012). The construct and measurement of peace of mind. *Journal of Happiness Studies, 14*(2), 571–590. https://doi.org/10.1007/s10902-012-9343-5

Legatum Institute. (2017). The 2017 Legatum Prosperity Index. https://prosperitysite.s3-accelerate.amazonaws.com/3515/1187/1128/Legatum_Prosperity_Index_2017.pdf

Lieberman, M. D. (2013). *Social: Why our brains are wired to connect*. Crown.

Martela, F., & Sheldon, K. M. (2019). Clarifying the concept of well-being: Psychological need satisfaction as the common core connecting eudaimonic and subjective well-being. *Review of General Psychology, 23*(4), 458–474. https://doi.org/10.1177/1089268019880886

Mroczek, D. K., & Kolarz, C. M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology, 75*(5), 1333–1349. https://doi.org/10.1037/0022-3514.75.5.1333

Mundfrom, D. J., Shaw, D. G., & Ke, T. L. (2005). Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing, 5*(2), 159–168.

Ng, V., Tay, L., & Kuykendall, L. (2018). The development and validation of a measure of character: The CIVIC. *The Journal of Positive Psychology, 13*(4), 346–372. https://doi.org/10.1080/17439760.2017.1291850

Pett, M. A., Lackey. N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis*. Thousand. Oaks, CA: Sage.

Posner, J., Russell, J. A., & Peterson, B. S. (2005). The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development and psychopathology. *Development and Psychopathology, 17*(3), 715–734.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*(1), 141–166.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological wellbeing. *Journal of Personality and Social Psychology, 57*(6), 1069–1081.

Ryff, C. D. (2016). Beautiful Ideas and the scientific enterprise: Sources of intellectual vitality in research on eudaimonic well-being. In J. Vittersø (Ed.), *Handbook of eudaimonic well-being* (pp. 95–107). Springer.

Ryff, C. D., Almeida, D., Ayanian, J., Binkley, N., Carr, D. S., Coe, C., . . . Williams, D. (2017). *Midlife in the United States (MIDUS Refresher), 2011–2014*. Retrieved from www.icpsr.umich.edu/web/ICPSR/studies/36532/summary

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., Ramos, A., Verkasalo, M., Lönnqvist, J.-E., Demirutku, K., Dirilen-Gumus, O., & Konty, M. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology, 103*(4), 663–688. https://doi.org/10.1037/a0029393

Sirgy, M. J. (2019). Positive balance: a hierarchical perspective of positive mental health. *Quality of Life Research, 28*(7), 1921–1930. https://doi.org/10.1007/s11136-019-02145-5

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics*. Harlow: Pearson Education Limited.

VanderWeele, T. J., Trudel-Fitzgerald, C., Allin, P., Farrelly, C., Fletcher, G., Frederick, D. E., Hall, J., Helliwell, J. F., Kim, E. S., Lauinger, W. A., Lee, M. T., Lyubomirsky, S., Margolis, S., McNeely, E., Messer, N., Tay, L., Viswanath, V., Węziak-Białowolska, D., & Kubzansky, L. D. (2020). Current recommendations on the selection of measures for well-being. *Preventive Medicine, 133*, 106004. https://doi.org/10.1016/j.ypmed.2020.106004

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes and future directions. *Motivation and Emotion, 44*(1), 1–31. https://doi.org/10.1007/s11031-019-09818-1

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

Vittersø, J., & Søholt, Y. (2011). Life satisfaction goes with pleasure and personal growth goes with interest: Further arguments for separating hedonic and eudaimonic well-being. *The Journal of Positive Psychology, 6*, 326–335. https://doi.org/10.1080/17439760.2011.584548

Waterman, A. S. (2013). Eudaimonia: Contrasting two conceptions of happiness: Hedonia and eudaimonia. In J. Parks (Ed.), *Activities for teaching positive psychology: A guide for instructors* (pp. 29–34). American Psychological Association.

Waterman, A. S., Schwartz, S. J., Zamboanga, B. L., Ravert, R. D., Williams, M. K., Bede Agocha, V., & Brent Donnellan, M. (2010). The Questionnaire for Eudaimonic Well-Being: Psychometric properties, demographic comparisons and evidence of validity. *The Journal of Positive Psychology, 5*(1), 41–61.

World Health Organization. (2001). *Basic documents* (43rd ed.). . World Health Organization.