

INVESTIGATING THE PSYCHOMETRIC PROPERTIES OF THE QUESTIONNAIRE FOR EUDAIMONIC WELL-BEING: A RASCH ANALYSIS

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Eudaimonic well-being (EWB) has been defined as the positive psychological functioning deriving from the development of one's best potentials in accordance with one's true self. The main aim of this study was to investigate the psychometric properties of the Questionnaire for Eudaimonic Well-Being (QEWB; Waterman et al., 2010) within the theoretical framework of Rasch models. One thousand two hundred five Italian adults (aged 18-60) completed the Italian version of the QEWB, along with the Italian versions of two other well-being scales. Results showed that the QEWB provides a reliable and valid measure of EWB. However, it might be inadequate for measuring the highest levels of EWB. Furthermore, the item measures were invariant across gender but not across age. The theoretical and empirical implications of the results are discussed.

Key words: Eudaimonic well-being; Questionnaire for Eudaimonic Well-Being; Rasch models; Rating scale model.

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Drawing upon Aristotelian ethics, contemporary psychologists have defined eudaimonic well-being (EWB) as the positive psychological functioning deriving from the development of one's best potentials in accordance with one's true self (Huta, 2013; Sotgiu, 2013; Waterman, 2008, 2013). More specifically, it has been argued that people living eudaimonically in general engage in intrinsically motivated activities granting them the opportunity to experience feelings of personal expressiveness and authenticity, elevation, self-improvement, and a sense of meaning in life. From a theoretical point of view, the construct of EWB has been contrasted to that of hedonic well-being, which indicates enjoyment, pleasure, and positive affect (Kahneman, Diener, & Schwarz, 1999; Ryan & Deci, 2001; Waterman, 1993). However, a positive relationship between EWB and hedonic well-being has been repeatedly found (cf. Huta & Waterman, 2014; Kashdan, Biswas-Diener, & King, 2008).

Whereas EWB is defined in a variety of ways (e.g., Bauer, McAdams, & Pals, 2008; Delle Fave, Brdar, Freire, Vella-Brodrick, & Wissing, 2011; Fowers, 2012; Ryan, Huta, & Deci, 2008; Ryff, 1989; Ryff & Singer, 2008; Seligman, 2002; Steger, Shin, Shim, & Fitch-Martin, 2013; Waterman, 1993, 2008; for

reviews, see Huta & Waterman, 2014; Sotgiu, 2013; Vittersø, 2016; Waterman, 2013), standardized measures of this construct are lacking. Recently, Waterman and colleagues (2010) developed the Questionnaire for Eudaimonic Well-Being (QEWB) as a measure of eudaimonic functioning at the trait level. This instrument consists of 21 items tapping six core conceptual dimensions of EWB (i.e., self-discovery, perceived development of one's best potentials, sense of purpose and meaning in life, investment of significant effort in the pursuit of excellence, intense involvement in activities, and enjoyment of activities as personally expressive). The psychometric properties of the QEWB were assessed by Waterman et al. in two large, ethnically-diverse, samples of American college students. Confirmatory factor analyses suggested that the QEWB has a unifactorial structure. Correlational analyses also indicated that the QEWB scores are significantly associated with other well-validated measures of subjective well-being and psychosocial functioning, including the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), the Scales of Psychological Well-Being (SPWB; Ryff & Keyes, 1995), and the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1986). Based on these results, Waterman et al. concluded that the QEWB is an appropriate instrument for assessing EWB. However, the authors also acknowledged that the generalizability of their findings was limited by the characteristics of the samples, which only included young student participants.

In recent years, two studies (Areepattamannil & Hashim, 2017; Schutte, Wissing, & Khumalo, 2013) further examined whether the QEWB is a reliable, valid, and generalizable measure of EWB across different countries and cultural contexts (i.e., South Africa and India). Unfortunately, the analysis of the factor structure of the QEWB revealed some inconsistencies. While Areepattamannil and Hashim (2017) replicated the findings obtained in the Waterman et al.'s (2010) study, Schutte et al. (2013) did not. Furthermore, both studies exclusively considered very young samples drawn from the student population. Thus, similarly to the original validation study by Waterman et al. (2010), the generalizability of their findings is strongly limited.

The present study extends our current knowledge of the psychometric characteristics of the QEWB for two main reasons. First, we recruited participants spanning a wide age range (18 to 60 years) and living in a European country (Italy). Second, the psychometric properties of the QEWB were evaluated within the theoretical framework of Rasch models, which had been proved to be valuable tools for the validation of measurement instruments (Singh, 2004; Smith, 2001; Wright & Stone, 1999). Some advantages of Rasch models are transformation of ordinal raw scores into interval measures, identification of poorly functioning items, generalizability of results across samples and items, and investigation of response behavior. Several analyses were carried out to investigate the functioning of the items and of the response scale, as well as the reliability and validity of the QEWB.

METHOD

Participants

One thousand two hundred five adults living in Northern Italy (769 females; mean age = 28.76, *SD* = 10.66) took part in the study. About half of the sample (51%) were university students. For the purposes of statistical analyses and based on the contemporary literature on life span psychology (e.g., Arnett, 2000, 2011), the participants were assigned to the following three age groups: emerging adults (18–25 years, 51% of the sample), young adults (26–35 years, 27%), and middle-aged adults (36–60 years, 22%). A chi-square analysis showed that the emerging adult group included a significantly higher proportion of females compared to the young and middle-aged adult groups, $\chi^2(2, N = 1,197) = 59.22, p < .001$. The gender distribution did not vary between the young adults and middle-aged adults (53% of females in each group).

Procedure

Data collection took place between February 2013 and July 2015. The student participants were recruited at both the University of Bergamo and the University of Verona. The rest of the sample was recruited and surveyed in multiple sites in the Piedmont, Lombardy, and Veneto regions of Northern Italy. All participants were administered the Italian version of the QEWB, along with the Italian versions of the Positive and Negative Affect Schedule (PANAS; Terracciano, McCrae, & Costa, 2003; Watson, Clark, & Tellegen, 1988) and of the SWLS (Diener et al., 1985).¹ Other measures of psychological functioning were also administered to small subgroups of the investigated sample, but they will not be presented here. Participants were informed that the questionnaires were anonymous and that their replies would be used for research purposes only. Those who agreed to participate were then given the questionnaires and directions for returning them to the authors. Respondents were not paid for their participation.

Instruments

QEWB (Waterman et al., 2010). Respondents were requested to rate the extent to which they agreed or disagreed with each of the 21 statements of the questionnaire, all assessed on a 5-point Likert scale (0 = *strongly disagree*, 4 = *strongly agree*). Sample statements include “My life is centered around a set of core beliefs that give meaning to my life” (Item 4 of the original version of the QEWB), “It is more important that I really enjoy what I do than that other people are impressed by it” (Item 5), “I believe I know what my best potentials are and I try to develop them whenever possible” (Item 6), and “When I engage in activities that involve my best potentials, I have this sense of really being alive” (Item 15). Seven statements are worded negatively and were reverse scored.

In Waterman et al.’s validation study, a global score of EWB was computed by summing the 21 QEWB items, with higher scores indicating higher levels of EWB. However, in the present study, an overall measure of EWB was estimated by using the Rasch model (see the Section “Data Analysis”). The original English version of QEWB was translated into Italian by two of the authors of the current article with the help of a bilingual (Italian/English) native speaker of Italian. A back-translation was then performed by a second bilingual (English/Italian) native speaker of English who had no knowledge of and had never seen the original English version of the QEWB. Only a few discrepancies emerged, with the translators agreeing on how to resolve them. Table 1 reports a brief description of the semantic content of all the 21 items of the QEWB. The full questionnaire can be found in the original article by Waterman et al. (2010).

PANAS (Terracciano et al., 2003; Watson et al., 1988). The PANAS was used as a measure of hedonic well-being. This questionnaire consists of two 10-item subscales providing separate scores of positive affect (PA) and negative affect (NA). Respondents are asked to assess the extent to which they usually experience a specific emotion (e.g., “excited,” “afraid”) using a 5-point Likert scale (1 = *very slightly or not at all*, 5 = *extremely*). A global measure of hedonic well-being (known as *hedonic balance*) was computed by subtracting the NA scores from the PA scores. Both PA and NA subscales had good internal consistency in the current sample ($\alpha > .81$).

SWLS (Diener et al., 1985). In line with Waterman and colleagues (2010), the SWLS was used as a measure of subjective well-being. This scale consists of five items inviting participants to assess their overall life satisfaction. Each item (e.g., “In most ways my life is close to my ideal,” “If I could live my life over, I would change almost nothing”) is rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7

(*strongly agree*). An overall index of life satisfaction was thus obtained by summing the responses to each item. The internal consistency of the SWLS was good ($\alpha = .84$).

TABLE 1
Brief description of the content of items included in the original version of the QEWB

Item n.	Content
1	Investment in activities
2	Discovering oneself
3	Life requires effort
4	Core beliefs that give meaning to life
5	Ignoring what other people are impressed by
6	Trying to develop one's potentials
7	Knowing what is good for oneself
8	Feeling best when investing effort
9	Finding one's life purpose
10	Finding rewards in one's activities
11	Figuring out what to do with life
12	Understanding why some people want to work hard
13	Fit between activities and purposes
14	Knowing how to act
15	Feeling alive
16	Not being confused about one's talents
17	Personal expressiveness
18	Feeling fulfilled
19	Valuing difficult things
20	Getting easily invested in one's activities
21	Knowing one's talents

Data Analysis

The rating scale model (Andrich, 1978) was used in the present study. It is a Rasch model for transforming nonlinear, scale-dependent ordinal raw scores into linear, scale-free interval measures. The result of the analysis provides a measure for each respondent, indicating his/her level of EWB, and a measure for each item, indicating how hard it is to give the item a response indicative of EWB.

Several Rasch-based statistics were computed, providing information about the functioning of the items and of the response scale, as well as about the reliability and validity of the QEWB.

Functioning of the Items

The functioning of the items was assessed using item mean-square fit statistics (infit and outfit; Wright & Masters, 1982). Values greater than 2 suggest that the item is badly formulated and confusing, or that it may measure a construct other than the other items (multidimensionality; Linacre, 2002b; Smith,

2002). The same fit statistics were also computed for the respondents to the QEWB. Values greater than 2 for a particular respondent suggest that he/she might belong to a different population or might have completed the questionnaire inaccurately (Smith, 2001). Taken together, the fit statistics of both items and respondents provide information about the fit of the data to the rating scale model.

Functioning of the Response Scale

The Likert-scale structure requires that increasing levels of latent variable in a respondent correspond to increasing probabilities that he/she will choose higher response categories (Linacre, 2002a). In the Rasch measurement framework, the thresholds represent the point on the latent variable where two adjacent response categories (e.g., strongly disagree and disagree) are equally probable. The functioning of the response scale was assessed by determining whether the thresholds were ordered or not (Linacre, 1999; Tennant, 2004). If the thresholds are not ordered, the response scale is not adequate for measuring EWB (i.e., there is discordance between the use of the response categories and the level of EWB).

Reliability

The reliability of the QEWB was examined by means of the separation reliability R of respondents. R is the Rasch equivalent of Cronbach's α , considered to be a better estimate of reliability for two main reasons (Smith 2001; Wright & Stone 1999). First, if the data fit the model, the measures estimated for each respondent are on a linear scale. As a consequence, these measures are numerically suitable for calculating sample variances. Second, the actual average error variance of the sample is used instead of the error variance of an "average" respondent (which overestimates the error variance of respondents with high or low scores).

Validity

As far as the validity of the QEWB is concerned, content representativeness, construct generalizability, and convergent validity were evaluated.

Content representativeness (see, for example, Smith, 2001; Wright & Stone, 1999) was assessed by examining the empirical hierarchy and spread of the item measures along the latent variable. The hierarchy of the items provides information about the definition of the construct (e.g., what are the most typical attributes of EWB?). Moreover, since respondents and items are located on the same unidimensional scale, the comparison between their distributions allows the identification of the levels of EWB, if any, that are poorly evaluated by the QEWB. The spread of the item measures was assessed by examining item strata (Fisher, 1992) which represent the number of statistically distinct groups of item measures that the respondents have distinguished. If it is not possible to identify at least two groups, the construct defined by the items is extremely difficult to interpret (i.e., the most typical attributes of EWB cannot be distinguished from the least typical ones).

Construct generalizability was assessed by investigating whether the item measures were invariant across groups of respondents defined by gender or age. If the item measures are invariant, the construct is defined in the same way by each group, and the groups can be compared in terms of the degree of difference

between them (i.e., comparisons of means). If the item measures are not invariant, the construct is defined in alternative ways, and comparisons between groups are limited (Smith 2001).

Convergent validity was assessed by computing Pearson's correlations between the respondents' measures of EWB (estimated using the rating scale model) and the global scores of hedonic well-being and subjective well-being obtained from the PANAS and the SWLS, respectively. In line with Waterman and colleagues (2010) — who also used the SWLS in their study of American students — we expected to find a positive correlation between QEWB measures and SWLS scores. Furthermore, based on theory and empirical research investigating the relationship between eudaimonic and hedonic well-being (Henderson, Knight, & Richardson, 2013; Huta & Ryan, 2010; Huta & Waterman, 2014; Kashdan et al., 2008; Steger, Kashdan, & Oishi, 2008; Waterman, 1993; Waterman, Schwartz, & Conti, 2008), we predicted that the QEWB measures would be positively correlated with the PA scores obtained from the PANAS, and that they would also be negatively correlated with the NA scores from the same questionnaire.

RESULTS

Functioning of the Items and of the Response Scale, and Reliability

Infit and outfit of all the items were below the cut-off of 2. This result suggests that the 21 items of the QEWB are well formulated and contribute to define a substantively unidimensional construct. Only 7.8% of the respondents had an infit and/or outfit greater than 2. Thus the respondents mostly belonged to the same population and filled out the questionnaire accurately.

The thresholds were in increasing order: $\tau_{0-1} = -.81$, $\tau_{1-2} = -.55$, $\tau_{2-3} = .18$, $\tau_{3-4} = 1.17$. This result suggests that the 5-point response scale is adequate for measuring EWB. The separation reliability R of respondents was .78, and the Cronbach's α was .81. Both statistics suggest that the QEWB is reliable.

Validity

Figure 1 depicts the locations of respondents and items on the latent variable of EWB. The greater the measures of the respondents, the greater their level of EWB. The greater the measures of the items, the harder it is to give the item a response indicative of EWB. *Feeling fulfilled by one's activities* (Item 18), *having the sense of being alive during these activities* (Item 15), *investing effort in difficult things* (Item 19), *enjoying one's activities disregarding those other people are impressed by* (Item 5), and *understanding why some people want to work so hard on the things they do* (Item 12) are the most typical attributes of EWB (Measures = $-.72$, $-.69$, $-.66$, $-.60$, $-.58$ for Items 18, 15, 19, 5, 12, respectively), whereas *thinking that an ideal life requires great effort* (Item 3) is the least typical (Measure = 1.11). The item hierarchy in Figure 1 is highly reliable (item strata = 18.81).

The respondents located in the upper region of the variable (i.e., the 295 respondents above the dashed line in Figure 1 representing 24.5% of the sample) do not have items targeted on their level of EWB. This result suggests that the QEWB is not adequate for measuring the highest levels of EWB.

The variable defined by the QEWB is substantially invariant across gender, but not across age. *Thinking that an ideal life requires great effort* (Item 3) is more typical for emerging adults than for young

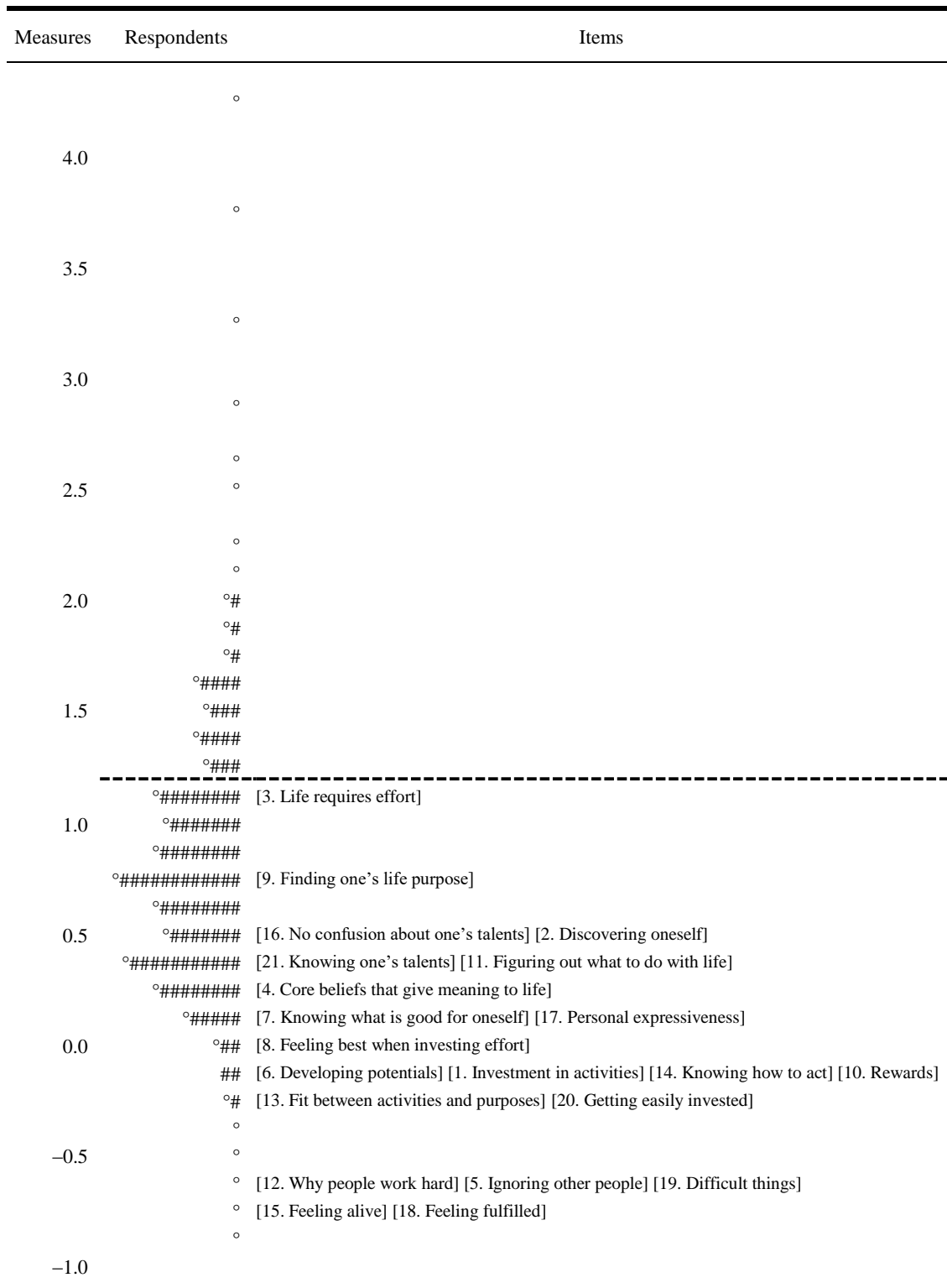


FIGURE 1
Locations of respondents and items on the latent variable of EWB.
Each # denotes 11 respondents, each ° denotes 1 to 10 respondents.

adults (Cohen's $d = .69$) and middle-aged adults (Cohen's $d = 1.12$), whereas *figuring out what to do in one's life* (Item 11) is more typical for young adults and middle-aged adults than for emerging adults (Cohen's $d = .51$ and $.67$, respectively). *Understanding why some people want to work so hard on the things they do* (Item 12) and *investing effort in difficult things* (Item 19) are more typical for emerging adults (Cohen's $d = .85$ and $.89$ for Items 12 and 19, respectively) and young adults (Cohen's $d = .51$ and $.55$ for Items 12 and 19, respectively) than for middle-aged adults. Finally, *believing to have discovered oneself* (Item 2), *finding one's life purpose* (Item 9), and *knowing one's talents* (Item 21) are more typical for middle-aged adults than for emerging adults (Cohen's $d = .47$, $.58$, and $.51$ for Items 2, 9, and 21, respectively).

The correlations of the QEWB measures with PA, NA, and hedonic balance scores were $.62$, $-.30$, and $.58$, respectively. A positive correlation between the QEWB and SWLS scores was also found ($r = .53$).

DISCUSSION

The present study expands on previous studies about the QEWB by considering Italian participants spanning a wide age range and involves a statistical analysis procedure — the Rasch model — that has the potential to provide further insights into the psychometric properties of the QEWB.

Overall, the QEWB was found to be a reliable and valid instrument for assessing EWB. The items in the Italian version of the QEWB are well formulated and easy to understand, and contributed to define a unidimensional construct. The latter result is in line with findings from both the original validation study by Waterman and colleagues (2010) and a very recent study that examined the structural validity of the QEWB in a sample of Indian adolescents (Areepattamannil & Hashim, 2017). Importantly, results from our study also showed that a 5-point scale is adequate for measuring EWB, namely there is concordance between the use of the response categories by the participants and their level of EWB.

In accordance with our predictions, the global QEWB measures were positively correlated with measures of both subjective and hedonic well-being, thus providing evidence of good convergent validity. The strength of the association between QEWB measures and SWLS scores ($r = .53$) was very close to that found by Waterman et al. (2010; $r = .47$). This result indicates that the relationship between different forms of psychological well-being did not vary between United States and Italy. This might not be surprising as both countries endorse an individualistic cultural orientation. However, future studies comparing individualistic and collectivistic cultures are needed to further corroborate our findings. As regards the relationship between the QEWB and the PANAS, we found that the strength of the correlation between QEWB measures and NA scores ($r = -.30$) was not as high as that between QEWB measures and PA scores ($r = .62$). This suggests that positive and negative emotional experiences may play a somewhat different role in eudaimonic psychological functioning (on this topic, see Bauer et al., 2008).

An exploration of the location of items on the latent variable of EWB permitted us to identify five items (Items 5, 12, 15, 18, and 19) which represent the most typical attributes of the EWB construct. These items tap the majority of the six conceptual dimensions investigated by the QEWB: specifically, Items 5 and 18 refer to personal expressiveness; Item 12 refers to intense involvement in activities; Item 15 has to do with the development of one's potentials; last, Item 19 refers to the investment of significant effort in the pursuit of excellence. The least typical attribute of the EWB construct was evaluated by Item 3, which also refers to the investment of significant effort in the pursuit of excellence. A possible interpretation of this may derive from the linguistic formulation of this item ("I think it would be ideal if things came easily to me in my life"), which does not include terms explicitly referring to the conceptual dimension the item is meant to assess.

The comparison between the distributions of respondents and items on the latent trait of EWB suggests that the QEWB is not adequate for measuring the highest levels of EWB. Again, this problem could be related to the linguistic formulation of the QEWB, which does not include items describing extreme attitudes and beliefs towards EWB. We propose that future studies investigating the psychometric properties of the QEWB incorporate and test new items measuring the highest levels of EWB (e.g., “I have no doubts about who I really am”). This would allow even the happiest, self-fulfilled respondents to properly express their level of EWB.

The measure of EWB provided by the QEWB was found to be invariant across gender but not across age. In particular, our findings suggest that some specific attributes of the EWB construct have a different salience for the age groups we investigated. Whereas emerging adults and young adults seem to cultivate their EWB by working hard and investing significant effort in difficult activities, middle-aged adults seem to place more emphasis on self-knowledge and on setting life goals. To interpret these findings, we argue that early adulthood is a time in which individuals have not yet fully discovered their best potentials and, thus, they easily become involved in demanding activities offering them the opportunity to test their skills and talents (on this topic, see Arnett 2000, 2004, 2011; Carstensen, 1998; Luyckx, Goossens, & Soenens, 2006). In contrast, middle adulthood can be assumed to be a life stage in which individuals have already gone through significant experiences, have already discovered and tested their talents and potentials, and are looking at how to further develop them (cf. Hudson, 1999). Notably, the age differences found in the current study should be interpreted with caution as the emerging adult group included a higher proportion of females compared to the other two age groups. New studies comparing the representation of the EWB construct in demographically similar age groups are thus needed to confirm our results.

To conclude, future studies conducted in other countries on both younger and older samples are expected to provide new insights into the generalizability of the EWB construct to different life stages. Further exploration of this issue would have significant implications for the measurement of EWB in the general population. In fact, if results of the present research will be replicated in other studies, researchers interested in detecting differences relating to age should develop alternative ways to compute global QEWB scores. For example, they might use only those items that are invariant across age, thus allowing direct comparisons between respondents having a partially different representation of the EWB construct.

NOTES

1. The Italian version of the SWLS is available at <http://internal.psychology.illinois.edu/~ediener/SWLS.html>

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