

# Does Satisfaction with Food Matter? Testing the Personal Well-Being Index-School Children (PWI-SC) with an Additional Item on Satisfaction with Food on a Sample of 10 to 12-Year-Olds

Cristina Vaqué-Crusellas · Mònica González · Ferran Casas

Accepted: 8 January 2015 / Published online: 25 January 2015  
© Springer Science+Business Media Dordrecht 2015

**Abstract** The Personal Well-being Index-School Children version (PWI-SC) by Cummins and Lau (2005) is among the few instruments devoted to assessing the subjective well-being of children. However, only a handful of studies have used this instrument and in a limited number of countries. This article presents an extended version of the 7-item version of the PWI-SC. The instrument was administered to a sample of children aged 10–12 in Spain ( $N=371$ ) together with a single-item scale on overall life satisfaction (OLS) and an additional item on satisfaction with food. The responses obtained were analysed in order to determine its psychometric properties and check whether one additional item would improve its qualities. The models we present here resulting from Confirmatory Factor Analysis (CFA) show good fit statistics with both 7 and 8 items. Our analysis confirms that the inclusion of a domain on satisfaction with food – a proposed new indicator to study subjective well-being in this age group - contributes to the PWI-SC with unique variance (6.7 %), displaying an increase of 3.6 % in shared variance.

**Keywords** Subjective Well-being · Satisfaction with food · Children · Personal Well-being Index-School Children (PWI-SC) · Confirmatory Factor Analysis (CFA)

---

C. Vaqué-Crusellas (✉)

Food, health and well-being Research Group, University of Vic-UCC (Spain), C/ Sagrada Família, 7,  
08500 VicBarcelona, Spain  
e-mail: cristina.vaque@uvic.cat

M. González · F. Casas

Quality of Life Research Institute, University of Girona (Spain), M-20. Campus Montilivi, 17071 Girona,  
Spain

M. González

e-mail: monica.gonzalez@udg.edu

F. Casas

e-mail: ferran.casas@udg.edu

## 1 Introduction

Cummins et al. (2003) define subjective well-being as the normal state of positive well-being resulting from an individual's overall life experience. This experience can be measured by means of a multidimensional assessment that reflects the combination of a cognitive process (rating of satisfaction/dissatisfaction with life) and two affective processes (presence of positive affect and absence of negative affect) (Argyle 1993; Diener 1994) equally applicable to both adults and children and adolescents. The cognitive dimension includes *overall life satisfaction* on the one hand and *satisfaction with various specific domains* on the other. *Satisfaction with specific domains* of life includes an unspecified number of dimensions, such as education, health, family, and friends, which are closely related to one's personal life (Diener 1994) and most influence one's levels of well-being (Andrews and Whitney 1976; Campbell et al. 1976).

With regard to children, more research is needed to ascertain which life satisfaction domains have most impact on their well-being, and from their own perspective, given that most of the references available come from studies on adult populations (Casas 2014). This approach would be in line with that postulated by the new sociology of childhood and the children's rights movement which began in the 1990's (Ben-Arieh 2008).

There is a lack of instruments for assessing children's well-being from a non-clinical perspective. Among the few available for the under-12 population are the Students' Life Satisfaction Scale (SLSS) by Huebner (1991), the Multidimensional Students' Life Satisfaction Scale (MSLSS) by Huebner (1994), the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) by Seligson et al. (2003) and the Personal Well-being Index-School Children (PWI-SC) designed by the International Well-being Group (Cummins and Lau 2005). The latter is administered in conjunction with a single item on overall life satisfaction (OLS). The SLSS is a context-free scale: it evaluates well-being on the basis of a single construct in which the meaning of individual items is not independent from the construct of general well-being, rather they are variations of this construct. The BMSLSS and PWI-SC are multi-domain based-scales and therefore grounded on the assumption that subjective well-being or life satisfaction is composed of different life domains.

The instrument we will be testing in this study is the school version of the PWI, the Personal Well-being Index-School Children (PWI-SC: Cummins and Lau 2005). The seven items that comprise the PWI are theoretically embedded, representing the first level deconstruction of the global question 'How satisfied are you with your life as a whole? Few studies have tested this instrument and those that have applied it mainly to samples of adolescents and young people in specific geographical contexts (specifically, in Australia and China) and only rarely to younger children. It is for this reason that we believe more research should be developed with the PWI-SC in order to see how it works in contexts beyond the aforementioned countries and with a younger population. In the next paragraph we discuss the results of the studies we have found that have used the PWI-SC.

Studies carried out in China using the PWI-SC with data from 2,055 children and adolescents aged 4-17 have shown that they have higher levels of well-being (mean of 70.2 points on a scale of 100) than the adult Chinese population (10 points below the Australian standard). This higher mean among Chinese children is attributed to the fact that they are not yet influenced by the cultural bias that characterizes the people of this country (Lau et al. 2007a, b). These results reflect the sensitivity of the scale to respondents' age and culture.

The aforementioned authors state that the PWI-SC displays good psychometric properties, although these are less robust than the adult version. The Cronbach alpha of the PWI-SC is 0.84 for the oldest adolescents but lower for the youngest children (0.67). Although all versions form a single stable factor, the variance accounted for with older adolescents (47.2 %) is about 12 % higher than with younger children (34.4 %). A similar discrepant pattern is found in the domain contributions to OLS variance.

Tomyn and Cummins (2010) applied the PWI-SC to evaluate levels of subjective well-being in a sample of 351 Australian adolescents and young adults aged 12 to 20. The mean overall score was 74.7 (SD=1.10) on a scale of 0 to 100, falling within the scores of the reference Australian adult population. However, in some specific domains the mean score is significantly lower (such as satisfaction with achievements), and in others it is significantly higher (satisfaction with the community). The authors believe that this latter result is due to the school version not asking directly about community but rather posing the question “How satisfied are you about doing things away from your home?”, implying social activities such as going to the movies or to a party with friends. Pleasant memories associated with these experiences may contribute to the higher than expected mean satisfaction ratings for this domain. Statistically significant differences are found between the oldest and youngest, the oldest scoring lower on the well-being index. With regard to gender, the authors observe that subjective well-being is higher among girls than boys.

Another example of this index being used is the study conducted by Tomyn et al. (2011b) on a sample of 504 adolescents and young adults (12–19 year olds), obtaining a mean score of 75.03 (SD=15.14). Although this figure does not display statistically significant differences from that of the adult population, three of the seven specific satisfaction domains (security in the future, standard of living and achievements) do obtain higher scores.

This article presents the results of applying confirmatory factor analysis (CFA) to an adapted version of the PWI-SC used on a sample of the Catalan-speaking Spanish population in order to test whether this is a valid instrument for measuring the subjective well-being of children belonging to a different context than those addressed in previous studies.

Among the findings of those studies aimed at determining which other life satisfaction domains may have a significant weight in the subjective well-being of children and adolescents beyond those included in the PWI-SC, “satisfaction with school” stands out, with a unique explained variance of 1 % (Tomyn and Cummins 2010). The contribution of other specific domains to children and adolescents’ well-being is yet to be explored, one of these being satisfaction with food. Satisfaction with food could be understood as a much more concrete life domain than those comprising the PWI-SC and therefore not a good candidate for this instrument. We hypothesize, however, that far beyond solely food, it might include other things such as satisfaction with appearance (through the connection observed among children between food intake and how they perceive themselves physically, Vaqué 2012) and even satisfaction with health (as most of them are not ill, they consider food intake to be one of the strongest factors influencing health, Vaqué 2012).

Food stands out as one of the main exogenous factors affecting children’s growth, as well as playing a key role in their health (Aranceta et al. 2004; Serra et al. 2002). The dietary patterns and nutritional profile of this population, and particularly of children in

industrialized countries, have undergone major changes in the last three decades. The epidemiological study *enKid* (1998–2002), which assessed the dietary habits and nutritional status of children and young people in Spain, showed an imbalance in eating habits at these ages (Serra et al. 2003; Aranceta and Rodríguez 2003). Furthermore, ways of living are increasingly more sedentary, leading to a progressive decrease in physical activity and energy expenditure among children. These changes are jointly responsible for the appearance of prevalent illnesses such as overweight and obesity among the younger age groups (Aranceta et al. 2005).

Exploring which elements might contribute to children enjoying food and valuing it as pleasurable and important for their subjective well-being may contribute to a new perspective for intervention in addressing some of the public health problems present in the child population, such as the numerous cases of food-related illnesses (Calañas 2005). The results of this line of research may also contribute to suggesting new approaches in relation to promoting children's health and proposing new indicators for the evaluation of their OLS.

As well as the scarcity of studies exploring the relationship between food and subjective well-being in children, we must also add the fact that most of the studies that do exist do not focus on the healthy population, but rather analyse deficiencies suffered by people as a consequence of some disorder, illness or medical treatment (see, for instance, the review by Proctor et al. 2009). The few studies that relate subjective well-being to food in a non-clinical population do so from the point of view of eating behaviour; for example, Valois et al. (2003), observed that low levels of subjective well-being, measured through the BMSLSS, were associated with poorer dietary behaviour. They do not, however, consider food as a life satisfaction domain, as we propose to do in this article.

When we speak of satisfaction with food, we are referring to evaluating those elements that may contribute to children enjoying food and valuing it as a pleasurable and important element in their subjective well-being. This concept goes beyond the type and quantity of food included in their diet. Feeling good about food is also related to a positive perception of the senses of taste, smell, touch, sight and hearing associated with eating. It includes aspects of the physical environment (where the eating takes place, the furniture, the cutlery used, sound and environmental temperature, among others), the psychosocial environment (interpersonal relationships with meal companions) and also beliefs and values held with regard to food in each socio-cultural context (Vaqué 2014).

For the reasons mentioned above, we believe it appropriate to expand the adapted version of the PWI-SC to include an item on satisfaction with food. This will allow us to first assess whether the item has a factor loading greater than or equal to other life domains included in the PWI-SC and then evaluate the potential interest of including dietary-related issues in the study of children's subjective well-being.

## 2 Method

### 2.1 Sample

Participants were selected by means of cluster sampling. The sample unit comprised of primary schools in the county of Osona (Catalonia, Spain). Specifically, we selected classes from Years 5 (mainly 10-year-olds) and 6 (mainly 11-year-olds) to ensure

participants had adequate cognitive and communicative abilities to explore and study the constructs on which the research was based. Of the 78 primary schools in the county, 18 (23.07 % of the total) showed an interest in participating in the project. All the selected schools included students from mixed socio-economic backgrounds.

Due to the fact that the data analysed in this article comprise part of a broader study aimed at exploring issues related to the use of the school dining hall, the study population consisted of all users aged between 10 and 12 who used the dining hall service in these 18 schools on a regular basis (430 subjects). The final sample comprised 371 children, who filled in the questionnaire at the school and within school hours. This meant that all children who were not present at school on the day of administration did not participate in the study (13.7 %).

Of the 371 participants, 53.6 % were boys ( $n=199$ ) and 46.4 % girls ( $n=172$ ). The mean age was 10.73 ( $SD=0.70$ ). 50.1 % were 11 year-olds (26.6 % boys and 23.5 % girls), 38.5 % 10 year-olds (21 % boys and 17.5 % girls) and the rest were 12 year-olds (5.9 % boys and 5.4 % girls). Most participating schools were state schools (77.8 %, mirroring the total distribution of state schools in the region), while the remainder were schools with mixed funding (22.2 %). Half the schools (50 %) were located in semi-rural areas (with populations of between 2,000 and 5,000 residents), while 33.3 % were in urban areas (over 5,000 residents) and 16.6 % in rural areas (under 2,000 residents).

## 2.2 Instruments

To collect the data we used:

### 1. *The Personal Well-being Index-Schoolchildren (PWI-SC)*

The *Personal Well-being Index – Schoolchildren (PWI-SC, Cummins and Lau 2005)* was developed on the basis of the *Personal Well-being Index (PWI-A, 4th edition)* originally designed for adults (Cummins et al. 2003) and the *Comprehensive Quality of Life Scale - School version (Cummins 1997)*.

The PWI-SC evaluates well-being by directly asking children and adolescents the question “*How happy are you....*” with regard to the following domains: standard of living (“*about the things you have? Like the money you have and the things you own?*”), personal health (“*... with your health?*”), achievements in life (“*... with the things you want to be good at?*”), personal relationships (“*... about getting on with the people you know?*”), personal safety (“*... about how safe you feel?*”), feeling part of the community (“*... about doing things away from your home?*”) and future security (“*... about what may happen to you later on in your life?*”).

Evaluations of each of the items described above are given on a scale on which responses range from *very sad* (score of 0) to *very happy* (score of 10), with the mid position also labelled (score of 5) as *not happy or sad*. Emoticons with faces expressing happiness/sadness and a neutral expression were used jointly with the labels in order to aid comprehension. The overall score for the PWI-7 is calculated by summing all items and transforming the result to a 0–100 scale.

The psychometric properties of this scale have been published in various articles. The seven original domains form a single factor and predict over 50 % of the variance on “satisfaction with life as a whole” (Cummins et al. 2003). However, variance

explained among adolescent populations is usually lower, between 43 and 48 % (Casas et al. 2011).

The Cronbach's alpha for the PWI-SC is 0.657, indicating that the instrument has an acceptable internal consistency. It is worth bearing in mind that removing the last two items, satisfaction with *what may happen to you later on in your life* and satisfaction with *doing things away from your home*, slightly improves internal consistency.

## 2. *The single-item scale on Overall Life Satisfaction (OLS):*

The importance of including a single-item scale on overall life satisfaction when studying personal well-being was first highlighted by Campbell et al. (1976). We have included a question on Satisfaction with overall life (*At present, to what extent are you satisfied with your life as a whole?*) using a 0–10 scale, from completely dissatisfied to completely satisfied.

## 3. *An item on Satisfaction with Food:*

One item on satisfaction with food was included in the questionnaire (*At present, to what extent are you satisfied with the food that you eat?*). The item was end-labelled on a 0–10 scale, from *completely dissatisfied* to *completely satisfied*.

We first developed a pilot project to assess participants' comprehension of the questionnaire. The most significant change was to replace "happy" with "content" in the question that introduces the PWI-SC, this change also affecting how the OLS and the item on satisfaction with food were asked, as we detected that Spanish children use the word "content" more often than "happy". A further change was to use the first person singular instead of the second person singular of the original English version with the aim of making the instrument more personalized for Spanish participants (see Table 1). Given that in previous studies (Casas et al. 2013) we found that additional information included in brackets does not improve comprehension at the ages studied here but actually slows down reading and reduces motivation to read carefully this kind of information was omitted; this only affected the domain measuring standard of living.

## 2.3 Procedure

In each school, we proceeded in accordance with regular ethical guidelines for administering questionnaires to children. We reported to the school director and the parents' association for permission. We then asked for cooperation from the class teacher. Following approval, the children were asked for their cooperation and were 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 a researcher were present during administration and clarified any questions that arose.

## 2.4 Statistical Analysis

First, we calculated the mean and standard deviation for items on the PWI-SC, the OLS and *satisfaction with food*. We then calculated a multiple linear regression including the

**Table 1** Back translation of items on the PWI-SC

Original items (English)	Translated items (Catalan)	Back translation (English)
How happy are you with/about..	Actualment, fins a quin punt estàs content/a amb...	At present, to what extent are you content with...
The things you have	Les coses que tinc	The things I have
Your health	La meva salut	My health
The things you want to be good at	Les coses en les que vull ser bo	The things that I want to be good at
Getting on with the people you know	Tenir bona relació amb les persones que conec	Having a good relationship with the people I know
How safe you feel	El segur/a que em sento	How safe I feel
Doing things away from your home	El fet de fer coses fora de casa	The fact of doing things away from home
What may happen to you later on in your life	El que em pot passar més endavant a la vida	What might happen to me later in life

seven items on the PWI-SC as predictors of OLS, and the unique variance explained by each of these items. We then conducted the same regression on OLS, adding the variable satisfaction *with food*. Finally, version 19 of AMOS was used to carry out a Confirmatory Factor Analysis (CFA) of the PWI-SC, all subjects with more than two missing values being deleted after deputation of the databases. The remaining missing values were substituted by regression using SPSS, version 19. The data presented higher multivariate kurtosis than desirable, which required a bootstrap ML correction.

Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR) were 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).

### 3 Results

#### 3.1 Descriptors for the PWI-SC, OLS and Satisfaction with Food

As Table 2 shows, the highest scores for items included in the PWI-SC are for satisfaction with *having a good relationship with the people I know* and *my health* (the mean being over 9 in both cases).

The mean overall score for the PWI-SC on a scale of 0 to 100 is 86.54 (SD=10.54). No statistically significant differences are observed by gender or age of participants in the well-being indicators explored.

#### 3.2 Calculating the Variance of the PWI-SC (with 7 Items) and a Version with one Added Item (8 Items)

First, we performed a regression of the 7 items included on the PWI-SC as predictors of OLS, calculating the unique variance explained by each of these items (Table 3).

**Table 2** Mean values for items comprising the PWI-SC, OLS and Satisfaction with food

PWI-SC	Mean	SD
Satisfaction with having a good relationship with the people I know	9.23	1.46
Satisfaction with my health	9.19	1.45
Satisfaction with the things I have	8.69	1.78
Satisfaction with the things that I want to be good at	8.55	1.80
Satisfaction with how safe I feel	8.46	1.80
Satisfaction with what might happen to me later in life	8.25	2.07
Satisfaction with the fact of doing things away from home	8.11	2.19
OLS	9.09	1.50
Satisfaction with food	8.62	2.94

The items with the highest explained variance are satisfaction with *having a good relationship with the people I know* (0.326), *what might happen to me later in life* (0.146), and *my health* (0.118), as shown in Table 3.

We then performed the same regression on OLS, adding the variable satisfaction with *food*. In this case, the explained variance is 0.342, well above that obtained for the PWI-SC with 7 items ( $\Delta R^2=0.067$ ) (Table 3). Both unique and shared variance increase.

In the second regression, although the item with the highest unique explained variance continues to be satisfaction with *having a good relationship with people I know* (0.305), the other indicators have different weightings. The next indicators with

**Table 3** Regressions of PWI-SC items (7 and 8-item versions) on OLS

PWI-SC (7 items)	B <sup>a</sup>	Sr <sup>2b</sup>	PWI-SC (8 items)	B <sup>a</sup>	Sr <sup>2b</sup>
The things I have	0.069	0.004	The things I have	0.040	0.001
My health	0.118	0.011	My health	0.030	0.000
The things that I want to be good at	0.026	0.000	The things that I want to be good at	0.002	0.000
Having a good relationship with the people I know	0.326	0.085	Having a good relationship with the people I know	0.305	0.075
How safe I feel	0.074	0.003	How safe I feel	0.064	0.003
Doing things away from home	0.070	0.004	Doing things away from home	0.024	0.000
What might happen to me later in life	0.146	0.018	What might happen to me later in life	0.111	0.010
			Satisfaction with food	0.304	0.067
Total		0.125	Total		0.156
Corrected R <sup>2</sup>	0.275		Corrected R <sup>2</sup>	0.342	
Total Variance	0.275		Total Variance	0.342	
Unique Variance	0.125		Unique Variance	0.156	
Shared Variance	0.15		Shared Variance	0.186	
			$\Delta R^2$	0.067	

<sup>a</sup> standardized regression coefficients

<sup>b</sup> semi-partial correlations



most weight are satisfaction with *food* (0.304), and *what might happen to me later in life* (0.111).

These results suggest that the indicator satisfaction with *food* is a relevant variable in explaining the subjective well-being of the participants in the study, and these results led us to conduct a CFA to test a model that includes this additional variable.

### 3.3 Confirmatory Factor Analysis of the PWI-SC

The initial model with the 7 indicators of the PWI-SC related to a latent variable shows a good fit (Table 4), given that the CFI is above 0.950 and the SRMR and RMSEA values are below 0.05.

We observe that all variables show moderate standardized loadings on the PWI-SC latent variable, *Satisfaction with what might happen to me later in life* being the lowest (0.39), and *Satisfaction with how safe I feel* the highest (0.61) (Table 5). We then explored a second model which included an additional indicator, *Satisfaction with food* (Table 4).

In this second model we observe that the variable *Satisfaction with what might happen to me later in life* (0.40) has the lowest standardized loading and *Satisfaction with how safe I feel* (0.59) the highest. That said, we also find that *Satisfaction with food* has an important weight in the model (0.54) along with other satisfaction domains such as *my health* (0.54) and *the things that I want to be good at* (0.54), above other domains such as *satisfaction with the things I have* (0.51), *having a good relationship with the people I know* (0.51) and *doing things away from home* (0.47).

The model shows even better fit indexes if we add an error covariance between the domains of *satisfaction with my health* and *satisfaction with food*, suggesting that the participants in the study have linked the two areas in their responses. Table 5 shows the confidence intervals obtained from the bootstrap for the two models.

## 4 Discussion

The average score obtained by participants for the adapted version of the PWI-SC (Cummins and Lau 2005) used in this article is high, and higher than the normative scores defined by the authors for the young Australian population ( $M=75$ ,  $SD=2.5$  % of scale maximum, Cummins and Lau 2005). These results agree with those of other studies conducted with children and young people using the same instrument (Lau et al. 2007a). In contrast with that posited by Lau et al (2007b), we believe that this

**Table 4** Statistics for model fit relating different items of satisfaction with life domains with the latent variable PWI-SC

Model	$\chi^2$	df	<i>p</i> -value	CFI	RMSEA (confidence interval)	SRMR
1 Initial model 7-item PWI-SC	18.12	14	.201	.987	.028 (.000–.061)	.031
2 Model PWI-SC + satisfaction food (1 error covariance)	24.37	19	.182	.988	.028 (.000–.056)	.031

**Table 5** Standardized weightings of the variables studied on the latent variable PWI-SC

Bootstrap ML. 95 % CI. (samples=500).		Estimate	Lower	Upper	P value
Initial model 7-item PWI-SC					
PWI Sat Things I have	← PWISC	.512	.360	.664	.004
PWI Sat Health	← PWISC	.538	.420	.665	.004
PWI Sat Things want be good at	← PWISC	.541	.405	.663	.004
PWI Sat Having a good relationship with people I know	← PWISC	.507	.374	.627	.004
PWI Sat How safe I feel	← PWISC	.612	.485	.727	.004
PWI Sat Doing things outside home	← PWISC	.451	.304	.585	.004
PWI Sat What might happen to me later in life	← PWISC	.389	.249	.526	.004
Initial model 7-item PWI-SC + Satisfaction food					
PWI Sat Things I have	← PWISC	.513	.360	.660	.004
PWI Sat Health	← PWISC	.536	.422	.663	.004
PWI Sat Things want be good at	← PWISC	.538	.401	.660	.004
PWI Sat Having a good relationship with people I know	← PWISC	.508	.379	.629	.004
PWI Sat How safe I feel	← PWISC	.592	.457	.711	.004
PWI Sat Doing things outside home	← PWISC	.469	.323	.593	.004
PWI Sat What might happen to me later in life	← PWISC	.403	.267	.542	.004
Sat with food	← PWISC	.540	.407	.669	.004

difference is not due to a cultural issue, but rather one of age. Higher means than those obtained for adults have also been observed when the adult version of the PWI has been applied to a Spanish adolescent population (UNICEF 2012). The mean OLS score observed in our study reinforces the above assertion that at these ages levels of subjective well-being are high compared to adult levels. As long as the existence of a homeostatic mechanism is considered to be the reason for the PWI means being constrained within a specific range (normative values), regardless of the age and cultural origin of the respondents, both additional research and theoretical debate are needed in order to explain why children's scores are higher than adults'.

The participants in our study also obtain a high mean score for the domain *Satisfaction with food*, coinciding with the results of research by Schnettler et al. (2011), who studied levels of subjective well-being (using the SWLS, developed by Diener et al. 1985) and satisfaction with food (using the scale Satisfaction with food-related life, developed by Grunert et al. 2007) on a sample of university students.

The well-being indicators explored in this article (PWI-SC, OLS and *Satisfaction with food*) do not display statistically significant differences according to the age of the participants, unlike previous studies done with children and young people (Tomyn and Cummins 2010; Bradshaw and Richardson 2009). These results can probably be explained by the little variability in age range studied and the fact that the children were younger than in the aforementioned research. Neither were gender differences observed between these well-being indicators, a finding which coincides with the results of research by Casas et al. (2007) on a sample of 1,618 Spanish children and adolescents aged 12–16.

The CFA performed on the PWI-SC indicates that it is a reliable and valid tool for evaluating well-being in the Catalan context and for this age group. Expanding the PWI-SC with an item on *Satisfaction with food* presents a very good statistical fit, all 8 items displaying high factor loadings. The fact that the PWI-SC model fits when including *Satisfaction with food*, and that this item has a factor loading greater than or equal to other specific domains included in the PWI-SC emphasizes the interest of including this additional domain and the importance of issues related to food in participants' well-being. The contribution of *Satisfaction with food* being much higher than *Satisfaction with health* when included in the analysis leads us to consider that the former probably also measures the health dimension of subjective well-being at the studied ages. Further research and debate are needed on how to better measure satisfaction with health in children. The most significant changes we made in adapting the PWI-SC to Catalan were replacing the word "happy" with "content" in the question introducing the index and changing the grammatical subject in formulation of the items (for example, content with "my health" instead of content with "your health"). Emoticons were also helpful, in line with what Casas et al. (2013) found in relation to research on subjective well-being at these ages. These changes led to participants' greater understanding of the instrument, highlighting the importance of incorporating the views of children themselves in the process of adapting instruments and not only those changes researchers are able to make from an adult perspective. In the same vein, Tomy et al. (2011a) compared two versions of the PWI-SC using the word "satisfaction" and "happy" and found that the version which works best at these ages is the one using the word "happy". It is worth noting that the instrument did not require any changes in terms of the content of items, showing that there is some equivalence between the Catalan version and the English original.

The results of the linear regressions show that satisfaction with interpersonal relationships is the variable that most contributes to explaining participants' OLS. This result is consistent with the importance that some authors attribute to the social support children receive from parents, classmates, teachers and close friends (Demaray and Malecki 2002). After this, the specific domain that most contributes to explaining OLS is *Satisfaction with food*, displaying a unique variance of 6.7 %, markedly higher than that of most other indicators included in the PWI-SC.

Taking a more in-depth look at the emotion emotional aspects of food is of interest as a future line of research in the fields of both nutrition and well-being. We believe that the more food practices are associated with subjective experiences that reinforce children's well-being, the more successful they will be.

Based on "bottom-up" theories presented in the review conducted by Diener (1984), which states that satisfaction with various specific life domains can affect life satisfaction, we believe that motivating children about and awakening their interest in issues related to food while stressing its importance to their health will contribute to a greater satisfaction with food and, in turn, a greater sense of overall well-being. Consequently, we propose incorporating satisfaction with food as an indicator for evaluating aspects that can help children enjoy eating and understand food as a positive element in their well-being and quality of life.

We conducted the research presented in this article in the belief that we can only advance knowledge about and understanding of children's subjective well-being by awarding them the status of active subjects in such research. Following the approach

adopted by authors such as Liebel (2007), future work might consider studying issues related to food and well-being on the basis of research designed by children themselves in order to better understand reality as they see it.

With regard to limitations, not all schools approached were motivated to participate in the study, restricting the number of children involved, and we did not ask children about their socio-economic status, which could have some connection with their satisfaction with food. In order to compare the results obtained in this study, it would be appropriate to carry out longitudinal research that would allow us to ascertain how the influence that food can have on the evaluation of subjective well-being varies throughout childhood, preferably on samples from different cultural contexts and representative of the population in these age groups. Focus groups would also prove very helpful for a more in-depth understanding of what children understand by satisfaction with food and satisfaction with health and the connections between these two life domains.

**Acknowledgments** Particular thanks are due to Barney Griffiths for editing the English in this paper.

## References

- Andrews, F., & Withey, S. (1976). *Social Indicators of well-being*. Nova York: Plenum Press.
- Aranceta, J., & Rodríguez, F. (2003). Crecimiento y desarrollo, estudio Enkid. Barcelona, España: Masson.
- Aranceta, J., Pérez, C., Foz, M., Mantilla, T., Serra, L., Moreno, B., Monereo, S., & Millán, J. (2004). Tablas de evaluación del riesgo coronario adaptadas a la población española. Estudio DORICA. *Medicina Clínica*, 123(18), 686–691.
- Aranceta, J., Pérez, C., Ribas, L., & Serra, L. (2005). Epidemiología y factores determinantes de la obesidad infantil y juvenil en España. *Revista Pediatría de Atención Primaria*, 7, S13–S20.
- Arbuckle, J. L. (2010). *IBM SPSS Amos 19 user's guide*. Crawfordville: Amos Development Corporation.
- Argyle, M. (1993). Psicología y calidad de vida. *Intervención Psicosocial*, 2(6), 5–15.
- Batista-Foguet, J. M., & Coenders, G. (2000). *Modelos de ecuaciones estructurales*. Madrid: La Muralla.
- Ben-Arieh, A. (2008). The child indicators movement: past, present and future. *Children Indicators Research*, 1, 3–16. doi:10.1007/s12187-007-9003-1.
- Bradshaw, J., & Richardson, D. (2009). An index of child well-being in Europe. *Child Indicators Research*, 2(3), 319–351.
- Byrne, B. M. (2010). *Structural equation modeling with AMOS. Basic concepts, applications and programming* (2nd ed.). NY: Routledge.
- Calañas, A. (2005). Alimentación saludable basada en la evidencia. *Endocrinología y Nutrición*, 52(S2), 8–24.
- Campbell, A., Converse, P., & Rodgers, W. (1976). *The quality of American life: perceptions, evaluations and satisfactions*. New York: Russell Sage Foundation.
- Casas, F. (2014). Psychology of Child Well-being. In A. Ben-Arieh et al. (eds.), *Handbook of Child Well-being*. Springer Science and Business Media Dordrecht. doi:10.1007/978-90-481-9063-8\_13.
- Casas, F., Figuer, C., González, M., Malo, S., Alsinet, C., & Subarroca, S. (2007). The well-being of 12 to 16 year-old adolescents and their parents: results from 1999 to 2003 Spanish samples. *Social Indicators Research*, 83(1), 87–115. doi:10.1007/s11205-006-9059-1.
- Casas, F., Castellá, J., Alfaro, J., González, M., Malo, S., Bertran, I., Figuer, C., Cruz, D., Bedin, L., Paradiso, A., Weinreich, K., & Valdenegro, B. (2011). Testing the personal well-being index on 12–16 year-old adolescents in 3 different countries with 2 new items. *Social Indicators Research*, 105(3), 461–482. doi:10.1007/s11205-011-9781-1.
- Casas, F., González, M., Navarro, D., & Aligué, M. (2013). Children as advisers of their researchers: assuming a different status for children. *Child Indicators Research*, 6, 193–212. doi:10.1007/s12187-012-9168-0.
- Cummins, R. A. (1997). *Comprehensive quality of life scale – student (grades 7–12): ComQol-S5* (5th ed.). Melbourne: School of Psychology, Deakin University.

- Cummins, R.A., & Lau, A. (2005). Manual: personal Well-being index - school children. Third edition. Melbourne: Australian Centre on Quality of Life, Deakin University. Resource document. <http://www.deakin.edu.au/research/acqol/instruments/wellbeing-index/pwi-school.pdf>.
- Cummins, R. A., Eckersley, R., Pallant, J., Van 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.
- Demaray, M., & Malecki, C. (2002). The relationship between perceived social support and maladjustment for students at risk. *Psychology in the Schools*, *39*(3), 305–316.
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, *95*(3), 542–575.
- Diener, E. (1994). El bienestar subjetivo. *Intervención Psicosocial*, *3*(8), 67–113.
- Diener, E., Emmons, R., Larsen, R., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*, 71–75.
- Grunert, K., Dean, M., Raats, M., Nielsen, N., & Lumbers, M. (2007). Food in later life team. *Appetite*, *49*, 486–493.
- Huebner, E. S. (1991). Initial development of the students' life satisfaction scale. *School Psychology International*, *12*, 231–240.
- Huebner, E. S. (1994). Preliminary development and validation of a multidimensional life satisfaction scale for children. *Psychological Assessment*, *6*, 149–158.
- Lau, A. L. D., Chan, C. M., & Cummins, R. A. (2007a). Measuring subjective Well-being of school age Children using The Personal Well-being Index. 4th Asia Pacific Occupational Therapy Congress, Co-organised by The Hong Kong Polytechnic University, Hong Kong Occupational Therapy Association and World Federation of Occupational Therapy, June, Hong Kong.
- Lau, A. L. D., Cummins, R. A., Chan, C. C. H., Chan, B. C. M., & Tang, L. K. (2007b). Subjective Well-being Measurement of Young Children Using the Personal Well-being Index. 8th Conference of the International Society for Quality of Life Studies, San Diego, USA, December.
- Liebel, M. (2007). Niños investigadores. *Encuentro*, *78*, 6–18.
- Proctor, C., Linely, P., & Maltby, J. (2009). Youth life satisfaction: a review of the literature. *Journal of Happiness Studies*, *10*, 586–630. doi:10.1007/s10902-008-9110-9.
- Schnettler, B., Miranda, H., Sepúlveda, J., & Denegri, M. (2011). Satisfacción con la alimentación y la vida, un estudio exploratorio en estudiantes de la universidad de la Frontera, Temuco-Chile. *Psicología & Sociedad*, *24*(2), 426–435.
- Seligson, J., Huebner, E. S., & Valois, R. (2003). Preliminary validation of the brief multidimensional student's life satisfaction scale. *Social Indicators Research*, *61*, 121–145.
- Serra, Ll., Ribas, L., García, R., Pérez, C., Peña, L., & Aranceta, J. (2002). Hábitos alimentarios y consumo de alimentos en la población infantil y juvenil española. Dins Ll. Serra i J. Aranceta. Alimentación infantil y juvenil. Estudio enKid (Vol.3, pp. 1–203). Barcelona, Espanya: Masson.
- Serra, L., Román, B., Aranceta, J., Ribas, L., & Pérez, C. (2003). Hábitos alimentarios y consumo de alimentos en la población infantil y juvenil española (1998–2000) variables socioeconómicas y geográficas. *Medicina Clínica*, *121*(4), 126–131.
- Tomyn, A., & Cummins, R. A. (2010). The subjective well-being of high-school students: validating the personal well-being index—school children. *Social Indicators Research*. doi:10.1007/s11205-010-9668-6.
- Tomyn, A., Fuller, M., Tyszkiewicz, & Cummins, R. A. (2011a). The personal well-being index: psychometric equivalence for adults and school children. *Social Indicators Research*. doi:10.1007/s11205-011-9964-9.
- Tomyn, A., Norrish, J., & Cummins, R. A. (2011b). The subjective well-being of indigenous Australian adolescents: validating the personal well-being index-school children. *Social Indicators Research*. doi:10.1007/s11205-011-9970-y.
- UNICEF Espanya (2012). Calidad de vida y bienestar infantil subjetivo en España. ¿Qué afecta al bienestar de niños y niñas españoles de 1º de ESO? F. Casas i A. Bello (coord.), Madrid, Espanya: UNICEF España. Retrieved 14th July 2014, from: [http://www.unicef.es/sites/www.unicef.es/files/Bienestar\\_infantil\\_subjetivo\\_en\\_Espakua.pdf](http://www.unicef.es/sites/www.unicef.es/files/Bienestar_infantil_subjetivo_en_Espakua.pdf).
- Valois, R., Zulling, K., Huebner, S., & Wanzer, D. (2003). Dieting behaviors, weight perceptions, and life satisfaction among public high school adolescents. *Eating Disorders*, *11*, 271–288.
- Vaqué, C. (2012). El paper de l'alimentació en el benestar subjectiu dels nens i nenes de cinquè i sisè de primària. Doctoral Thesis. University of Girona.
- Vaqué, C. (2014). Satisfaction with food in childhood. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 2322–2324). Springer: Springer.