RESEARCH PAPER

Reconsidering Life Domains that Contribute to Subjective Well-Being Among Adolescents with Data from Three Countries

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Abstract Several theoretical models and testing procedures are presented with the aim of identifying the most relevant items and domains to include in a model for evaluating adolescents' subjective well-being, above and beyond those usually included in adults' scales. Data were collected in three countries based on a list of 30 items regarding adolescents' satisfaction with different domains or facets of life. Responses to these 30 items (including Personal Well-Being Index and Brief Multidimensional Students' Life Satisfaction Scale items) have been analysed by means of Confirmatory Factor Analysis using different Structural Equation Models (SEM) on a pooled sample comprising 5,316 twelve to sixteen-year-olds from Spain, Brazil and Chile. Several models have shown good enough fit statistics. A model using 14 items shows excellent fit statistics and is conceptually coherent. However, the inclusion or non-inclusion of items related to satisfaction with religion or spirituality results in both advantages and disadvantages when comparing the alternative models analysed. The relevance of including these items may therefore depend on the socio-cultural context where data are collected and their inclusion makes cross-country comparison more statistically challenging. The 14-item model has also been tested using multigroup SEM in order to check comparability of data among the three countries. All things considered, multigroup models have shown good fit with constrained loadings, but not with constrained loadings and intercepts, suggesting we can compare correlations and regressions among countries, but not means. Additional multigroup SEM with the five age groups available from the pooled sample have demonstrated that

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responses—and means—are comparable across different age groups during early adolescence.

1 Introduction

According to the International Wellbeing Group (2013), subjective wellbeing (SWB) can be measured though questions of satisfaction directed to people's feelings about themselves. There are three ways in which these feelings can be tapped as follows: using a single item scale, using multi-item scales of single constructs and using multi-item life-domain scales. In this article the third perspective is adopted. This approach assumes a domain-level representation of global life satisfaction. Here, individual items refer to specific life domains (life aspects) and the scores are averaged to produce a measure of SWB. A large number of SWB instruments have adopted this approach and the Personal Wellbeing Index is one such instrument. For a review of such scales, see Cummins and Weinberg (2013).

A good domain-based synthetic psychometric scale of subjective well-being should be able to measure the first level of deconstruction of overall life satisfaction (OLS), with items loading in only one component (International Wellbeing Group 2013). When conducting such a measurement using the Personal Well-Being Index (PWI) (Cummins et al. 2003), for example, the items need to be formulated at a rather high level of abstraction.

This theory implying the existence of different levels of abstraction by addressing satisfaction with certain "domains" or "facets" of life has not yet been explicit regarding how many "levels" of abstraction we may expect to find, or how variables in the different levels may relate to one another. Davern et al. (2007) proposed that the essence of SWB is best reflected by the most abstract and personal questions regarding satisfaction. However, many items with high levels of abstraction cannot be used with children under certain ages because of their lack of cognitive maturity to deal with the rather abstract questions used to carry out such measures.

Although items with a rather high level of abstraction may be understood by most adolescents depending on their age and familiarity with the wording of the life domain referred to, they are seldom understood by younger children (10–12-year-olds, for example). Determining at which age any concrete life domain wording—whether more or less abstract—is properly understood in each socio-cultural and linguistic context may be a never-ending task, and we can presume that there is a lot of personal variation in the age of understanding each wording, influenced by multiple factors. It seems more appropriate to pose questions with more concrete wordings to children and pre-adolescents. This task has already been initiated with some existing psychometric scales (for example, the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS)—, by Seligson et al. 2003; and the Personal Well-Being Index School Children (PWI-SC)—, by Cummins and Lau 2005b) and implies the assumption that with children (and perhaps pre-adolescents) we will not be measuring the first level of deconstruction of OLS, but a combination of different levels of deconstruction.

Up to now, no theoretical model has existed to guide us in how to statistically link these different levels of abstraction. However, in an article by Casas et al. (2012), using data from a pooled sample of 12–16-year-olds from 3 countries, a Structural Equation Model (SEM) relating three different subjective well-being scales to a second order latent variable supported the hypothesis that the three measured constructs belong to a same higher-order supra-construct (Stones and Kozma 1985; Diener et al. 1999). Two of these scales were the PWI and the BMSLSS, i.e., one scale with abstractly formulated items and another scale with concretely formulated items (the third was a context-free scale). Said finding suggests that more concretely and more abstractly formulated life domains relate to one another in adolescents' lives and can be combined on the same scale or model, offering a good statistical fit. Therefore, the challenge of combining concrete and abstract items to evaluate children and adolescents' well-being remains more theoretical than statistical.

The BMSLSS includes five concrete domains in children's lives (family, friends, school, self and the place I live in), which are in fact very different from the seven domains included in the PWI (health, standard of living, safety, achievements, interpersonal relationships, community and future security). Therefore, when the two scales have been used together, a combination of items referring at the same time to different levels of abstraction and different life domains has been measured.

The BMSLSS was designed by Seligson et al. (2003) and developed for use with students aged 8-18. It includes 5 items, each one referring to the satisfaction with the said life domains. Responses were originally coded on a scale of 1–7, from *terrible* to *delighted*. A .68 Cronbach's α was originally reported (Seligson et al. 2003). In Casas, Sarriera et al. (2012) the 1–7 scale was changed to a 0–10 scale in order to make it more sensitive and the reported Cronbach's α was .74.

The PWI was designed by Cummins et al. (2003) as part of the Australian Unity Wellbeing Index. Originally, it included 7 items, each one referring to the satisfaction with the said life domains. Responses were originally coded on a scale of 0–10, with labels only in the extreme values, from *completely dissatisfied* to *completely satisfied*. The psychometric properties of the PWI have been published in several articles (see, for example, Lau et al. 2005b; International Wellbeing Group 2013). Cronbach's α was originally reported to lie between .7 and .8. In Casas, Sarriera et al. (2012) a .80 Cronbach's α was reported.

On the other hand, we know from research by different authors that when we assess subjective well-being among adolescents by means of the most frequently used scales with adults, adolescents' results usually display a lower explained variance (Tomyn and Cummins 2011; Casas et al. 2012). An important challenge is therefore to determine which life domains are most relevant for adolescents' satisfaction with their overall life, particularly those that may differ from adults' satisfaction and even be missing from scales used with adults.

Additionally, any scale to be used for cross-country studies will be easier to deal with if it includes a short rather than a long list of items. Another challenge for research is therefore to identify models that combine the shorter list of domains, but show the highest explained variance. Hypothetically, the more abstract life domain wordings used, the shorter the number of items could be; however, we do not know beforehand which life domains this is possible for in each age group studied.

Taking advantage of our pooled database of responses by 12–16-year-olds adolescents from three different countries to a list of 30 items on satisfaction with different life domains, the aim of the data analysis presented here is to contribute to the current international debate on measuring adolescents' subjective well-being by means of items that assess satisfaction with life domains. With this in mind, we plan to identify which items—

among the 30 for which we have available data—are most relevant for inclusion in different models. This will be achieved by checking the fit statistics of different alternative models showing theoretical coherence, by means of Confirmatory Factor Analysis (CFA) using Structural Equation Models (SEM).

Our list of 30 satisfaction items includes items from different existing scales which have already demonstrated good functioning in the countries studied here, but also several additional items not found on previous scales which have been found to be important for children from their own perspective according to pilot research previously undertaken in the three countries. These additional items have mostly been taken from questionnaires used in other countries and show unique explained variance on the single-item scale assessing OLS. The models we aim to check combine different levels of abstraction in the formulation of their items.

Like the authors of the mentioned psychometric scales, we assume their items to be subjective well-being indicators.

2 Methodology

2.1 Instruments

Items with two different wordings have been used to perform the analysis presented here, as detailed in Table 2. 30 items refer to satisfaction with specific life domains or facets, and two alternative items have been used to assess OLS.

The two wordings used when formulating the questions were: (a) for items belonging to the original BMSLSS, *I would describe my satisfaction with ….as...*; (b) for all other items, the original PWI wording is used: *How satisfied are you with your…?*

We have repeated data for the OLS item and the *satisfaction with my friends* item using the two different wordings in order to test whether they might produce significant differences in responses.

2.1.1 List of Life Domains

The list of 30 life domains and facets includes (see detail in Table 2):

a. The seven original domains from the PWI (Cummins et al. 2003);
b. Four of the five original domains from the BMSLSS (Seligson et al. 2003), excluding satisfaction with oneself;
c. Seven items on school satisfaction (taken from Casas et al. 2012);
d. Two items on satisfaction with religion and spirituality, taken from Casas et al. (2009);
e. Five additional items on interpersonal relationships, taken from Bălţătescu (2006) after group discussion with adolescents in the three countries;
f. Three items on how time is organized, one of them (*satisfaction with time use*) taken from Casas et al. (2011) and the other two decided by the three research teams after group discussion with adolescents in the three countries; and
g. Two items on own body and sports activities done, the first of them as used in Casas et al. (2013) and the other decided by the three research teams after group discussion with adolescents in the three countries.

The versions of both the PWI and the BMSLSS scales used here are the same as those used in Casas et al. (2012), where more details of their psychometric properties can be found.

The original 1–7 scores from the BMSLSS were not used. Rather, scores for all items were collected on a 0–10 scale, as recommended by Cummins and Gullone (2000), with only the extreme values labelled, from *completely dissatisfied* to *completely satisfied*.

The original BMSLSS includes one item on *satisfaction with oneself*. In Casas et al. (2012), it was shown that this item contributes with unique explained variance to the PWI when regressed on a single-item scale on OLS. However, the inclusion of this item makes all other items in the PWI lose unique explained variance, suggesting that it is much more related to OLS than any other item and might therefore be considered an intermediate level of abstraction between OLS and the PWI items, and that it might be considered rather redundant with OLS. In the most recent 5th version of the PWI Manual (International Wellbeing Group 2013), it has been decided that items making other items lose unique explained variance on OLS should not been accepted. Because of the specific theoretical and empirical problem of using this item, we decided not to include it in the analytical procedures presented here.

2.1.2 Overall Life Satisfaction (OLS)

The importance of including a single-item scale on OLS when studying personal well-being was highlighted by Campbell et al. (1976). In our research, we have included two separate questions, using an end-labelled 0–10 scale from *completely dissatisfied* to *completely satisfied*. One of the questions used the PWI wording and the other the BMSLSS wording (Table 2, last lines).

2.2 Procedure

A two-stage cluster sampling design was used to select the sample of adolescents in each country. In the first stage, we randomly selected a number of secondary schools in the chosen region of each country (Rio Grande do Sul in Brasil, Valparaíso in Chile, Catalonia in Spain). At each school, we proceeded according to regular ethical guidelines for administering questionnaires to children in each country.

When a school agreed to participate, we randomly selected a number of classes until we filled a quota for each age group from each school. We then asked for cooperation from the class teacher. Following approval, and as soon as the ethical and formal procedures were concluded, the children were asked for their cooperation and informed that their data would be treated confidentially and that they were free to refuse. The questionnaires were administered to the whole group in their regular classroom. One of their usual teachers and one or two researchers were present during administration and clarified any questions that arose.

2.3 Sample

The overall sample is composed of 5,316 twelve to sixteen-year-olds. In Chile, data were only obtained for the age range 14–16. The two extreme age groups contain more or fewer subjects depending on the period of the school year when the questionnaires were administered.

School years are not structured identically in each of the countries studied. In Brazil, compulsory schooling finishes at 14, in Spain at 16 and in Chile at 18. The names and levels of years also differ. The distribution of age by school year in each country is detailed in Table 1, but labels for each school year refer to the age at which that year is usually

Table 1 Sample of adolescents aged 12 to 16, by age and school year

	Year 12	Year 13	Year 14	Year 15	Total
Spain					
Age					
12	511	48	2	0	561
13	191	455	29	2	677
14	31	240	467	11	749
15	2	44	253	308	607
16	2	3	50	250	305
Total	737	790	801	571	2,899
Brazil					
Age					
12	178	8	1	0	187
13	159	192	2	0	353
14	68	162	147	2	379
15	29	57	166	154	406
16	7	25	79	151	262
Total	441	444	395	307	1,587
Chile					
Age					
14			220	1	221
15			187	209	396
16			46	179	225
Total			453	389	842

initiated, as there is no equivalent translation of the terms used in each country for each school year. That is to say, "Year 12″ means that children are expected to start this year at the age of 12 in each country and finish when they are 13, or repeat the year.

The sample from Brazil only includes those students continuing in formal post-compulsory education after 14, and lower-class adolescents from that country are therefore probably underrepresented in the sample. In Spain and Brazil, a similar percentage of adolescents are behind in relation to the school year they are expected to be in.

Females comprise 55.8 % of the overall sample. They make up 65.6 % of the Brazilian sample, 54.2 % of the Chilean sample and 50.9 % of the Spanish one. The sample in Brazil includes far more girls than boys because of the ethical sampling procedure, which requires explicit consent from parents. The research team reported that girls of this age range are usually much more conscientious than boys in bringing the signed informed consent of parents from home.

2.4 Data Analysis

In order to carry out several Confirmatory Factor Analyses (CFA) and some full Structural Equation Modelling (SEM) using AMOS version 19, after depuration of the databases all subjects with more than two missing values (N = 42 from the 3 countries) were deleted. The remaining missing values were substituted by regression.

Data from the three countries present higher multivariate kurtosis than desirable, which required a bootstrap ML correction with AMOS19.

In order to verify the validity of the data factor structure, several CFA models have been tested. Maximum likelihood estimation has been used. Squared multiple correlations have been used to estimate the explained variance of the latent variables on OLS. According to Arbuckle (2010) the squared multiple correlation of a variable is the proportion of its variance that is accounted for by its predictors.

Comparative fix index (CFI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) have been used as fit indexes. We assumed that results higher than .950 for CFI and results below .05 for RMSEA and SRMR are excellent, in accordance with Batista-Foguet and Coenders (2000), Arbuckle (2010) and Byrne (2010). However, it is worth bearing in mind that for some other authors RMSEA values up to .08 represent acceptable errors of approximation in larger samples (Browne and Cudeck 1993; Byrne 2010; Marsh et al. 2010), while CFI greater than .90 reflects acceptable fit to the data (Marsh et al. 2010).

Multigroup SEM have been used to analyse cross-country and cross-age comparability of the data. In each case, we tested three multigroup models, firstly unconstrained, then with constrained loadings and finally with constrained loadings and intercepts.

3 Results

3.1 Overall Descriptive Results

Mean and standard deviation for all of the items investigated by country and with the pooled sample are shown in Table 2. The highest mean values from the pooled sample are observed for *satisfaction with my friends* (PWI format)*, with how I enjoy myself* and *with the groups of people I belong to*. The lowest mean values are observed for *satisfaction with religion* and *with school results*. The three highest and the two lowest mean values are bolded in Table 2.

The two repeated measures (satisfaction with friends and the OLS) display significant differences by both country and gender, suggesting that diverse wordings may significantly affect results obtained for subjective well-being. Scores are always higher for the two items when using the PWI wording, with the only exception of OLS in Chile, which scores higher with the BMSLSS wording.

Correlations among studied items, including the two versions of the OLS (Table 3), show that:

1. The two OLS versions (PWI format and BMSLSS format) show a high correlation, but not as high as expected: .55.
2. The highest correlation for OLS (PWI format) is with *satisfaction with my standard of living* (.45) and then *satisfaction with my personal security* and *with my family* (.44).
3. The highest correlation with OLS (BMSLSS format) is with *satisfaction with my family life* (.47) and then *with the place I live in* (.46).
4. The two versions of the item on *satisfaction with friends* correlate .57. Although these two items are supposed to measure the same, once again, do not correlate as high as expected.
5. *Satisfaction with the family* (PWI format) and *satisfaction with the family experience* (BMSLSS format) correlate .57.
6. The highest correlation in Table 3 is between *satisfaction with my life as a student* and *satisfaction with my school results*: .65—two different items using PWI format.

Table 2 Mean and standard deviation of all the satisfaction items explored

	Spain		Brazil		Chile		12-year-olds		13-year-olds		14-year-olds		15-year-olds		16-year-olds		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
PWI7																		
Health	8.44	1.92	8.46	1.60	7.97	2.24	8.73	1.70	8.59	1.74	8.37	1.91	8.13	2.01	8.17	1.92	8.37	1.89
Standard of living	8.41	1.73	8.29	1.58	8.16	2.07	8.68	1.60	8.49	1.63	8.33	1.79	8.20	1.79	8.07	1.82	8.34	1.75
Achievements in life	7.86	1.91	8.03	1.77	7.85	2.12	8.26	1.78	8.07	1.88	7.86	1.90	7.77	1.91	7.71	2.01	7.91	1.91
Personal safety	7.60	2.14	7.57	2.05	7.43	2.38	7.97	2.01	7.79	2.06	7.45	2.19	7.37	2.19	7.44	2.23	7.57	2.16
Groups of people belonging to	8.48	1.99	8.64	1.76	8.52	1.97	8.63	1.92	8.70	1.81	8.51	1.96	8.38	2.00	8.54	1.79	**8.53**	1.92
Security for future	7.43	2.15	7.78	2.01	7.48	2.36	8.02	1.96	7.87	2.02	7.38	2.22	7.27	2.21	7.42	2.11	7.54	2.15
Relationships other people	8.17	1.93	8.30	1.75	8.09	2.10	8.34	1.95	8.43	1.73	8.15	1.96	8.05	1.94	8.10	1.92	8.20	1.91
BMSLSS																		
Family life	8.18	1.91	8.11	1.86	7.79	2.14	8.55	1.83	8.32	1.78	8.04	1.98	7.93	1.95	7.80	2.03	8.10	1.93
Friends	8.36	1.68	8.13	1.80	8.53	1.55	8.37	1.89	8.45	1.62	8.29	1.76	8.21	1.69	8.33	1.53	8.32	1.70
School experience	6.88	2.12	7.55	1.90	7.10	1.97	7.61	1.99	7.31	1.97	6.97	2.10	6.97	2.07	6.89	2.01	7.12	2.06
The place I live in	8.01	2.14	8.00	2.05	7.87	2.13	8.49	1.90	8.23	1.97	7.91	2.18	7.76	2.18	7.73	2.16	7.99	2.12
School related																		
School results	6.83	2.40	7.49	2.04	6.33	2.51	7.58	2.15	7.37	2.25	6.77	2.39	6.65	2.41	6.65	2.30	**6.95**	2.35
What I have learned	7.89	1.85	8.32	1.63	7.90	1.98	8.45	1.62	8.21	1.73	7.82	1.95	7.94	1.79	7.88	1.85	8.02	1.82
Classmates	8.19	2.09	8.27	1.93	7.70	2.42	8.57	1.99	8.46	1.85	8.02	2.19	7.87	2.20	7.98	2.13	8.14	2.11
Teachers	7.24	2.31	8.19	1.95	7.05	2.56	7.97	2.13	7.74	2.21	7.29	2.39	7.31	2.34	7.43	2.24	7.50	2.30
The school I attend to	7.14	2.50	7.88	2.14	6.97	2.67	8.03	2.14	7.71	2.30	7.11	2.52	7.09	2.46	7.01	2.59	7.33	2.45
Preparation for future	7.33	2.18	7.96	1.95	7.16	2.29	7.91	2.01	7.76	2.08	7.35	2.19	7.29	2.17	7.33	2.19	7.49	2.15
Life as student	6.91	2.39	7.74	1.99	6.92	2.39	7.90	1.99	7.48	2.23	6.93	2.42	6.91	2.31	6.89	2.32	7.16	2.31
Religion and spirituality																		
Religion	6.11	3.49	7.64	2.70	6.67	3.38	7.07	3.21	6.86	3.26	6.55	3.35	6.41	3.31	6.59	3.44	**6.65**	3.32
Spirituality	6.68	2.68	7.89	2.14	7.31	2.61	7.03	2.71	7.25	2.47	7.04	2.60	7.03	2.65	7.48	2.35	7.14	2.57

Table 2 continued

	Spain		Brazil		Chile		12-year-olds		13-year-olds		14-year-olds		15-year-olds		16-year-olds		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Interpersonal relations																		
Love life (*)	7.15	2.72	7.58	2.41	6.90	2.77	7.63	2.55	7.39	2.55	7.04	2.70	7.16	2.63	7.13	2.77	7.24	2.65
Father	7.84	2.70	7.68	2.87	6.61	3.33	8.60	2.25	7.96	2.67	7.47	2.90	7.19	3.05	7.13	3.12	7.60	2.89
Mother	8.43	2.14	8.60	2.01	7.86	2.62	9.11	1.62	8.54	2.13	8.25	2.32	8.20	2.21	8.11	2.38	8.39	2.20
Family	8.32	2.04	8.42	1.90	7.68	2.42	8.95	1.71	8.53	1.93	8.13	2.10	8.02	2.11	7.87	2.27	8.25	2.08
Friends (PWI format)	8.72	1.74	8.89	1.53	8.72	1.85	8.96	1.74	8.94	1.53	8.74	1.75	8.63	1.71	8.68	1.73	**8.77**	1.70
Time organisation																		
Time use	7.54	2.12	7.62	2.10	6.96	2.37	8.00	2.01	7.78	1.98	7.33	2.19	7.28	2.26	7.18	2.20	7.47	2.16
Free time	7.86	2.05	7.82	2.25	7.51	2.40	8.31	1.99	8.03	1.98	7.68	2.22	7.59	2.23	7.53	2.29	7.79	2.17
How I enjoy myself	8.65	1.76	8.53	1.97	8.41	2.00	8.94	1.65	8.78	1.73	8.51	1.87	8.46	1.89	8.29	2.06	**8.58**	1.86
Other life domains																		
Own body	7.06	2.67	7.29	2.45	6.97	2.73	7.66	2.41	7.36	2.51	6.92	2.66	6.89	2.68	7.00	2.64	7.11	2.62
The sports I practice	7.63	2.48	7.41	2.63	6.58	2.93	8.20	2.20	7.88	2.31	7.18	2.70	7.06	2.74	6.98	2.78	7.40	2.63
Overall life satisfaction (OLS)																		
PWI format	8.15	1.98	8.09	1.85	7.90	2.15	8.57	1.75	8.23	1.90	8.05	2.00	7.90	2.00	7.86	2.07	8.09	1.97
BMSLSS format	8.07	1.78	7.63	1.87	8.06	1.81	8.26	1.85	8.10	1.67	7.86	1.93	7.85	1.79	7.70	1.82	7.94	1.82

* In Catalan, Spanish and Portuguese we can distinguish between "*vida amorosa*" and "*vida sentimental*", both of which are usually translated as "love life", given that "sentimental life" does not seem to make much sense in English. "*Vida amorosa*" may emphasise aspects of sexual intimacy and would not seem to be a very appropriate question for 12 year-olds, while "*vida sentimental*" refers to love-related feelings, which is a frequent common topic of discussion among peers during adolescence

The three highest and the two lowest mean values from the pooled sample are bolded. See comments in the text

Table 3 Correlations among all items, including the two OLS items (all correlations are significant at the .01 level, 2-tailed)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1. Health																															
2. Standard of living	.49																														
3. Achievements in life	.34	.50																													
4. Personal safety	.32	.39	.46																												
5. Groups people belonging	.26	.30	.32	.35																											
6. Security for future	.30	.36	.41	.44	.29																										
7. Relationships other people	.30	.34	.36	.39	.45	.34																									
8. Family life	.26	.39	.32	.27	.22	.26	.26																								
9. Friends (BMSLSS format)	.18	.24	.24	.25	.46	.20	.41	.33																							
10. School experience	.22	.30	.35	.24	.18	.37	.22	.37	.26																						
11. The place I live in	.21	.34	.26	.25	.20	.23	.24	.41	.26	.29																					
12. School results	.27	.31	.38	.29	.18	.43	.22	.27	.15	.59	.22																				
13. What I have learned	.27	.31	.40	.32	.23	.41	.29	.26	.18	.44	.21	.55																			
14. Classmates	.23	.27	.27	.30	.42	.26	.53	.23	.43	.23	.24	.24	.32																		
15. Teachers	.22	.24	.28	.24	.23	.30	.28	.25	.18	.41	.22	.40	.43	.38																	
16. The school 1 attend to	.22	.28	.28	.24	.24	.31	.28	.25	.21	.36	.24	.35	.38	.36	.57																
17. Preparation for future	.26	.32	.39	.33	.24	.54	.31	.29	.19	.47	.24	.51	.45	.26	.37	.33															
18. Life as student	.30	.37	.41	.33	.23	.44	.28	.33	.19	.61	.26	.65	.50	.29	.44	.42	.54														
19. Religion	.15	.16	.17	.16	.12	.21	.18	.19	.09	.23	.13	.21	.25	.15	.26	.24	.25	.30													
20. Spirituality	.18	.23	.27	.25	.18	.26	.25	.19	.13	.26	.15	.28	.31	.18	.27	.22	.30	.31	.43												
21. Love life	.24	.30	.32	.35	.25	.31	.40	.26	.23	.23	.23	.23	.23	.30	.24	.24	.31	.31	.19	.23											
22. Father	.25	.32	.27	.25	.17	.25	.23	.45	.13	.22	.29	.25	.23	.26	.22	.20	.26	.29	.16	.13	.26										
23. Mother	.24	.33	.27	.26	.22	.27	.25	.53	.17	.26	.26	.27	.27	.24	.26	.25	.29	.32	.19	.20	.30	.44									
24. Family	.29	.38	.34	.30	.25	.33	.32	.57	.22	.30	.31	.31	.32	.32	.30	.31	.38	.39	.23	.23	.31	.47	.53								
25. Friends (PWI format)	.25	.26	.28	.29	.49	.25	.50	.23	.57	.21	.21	.18	.25	.51	.25	.28	.25	.24	.13	.17	.31	.19	.25	.35							
26. Time use	.27	.34	.36	.36	.25	.35	.31	.28	.23	.28	.23	.33	.30	.26	.23	.23	.44	.38	.18	.22	.32	.27	.31	.36	.28						
27. Free time	.24	.31	.30	.32	.26	.29	.31	.23	.23	.22	.25	.27	.28	.27	.19	.21	.38	.35	.19	.19	.29	.22	.24	.30	.31	.57					

Table 3 continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
28. How I enjoy myself	.24	.33	.32	.32	.30	.28	.36	.28	.32	.19	.27	.20	.27	.34	.18	.21	.31	.26	.13	.17	.29	.24	.29	.36	.42	.47	.51				
29. The sports I practice	.39	.36	.33	.39	.22	.33	.30	.27	.19	.25	.24	.28	.27	.26	.22	.22	.34	.43	.17	.23	.37	.25	.26	.31	.24	.35	.33	.28			
30. Own body	.31	.30	.27	.31	.22	.28	.29	.24	.19	.23	.23	.25	.24	.26	.21	.21	.29	.33	.10	.14	.29	.27	.24	.30	.25	.35	.33	.30	.50		
31. OLS–PWI format	.34	.45	.43	.44	.32	.38	.37	.41	.27	.35	.34	.36	.34	.35	.29	.31	.40	.42	.25	.24	.40	.35	.38	.44	.34	.42	.37	.37	.41	.33	
32. OLS–BMSLSS format	.28	.39	.36	.37	.28	.32	.32	.47	.36	.37	.46	.30	.28	.29	.22	.26	.33	.35	.15	.18	.33	.30	.30	.37	.29	.32	.30	.33	.34	.27	.55

The two versions of the OLS explored here show different patterns of correlations with the items on satisfaction domains. The version with the BMSLSS format shows much higher correlations with the other items on its scale than with the items from the PWI format. The same can be said of the version with the PWI format: it shows higher correlations with the other items on its scale than with items from the BMSLSS format. Therefore, the fact of having the same worded format and being together on a questionnaire increases correlation between the satisfaction items explored.

3.2 Regression of the Life Domain Items on Overall Life Satisfaction

With the aim of testing how different satisfaction items contribute to OLS, ordinary least squares linear regressions were fitted on the two formats of the scale used here. Table 4 displays data regarding which items are non-significant in each case, and explained variance (R^2 adjusted for degrees of freedom).

Once again, the different wording of the item on OLS clearly appears to offer different results:

- When 30 satisfaction items are regressed on OLS (PWI format), 20 appear to be significant. The highest betas are for satisfaction with personal safety. Satisfaction with spirituality shows a significant negative beta.
- When 30 satisfaction items are regressed on OLS (BMSLSS format), only 13 appear to be significant. The highest betas are for the four items of the BMSLSS, the highest being satisfaction with the place I live in. Satisfaction with spirituality, with teachers and with their mother show significant negative betas—although very low—, probably due to multicollinearity among variables.

These results show that when regressing the satisfaction items on the OLS (BMSLSS format), the highest betas are always shown for the other items belonging to the BMSLSS, therefore suggesting that items with the same wording presented together in the questionnaire tend to load more on the OLS item with the same format.

Regression on OLS–BMSLSS format- shows a lower R^2 and fewer items contributing significantly than regression of the same items on OLS–PWI format. Satisfaction with spirituality shows a significant negative beta in the two regressions; however, only regressions on OLS–BMSLSS format- show a significant negative beta for satisfaction with teachers and with their mother. For these reasons, we decided to use the PWI format in our models with SEM.

3.3 Testing Structural Equation Models

Using CFA, we related the 30 satisfaction items explored here to a unique latent variable using the pooled sample. Although the initial model did not fit well (Table 5, Model 1), after analysing the modification indexes we tested another model including 63 error covariances which did fit very well (Model 2). We are aware that with so many error covariances we are artificially forcing the model to fit—but we have proceeded in this way because the model will only be a starting point from which to design other models.

When we included OLS, age and gender in this model (Model 2B, Table 5), the explained variance of the latent variable on OLS was .52. Age showed a negative covariance with OLS and a negative correlation with the latent variable, while gender did not show significant correlation with the latent variable but showed a low but significant covariance with OLS. Standardized loading of the latent variable on OLS was .70.

Table 4 Regressions on overall life satisfaction

Dependent variable	OLS (PWI format)		OLS (BMSLSS format)	
R^2	.444		.411	
	Beta	Sig.	Beta	Sig.
Health	.019	.129	.004	.760
Standard of living	.091	.000	.062	.000
Achievements in life	.056	.000	.035	.011
Personal safety	.115	.000	.096	.000
Groups of people belonging to	.022	.094	−.001	.910
Security for future	.007	.595	.006	.643
Relationships other people	.014	.315	.014	.332
Family life	.066	.000	.188	.000
Friends (BMSLSS format)	−.024	.077	.118	.000
School experience	.038	.009	.115	.000
The place I live in	.062	.000	.209	.000
School results	.036	.018	.002	.905
What I have learned	−.011	.407	.009	.520
Classmates	.047	.001	.017	.241
Teachers	−.016	.228	−.052	.000
The school I attend to	.014	.276	.014	.307
Preparation for future	.036	.013	.021	.143
Life as student	.022	.173	−.002	.909
Religion	.069	.000	.000	.940
Spirituality	−.034	.005	−.026	.037
Love life	.095	.000	.067	.000
Father	.025	.044	.010	.448
Mother	.048	.000	−.032	.019
Family	.066	.000	.023	.122
Friends (PWI format)	.046	.002	−.010	.525
Time use	.070	.000	.023	.111
Free time	.031	.024	.010	.459
How I enjoy myself	.034	.011	.036	.008
The sports I practice	−.007	.592	−.008	.529
Own body	.091	.000	.067	.000

Next, recalling results from Casas et al. (2011), we tested another model with two correlated latent variables: one related to the BMSLSS items and the other related to the remaining items (Model 3). The fit statistics of this model are rather similar to those for Model 2—with only CFI slightly improving.

We then checked the fit statistics for Model 2 with all items of the BMSLSS deleted—that is to say, retaining only items with the same wording (Model 4). As a result, both CFI and RMSEA were shown to be worse than in Model 3, while SRMR remained the same. A first provisional conclusion is that a model mixing the two different wordings may offer a better fit. An alternative explanation is that some domain in the BMSLSS—and not in the PWI—may be relevant in better explaining SWB.

Table 5 Fit indexes of different models using SEM. Models without a B in the number are Confirmatory Factor Analysis relating items on satisfaction with life domains to a latent variable (SWB), and those with a B are full SE models that include other exogenous variables such as OLS and gender

Model	χ^2	df	p value	CFI	RMSEA (confidence interval)	SRMR
1 Initial model: 30 satisfaction items	22,080.48	464	.000	.687	.094 (.093–.095)	.071
2 Modified model: 30 items + 63 error cov.	3,679.16	401	.000	.953	.039 (.038–.040)	.033
2B Model 2 + OLS + age + gender	4,387.31	431	.000	.941	.042 (.040–.043)	.036
3 2 Correl latent var: BMSLSS4 + PWI	3,144.91	348	.000	.955	.039 (.038–.040)	.033
4 Model 2 without BMSLSS items	2,842.50	283	.000	.952	.041 (.040–.042)	.033
5 30 Items related to 7 latent variables	**2,814.10**	**356**	**.000**	**.960**	**.036 (.035–.037)**	**.030**
6 Model 5 without BMSLSS items	2,343.27	262	.000	.959	.039 (.037–.040)	.029
7 30 Items related to 7 latent variables + a second order latent (Figure 4)	2,822.60	364	.000	.960	.036 (.034–.037)	.032
8 14 Items 8 error covariances	**574.90**	**69**	**.000**	**.973**	**.037 (.034–.040)**	**.024**
8B 14 Items 8 error covariances + OLS + age + gender	**1,078.35**	**108**	**.000**	**.956**	**.041 (.039–.043)**	**.029**
9 13 Items (no religion) 7 error covariances	504.47	58	.000	.974	.038 (.035–.041)	.023
10 13 Items (no spiritual.) 7 error covariances	520.36	58	.000	.973	.039 (.036–.042)	.023
11 12 Items (no religion and no spirituality) 7 error covariances	425.79	47	.000	.977	.039 (.036–.042)	.022
12 Model 8 multigroup (3 countries) unconstrained	**765.79**	**207**	**.000**	**.970**	**.023 (.021–.024)**	**.024**
13 Model 8 multigroup (3 countries) constrained loadings	**841.86**	**233**	**.000**	**.967**	**.022 (.021–.024)**	**.026**
14 Model 8 multigroup (3 countries). Constr. loadings and intercepts	1,496.98	259	.000	.933	.030 (.029–.031)	.026
13B Model 12 multigroup + OLS + age + gender constrained loadings	1,447.88	350	.000	.951	.024 (.023–.026)	.031
15 Model 8 multigroup (age groups) unconstrained	1,042.79	345	.000	.962	.020 (.018–.021)	.034
16 Model 8 multigroup (age groups) constrained loadings	1,125.74	397	.000	.960	.019 (.017–.020)	.038
17 Model 8 multigroup (age groups). Constr. loadings and intercepts	1,329.38	449	.000	.952	.019 (.018–.020)	.038
17B Model 8 multigroup + OLS + gender (age groups). Constr. loadings and intercepts	1,827,64	579	.000	.942	.020 (.019–.021)	.040

The most outstanding models are bolded. See comments in the text

High error covariances suggest that clusters of the items may be related to different latent variables, and consequently SWB could be considered a second order latent variable. In order to identify which clusters of items should be explored as being related to different latent variables in an SEM, a hierarchical cluster analysis was conducted with the correlation matrix using the furthest neighbour method. Results suggested the following clusters:

- Standard of living, achievements, safety and health
- Interpersonal relationships, groups belonged to, school mates, friends (PWI) and friends (BMSLSS)
- Future security, school results, learning, teachers, school, preparation for future, life as a student and school experience
- Leisure time, enjoyment and time use
- Father, mother, family and family life
- Religion and spirituality
- Love life, own body and sports activities done
- The place I live in

The first of these clusters includes abstractly worded items, which belong to the adults' version of the PWI and coincide with four of the items proposed on the PWI as participating in the first level of deconstruction for OLS. This cluster of items probably represents "core subjective well-being" (CSWB) among adolescents.

Using all of the above clusters, we tested a model relating each group of items to a different latent variable, all the latent variables being correlated. Because *satisfaction with the place I live in* was found to be the only item in a separate cluster, we checked to see whether its contribution to other latent variables was relevant and found that it improved the model fit if related to the CSWB latent variable. We also observed that *satisfaction with love life* contributed to a better fit of the model if related to CSWB rather than the latent variable on own body and sports activities done. Taking all of the above into account, another model was designed with 30 items relating to 7 latent variables. This model showed better fit statistics than any of the previous models tested here (Model 5 in Table 5).

We then tested this model without the BMSLSS items (Model 6 in Table 5) and observed that the fit is clearly worse. This again counter-intuitively suggests that a mixture of concrete and more abstract items and a mixture of wordings in the items do actually statistically improve a model designed to explain SWB. However, all items from the BMLSS—and therefore having a different wording—display significant error covariances with one another. This observation points to the possibility that some item included in the BMSLSS is important in better explaining SWB, and that item could be *satisfaction with the place I live in*.

The latent variable on religion/spirituality displays the lowest correlations with all other latent variables in both Models 5 and 6.

Next, we tested whether a new model relating the seven latent variables in Model 5 to a second order latent variable also fit. This is Model 7 (Table 5), which shows very good fit statistics. In this model, however, the standardized CSWB loading on the second order latent variable is 1, meaning that the two latent variables are interchangeable and one of them is unnecessary.

We then again analysed error covariances in Model 2 and Model 5 in order to infer new simplified models to be tested with items related to a single latent variable, and with the minimum error covariances possible. We followed a two-fold strategy: (a) first selecting
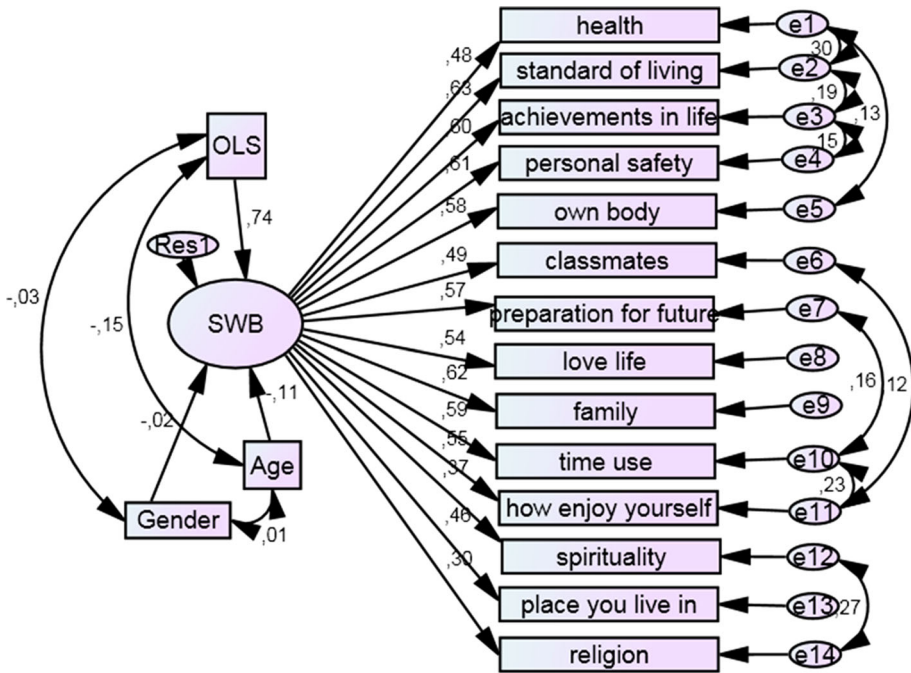
Fig. 1 Structural Equation model relating the SWB latent variable to OLS, age and gender, with constrained loadings. Standardized loadings for Spain (Model 13B in Table 5)

the items with the highest standardized loadings in each latent variable in Model 5, and (b) then analysing the items showing a major increase of the fit indexes in Model 2 when deleted.

These strategies brought us to a model with 14 items and only 8 error covariances (Model 8, Table 5; Fig. 1), showing excellent fit statistics. This model shows a high error covariance between *satisfaction with religion* and *satisfaction with spirituality*. Therefore, we tested models deleting either *satisfaction with religion* (Model 9, Table 5), *satisfaction with spirituality* (Model 10, Table 5), or both (Model 11, Table 5). Which model fits statistically best remains unclear, as CFI and SRMR improve when deleting these 2 items, but RMSEA worsens.

We also tested whether Model 8 would improve by deleting *satisfaction with health* because of its low standardized loading on the latent variable, and by deleting *satisfaction with love life*, presuming it might have different standardized loading depending on age. However, none of these alternative models offered a better fit. When deleting love life, CFI improved, but RMSEA worsened, while SRMR remained the same. When deleting health, all fit indexes worsened.

When we included OLS, age and gender in this model (Model 8B, Table 5), the explained variance of the latent variable on OLS was .53, which is very good and means we have not lost explained variance by diminishing the number of items in the model from 30 to 14. Age showed a negative covariance with OLS and a negative correlation with the latent variable, while gender did not show significant correlation with the latent variable but did show a low but significant covariance with OLS. Standardized loading of the latent variable on OLS was .71.

3.4 Multigroup Structural Equation Models

We tested Model 8 (Table 5) as multigroup in order to check whether data are comparable among countries. As previously mentioned, we tested three multigroup models, firstly unconstrained, then with constrained loadings and finally with constrained loadings and intercepts. The results are presented in Table 5 (Models 12, 13 and 14).

The unconstrained model and the one with constrained loadings show excellent fit statistics. The model with constrained loadings and intercepts shows a change in the CFI of more than .01 and is therefore not acceptable (Chen 2007; Cheung and Rensvold 2001). These results suggest the conclusion that we can compare correlations and regressions among the three countries, but not means, probably due to a different response style among adolescents in each country.

In Table 6 it can be observed that the satisfaction domain with highest standardized loadings on the latent variable differs among countries: It is *satisfaction with standard of living* in Spain, *satisfaction with personal safety* in Chile, and *satisfaction with achievements* in Brazil. The lowest standardized loadings are the same in the three countries: *satisfaction with religion,* followed by *satisfaction with spirituality.*

When we included OLS, age and gender in this model (Model 13B, Table 5; Figs. 1, 2 and 3), the explained variance of the latent variable on OLS appeared to be very different in each country and particularly much lower in Brazil (Table 6). Standardized loading of the latent variable on OLS was .73 in Spain and Chile (Figs. 1, 3), but clearly lower in Brazil (.64; Fig. 2).

Table 6 Confirmatory Factor Analysis by means of a multigroup SEM

Bootstrap ML. 95 % Confidence intervals. Resamples = 500			Brazil			Chile			Spain		
			Estim	Lower	Upper	Estim	Lower	Upper	Estim	Lower	Upper
Standard of living	←	SWB	.610	.575	.646	.563	.519	.601	**.628**	.594	.659
Achievements in life	←	SWB	**.611**	.572	.651	.590	.548	.629	.611	.576	.639
Personal safety	←	SWB	.576	.542	.611	**.606**	.561	.648	.616	.586	.641
Health	←	SWB	.510	.476	.549	.429	.385	.471	.482	.444	.519
Place live I in	←	SWB	.445	.409	.483	.473	.429	.516	.452	.415	.484
Love life	←	SWB	.564	.526	.600	.550	.505	.591	.541	.513	.572
Classmates	←	SWB	.476	.442	.515	.447	.405	.491	.491	.455	.524
Religion	←	SWB	.344	.303	.385	.325	.283	.362	.291	.255	.319
Preparation for future	←	SWB	.596	.564	.632	.598	.559	.636	.574	.545	.604
Family	←	SWB	.589	.554	.628	.552	.507	.599	.612	.581	.640
Time Use	←	SWB	.559	.524	.602	.562	.517	.607	.587	.557	.616
How I enjoy myself	←	SWB	.475	.439	.516	.535	.492	.579	.554	.519	.584
Spirituality	←	SWB	.448	.409	.486	.429	.387	.470	.386	.353	.414
Own Body	←	SWB	.571	.536	.609	.592	.553	.632	.576	.544	.606
Squared multiple correlations of the latent variable SWB on OLS			.419	.353	.479	.552	.489	.620	.578	.542	.615

Group = country. Constrained loadings. Standardized regression weights of 14 life satisfaction domain items on a latent variable (SWB) (Model 13, Table 5)

The highest standardized regression weight in each country is bolded. See comments in the text
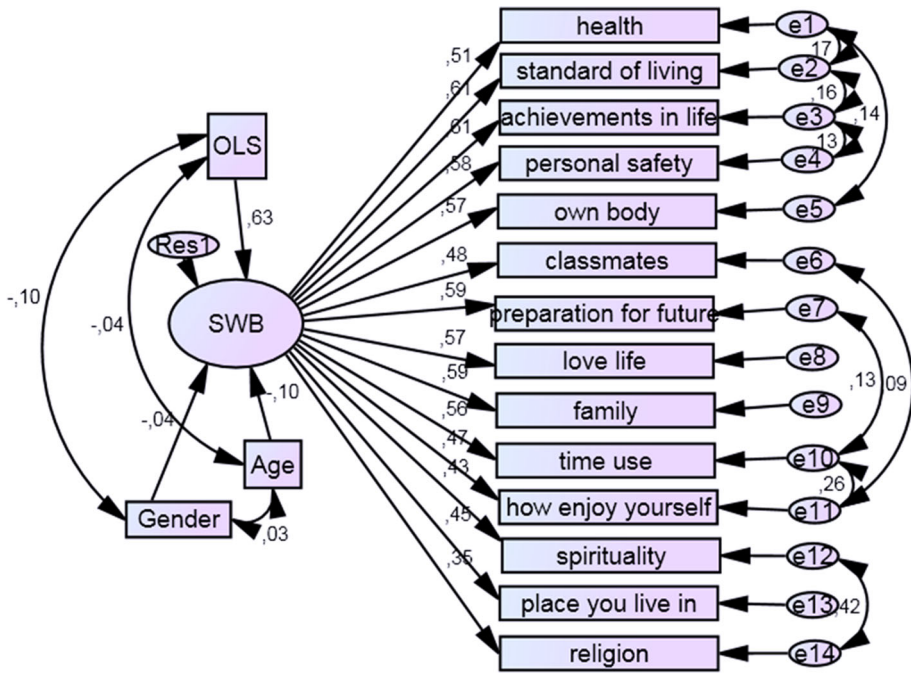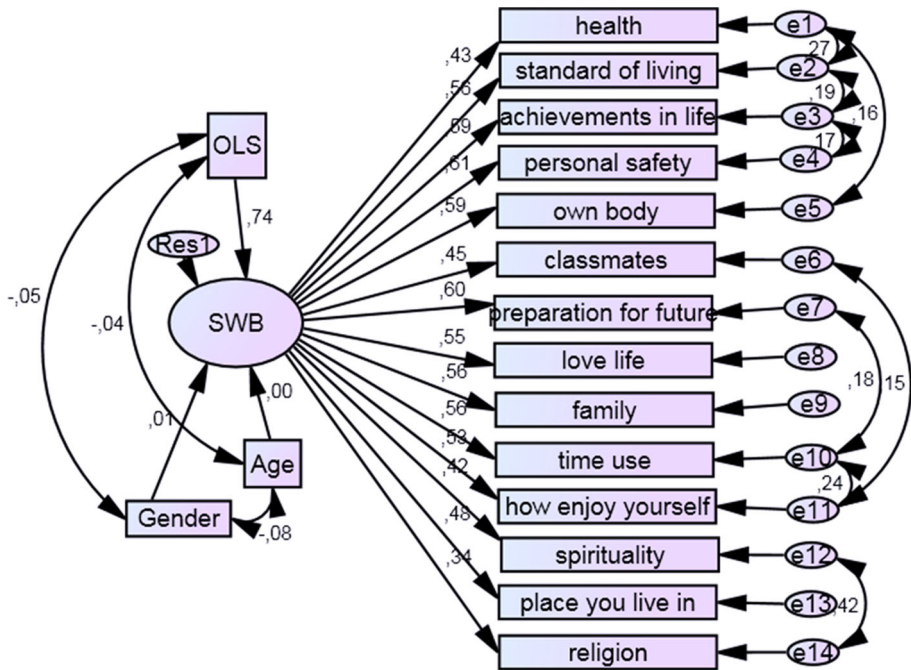
Fig. 2 Structural Equation model relating the SWB latent variable to OLS, age and gender, with constrained loadings. Standardized loadings for Brazil (Model 13B in Table 5)

Age showed significant negative covariance with OLS only in Spain and significant negative correlation with the latent variable in Spain and Brazil, while gender did not show significant correlation with the latent variable in any country and significant covariance with OLS only appears in Brazil. In Chile, the fact that the sample included a smaller age range may have influenced said results.

Finally, we also checked whether data are comparable among age groups. This is very important, because understanding of the more abstractly worded items may differ across age groups. The unconstrained model and the one with constrained loadings show excellent fit statistics (Models 15 and 16 in Table 5). The model with constrained loadings and intercepts shows a change in the CFI lower than .01, while RMSEA and SRMR remain the same. These results suggest the conclusion that we can compare means, correlations and regressions among age groups.

Table 7 shows changes in standardized regression loadings across age groups. A very interesting observation is that, while the standardized regression weights of many domains on the latent variable SWB tend to decrease with age, in the case of religion and spirituality they both seem to increase with age throughout the studied age range. *Satisfaction with love life* also tends to slightly increase its contribution to the latent variable with age. The analysis of latent variable means suggests that SWB decreases significantly from 12 to 14 years of age, while from 14 to 16 the decrease is no longer significant.

When we included OLS and gender in this model (Model 17B, Table 5), the explained variance of the latent variable on OLS appeared to be clearly lower in the two younger groups, particularly in the 13-year-olds group (Squared Multiple Correlations in Table 7). Standardized regression loadings of the latent variable on OLS are also lower among the

Fig. 3 Structural Equation model relating the SWB latent variable to OLS, age and gender, with constrained loadings. Standardized loadings for Chile (Model 13B in Table 5)

younger (.65 in the 12-year-olds group) and highest in the 13-year-olds group (.75). Gender does not appear to have a significant effect on the latent variable (SWB), although it does show very low but significant covariance with OLS at the ages of 16 and 13.

4 Discussion

We have used measurements based on a list of 30 items available from three countries regarding satisfaction with different domains or facets of life. Since our 30 items used two different wordings, and were taken from psychometric scales using different levels of abstraction in their wording, our first concern was to check whether they might fit properly in the same model. Importantly, the two well-known psychometric scales used here had been combined together in previous research, showing there was no problem for the statistical fit when used in the same model with adolescents' data.

Our results using SE Models give support to these previous results, suggesting that when we are measuring satisfaction with different life domains or facets of life, mixing items with diverse levels of abstraction and relating them to a common latent variable does not pose a problem for the models' statistical fit, at least with our pooled data. One possible explanation could be that adolescents do not evaluate life satisfaction according to or in coherence with levels of abstraction.

A different wording of the same item has been shown to lead to significant differences in the results observed, and this is a point to be researched more fully in the future. Unexpectedly, mixing some items with different wordings in the same model has improved

Table 7 Confirmatory Factor Analysis by means of a multigroup SEM

Bootstrap ML. 95 % Confidence intervals. Resamples = 500		12-year-olds			13-year-olds			14-year-olds			15-year-olds			16-year-olds		
		Estim	Lower	Upper	Estim	Lower	Upper	Estim	Lower	Upper	Estim	Lower	Upper	Estim	Lower	Upper
Standard of living	→ SWB	.607	.546	.669	.610	.571	.647	.608	.575	.647	.601	.566	.635	.584	.540	.626
Achievements in life	→ SWB	.570	.513	.626	.568	.529	.608	.613	.576	.647	.617	.577	.654	.589	.545	.637
Personal safety	→ SWB	.557	.502	.607	.578	.540	.618	.598	.563	.635	.609	.570	.644	.601	.553	.649
Health	→ SWB	.481	.427	.536	.479	.436	.520	.488	.447	.528	.464	.426	.504	.480	.435	.517
Place live I in	→ SWB	.443	.389	.496	.446	.410	.482	.448	.413	.481	.444	.405	.481	.449	.405	.496
Love life	→ SWB	.516	.452	.583	.526	.486	.572	.544	.509	.579	.550	.516	.580	.561	.517	.605
Classmates	→ SWB	.464	.404	.532	.501	.461	.541	.484	.444	.526	.470	.430	.508	.470	.427	.511
Religion	→ SWB	.285	.243	.326	.292	.258	.323	.314	.280	.350	.319	.285	.352	.310	.277	.345
Preparation for future	→ SWB	.554	.483	.612	.551	.510	.584	.597	.559	.640	.587	.550	.620	.592	.549	.632
Family	→ SWB	.624	.563	.683	.598	.557	.637	.593	.558	.630	.600	.560	.640	.565	.514	.609
Time use	→ SWB	.543	.486	.596	.566	.525	.602	.576	.538	.615	.574	.533	.608	.582	.531	.624
How I enjoy myself	→ SWB	.521	.456	.579	.516	.474	.564	.525	.484	.572	.535	.500	.575	.495	.450	.548
Spirituality	→ SWB	.326	.280	.375	.385	.348	.426	.401	.366	.438	.401	.362	.436	.433	.396	.475
Own Body	→ SWB	.607	.546	.669	.610	.571	.647	.608	.575	.647	.601	.566	.635	.596	.551	.636
Squared multiple correlations of the latent variable SWB on OLS		.487	.397	.576	.429	.359	.513	.566	.509	.627	.514	.463	.570	.539	.471	.619
Mean (unstandardized) using 12-year-olds as mean reference		0	0	0	−.278	−.428	−.141	−.701	−.868	−.565	−.802	−.946	−.661	−.801	−.970	−.623
Mean (unstandardized) using 16-year-olds as mean reference		.801	.623	.970	.523	.352	.683	.100*	−.065	.246	−.002*	−.157	.152	0	0	0

Group = Age group. Constrained loadings and intercepts. Standardized regression weights of 14 life satisfaction domain items on a latent variable (SWB)

* Non significant

the fit indexes of the model on some occasions, although it is unclear whether this may be due to the contribution of some specific items included in one of the scales but not the other.

Several models tested here have shown good fit statistics, suggesting it is possible to use diverse empirical models and that the choice of one should be based on theoretical reasons. The best model we have identified, relating 14 satisfaction items to only one latent variable (Model 8, in Table 5), shows excellent fit statistics.

However, we recommend collecting more data and testing more models that mix items with different levels of abstraction using additional items in future testing. Our results are limited by the 30 domains for which we have available data. Other domains should be explored in the future. For example, in recent research by the Children's Society (Rees et al. 2012), an item on *satisfaction with your freedom of choice* has been found to be very promising with English and Welsh children and young adolescents, and was not included in our list of items. Additionally, it is also important to test our results including data from more countries in this kind of debate.

The 14-item model has been tested using multigroup SEM in order to check the comparability of data among the three countries. All multigroup models considered show good fit with constrained loadings, but not with constrained loadings and intercepts, suggesting—as in many previous studies—that we can compare correlations and regressions among countries, but not means.

Much more research should be developed and in more countries with long lists of satisfaction items in order to check new SEM, which may capture much better the components that are important for OLS and subjective well-being among adolescents from different socio-cultural contexts. The fact that we have identified new items—beyond the more frequently used psychometric scales in the field—that can guide the construction of new short and manageable psychometric instruments, improving the overall explained variance, is a promising result. This is the case of *satisfaction with own body, with how you enjoy yourself* and *with love life.* However, because we only had one item devoted to the life domain *the place you live in,* we have been unable to explore in more detail the interesting results related to it and must therefore conclude that it deserves much more attention in the future.

The inclusion or not of items related to satisfaction with religion and satisfaction with spirituality remains open to debate, as is already the case in research into adults, but with additional limitations due to the different understanding of the two concepts found among adolescents (Casas et al. 2009). Additionally, these items, when analysed with our pooled data, have shown lower contribution to SWB and lower correlation with the other domains analysed here. Therefore, more research is needed with adolescents from different socio-cultural contexts to better understand their contribution to OLS among the youngest populations.

A pending challenge is that we still find a lower explained variance of the domain-based SWB scale among the younger age groups than among the older groups. This challenge includes taking into account the additional observation that explained variance differs greatly from one country to another among these age groups. The explained variance of the latent variable on OLS is clearly lower among 12 and 13-year-olds than among elder adolescents, suggesting that our instruments are not yet good enough to properly understand subjective well-being among the youngest adolescents from different cultures.

Last but no least, results from this study testing a new 14-item model with data from Brazil, Chile and Spain confirm an overall subjective well-being decreasing-with-age tendency along adolescence. Gender has not displayed a significant contribution to the

latent variable in any of the three countries, although a significant covariance with OLS appeared in Brazil. Multigroup model results suggest that mean answers are in-country comparable year by year along adolescence in each of the three studied countries. However, overall means are not cross-country comparable, presumably due to different cultural answering styles. Results also suggest that correlations and regressions are cross-country comparable. Its comparison indicates that the most important contribution to subjective well-being is displayed by a different item in each country, supporting the idea of cultural specificities among the three studied countries adolescents. Additionally, the contribution of the latent variable to OLS is clearly lower in Brazil, than in Chile or Spain and more research will be needed to understand this difference.

References

Arbuckle, J. L. (2010). *IBM SPSS® Amos™ 19 user's guide*. Crawfordville (Fl): Amos Development Corporation.

Bălţătescu, S. (2006). Comparative results and psychometric properties of the personal well-being index—Romania (old and new versions) with an adolescent sample—a preliminary analysis. Retrieved May 4, 2013 from http://www.sergiubaltatescu.info/content/comparativePWI.

Batista-Foguet, J. M., & Coenders, G. (2000). *Modelos de ecuaciones estructurales*. Madrid: La Muralla.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Thousand Oaks: Sage.

Byrne, B. M. (2010). *Structural Equation Modeling with AMOS. Basic concepts, applications and programming* (2nd ed.). NY: Routledge.

Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). *The quality of American life: Perceptions, evaluations, and satisfactions*. Nueva York: Russell Sage.

Casas, F., Baltatescu, S., Bertrán, I., González, M., & Hatos, A. (2012a). School satisfaction among adolescents: Testing different indicators for its measurement and its relationship with overall life satisfaction and subjective well-being in Romania and Spain. *Social Indicators Research,*. doi:10.1007/s11205-012-0025-9.

Casas, F., González, M., Figuer, C., & Malo, S. (2009). Satisfaction with spirituality, satisfaction with religion and personal well-being among Spanish adolescents and young university students. *Applied Research in Quality of Life, 4,* 23–45.

Casas, F., Sarriera, J. C., Abs, D., Coenders, G., Alfaro, J., Saforcada, E., et al. (2012b). Subjective indicators of personal well-being among adolescents. Performance and results for different scales in Latin-language speaking countries: A contribution to the international debate. *Child Indicators Research, 5,* 1–28. doi:10.1007/s12187-011-9119-1.

Casas, F., Sarriera, J. C., Alfaro, J., González, M., Malo, S., Bertran, I., et al. (2011). Testing the personal wellbeing index on 12–16 year-old adolescents in 3 different countries with 2 new items. *Social Indicators Research, 105,* 461–482. doi:10.1007/s11205-011-9781-1.

Casas, F., Tiliouine, H., & Figuer, C. (2013). The subjective well-being of adolescents from two different cultures: Applying three versions of the PWI in Algeria and Spain. *Social Indicators Research,*. doi:10.1007/s11205-012-0229-z.

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14,* 464–504.

Cheung, G. W., & Rensvold, R. B. (2001). The effects of model parsimony and sampling error on the fit of structural equation models. *Organizational Research Methods, 4,* 236–264.

Cummins, R.A., Eckersley, R., van Pallant, J., Vugt, J. & Misajon, R. (2003). Developing a national index of subjective well-being: The Australian unity well-being index. Social Indicators Research 64, 159–190. (Updated in:http://www.deakin.edu.au/research/acqol/instruments/well-being_index.htm.

Cummins, R.A. & Gullone, E. (2000). Why we should not use 5-point Likert scales: The case for subjective quality of life measurement. Proceedings Second International Conference on Quality of Life in Cities (pp 74–93). Singapore: National University of Singapore.

Cummins, R A., & Lau, A. (2005b). Manual: personal wellbeing index—school children, Cantonese translation. Third edition. Resource document. Melbourne: Australian Centre on Quality of Life, Deakin University. http://www.deakin.edu.au/research/acqol/instruments/wellbeing-index/pwi-sc-chinese-cantonese.pdf.

Cummins, R. A., & Weinberg, M. K. (2013). Subjective wellbeing—multi-item measurement: A review. In W. Glatzer (Eds.) Global handbook of wellbeing and quality of life. Dordrecht: Springer (in press).

Davern, M. T., Cummins, R. A., & Stokes, M. A. (2007). Subjective wellbeing as an affective-cognitive construct. *Journal of Happiness Studies, 8,* 429–449.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*(2), 276–302.

International Wellbeing Group (2013). Personal wellbeing index—adult—manual, 5th version. Melbourne: Australian Centre on Quality of Life, Deakin University. Retrieved on 10th August 2013 from: http://www.deakin.edu.au/research/acqol/instruments/wellbeing-index/pwi-a-english.pdf.

Marsh, H. W., Lüdtke, O., Muthén, B., Asparouhov, T., Morin, A. J. S., Trautwein, U., et al. (2010). A new look at the big five factor structure through exploratory structural equation modeling. *Psychological Assessment, 22*(3), 471–491.

Rees, G., Goswami, H., Pople, L., Bradshaw, J., Keung, A. & Main, G. (2012). The good childhood report 2012. A review of our children's well-being. Leeds (UK): The Children's Society.

Seligson, J. L., Huebner, E. S., & Valois, R. F. (2003). Preliminary validation of the brief multidimensional student's life satisfaction scale. *Social Indicators Research, 61,* 121–145.

Stones, M. J., & Kozma, A. (1985). Structural relationships among happiness scales: A second order factorial study. *Social Indicators Research, 17,* 19–28.

Tomyn, A. J., & Cummins, R. A. (2011). The subjective wellbeing of high-school students: Validating the personal wellbeing index—school children. *Social Indicators Research, 101*, 405–418. doi:10.1007/s11205-010-9668-6.