Personality and Individual Differences 116 (2017) 216–222

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

A bifactor-ESEM representation of the Questionnaire for Eudaimonic Wellbeing

Daniela Fadda [a,*], L. Francesca Scalas [a], Mauro Meleddu [a], Alexandre J.S. Morin [b]

[a] Department of Education, Psychology, Philosophy, University of Cagliari, Via Is Mirrionis 1, 09123 Cagliari, Italy
[b] Department of Psychology, Concordia University, Canada, 7141 Sherbrooke W, Montreal, QC H3B 1R6, Canada

ARTICLE INFO

Article history:
Received 22 February 2017
Received in revised form 28 April 2017
Accepted 30 April 2017
Available online xxxx

Keywords:
Wellbeing
Eudaimonia
ESEM
Bifactor analysis

ABSTRACT

The present study aims to provide an improved representation of the factor structure of the Questionnaire for Eudaimonic Wellbeing (QEWB) through the application of the bifactor-exploratory structural equation modeling (ESEM) framework. Using a convenience sample of 438 Italian students (233 males; 205 females, $M_{age} = 18.5$) we contrasted the original unidimensional model (Waterman et al., 2010), with Schutte, Wissing, and Khumalo's (2013) 3- and 4- factor models, while contrasting alternative representations of the QEWB (CFA, ESEM, bifactor-CFA and bifactor-ESEM). Our results supported the superiority of a bifactor-ESEM solution including three specific factors (Sense of Purpose, Purposeful Personal Expressiveness, and Effortful Engagement) and a global eudaimonic wellbeing factor. Importantly, the results revealed that the items associated with the Sense of Purpose and Effortful Engagement subscales tapped into relevant specificity over and above participants' global levels of eudaimonic wellbeing. Finally, our results supported the criterion-related validity of the global eudaimonic wellbeing, which was found to correlate with measures of life satisfaction and self-esteem.

1. Introduction

A holistic definition of subjective wellbeing (SWB) encompasses two main classical conceptions: the hedonic and the eudaimonic perspectives (Ryan & Deci, 2001). Hedonia refers to the subjective experience of pleasure irrespective of the sources from which pleasure is derived (Kahneman, Diener, & Schwarz, 1999). Hedonic approaches have generally considered SWB to reflect an internal state encompassing a variety of subjective evaluations about the quality of one's life, broadly defined (Delle Fave, Massimini, & Bassi, 2011). These approaches have typically emphasized the importance of engaging in pursuits that generate positive emotional experiences and that lead to the satisfaction of one's desires. Studies have typically operationalized hedonia in terms of positive emotions, absence of negative mood and overall satisfaction with life (Diener, 1984), such as in the Satisfaction With Life Scale (SWLS; Pavot & Diener, 1993) designed to measure global judgments of satisfaction with one's life.

Eudaimonia focuses on factors that promote personal growth and the fulfillment of human potential. The eudaimonic perspective views SWB as long-term state of positive psychological functioning, resulting from a state of engagement with the various developmental and existential challenges of life, meaning and self-reflection (Ryan & Deci, 2001; Waterman, 1993). Researchers have often measured eudaimonia using Ryff's Psychological Wellbeing Scales (PWBS; Ryff, 1989), which assess eudaimonia in terms of qualities associated with positive psychological functioning such as autonomy, personal growth, self-acceptance, life purpose, mastery, and positive relatedness.

Waterman's (1993, 2008) studies suggest that despite a high correlation between measures of hedonia and eudaimonia, they present several differences. Eudaimonic activities are associated with opportunities to advance one's personal potential. They are characterized by a balance of challenge and skill, and are associated with having clear goals, with investing a great deal of effort, and with the experience of interest and flow. In contrast, hedonic activities show stronger correlations with feeling relaxed, excited, content, happy and forgetting one's personal problems. While both hedonia and eudaimonia are positive subjective states, Waterman (2008) proposed that eudaimonia is preferable, as it affords opportunities for individuals to develop their potential. In his conceptualization of eudaimonia, Waterman (1993, 2011), adopts a philosophical perspective that places self-realization as a core defining element of eudaimonia, and reinforces the distinct nature of eudaimonia from more hedonic representations of SWB (Waterman, 2008; Waterman et al., 2010). In order to clarify this differentiation, Waterman et al. (2010) proposed a new instrument to measure SWB, directly linked to the eudaimonic tradition, the Questionnaire for Eudaimonic Wellbeing (QEWB).

* Corresponding author.
E-mail addresses: danielafadda@unica.it (D. Fadda), lfscalas@unica.it (L.F. Scalas), meleddu@unica.it (M. Meleddu), alexandre.morin@concordia.ca (A.J.S. Morin).

http://dx.doi.org/10.1016/j.paid.2017.04.062
0191-8869/

1.1. The Questionnaire for Eudaimonic Wellbeing

The QEWB was developed as an operational definition of eudaimonic wellbeing, placing priority on the creation of items grounded in philosophical understandings of eudaimonic functioning. Therefore, the QEWB included items reflecting qualities of eudaimonic functioning derived from the philosophical literature such as the Aristotelian concepts of eudaimonia, pursuit of excellence, virtue, and self-realization (Ackrill, 1973; Annas, 2004; McDowell, 1980), the "true self" concept of Norton (1976) and items taping subjective experiences of eudaimonia (e.g., feelings that activities engaged in are personally expressive). As it was done in earlier research on eudaimonia, the items on the QEWB refer to a general level of eudaimonic functioning and not to experiences associated with specific activities (Waterman, 2008; Waterman et al., 2003).

The initial item pool for the QEWB included 25 items designed to assess six inter-related categories with strong philosophical-psychological linkages: self-discovery, perceived development of one's best potentials, a sense of purpose and meaning in, investment of significant effort in pursuit of excellence; intense involvement in activities, and enjoyment of activities as personally. As a result of a pilot study (Waterman et al., 2010), items that reduced the value of Cronbach's alpha were eliminated and replaced by items created based on participants' feedback. The final version of the instrument includes 21 items reflecting a single common construct of eudaimonic wellbeing.

Waterman et al. (2010) relied on multi-ethnic samples ($N_1 = 1728$, $N_2 = 5606$) of college and university students (age: $M_1 = 20.04$, $M_2 = 20.38$) to test the psychometric properties of the QEWB. Their results supported the presence of a single underlying dimension of eudaimonic wellbeing in both samples, with satisfactory estimates of scale score reliability ($\alpha = 0.86$ and 0.85). Convergent, discriminant, construct, and incremental validity were also supported. However, Waterman et al. (2010) analyses relied on the estimation of measurement models from item parcels (five parcels were created by summing responses to adjacent items). Importantly, item parcels often have the effect of hiding scale multidimensionality and are thus not recommended for initial psychometric validation studies (Marsh, Lüdtke, Nagengast, Morin, & Von Davier, 2013).

A further study of the QEWB was conducted by Schutte, Wissing, and Khumalo (2013) among a multicultural sample of South African students ($n = 325$; $M_{age} = 21.03$; $SD = 4.09$). These authors with an item-level exploratory factor analysis revealed a multidimensional factor structure. In particular a 3- (Sense of Purpose, Purposeful Personal Expressiveness, Effortful Engagement), and 4-factor (Sense of Purpose, Engagement in Rewarding Activities, Living from Beliefs, Effortful Engagement) solutions were reported by the authors. The 3-factor solution explained 41.99% of the variance ($\alpha = 0.61$ to 0.77), while the 4-factor solution explained 47.60% of the variance ($\alpha = 0.51$ to 0.77). Some items displayed substantial cross-loadings ($\lambda > 0.30$) on more than one factor, while other showed low corrected item-total correlations.

1.2. Limitations of previous studies on the QEWB and possible solutions

The aim of Waterman et al.'s (2010) study was to develop a new instrument that accurately reflected the philosophical representation of eudaimonia in order to add to our understanding of SWB beyond what can be explained by wellbeing dimensions already widely studied. Therefore, in developing the QEWB, the authors selected items reflecting six inter-related components of eudaimonic wellbeing. Unfortunately, Waterman et al. (2010) did not provide the original distribution of items into these six a priori dimensions (they only provided a single sample item for each dimension), which could be explained by their assumption that the measure would prove to be unidimensional. However, despite initial evidence supporting this assumption based on a parceling strategy, additional results relying on a more adequate item-level analysis (Schutte et al., 2013) demonstrated the multidimensionality of the instrument. This discrepancy is not surprising. Indeed, as demonstrated by Marsh et al. (2013), the a priori use of item parcels is never justified without clear a priori support for the unidimensionality of the data (i.e., there are no cross-loadings, no correlated uniquenesses, no secondary factors, and no other sources of misspecification). Marsh et al. (2013) demonstrated that even minor violations of these conditions could lead to substantially biased results regarding the underlying structure of a measurement scale.

The highly contrasting results obtained by Waterman et al. (2010) and Schutte et al. (2013) suggest the need to further explore the underlying structure of the QEWB, and this is precisely the aim of the present study. As noted by Morin, Arens and Marsh (Morin, Arens, & Marsh, 2016; Morin, Arens, Tran, & Caci, 2016), measurement models often fail to account for two possible sources of construct-relevant psychometric multidimensionality that often tend to be present at the item level. Construct-relevant psychometric multidimensionality refers to the fact that "the items forming an instrument might be associated with more than one source of true score variance" (Morin, Arens, & Marsh, 2016, p. 117). First, when conceptually-related constructs are assessed, items might be expected to present some degree of valid association with more than one construct, which is typically expressed through cross-loadings. Interestingly, Schutte et al. (2013) results revealed that multiple cross-loadings were present in responses to the QEWB. Second, whenever an instrument is explicitly designed to assess a single overarching construct from items that also tap into a variety of dimensions, it is important to take into account the fact that items are likely to reflect these two sources of true-score variance (i.e., global eudaimonic wellbeing, together with the more specific components that form this global construct). Once again, Schutte et al. (2013) results, characterized by multiple large cross-loadings and by discrepant conclusions regarding the presence of a single overarching dimension depending on the analytical method that was used, suggest that this might be the case.

To account for both sources of construct-relevant psychometric multidimensionality Morin, Arens et al. (Morin, Arens, & Marsh, 2016; Morin, Arens, & Tran et al., 2016) proposed to rely on the overarching bifactor-exploratory structural equation modeling framework (see Appendix A). Applications of this approach for wellbeing at work (Morin, Boudrias, Marsh, Madore & Desrumaux, 2016; Morin, Boudrias, Marsh, McInerney, & Dagenais-Desmarais et al., 2016) supported the idea that a global overarching wellbeing construct co-exists with more specific components of wellbeing. In the present study, we extend these results by focusing on general wellbeing among a sample of students.

1.3. The present study

The aim of this study is to provide a further investigation of the QEWB while relying on the bifactor-ESEM framework in order to compare the relative adequacy of the a priori one-factor solution proposed by Waterman et al. (2010) with that of the 3- and 4-factor solutions proposed by Schutte et al. (2013) and including, or not, a global overarching eudaimonic wellbeing factor. Following the guidelines proposed by Morin, Arens, et al. (Morin, Arens, & Marsh, 2016; Morin, Arens, & Tran et al., 2016), we contrasted alternative representations of the QEWB: (a) a one factor-model, (b) 3- and 4-factor CFA and ESEM models; and (c) bifactor-CFA and bifactor-ESEM models including 3–4 specific factors and one global factor (see Fig. 1).

2. Method

2.1. Participants

A convenience sample of 438 Italian students attending the final year of high school (233 males and 205 females, $M_{age} = 18.5$, $SD = 0.83$) was recruited. Each student received a parental consent form,

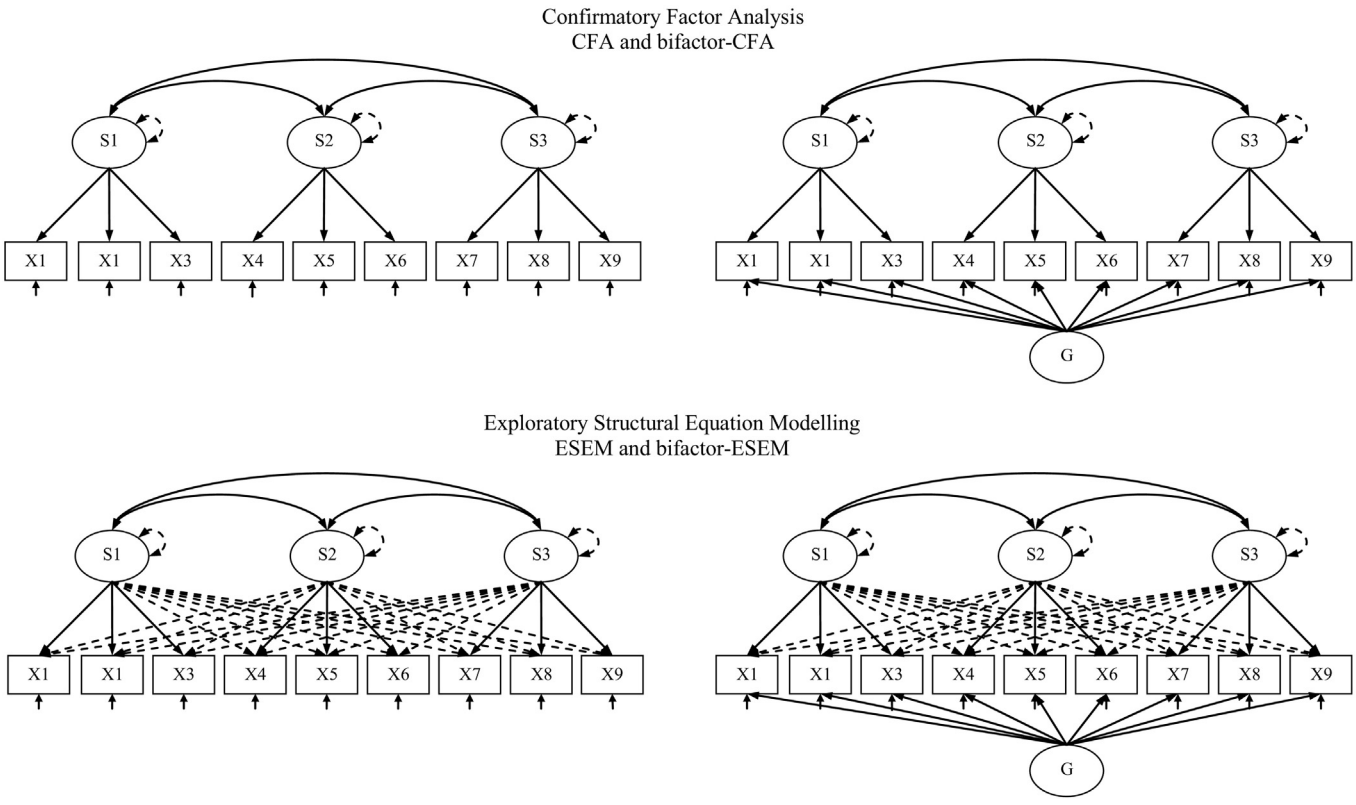

Fig. 1. Simplified conceptual representations of the estimated models.

with information about the study. We used an opt-out method, so that only parents not interested would have to return back the signed form within one week after receiving it. On the testing date, this was supplemented by an active consent from the students. The response rate was 98%. The participants anonymously completed a battery of questionnaires in group sessions. Confidentiality was guaranteed. All test sessions took place during students' regular school time and took around 30 min.

2.2. Measures

All participants completed an Italian version of the QEWB (Waterman et al., 2010) developed for purposes of the present study following classical translation-back translation procedures (Gudmundsson, 2009).Two independent Italian translations were obtained from bilingual translators and then compared to one another and to the original version by the translators and members of the research team to solve discrepancies. The final version was then back-translated into English by a new independent bilingual translator. Comparison of the original and back-translated English versions revealed no further discrepancies. The Italian version is available in the online supplements (see Appendix C). Like the original QEWB, this version includes 21 items, including 7 negatively-worded items. In the present study we used a 6-point Likert response scale (from 1 = *strongly disagree* to 6 = *completely agree*) to avoid the possibility to pick a neutral value on the scale and to have a more adequate approximation of the underlying continuity of the response process, which is an assumption of Maximum Likelihood estimation (Finney & DiStefano, 2013).

Participants also completed the Italian version of the SWLS (Pavot & Diener, 1993). The SWLS includes five items rated on a 6-point Likert-type scale. Cronbach's alpha for SWLS in our sample was 0.80. Finally, participants completed the validated Italian version (Prezza, Trombaccia, & Armento, 1997) of the Rosenberg Self-Esteem Inventory (RSEI; Rosenberg, 1965), which includes 10 items rated on a 4-point response scale. In this sample, Cronbach's alpha was 0.90.

2.3. Analyses

All models were estimated using Mplus 7.3 (Muthén & Muthén, 1998–2014) robust maximum likelihood (MLR) estimator and Full Information Maximum Likelihood (FIML) procedures to handle the limited amount of missing data present at the item level (0.2% to 2.3%, M = 0.9%). Students' responses to the QEWB were first modelled using a single factor model, before moving to the four alternative models proposed by Morin, Arens et al. (Morin, Arens, & Marsh, 2016; Morin, Arens, & Tran et al., 2016; Morin, Boudrias, Marsh, & Madore et al., 2016; Morin, Boudrias, Marsh, & McInerney et al., 2016): CFA, bifactor-CFA, ESEM, and bifactor-ESEM).[1] For each of these models, the 3- and 4-factor (or specific factors for bifactor models) solutions proposed by Schutte et al. (2013) were contrasted (see Appendix B). Lastly, the correlations between the QEWB, SWLS and RSE were examined within a latent model based on the final retained solution.

The following goodness-of-fit indexes were examined: the chi-square (χ^2) test of exact fit, the comparative fit index (CFI), the Tucker–Lewis Index (TLI), and the root mean square error of approximation (RMSEA) with its 90% confidence interval. According to typical interpretation guidelines (Marsh, Hau, & Wen, 2004), values >0.90 and 0.95 for the CFI and TLI are considered to be indicative of adequate and excellent fit to the data, respectively, whereas values smaller than 0.08 or 0.06 for the RMSEA support acceptable and excellent model fit, respectively. For model comparisons, the following guidelines were used (Cheung & Rensvold, 2002): A change in CFI of 0.01 or less and a change in

[1] In all analyses, a correlation between the uniquenesses of items 9 and 16 was included based on wording content and modification indices.

RMSEA of 0.015 or less between two models indicate that the most parsimonious model should be retained. As recommended by Morin, Arens et al. (Arens & Morin, 2016; Morin, Arens, & Tran et al., 2016) we also report model-based omega coefficients of composite reliability (McDonald, 1970): $\omega = (\Sigma|\lambda_i|)^2/([\Sigma|\lambda_i|]^2 + \Sigma\delta_{ii})$ where λ_i are the factor loadings and δ_{ii} the error variances.

3. Results

The goodness-of-fit results of the alternative models are reported in Table 1. These results reveal that none of the CFA, or bifactor-CFA, solutions are able to achieve a minimally acceptable level of fit to the data according to both the CFI and TLI (≤0.900). Importantly, the unidimensional structure clearly resulted in the worst level of fit to the data out of all of the alternative solutions considered here. These results thus support the need to take into account a first source of construct-relevant multidimensionality due to the conceptually-related nature of the various dimensions covered in the QEWB through the reliance on an ESEM representation of the data. Interestingly, both the ESEM, and bifactor-ESEM solutions provided acceptable levels of fit to the data (CFI/TLI ≥0.900; RMSEA ≤0.060).

However, as noted above, each of these models is able to absorb unmodeled sources of construct-relevant multidimensionality through an inflation of specific parameter estimates (Asparouhov, Muthén, & Morin, 2015; Morin, Arens, & Marsh, 2016). For this reason, Morin, Arens, and Marsh (2016) reinforce the importance of relying on a close examination of parameter estimates and theoretical conformity in order to select the best alternative given that goodness-of-fit assessment is sometimes insufficient to differentiate among equally fitting models. The detailed parameter estimates from the ESEM solution are thus reported in Table 2, while those from the bifactor-ESEM solution are reported in Table 3.

Starting with the ESEM model, it is noteworthy that the 4-factor solution resulted in a substantially improved level of fit to the data relative to the 3-factor solution according to both the ΔCFI (+0.030) and ΔTLI (+0.032). However, the parameter estimates from this model, reported in Table 2, reveal one mostly "empty" Living from Beliefs factor defined by a single item (item 8) characterized by a factor loading >0.300. Thus, from a substantive perspective, the 3-factor solution appeared to provide a more accurate depiction of participants' responses to the QEWB. Unfortunately, this solution failed to achieve a proper level of fit to the data based on the TLI. Interestingly, the multiple cross-loadings present in both ESEM solutions clearly suggest the presence of a global overarching factor and the need to rely on a bifactor-ESEM representation of the data. Interestingly, in the bifactor-ESEM solutions, adding a fourth S-factor only resulted in a minimal increase in fit (ΔCFI = +0.010 but ΔTLI = +0.006 and ΔRMSEA = −0.001). Furthermore, the parameter estimates from these models, reported in Table 3, again show that adding a fourth S-factor also revealed the presence of an almost empty (save for item 8) Living from Beliefs S-factor. The high factor loading associated with item 8 suggests that this item appears to retain some meaningful specificity related to Purposeful Personal Expressiveness, and thus that it might bring some added clinical value to the results. Taken together, these results support the superiority of the bifactor-ESEM solution including 3 S-factors.

The bifactor-ESEM solution reveals the presence of a G-factor that is relatively well defined by a majority of items (|λ| = 0.01 to 0.64, M = 0.37, ω = 0.97). Only items 3, 7 and 10 presented weak factor loadings (≤0.200) on the G-factor. Regarding item 3, the results suggest that this item seems to be mainly associated with the Living from Belief S-factor. In contrast, items 3 and 10 present weak loadings on all factors, suggesting that these items need to be reviewed. When examining the bifactor-ESEM solution, it is important to keep in mind that factor loadings generally tend to be smaller in magnitude in a bifactor solution given the fact that each item has to be associated with two substantive factors (the G-factor, and one S-factor). As expected, most of the elevated cross-loadings from the ESEM solution are substantially reduced in magnitude when the G-factor was taken into account. Looking at the S-factors, the Sense of Purpose S-factor is relatively well-defined by most items (|λ| = 0.22 to 0.70, M = 0.54, ω = 0.90), as well as, to a lesser extent, the Effortful Engagement S-factor (|λ| = 0.25 to 0.51, M = 0.39, ω = 0.73), suggesting that these two S-factors retain some level of meaningful specificity over and above that explained by the G-Factor. It should be noted that the Effortful Engagement S-factor includes only reversed items (Schutte et al., 2013).[2] In contrast, the Purposeful Personal Expressiveness (|λ| = 0.02 to 0.67, M = 0.18, ω = 0.12) S-factor appears to retain almost no specificity once the variance explained by the G-factor is taken into account, arguing against the added-value of this dimension. Thus, this factor mainly serve to control for the limited level of residual covariance present in these items once the G-factor is taken into account.

Table 1
Goodness of fit indices for the estimated models.

Model	χ^2	*df*	CFI	TLI	RMSEA	RMSEA CI
CFA						
1 Factor	748.177	188	0.638	0.595	0.082	[0.076, 0.089]
3-Factor	428.633	185	0.842	0.821	0.055	[0.048, 0.062]
4-Factor	425.760	182	0.842	0.818	0.055	[0.048, 0.062]
ESEM						
3-Factor	273.576	149	0.919	0.886	0.044	[0.035, 0.052]
4-Factor	210.064	131	0.949	0.918	0.037	[0.028, 0.046]
Bifactor CFA						
3-Factor	357.976	168	0.877	0.846	0.051	[0.044, 0.058]
4-Factor	381.594	169	0.863	0.829	0.054	[0.046, 0.061]
Bifactor ESEM						
3-Factor	210.064	131	0.949	0.918	0.037	[0.028, 0.046]
4-Factor	177.767	114	0.959	0.924	0.036	[0.025, 0.046]

3.1. Criterion-related validity

Latent CFA factors representing the satisfaction with life and self-esteem were added to the final bifactor-ESEM solution (χ^2 = 837.733, *df* = 517, CFI = 0.933, TLI = 0.918, RMSEA = 0.037, RMSEA CI = [0.033, 0.042]) in order to assess the criterion-related validity of the QEWS. The results from this model revealed that the QEWB G-Factor correlated positively with the SWLS (r = 0.78, p < 0.01) and the RSEI (r = 0.76, p < 0.01). The S-factors representing subscales did not correlate with the SWLS or the RSEI. This result suggests that the key determinant of participants' levels of life satisfaction and self-esteem is their global levels of eudaimonic wellbeing and that the specific factors representing participants' Sense of Purposes, Effortful Engagement and Purposeful Personal Expressiveness over and above this global factor did not explain additional variance in SWLS and RSEI ratings.

4. Discussion

The QWEB was designed as a unidimensional measure of eudaimonic wellbeing (Waterman et al., 2010). Nonetheless, research evidence supports its multidimensionality, although the exact multidimensional structure of this instrument remains unclear (Schutte et al., 2013). For this reason, the present study aimed to further examine the factor structure of the QWEB using the overarching bifactor-ESEM

[2] To take into account the methodological artifact due to the negatively-worded items, this model was re-estimated including a priori correlated uniquenesses among to negatively-worded items (Marsh, Scalas, & Nagengast, 2010). The results from this model were essentially identical to those from the model without this methodological control, suggesting that this control was not necessary.

Table 2
Standardized parameter estimates from the ESEM solutions including 3-and 4-factor.

Item	3-Factor model				4-Factor model				
	F1 (λ)	F2 (λ)	F3 (λ)	δ	F1 (λ)	F2 (λ)	F3 (λ)	F4 (λ)	δ
1. I find I get intensely involved in many of the things I do each day.	**0.245**	0.178	0.161	0.819	**0.268**	0.066	0.139	0.148	0.816
2. I believe I have discovered who I really am.	**0.640**	0.109	−0.145	0.560	**0.658**	0.074	0.005	−0.130	0.565
6. I believe I know what my best potentials are and I try to develop them whenever possible.	**0.500**	0.256	−0.066	0.614	**0.525**	0.186	0.073	−0.043	0.617
9. I can say that I have found my purpose in life.	**0.769**	0.016	0.063	0.373	**0.797**	−0.070	0.055	0.035	0.365
11. As yet, I've not figured out what to do with my life. (R)	**0.717**	−0.091	0.150	0.459	**0.717**	−0.101	−0.054	0.139	0.458
16. I am confused about what my talents really are. (R)	**0.683**	−0.130	0.100	0.544	**0.669**	−0.103	−0.090	0.103	0.547
21. I believe I know what I was meant to do in life.	**0.698**	0.029	−0.016	0.503	**0.723**	−0.029	0.024	−0.035	0.499
10. If I did not find what I was doing rewarding for me, I do not think I could continue doing it.	0.048	**0.269**	−0.229	0.902	0.075	**0.224**	0.080	−0.209	0.903
15. When I engage in activities that involve my best potentials, I have this sense of really being alive.	−0.026	**0.662**	0.097	0.530	0.069	**0.301**	0.496	0.039	0.503
17. I find a lot of the things I do are personally expressive for me.	0.148	**0.489**	0.073	0.659	0.125	**0.566**	−0.038	0.195	0.550
18. It is important to me that I feel fulfilled by the activities that I engage in.	−0.057	**0.570**	−0.029	0.702	−0.056	**0.584**	0.053	0.065	0.640
4. My life is centered around a set of core beliefs that give meaning to my life.	0.177	**0.351**	−0.163	0.820	0.216	0.253	**0.146**	−0.150	0.820
5. It is more important that I really enjoy what I do than that other people are impressed by it.	−0.029	**0.279**	0.127	0.894	−0.046	0.303	**−0.012**	0.201	0.864
8. I feel best when I'm doing something worth investing a great deal of effort in.	−0.131	**0.455**	0.284	0.684	−0.033	−0.071	**0.813**	0.156	0.291
13. I believe it is important to know how what I'm doing fits with purposes worth pursuing.	0.096	**0.491**	−0.045	0.729	0.161	0.301	**0.264**	−0.057	0.735
14. I usually know what I should do because some actions just feel right to me.	0.120	**0.458**	−0.022	0.743	0.132	0.429	**0.064**	0.050	0.723
3. I think it would be ideal if things came easily to me in my life. (R)	0.095	−0.185	**0.408**	0.826	0.086	−0.257	0.071	**0.364**	0.810
7. Other people usually know better what would be good for me to do than I know myself. (R)	0.259	−0.084	**0.213**	0.880	0.211	0.032	−0.185	**0.276**	0.845
12. I can't understand why some people want to work so hard on the things that they do. (R)	0.025	0.123	**0.437**	0.757	0.001	0.114	0.003	**0.475**	0.743
19. If something is really difficult, it probably isn't worth doing. (R)	−0.066	0.231	**0.573**	0.571	−0.075	0.154	0.107	**0.590**	0.575
20. I find it hard to get really invested in the things that I do. (R)	0.172	0.031	**0.441**	0.729	0.160	−0.006	0.028	**0.440**	0.733

Note. (R) Reversed-Scores Item; λ = standardized factor loading; δ = standardized item uniqueness; in bold the distribution of items on Schutte et al. (2013) factors (i.e. the target factor loadings); 3-factor model: FI = Sense of Purpose, F2 = Purposeful Personal Expressiveness, F3 = Effortful Engagement. 4-factor model: F1 = Senese of Purpose; F2 = Engagement in Rewarding Activities; F3 = Living from Beliefs, F4 = Effortful Engagement.

Table 3
Standardized parameter estimates from the bifactor-ESEM solutions including 3-and 4-S-factors.

Item	Model with 3 S-factors					Model with 4 S-factors					
	FG (λ)	FS1 (λ)	FS2 (λ)	FS3 (λ)	δ	FG (λ)	FS1 (λ)	FS2 (λ)	FS3 (λ)	FS4 (λ)	δ
1. I find I get intensely involved in many of the things I do each day.	0.335	**0.219**	0.085	0.129	0.816	0.334	**0.211**	0.102	0.088	0.141	0.806
2. I believe I have discovered who I really am.	0.343	**0.548**	−0.056	−0.116	0.565	0.347	**0.542**	0.153	−0.060	−0.102	0.548
6. I believe I know what my best potentials are and I try to develop them whenever possible.	0.455	**0.414**	−0.028	−0.062	0.617	0.462	**0.407**	0.259	−0.037	−0.039	0.551
9. I can say that I have found my purpose in life.	0.374	**0.700**	0.033	0.065	0.365	0.376	**0.682**	−0.008	0.033	0.061	0.388
11. As yet, I've not figured out what to do with my life. (R)	0.283	**0.658**	−0.034	0.164	0.458	0.279	**0.691**	−0.234	−0.021	0.151	0.367
16. I am confused about what my talents really are. (R)	0.221	**0.619**	−0.062	0.131	0.547	0.224	**0.611**	0.171	−0.071	0.160	0.517
21. I believe I know what I was meant to do in life.	0.329	**0.627**	−0.006	−0.009	0.499	0.330	**0.650**	−0.201	0.008	−0.041	0.426
10. If I did not find what I was doing rewarding for me, I do not think I could continue doing it.	0.208	0.001	**−0.024**	−0.232	0.903	0.211	−0.008	**0.148**	−0.031	−0.213	0.887
15. When I engage in activities that involve my best potentials, I have this sense of really being alive.	0.642	−0.048	**0.286**	−0.026	0.503	0.633	−0.046	**0.001**	0.293	−0.023	0.511
17. I find a lot of the things I do are personally expressive for me.	0.633	0.043	**−0.207**	0.073	0.550	0.637	0.037	**0.039**	−0.193	0.082	0.547
18. It is important to me that I feel fulfilled by the activities that I engage in.	0.564	−0.141	**−0.140**	−0.054	0.640	0.571	−0.145	**−0.114**	−0.129	−0.063	0.619
4. My life is centered around a set of core beliefs that give meaning to my life.	0.365	0.116	**−0.015**	−0.180	0.820	0.365	0.121	−0.081	**0.024**	−0.192	0.808
5. It is more important that I really enjoy what I do than that other people are impressed by it.	0.327	−0.068	**−0.094**	0.124	0.864	0.330	−0.068	−0.093	**−0.080**	0.110	0.859
8. I feel best when I'm doing something worth investing a great deal of effort in.	0.472	−0.106	**0.673**	0.151	0.291	0.460	−0.102	0.026	**0.695**	0.143	0.274
13. I believe it is important to know how what I'm doing fits with purposes worth pursuing.	0.491	0.054	**0.100**	−0.107	0.735	0.490	0.060	−0.095	**0.111**	−0.117	0.722
14. I usually know what I should do because some actions just feel right to me.	0.515	0.044	**−0.091**	−0.033	0.723	0.516	0.045	0.069	**−0.081**	−0.024	0.720
3. I think it would be ideal if things came easily to me in my life. (R)	−0.005	0.139	0.155	**0.382**	0.810	−0.009	0.136	0.039	0.157	**0.385**	0.807
7. Other people usually know better what would be good for me to do than I know myself. (R)	0.130	0.227	−0.150	**0.252**	0.845	0.135	0.217	0.144	−0.156	**0.281**	0.810
12. I can't understand why some people want to work so hard on the things that they do. (R)	0.294	0.026	−0.009	**0.411**	0.743	0.294	0.027	−0.131	0.006	**0.398**	0.738
19. If something is really difficult, it probably isn't worth doing. (R)	0.402	−0.049	0.070	**0.506**	0.575	0.400	−0.045	−0.165	0.089	**0.493**	0.560
20. I find it hard to get really invested in the things that I do. (R)	0.264	0.176	0.042	**0.406**	0.733	0.264	0.169	0.130	0.042	**0.437**	0.692

Note. (R) Reversed-Scores Item; λ = standardized factor loading; δ = standardized item uniqueness; in bold the distribution of items on Schutte et al. (2013) factors (i.e. the target factor loadings); 3-factor model: FG = Global Factor; FS1 = specific-factor: Sense of Purpose, FS2 = specific-factor: Purposeful Personal Expressiveness, FS3 = specific-factor: Effortful Engagement. 4-factor model: FG = Global Factor; FS1 = specific-factor: Sense of Purpose; FS2 = specific-factor: Engagement in Rewarding Activities; FS3 = specific-factor: Living from Beliefs, FS4 = specific-factor: Effortful Engagement.

framework (Morin, Arens, & Marsh, 2016; Morin, Arens, & Tran et al., 2016).

Previous studies on the QEWB suggest the presence of construct-relevant psychometric multidimensionality in responses to this instrument. Indeed, Waterman et al. (2010) built the QEWB as a unidimensional measure of a single overarching construct (i.e., eudaimonic wellbeing) from items that were written so as to tap into various dimensions (e.g., self-discovery, sense of purpose in life). Therefore, items of the QEWB are likely to reflect at least two sources of true-score variance, reflecting both this overarching construct and the more specific dimensions. Moreover, the presence of many cross-loadings identified by Schutte et al. (2013) is indicative of the fact that QEWB items present some degree of valid association with more than one construct covered in the instrument, in addition to supporting the idea that the presence of an unmodelled global overarching construct might explain some of these cross-loadings (Morin, Arens, & Marsh, 2016).

Our results show that the QWEB does not have a simple unidimensional structure, as argued by Waterman et al. (2010). Following Morin, Arens, et al. (Morin, Arens, & Marsh, 2016; Morin, Arens, & Tran et al., 2016)'s recommendations, we contrasted alternative representations of the QEWB (CFA, ESEM, bifactor CFA and bifactor ESEM) to test the sources of construct-relevant multidimensionality potentially present in this instrument. Our results provided clear evidence that both sources were present in the QEWB. Indeed, QEWB items were found to reflect a combination of one global overarching eudaimonic wellbeing construct, coupled with a variety of more specific dimensions themselves characterized by cross-loadings. Thus, even though the QWEB was designed to be unidimensional, our results show that part of the variance not explained by the G-factor is still meaningful from a substantive point of view. In other words, this shows that, over and above a global construct of eudaimonic wellbeing, specific components remain strong and relevant in their own right. Therefore, our results support recent findings on wellbeing in the workplace (Morin, Boudrias, Marsh, & Madore et al., 2016; Morin, Boudrias, Marsh, & McInerney et al., 2016) showing that a global overarching wellbeing construct co-existed with more specific components of psychological wellbeing at work.

In a bifactor (CFA or ESEM) model, it is important to keep in mind that the G-factor captures the variance that is shared across all items present in the questionnaire, and thus provides a direct estimate of participants' global levels of eudaimonic wellbeing. In contrast, the S-factors reflect the variance left unexplained by this global construct that is shared among the various indicators associated with the specific dimensions. In the present study, these S-factors can be interpreted to reflect specific features associated with participants' personal growth and fulfillment that remain independent from their more global, or "holistic" levels of eudaimonic wellbeing. In the present study, these specific features thus appear to reflect the extent to which participants felt that their lives had a Sense of Purpose and were characterized by some level of Effortful Engagement in life's activities.

More precisely, the Sense of Purpose subscale reflects ratings on items related to self-knowledge and having a sense of life purpose that are typically considered to be an integral part of eudaimonic wellbeing (Ryff, 1989; Steger, Frazier, Oishi, & Kaler, 2006). The Effortful Engagement reflects a willingness to invest efforts in life's activities, even when they prove difficult or challenging, and to assume responsibility for one's life direction. As Schutte et al. (2013) stated, the content of this factor resonates with the constructs of flow and optimal experience (Nakamura & Csikszentmihalyi, 2009), which involve the experience of complete absorption in the present moment when attention is fully invested in the task at hand, a state of deep engagement and concentration where challenges and skills meet. In the present study, our results support the idea that ratings on the items forming these two dimensions provided a reflection of participants' global levels of eudaimonic wellbeing, but also revealed that they also tapped into meaningful specificities that went beyond the simple measure of eudaimonic wellbeing.

In contrast, ratings on the items forming the Purposeful Personal Expressiveness subscale appeared to retain no meaningful specificity once participants' global levels of eudaimonic wellbeing where taken into account. This is not uncommon for bifactor models. For example, Morin, Boudrias, Marsh, and McInerney et al. (2016)also recently found some weak S-factors associated to specific dimensions of eudaimonic wellbeing in the workplace. As Morin, Arens, and Marsh (2016) stated, it is not critical for all factors to be equally well-defined, a true bifactor representation should typically result in at least some well-defined factors. Otherwise, a single-factor model should be seriously considered. Undefined factors should simply not be interpreted as having a substantive meaning. This does not mean that these items (and subscales) do not tap into a key component of eudaimonic wellbeing, as suggested by Schutte et al. (2013). Rather, our results simply suggest that these items only serve to reflect participants' global levels of eudaimonic wellbeing and do not retain any meaningful specificity once the variance explained by these global levels is taken into account. When we look at the specific content of the items associated with the Purposeful Personal Expressiveness subscale, we note that they reflect participants' full and active engagement in meaningful activities. According to Schutte et al. (2013), this factor is intimately related to intrinsic motivation (Ryan, Huta, & Deci, 2008) as well as to a virtue ethics perspective on eudaimonia (Fowers, 2012). As such, it is perhaps not so surprising to observe that these items almost exclusively provide an assessment of participants global levels of eudaimonic wellbeing in an instrument specifically developed to tap into a more philosophical representation of eudaimonia.

Taken together, these outcomes suggest that eudaimonic wellbeing is a multidimensional construct characterized by a global component, but also some specific aspects, which can be both captured and measured by the QEWB.

To better document the meaningfulness of the various factors retained in our final bifactor-ESEM solution, we examined the criterion-related validity. The global eudaimonic wellbeing construct, was found to significantly relate to measures of hedonia and self-esteem. Therefore, as shown in previous studies, a person with a positive eudaimonic functioning has a good perception of him/her self and of the quality of his/her life. In contrast, the S-factors did not present statistically significant correlations with both criterion-related measures. This result is not surprising for the Purposeful Personal Expressiveness S-factor which, was found to retain no meaningful specificity once participants' global levels of eudaimonic wellbeing was taken into account. Still, this observation appears to call into question the criterion-related validity of the Sense of Purpose and Effortful Engagement S-factors. However, it is important to keep in mind that the criterion-related variables were selected on the basis of their expected relations with the construct of eudaimonic wellbeing, whereas the S-factors representing these subscales are explicitly disaggregated from the variance already explained by the global eudaimonic wellbeing construct. Therefore, it would be interesting for future studies to re-assess the criterion-related validity of these two specific factors by focusing on more cognitive measures of participants' assessment of their lives' meaningfulness, as well as on more cognitive or behavioral measures of participants' engagement, commitment, or willingness to invest efforts in a variety of activities.

5. Conclusions

The present study supports the multidimensional nature of Eudemonic Wellbeing among young adolescents and help to reconcile the contrasting results from Waterman et al.'s (2010) and Schutte et al.'s (2013) studies. Still, further research is necessary to see how the current results generalize to older samples more directly comparable to those used in these previous studies.

Finally, although this was not a key objective of the present study, it is important to note that our results support the psychometric

properties of the newly developed Italian version of the QEWB. Even though a global dimension of eudaimonic wellbeing exists (the G-factor), and shows an adequate criterion-related validity, the QEWB cannot be simplistically considered to be a unidimensional measure, as it also taps into meaningful specific dimensions that cannot adequately be explained by global levels of eudaimonic wellbeing. These results strongly suggest the reliance on latent variable methodologies for research purposes, as these methodologies provide a way to explicitly account for this multidimensionality as illustrated in this article. For practice, beyond the global construct of eudaimonic wellbeing only the subscales that have strong factor loadings (Sense of Purpose and Effortful Engagement) should be considered.

Acknowledgements

This work was supported by the Regione Autonoma della Sardegna [Grants Premialità L.R. 7 agosto 2007, n. 7, 2011; Master & Back percorsi di rientro 2012/2013; Visiting Professor scheme, 2014]; and by the Fondazione Banco di Sardegna [Grant PRID, 2015]. We thank Dr. Laura Vismara for her help in the back translation of the Questionnaire for Eudaimonic Wellbeing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.paid.2017.04.062.

References

Ackrill, J. L. (1973). *Aristotle's ethics*. London: Faber and Faber.
Annas, J. (2004). Happiness as achievement. *Daedalus*, *133*, 44–51.
Arens, A. K., & Morin, A. J. S. (2016). Improved representation of the self-perception profile for children through bifactor exploratory structural equation modelling. *American Educational Research Journal*, *54*, 59–87.
Asparouhov, T., Muthén, B. O., & Morin, A. J. S. (2015). Bayesian structural equation modeling with cross-loadings and residual covariances. *Journal of Management*, *41*, 1561–1577.
Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, *9*, 233–255.
Delle Fave, A., Massimini, F., & Bassi, M. (2011). Hedonism and eudaimonism in positive psychology. In A. Delle Fave (Ed.), *Psychological selection and optimal experience across cultures: Social empowerment through personal growth. Vol. 2*. (pp. 3–18). New York: Springer.
Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, *95*, 542–575.
Finney, S. J., & DiStefano, C. (2013). Non-normal and categorical data in structural equation modeling. In G. R. Hancock, & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 439–492) (2nd ed.). Greenwich, CO: IAP.
Fowers, B. J. (2012). An Aristotelian framework for the human good. *Journal of Theoretical and Philosophical Psychology*, *32*, 10–23.
Gudmundsson, E. (2009). Guidelines for translating and adapting psychological instruments. *Nordic Psychology*, *61*, 29–45.
Kahneman, D., Diener, E., & Schwarz, N. (1999). *Well-being: The foundations of hedonic psychology*. New York: Sage.
Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, *11*, 320–341.
Marsh, H. W., Lüdtke, O., Nagengast, B., Morin, A. J. S., & Von Davier, M. (2013). Why item parcels are (almost) never appropriate: Two wrongs do not make a right-camouflaging misspecification with item parcels in CFA models. *Psychological Methods*, *18*, 257–284.
Marsh, H. W., Scalas, L. F., & Nagengast, B. (2010). Longitudinal tests of competing factor structures for the Rosenberg self-esteem scale: Traits, ephemeral artifacts, and stable response styles. *Psychological Assessment*, *22*, 366–381.
McDonald, R. P. (1970). Theoretical foundations of principal factor analysis, canonical factor analysis, and alpha factor analysis. *British Journal of Mathematical and Statistical Psychology*, *23*, 1–21.
McDowell, J. (1980). The role of eudaimonia in Aristotle's ethics. In A. O. Rorty (Ed.), *Essays on Aristotle's ethics* (pp. 359–376). Berkeley, CA: University of California Press.
Morin, A. J. S., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation modeling framework for the identification of distinct sources of construct-relevant psychometric multidimensionality. *Structural Equation Modeling*, *23*, 116–139.
Morin, A. J. S., Arens, A. K., Tran, A., & Caci, H. (2016). Exploring sources of construct-relevant multidimensionality in psychiatric measurement: A tutorial and illustration using the composite scale of morningness. *International Journal of Methods in Psychiatric Research*, *25*, 277–288.
Morin, A. J. S., Boudrias, J. S., Marsh, H. W., Madore, I., & Desrumaux, P. (2016). Further reflections on disentangling shape and level effects in person-centered analyses: An illustration aimed at exploring the dimensionality of psychological health. *Structural Equation Modeling*, *23*, 438–454.
Morin, A. J. S., Boudrias, J. -S., Marsh, H. W., McInerney, D. M., Dagenais-Desmarais, V., & Madore, I. (2016). Complementary variable- and person-centered approaches to exploring the dimensionality of psychometric constructs: Application to psychological wellbeing at work. *Journal of Business and Psychology*. http://dx.doi.org/10.1007/s10869-016-9448-7 (in press).
Muthén, L. K., & Muthén, B. O. (1998–2014). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
Nakamura, J., & Csikszentmihalyi, M. (2009). In C. R. Snyder, & S. J. Lopez (Eds.), *Flow theory and research* (pp. 195–206). New York, NY: Oxford University.
Norton, D. L. (1976). *Personal destinies*. Princeton, NJ: Princeton University Press.
Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, *5*, 164–172.
Prezza, M., Trombaccia, F. R., & Armento, L. (1997). La scala dell'autostima di Rosenberg: Traduzione e validazione italiana. *Bollettino di Psicologia Applicata*, *223*, 35–44.
Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University.
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*, 141–166.
Ryan, R. M., Huta, V., & Deci, E. L. (2008). Living well: A self-determination theory perspective on eudaimonia. *Journal of Happiness Studies*, *9*, 139–170.
Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*, 1069–1081.
Schutte, L., Wissing, M., & Khumalo, I. (2013). Further validation of the questionnaire for eudaimonic well-being. *Psychology of Well-Being: Theory, Research and Practice*, *3*, 1–22.
Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, *53*, 80–93.
Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness and hedonic enjoyment. *Journal of Personality and Social Psychology*, *64*, 678–691.
Waterman, A. S. (2008). Reconsidering happiness: A eudaimonist's perspective. *The Journal of Positive Psychology*, *F3*, 234–252.
Waterman, A. S. (2011). Eudaimonic identity theory: Identity as self-discovery. In S. J. Schwartz, K. Luyckx, & V. L. Vignoles (Eds.), *Handbook of identity theory and research. Vol. 1, 2*. New York, NY: Springer.
Waterman, A. S., Schwartz, S., Goldbacher, E., Green, H., Miller, C., & Philip, S. (2003). Predicting the subjective experience of intrinsic motivation. *Personality and Social Psychology Bulletin*, *29*, 1447–1458.
Waterman, A. S., Schwartz, S., Zamboanga, B., Ravert, R., Williams, M., Agocha, V., ... Donnellan, M. (2010). The questionnaire for Eudaimonic well-being: Psychometric properties, demographic comparisons, and validity. *The Journal of Positive Psychology*, *5*, 41–61.