

Child Indicators Research

FOOD INDICATORS AND THEIR RELATIONSHIP WITH 10 TO 12 YEAR-OLDS' PERSONAL WELL-BEING FOOD INDICATORS AND THEIR RELATIONSHIP WITH 10 TO 12 YEAR-OLDS' SUBJECTIVE WELL-BEING

--Manuscript Draft--

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Corresponding Author:	CRISTINA VAQUÉ Faculty of Health Sciences and Well-being.University of Vic Vic, Barcelona SPAIN
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	Faculty of Health Sciences and Well-being.University of Vic
Corresponding Author's Secondary Institution:	
First Author:	CRISTINA VAQUÉ
First Author Secondary Information:	
Order of Authors:	CRISTINA VAQUÉ Mònica González, PhD Ferran Casas, PhD
Order of Authors Secondary Information:	
Abstract:	<p>This study aimed to test subjective indicators designed to analyze the role food plays in children's lives, explore children's personal well-being, and evaluate the relationship between these two phenomena. It was conducted on 371 children aged 10 to 12 by means of a self-administered questionnaire.</p> <p>Results showed a marked interest in food on the part of children, who consider taste and health the most important indicators when it comes to eating. They demonstrated a high level of personal well-being, measured using Cummins & Lau's adapted version of the Personal Well-Being Index-School Children (PWI-SC) (2005), overall life satisfaction (OLS) and satisfaction with various life domains (friends, family, sports, food and body).</p> <p>Regression models were conducted to explain satisfaction with food, taking as independent variables the interest children have in food, the importance they give to different reasons for eating, scores from the PWI-SC, OLS and satisfaction with various life domains. In the final model, it was found that OLS, health indicators, satisfaction with health from the PWI-SC and satisfaction with your body contribute to explaining satisfaction with food.</p> <p>The results obtained suggest that satisfaction with food is a relevant indicator in the exploration of children's subjective well-being, calling into question the widespread belief that these aspects are of exclusive interest to adults. They also seem to reinforce the importance of including food indicators in any study aimed at exploring the well-being of the 10 to 12 year-old population.</p> <p>This study aims to test subjective indicators designed to analyze children's predisposition towards food consumption, to assess their subjective well-being, and to explore the relationship between subjective well-being, predisposition towards food consumption and satisfaction with food. Gender differences are analyzed. It was</p>

	<p>conducted on 371 children aged 10 to 12 by means of a self-administered questionnaire.</p> <p>Results show that children's motivations in relation to taste and health are relevant subjective indicators of their predisposition towards food consumption. They demonstrate a high subjective well-being, measured using Cummins & Lau's adapted version of the Personal Well-Being Index-School Children (PWI-SC) (2005), overall life satisfaction (OLS) and satisfaction with various life domains (friends, family, sports, food and body).</p> <p>In order to analyze the relationship between the three aforementioned constructs, regression models were conducted. The interest children have in food, the importance they give to different reasons for eating, scores from the PWI-SC, OLS and satisfaction with various life domains were regressed on satisfaction with food. It was observed that OLS, health motivations, satisfaction with health from the PWI-SC and satisfaction with doing things away from home (also from the PWI-SC), contribute to explaining satisfaction with food.</p> <p>The results obtained suggest that the different indicators for children's predisposition towards food consumption explored here and subjective well-being are relevant determinants of satisfaction with food. They also appear to reinforce the importance of exploring food satisfaction in any study aimed at analyzing the well-being of the 10 to 12 year-old population.</p>
<p>Response to Reviewers:</p>	<p>The paper is carefully written and the importance of the field is highlighted. However, there are some suggestions that could improve the writing of the paper so that readers can get the best of it.</p> <ol style="list-style-type: none"> 1. The use of the term "indicator" must be reviewed, in some parts of the text the relation of the predictor x indicator is not clear (ex. "The results obtained suggest that satisfaction with food is a relevant indicator in the exploration of children's subjective well-being?" in the abstract suggesting that satisfaction with food is the indicator of subjective well-being, but it is the opposite. The use of the term indicator has been reviewed and substituted by predictor or variable when necessary. 2. There is a key word "subjective children". Is this correct? Thanks for saying; the correct key word is children without the word subjective. 3. In page 2, the last phrase of the last paragraph is not clear ("However, these largely focus on an assessment of the service received and the nutritional quality of?"). The verb has been changed to increase comprehension. 4. In the sample, page 5, the last paragraph initiate with numbers, what is not recommended to be used. The sentence has been rephrased, now it begins with "In terms of gender..." 5. The OLS mentioned in the instruments could have the reference of Campbell, A., Converse, P.E., & Rogers, W.L. (1976). The quality of American life: Perceptions, evaluations, and satisfactions. New York: Russell Sage. Done 6. In the procedure, the author(s) inform that they requested the consent of school's directors, but t! here is no information about parents and children consent. Additional information on this issue has been added in the text. 7. In results, the differences are presented using the t test. I suggest presenting also the effect size of the differences, because they can be significant but with very low effect size. The eta value has been added in order to offer information about the effect size of the differences. 8. The PCA does not seem to be necessary. The results do not appear to contribute to the objectives of the paper. The items can be directly regressed with satisfaction with food. The PCA has been preserved because we consider interesting the three components coming from this analysis as they can be connected with the scientific literature. However, in order to avoid confusion, it has been deleted in the results section any regression model calculated directly with the items. 9. Linear Regression is used, but the author(s) don't mention the method used (enter,

stepwise?). The stepwise method has been the one used. Now it is explained in the text. In addition, tables 6 to 11 should present the Confidence Interval, according to APA style. The confidence interval for those tables has been added.

10. Results showed in table 7 are repeated in table 8. I suggest removing table 7. According to the reviewers' comments, the results displayed in table 8 have been modified so now results presented in table 7 are different from table 8.

11. In page 13, the corrected R is written as R2 corregida three times. It must be corrected. It has been corrected. Thanks for saying.

12. In page 16, the last phrase is not clear ("This might be due to the fact that none of the PWI-SC indicators explicitly refer to something as specific as food, their?"). The sentence has been rephrased.

I hope the author(s) finds the comments helpful in a further revision of their paper.

Reviewer #2: This article describes an interesting study focusing on what appears to be an under-researched aspect of children's life satisfaction. It has the potential to make an important contribution to the research literature and to stimulate further research on the role which food plays in children's lives and the links between this topic and life satisfaction.

Overall, I felt that the material described in the paper is definitely worthy of publication. However I feel that there is a need to do further work on the conceptual approach to exploring connections between the variables of interest and on the approach to statistical analysis, and for these aspects of the study to be more fully explained in the paper before presenting the results. I also thought that the structure of presentation of the results could be made clearer to enable the reader to follow the line of argument. An additional section on the structure of the analysis has been included before the results with the intention of clarifying all the analysis performed and the justification of the variables included.

I think the most important thing is to clarify the approach taken to the various levels of measurement of life satisfaction. As I understand it, there is a need to view life satisfaction as hierarchical with overall life satisfaction as the highest order. At the moment the article uses variables from different levels in the same analysis. For example the analysis in Table 8 uses overall life satisfaction and satisfaction with particular domains in a regression model to explain satisfaction with food. I think some theoretical justification is needed for this approach and for the direction of analysis here as it is more typical (as in Cummins' work using the PWI) to use domain satisfaction items as explanatory variables to predict overall life satisfaction. According to this suggestion, OLS in table 8 has been removed from the analysis, so only the domains of the PWI-SC have been included. Because we wanted to explore predictors of satisfaction with food, this is the only independent variable considered in the paper.

Some other more detailed suggestions are as follows:

- In the abstract and on page 17, the paper suggests that there is a belief that food is not an important issue for children. Some evidence is needed to support this statement. As there is not much literature on that issue reinforcing that idea, we've decided to delete this statement in the abstract and to add additional information on page 17.

- On page 2 it would be helpful to review any previous literature (relating to children or adults) on the links between food and life satisfaction. Two additional references have been added in the text. The literature is very scarce in relation to that issue, that's why we cannot extend on that point.

- Regarding page 3, Lines 1 to 15, it did not seem to me that the article fully pursued the argument described here and this paragraph may need to be revised. A paragraph has been re-phased in order to make clearer what the paper focuses on.

- On page 5, Lines 19 to 21, it would be helpful here or in the Discussion section to explain any implications of the fact that all participating children were regular users of school food. Does this have any particular implications in terms of the socio-economic status of these children? Additional information in the method section has been added.

- In the section describing the measures used, pages 6 and 7, it would be important to provide some more explanation on the origin of, and reasons for, the use of the measures making up the second set of items (page 6, lines 19 to 29) and the last set of items (page 7, lines 6 to 13). Additional information has been added in order to explain the correspondence between items and scales and the objectives.

- Page 14, Lines 7 to 19. This paragraph seemed hypothetical and should be considered for deletion. The authors present the statement as an hypothesis worth considering. For that reason the paragraph has not been deleted but complemented with another sentence to make things clearer.

- There is some interesting material on gender differences in the analysis, this does create additional complexity given the amount of material and analysis presented in the paper. One option would be to exclude this material and publish it separately. On the other hand, if it is to remain in the paper, I think that there is a need to draw some clearer conclusions from this aspect of the analysis. We think it is important to preserve in this paper the exploration of gender differences. But as we understand the point raised, some extra explanation have been added both in the introduction and in the discussion.

All in all, there is some very interesting and useful material in the paper, but I feel there is a need for a clearer and more clearly explained framework for the analysis.

FOOD INDICATORS AND THEIR RELATIONSHIP WITH 10 TO 12 YEAR-OLDS' PERSONAL WELL-BEING

Cristina Vaqué^a, Mònica González^b, Ferran Casas^b

^aUniversity of Vic (Spain). Faculty of Health Sciences and Well-being. C/ Sagrada Família, 7. 08500 Vic. (Barcelona-Spain). cristina.vaque@uvic.cat

^bUniversity of Girona (Spain). Quality of Life Research Institute. M-20. Campus Montilivi. 17071 Girona. monica.gonzalez@udg.edu, ferran.casas@udg.edu

1 **FOOD INDICATORS AND THEIR RELATIONSHIP WITH 10 TO 12 YEAR-OLDS' PERSONAL**
2
3 **WELL-BEING**

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9 **ABSTRACT**

10
11 This study aimed to test subjective indicators designed to analyze the role food plays in
12 children's lives, explore children's personal well-being, and evaluate the relationship between
13 these two phenomena. It was conducted on 371 children aged 10 to 12 by means of a self-
14 administered questionnaire.
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20 Results showed a marked interest in food on the part of children, who consider taste and health
21 the most important indicators when it comes to eating. They demonstrated a high level of
22 personal well-being, measured using Cummins & Lau's adapted version of the Personal Well-
23 Being Index–School Children (PWI-SC) (2005), overall life satisfaction (OLS) and satisfaction
24 with various life domains (friends, family, sports, food and body).
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30 Regression models were conducted to explain satisfaction with food, taking as independent
31 variables the interest children have in food, the importance they give to different reasons for
32 eating, scores from the PWI-SC, OLS and satisfaction with various life domains. In the final
33 model, it was found that OLS, health indicators, satisfaction with health from the PWI-SC and
34 satisfaction with your body contribute to explaining satisfaction with food.
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40 The results obtained suggest that satisfaction with food is a relevant indicator in the exploration
41 of children's subjective well-being, calling into question the widespread belief that these aspects
42 are of exclusive interest to adults. They also seem to reinforce the importance of including food
43 indicators in any study aimed at exploring the well-being of the 10 to 12 year-old population.
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49 **KEY WORDS:** Personal well-being, subjective children, subjective indicators, satisfaction with
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1 INTRODUCTION
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4 The scientific community first began to take an interest in the relationship between food and
5 health in the 1950s, a decade that saw the discovery of the link between certain eating habits
6 and a decreased risk of arteriosclerosis. Besides being a nutritional process, eating has
7 significant connotations relating to pleasure, and indeed serves as an element of social, cultural
8 and religious identification all at once. It also promotes and intervenes in the establishment of
9 interpersonal and emotional relationships that ultimately shape individuals' eating habits,
10 thereby having a bearing on their long-term health (Government of Catalonia's Department of
11 Health 2005).
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22 Food is also one of the key exogenous factors that affect children's proper growth and
23 development (Aranceta et al. 2004). This highlights the importance of addressing the issue of
24 food from an early age. Children grow and change quickly during their school years, with the
25 period between the ages of 6 and 12 representing one of the most important for the
26 development of their cognitive, physical and social skills. Although children begin to develop
27 causal reasoning during this stage, the criteria that affect their choice of food remain rather
28 immediate. That said, children at this age do start to take an interest in the links between food
29 and health (Contento 2007). Furthermore, they display an increasing amount of independence,
30 leading to the expansion of their relationships and a heightened capacity to make decisions
31 (Aranceta 1995), some of which may revolve around aspects relating to food.
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43 Research conducted on child nutrition in recent years (Serra et al. 2002; Contento et al. 2007,
44 among others) has demonstrated a need to deal with this issue, in part due to the dietary
45 imbalance and health issues in evidence among the child population. Studies have also been
46 carried out to analyze eating habits and satisfaction in relation to food received in specific
47 contexts (in schools, hospitals, etc.). However, these largely focus on an assessment of the
48 service received and the nutritional quality of the menus served (Watters et al. 2003;
49 Mavrommatis et al. 2011) and fail to take into account the possible role of food in children's
50 subjective well-being and how it relates to their opinions, perceptions and evaluations.
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1 This article argues that in order to understand individuals' eating habits and the role that food
2 plays in their lives one must go beyond strictly dietary and nutritional indicators for different
3 foods and consider a range of possible psychosocial indicators. These indicators concern the
4 immediate context in which food is consumed (eating habits in the family home and
5 environmental aspects of food, relationships with dining companions), a wider social context
6 (the importance given to food, beliefs about particular foods, the application of regulations on
7 dietary matters) and a more individual dimension: each person's judgments with respect to
8 different aspects of life, including subjective well-being and personal food preferences.
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18 This study will focus on some aspects of the last of the aforementioned areas using "satisfaction
19 with food" as an intersection indicator between these two phenomena. When we talk about
20 satisfaction with food, we refer to the evaluation of those aspects that can help children enjoy
21 their food and lead them to consider it a pleasurable and important element for their well-being
22 and quality of life.
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29 Subjective well-being is generally held to be a multidimensional assessment reflecting the
30 combination of a cognitive process (satisfaction with life both as a whole and in relation to
31 various specific domains: health, school, family, friends and relationships with other people,
32 among others) with two affective processes (presence of positive affect and absence of
33 negative affect) (Argyle 1987; Diener 1984; Diener & Larsen 1993; quoted in Eid & Diener
34 2004). This study focuses on the more cognitive side of well-being, leaving an analysis of the
35 more affective aspects for future research.
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44 Major contributions to the study of subjective well-being have been made by Cummins (1998;
45 2003), who argues for the inclusion of various domains when it comes to analyzing the
46 judgments that people make about their lives when questioned about their **personal well-**
47 **being**. He also contends that measuring the variable of overall life satisfaction involves a
48 homeostatic control mechanism, similar to the way in which blood pressure is measured, but
49 psychological. This means that the range of variation in personal well-being scores recorded
50 among people from the same country and between different countries tends to be limited,
51 pointing to the existence of normative values for well-being.
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1 Cummins et al. (2003) have developed a tool to investigate subjective well-being, which they
2 called the Personal Well-being Index (PWI). It assesses responses regarding level of
3 satisfaction in the following domains: standard of living, personal health, life achievement,
4 personal relationships, personal safety, community-connectedness, future security, and
5 spirituality and religion. It also includes satisfaction with life as a whole. Various versions of this
6 index have been designed to meet the specific needs of different age groups: adults (PWI-A)
7 (Cummins & Lau 2006), school children (PWI-SC) (Cummins & Lau 2005) and pre-school
8 children (PWI-PS) (Cummins & Lau 2004).

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19 In light of the above, the aims of this study are: (1) to test indicators designed to analyze the
20 role food plays in the lives of children aged between 10 and 12, (2) to test indicators that allow
21 assessment of their personal well-being, (3) to study potential links between the two
22 phenomena, taking satisfaction with food as a departure point, and (4) to explore the different
23 patterns displayed by participants in relation to these indicators according to gender.
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1 METHOD
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4 The data analyzed in this study were collected within the context of a larger research study on
5 school food carried out in 2008 in the region of Osona (Catalonia, north-east Spain), which was
6 funded by the Government of Catalonia's Department of Health and the University of Vic.
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8 Of the 79 schools in the region, 26 (32.9%) expressed an interest in participating. The target
9 population of this study was recruited from 18 of these schools. Eight schools were excluded
10 because they did not include primary-age students; another school with a special education
11 programme serving intellectually-impaired children was also excluded.
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18 In light of the fact that the data analyzed in this article are extracted from a school dining-room
19 study, it is clear that participating children are all regular users of school-provided food services.
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26 *Sample*
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28 Data are taken from a total of 371 children in the region of Osona in their last two years of
29 primary school (students were between 10 and 12 years of age). This sample comprises
30 25.82% of all children enrolled in the last two years of primary school in the 18 participating
31 schools. This age group was selected for two reasons: the difficulty of assessing the well-being
32 of children under 10, and the fact that other studies have reflected a growing interest in dietary
33 issues for children in this cohort.
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42 The majority of participating schools were state schools (77.8%, mirroring the total distribution of
43 state schools in the region), while the remainder of participating entities were publicly-funded
44 private schools from the region (22.2%). Half of these schools (50%) were located in semi-rural
45 areas (with populations between 2,000 and 5,000 residents), while 33.3% were in urban areas
46 (with more than 5,000 residents) and 16.6% of schools were in rural areas (with less than 2,000
47 residents).
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54 53.6% of the students were male ($n = 199$) and 46.6% were female ($n = 172$). The mean age of
55 these students was 10.73 years old ($SD = 0.65$). 38.5% of students were 10 years old (21%
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1 boys and 17.5% girls), 50.1% were 11 (26.7% boys and 23.4% girls), and the remaining 11.4%
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3 were 12 (5.4% boys and 6% girls).
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7 *Instruments*

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10 Data were collected using a questionnaire designed specifically for this study and containing the
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12 following scales:
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- 14 - One item regarding children's global interest in food scored on an 11-point scale, with 0
15 representing not interested at all and 10 representing extremely interested.
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- 18 - A group of items evaluated the importance attributed to various eating-related topics:
19 "this food is good for my health," "this food tastes good," "this food is easy to eat," "this
20 food is well-known," "someone recommended this food to me," "my friends also eat this
21 food," "my parents want me to eat this", "I have seen the food on TV", "I have enough
22 time to eat", "my body needs this food," and, finally, "I feel good after eating this food"
23 (scored from 0 = not at all to 10 = very much).
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- 26 - The adapted version of the Personal Well-being Index—School Children (PWI-SC;
27 Cummins & Lau, 2005) was used to indicate the subjective well-being of children. The
28 instrument was measured using an 11-point scale, 0 meaning *Completely dissatisfied*
29 and 10 *Completely satisfied*. The instrument begins each question by asking "Right
30 now, how satisfied are you..." and concludes with the following endings: "about the
31 things you have?", "with your health?", "with the things you want to be good at?", "about
32 getting on with the people you know?", "about how safe you feel?", "about doing things
33 away from your home", and "about what may happen to you later in life?" The exact
34 questions used in our study were not a literal Catalan translation of the questions posed
35 by the aforementioned authors; a pilot study demonstrated that students who
36 participated in the study struggled with the cognitive difficulty of the exact translations of
37 these questions, and consequently the questions were reformulated for the purpose of
38 this questionnaire.
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- A single item scale on overall life satisfaction (OLS). The item was measured using an 11-point scale, 0 meaning *Completely dissatisfied* and 10 *Completely satisfied*.
- Five items assessed satisfaction with additional specific life domains. The questionnaire asked: “Right now, how satisfied are you ...” “with your friends?”, “with your family?”, “with the sports you play?”, “about your body?”, and “with food?” These items were measured using an 11-point scale, 0 meaning *Completely dissatisfied* and 10 *Completely satisfied*.

The pilot study was conducted on a group of children displaying similar characteristics to the final sample (i.e. with regard to age, gender, school year, and school location) in order to test the degree of comprehension of the draft questionnaire. Consequently, the language in the tool was changed; the most important of these modifications entailed substituting the word *feliç* (happy) for the word *content* (content) in light of the fact that the latter word was more comprehensible than the former for children in this particular sociocultural context.

Procedure

After drafting the final version of the data collection tool, the directors of participating schools were contacted in order to explain the goals and progress of the study, underscore the importance of their collaboration, and request their consent.

The questionnaire was self-administered by students in their normal classroom during the school day. During each administration of the questionnaire, a researcher and one of the student’s teachers were always on hand in order to explain the study and answer any potential questions which might arise.

1 RESULTS

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4 *Interest in food and eating-related decision-making*

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7 The mean response to the question about student interest in food was 7.88 (SD = 2.43) on a
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9 scale of 0 to 10.

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11 51.1% of participants indicated that food is very interesting to them (they responded with either
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13 a 9 or a 10), while 31.1% expressed solid interest (responses between 6 and 8) and 17.8% said
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15 the topic was of little interest to them (responses ≤ 5). There were no significant differences
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17 between these three groups in terms of gender.

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20 The degree of importance children gave to different indicators which may influence eating are
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22 shown in Figure 1.

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26 Insert Figure 1 about here
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29 The main motivation when it comes to eating is the taste of food (“it tastes good”), followed by “it
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31 is good for my health.” The indicators which received the lowest scores were those most closely
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33 connected to external influences (“someone recommended this food to me,” “my friends also
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35 eat this food,” and “I have seen the food on TV”). Girls scored “feeling good after eating” higher
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37 than boys ($t(348.67) = 2.70, p = .007$ (two-tailed)), while boys gave greater importance to things
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39 they saw in advertisements ($t(367) = -2.168, p = .031$ (two-tailed)).

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42 The major indicators described in Table 1 were analyzed by means of a Principal Component
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44 Analysis (PCA) using Varimax rotation, yielding 3 components explaining 55.80% of all
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46 variance. These components were as follows (see Table 1):

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48 - Component 1 could be labeled “social influence” and explained 23.55% of the total
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50 variance. It included the following items: “I have seen this food on TV,” “my friends also
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52 eat this food,” “someone recommended this food to me,” “this food is well-known,” and
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54 “I have enough time to eat this food.”

- 1 - Component 2 was mainly related to health and explained 21.60% of the total variance. It
2 included the following items: “my body needs this food,” “my parents want me to eat this
3 food,” “this food is good for my health,” and “this food makes me feel comfortable.”
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7 - Component 3, which we have labeled “hedonic,” was composed of one item related to
8 the taste associated with foods (“this food tastes good”). This component explained
9 10.66% of total variance.
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13 Insert Table 1 about here
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17 The indicator corresponding to “this food is easy to eat” was removed from the analysis as it
18 loaded equally in two of the three aforementioned components. No statistically significant
19 differences were observed in any of the three components with regard to gender.
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25 Interest in food correlates positively and significantly with two of the three components: the
26 health component – for both boys ($\rho = .24, p = .001$) and girls ($\rho = .28, p < .0001$) – and the
27 hedonic component, for girls only ($\rho = .26, p = .001$).
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32 *The subjective well-being of children* 33 34

35 The responses study participants gave to items on the PWI-SC are shown in descending order
36 in Table 2.
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40 Insert Table 2 about here
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44 As Table 2 shows, the items of satisfaction which received the highest mean score were
45 “getting on with the people you know” and satisfaction “with your health” (the mean was higher
46 than 9 for both). The overall mean score on the PWI-SC on a scale of 0 to 100 was 86.54 (SD =
47 10.54).
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51 In keeping with the recommendations of the tool’s authors, the index was recalculated,
52 excluding the 29 subjects who gave extreme responses to all questions (responses of 0 or 10),
53 resulting in a mean score of 85.25 (SD = 10.17). As there were no statistically significant
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1 differences between the two means, this study continued to utilize the data from all
2 respondents.
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6 There were no statistically significant differences with regard to gender for the PWI-SC index,
7 but there were for the indicator “satisfaction with what may happen to you later in life” ($t(365) =$
8 $2.206, p = .0.028$ (two-tailed)), girls ($M = 8.50; SD = 2.01$) being the ones with the higher mean
9 score compared to boys ($M = 8.03; SD = 2.11$).
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14 The OLS score ($M = 9.09, SD = 1.54$) and satisfaction scores for other complementary life
15 domains are high (means range from 8.62 to 9.71). The highest mean corresponded to
16 satisfaction “with your family,” while the lowest corresponded to satisfaction “with food” (see
17 Table 3). There were no statistically significant differences with regard to gender for OLS or any
18 of the items described in Table 3.
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26 Insert Table 3 about here
27

28 29 *Food and well-being* 30

31
32 The correlation between interest in food and the PWI-SC was significant yet moderate ($\rho = .38,$
33 $p < .001$). Correlations were similar for both genders (girls: $\rho = .38, p < .0001$; boys: $\rho = .35, p <$
34 $.0001$).
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39 Correlations were lowest between interest in food and OLS and other indicators of satisfaction
40 which are not included on the PWI-SC, presented in Table 4.
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44 Insert Table 4 about here
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46
47 The highest correlation for boys was with satisfaction “with your body” ($\rho = .22, p = .001$), while
48 the highest correlation for girls was for satisfaction “with the sports you play” ($\rho = .30, p <$
49 $.0001$). The lowest correlations were satisfaction “with your family” for boys ($\rho = .15, p = .03$)
50 and satisfaction “with your friends” for girls ($\rho = .17, p = 0.28$).
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55
56 The three principal components encapsulating the degree of importance which participants
57 attributed to different components when it comes to eating (health, hedonism, and social
58
59

1 influence) reflected statistically significant correlations with the PWI-SC, although these
2 correlations are not particularly strong (health component: $\rho = .34, p < .0001$; hedonic
3 component: $\rho = .27, p < .0001$; social influence component: $\rho = .19, p < .0001$).

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8 Correlations between the PWI-SC and the 3 aforementioned components varied according to
9 gender: for girls, the PWI-SC only showed a statistically significant positive correlation for the
10 health component ($\rho = .26, p = .001$) and the hedonic component ($\rho = .25, p = .002$), while
11 statistically significant positive correlations were found for all three components in boys (health:
12 $\rho = .38, p < .001$; hedonic: $\rho = .29, p < .0001$; social influence: $\rho = .28, p = .002$).

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19 The strongest correlation between the 3 components (health, hedonism, and social influence)
20 and OLS were found in the importance given to questions of health. Only satisfaction “with your
21 body” correlates with the three components (see Table 5).

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Insert Table 5 about here

66 OLS correlates positively although modestly with the health component (girls: $\rho = .21, p = 0$
67 .008, boys: $\rho = .27, p < .0001$) and with the hedonic component, though in this case only for
68 girls ($\rho = .21, p = .008$).

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The highest correlation for both boys and girls was found between the health component and
the indicator entitled satisfaction “with your body” ($\rho = .24, p = .002$ and $\rho = .24, p = .001$,
respectively). There were statistically significant correlations between the hedonic component
and satisfaction “with your friends” ($\rho = .22, p = .006$), and “with your family” ($\rho = .16, p = .048$),
again only for girls.

After conducting the analyses described above, a series of regression models were run in order
to gain additional insight into the relationships between indicators related to food and personal
well-being, using “satisfaction with food” (SATFOOD) as the link between these two constructs.

An analysis of SATFOOD results in terms of the three principal components classifying eating-
related motivations and interest in food revealed that the model was significant (Adjusted $R^2 =$

1 .25, $F(4.331) = 29.25$, $p < .0001$). As Table 6 shows, the health component and interest in food
2
3 appear as significant indicators when it comes to predicting SATFOOD.
4

5
6 Insert Table 6 about here.
7

8
9 The variable testing interest in food to explain SATFOOD accounts for 12% of variance. By
10 taking as predictive variables the 11 items of importance when it comes to eating (rather than
11 considering them in the 3-component grouping) to explain SATFOOD, we see that only 3
12 indicators (good for my health, parents want me to eat this, and have enough time to eat)
13 contribute to explaining the SATFOOD results, corresponding to only of the two aforementioned
14 components: health and social influence (Adjusted $R^2 = .26$. $F(3.339) = 41.05$ $p < .0001$).
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22 Running this model with responses from only boys and then only girls revealed that for girls
23 (Adjusted $R^2 = .31$. $F(2.157) = 36.37$, $p < .0001$) the variable which best explained the
24 SATFOOD scores was the health component, followed by the hedonic component, whereas for
25 boys (Adjusted $R^2 = .23$. $F(2.181) = 27.92$, $p = .008$) the variable reflecting the highest beta
26 value was interest in food, followed by the health component.
27
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32
33 In order to explore which subjective well-being indicators act as predictors for SATFOOD we ran
34 additional regression models with the PWI-SC and OLS separately.
35
36
37

38 Both models are significant (OLS: Adjusted $R^2 = .21$. $F(1.356) = 93.9$, $p < .0001$ (Table 7); PWI-
39 SC: Adjusted $R^2 = .22$. $F(1.360) = 102.33$, $p < .0001$). Only 4 domains of the PWI-SC explain
40 SATFOOD (see Table 8).
41
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45 Insert Table 7 about here.
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51 Insert Table 8 about here.
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53
54 The results show that the only two domains with a statistically significant beta value are “health”
55 and “the things you want to be good at” in the girls model (Adjusted $R^2 = .12$. $F(2.341) = 23.97$,
56 $p < .0001$), whereas the model for boys included “health”, “what may happen to you later in life”,
57
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1 “getting on with the people you know” and “doing things away from your home”, in decreasing
2
3 order (Adjusted $R^2 = .03$. $F(1,183) = 7.11$, $p = .008$).

4
5
6 The degree to which complementary indicators of life satisfaction contribute to predicting
7
8 SATFOOD values was explored through a linear regression model. The model revealed that all
9
10 of the aforementioned indicators made a significant contribution, with the exception of
11
12 satisfaction “with the sports you play” (Adjusted $R^2 = .21$. $F(3,361) = 32.45$, $p < .0001$) (see Table
13
14 9).

17 Insert Table 9 about here.

20 The beta values suggest that the indicator to best explain SATFOOD in the model described in
21
22 Table 9 is satisfaction “with your body”, while the variable to least explain it is “your friends”.
23
24 Subsequently, the same model was run separately for both boys and girls. The most important
25
26 explanatory indicator for girls (Adjusted $R^2 = .18$. $F(1,168) = 39.25$, $p < .0001$) was satisfaction
27
28 “with the sports you play,” “with your friends,” and “with your family”. By contrast, results for
29
30 boys (Adjusted $R^2 = .25$. $F(1,192) = 31.12$, $p < .0001$) showed that the indicator with the highest
31
32 beta value was satisfaction “with your body,” followed by satisfaction “with your family” and “the
33
34 sports you play”.

36
37 Finally, in order to analyze which indicators are significant in the above partial models when
38
39 grouped together, we calculated a last linear regression model to explain SATFOOD. It is
40
41 observed that this model includes 4 indicators, OLS being the indicator with the highest
42
43 contribution ($R^2_{\text{corregida}} = .40$. $F(4,328) = 55.62$, $p < .0001$) (Table 10).

47 Insert Table 10 about here.

49 The indicators with the highest explanatory capacity for SATFOOD using this model, after OLS,
50
51 are the health component and “satisfaction with health” from the PWI-SC, for both genders,
52
53 “satisfaction with your body” ($R^2_{\text{corregida}} = .40$. $F(3,153) = 34.59$, $p < .0001$) in the model for girls
54
55 only and OLS and satisfaction with family ($R^2_{\text{corregida}} = .45$. $F(4,174) = 36.02$, $p < .0001$) in the
56
57 model for boys only (Table 11).

Insert Table 11 about here.

DISCUSSION

The children who took part in this study displayed a high level of interest in food-related issues. Although there are no data to demonstrate it categorically, we believe that this keen interest could be attributed to the effectiveness of the various strategies implemented in Spanish schools to raise awareness about and promote healthy lifestyles among the child population (namely the Strategy for Nutrition, Physical Activity and the Prevention of Obesity, Spanish Agency for Food Safety and Nutrition 2005), and the Integral Plan for Health Promotion through Physical Activity and Healthy Eating (Government of Catalonia's Department of Health 2005).

Motivations for the sample children's food choices coincide with the results obtained by De Moura (2007), with sensory factors such as taste being the most prevalent factor, closely followed by health-related aspects. An analysis of the predominant reasons for children's evaluation of food reveals some differences between the genders. Girls prioritize feeling good after eating, unlike boys, who attach more importance than girls to eating things that they have seen in television advertisements. To understand the source of these differences, it might be useful to apply qualitative methodology techniques such as in-depth personal interviews and discussion groups.

The importance of health as an indicator influencing food choices, widely recognized among the adult population (Neumark-Sztainer et al. 1999), is also apparent in our results, demonstrating the extent to which the children surveyed are conscious of the link between food and health. This finding supports the claims of authors such as Contento (2007), who argues that it is during preadolescence that children start to become aware of the consequences of their actions in relation to what they eat.

As far as motivations for eating are concerned, the lowest means correspond to variables related to an external influence factor such as, for example, foods having been seen in advertisements. This contrasts with previous studies that suggest that children are particularly

1 vulnerable to the influence of advertisements with respect to their eating habits (Mehta et al.
2
3 2010; Medeiros et al. 2008).

4
5
6 In line with the results obtained by De Moura (2007), the children in our sample who are most
7
8 interested in food are those whose eating preferences are most influenced by health-related
9
10 issues. The fact that girls of this age display a positive correlation between interest in food and a
11
12 component of hedonic motivation for eating while boys do not is a phenomenon which would be
13
14 worth studying in the future. The correlation between the factor of external influences and
15
16 interest in food is weak and statistically insignificant.

17
18
19 The subjective well-being of children under 12 is an issue which has hardly been addressed in
20
21 the literature owing to the difficulty involved in using concepts that are somewhat abstract in
22
23 nature. We studied this notion by using an adapted version of the Personal Well-being Index
24
25 (Cummins & Lau 2005) to facilitate comprehension among the sample group of Catalan
26
27 children.

28
29
30 The mean PWI-SC index scores for the children surveyed show that they have high levels of
31
32 well-being, corroborating the positive opinions about their lives as a whole expressed by many
33
34 children and teenagers in other research (Tomy & Cummins 2011). The results obtained
35
36 in our study are slightly higher and contain less variability of responses than the normative
37
38 values defined by the authors for the Australian population ($M = 75$, $SD = 12.65$; Cummins & Lau
39
40 2005). This difference could be due to factors such as the size of the sample. It could also be
41
42 attributed to the different sociocultural context involved. To verify this hypothesis, this study
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44 would have to be extended to include larger samples. Another hypothesis worth exploring in
45
46 greater detail in the future, and one which we would particularly like to emphasize, is that
47
48 normative values for the Australian population may be higher for the child population than for
49
50 the adolescent and adult population.

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52
53 In a previous study (González et al. in press) based on a sample of adolescent and young
54
55 adults (15-24 years old) regarding their personal well-being (using the adult version of the
56
57 Personal Well-being Index by Cummins and Lau (2006)), differences were found according to
58
59

1 the gender of the participants. Contrarily, in our study there are no significant differences
2
3 between boys and girls for the whole PWI-SC, but there is in relation to one specific domain
4
5 “satisfaction with what may happen to you in later life”, with girls scoring higher. This same
6
7 result was found in the study by Tomy & Cummins (2011) using the same index (PWI-SC), but
8
9 applied to 351 students aged 12 to 20.

10
11 The life satisfaction domain to obtain the highest mean from the PWI-SC was “having good
12
13 relationships with other people”, which the children displayed a high awareness of,
14
15 demonstrating the importance of interpersonal relationships and presumably the social support
16
17 children receive from parents, classmates, teachers and close friends (Demaray & Malecki
18
19 2002; Casas, 2010; Goswami, H, 2011).

20
21 The next most important domain (according to the mean scores obtained) is health, indicating
22
23 that this is a prominent life concern among the child population. One of the domains to produce
24
25 a low mean was security for future. A similar trend was observed with samples of teenagers and
26
27 young people aged 15 to 24 (González et al. in press), and this result could be attributed to a
28
29 heightened sense of uncertainty when thinking about the future. In light of this consideration,
30
31 subsequent questionnaires might designate a specific period in the future (3 years, for example)
32
33 to make it easier for participants from these age groups to respond.

34
35 As for OLS and satisfaction with other specific life domains studied in parallel to the PWI-SC,
36
37 the importance of interpersonal relationships is again borne out by the respondents' answers
38
39 concerning “satisfaction with family” and “satisfaction with friends”, with these domains obtaining
40
41 the highest scores. Both boys and girls scored high on OLS, and they were “satisfied with their
42
43 body” as well as “with food”, although the mean score for these specific aspects is slightly lower
44
45 than the figures for “satisfaction with family” and “satisfaction with friends”.

46
47 There are correlations, albeit moderate ones, between interest in food and the PWI-SC and the
48
49 three components and the PWI-SC for both boys and girls. This might be due to the fact that
50
51 none of the PWI-SC indicators explicitly refer to something as specific as food, their being
52
53 constructed on a higher level of abstraction.

1 Correlations between this interest in food and OLS and complementary domains of satisfaction
2 explored alongside the PWI-SC are statistically significant yet weak, with the closest
3
4 correspondence coming between interest and OLS. Boys and girls exhibit a different pattern of
5
6 responses, to the extent that the strongest correlation in the case of girls relates to interest and
7
8 “satisfaction with the sports you play”, while for boys it is interest and “satisfaction with your
9
10 body”, suggesting different roots for their respective interest in food.
11
12

13
14 In this paper, SATFOOD has been understood as an indicator that allows us to evaluate those
15
16 aspects that can help children enjoy their food and bring them to consider it as a pleasurable
17
18 and important element for their well-being and quality of life. It is worth mentioning that the
19
20 indicators that explain SATFOOD are not the same for boys and girls. Further studies are
21
22 needed in order to analyze the reasons for such differences in more depth.
23
24

25 From the regression models we have run, we see that SATFOOD is explained through both
26
27 food indicators and well-being indicators. These findings justify the consideration of SATFOOD
28
29 as an indicator for evaluating elements related to food (health motivations) and others related to
30
31 well-being (satisfaction with health, from the PWI-SC, OLS and satisfaction with your body) for
32
33 the children participating in this study.
34
35

36 The results obtained suggest that adults are probably underestimating the role played by food in
37
38 the lives of children aged between 10 and 12, with this issue having long been considered
39
40 solely of interest to adults or, at most, to older children. It is important to understand how eating
41
42 practices are conditioned from a young age and what affects this in order to be able to devise
43
44 tools that help promote a more suitable dietary education for different groups, one that would
45
46 bear in mind similarities and differences between each age bracket. There is a need to explore
47
48 the role of indicators such as satisfaction with food, young people’s interest in food, and the
49
50 child population’s levels of subjective well-being in order to open up new avenues of research in
51
52 the field of health education and promotion. To achieve this goal, future research must be
53
54 carried out in which a prominent role is afforded to children’s perspectives, which will allow us to
55
56 be able to look in greater depth at the connections between this population group’s subjective
57
58 well-being and satisfaction with food.
59
60

1 Children's well-being includes the evaluations and aspirations of children themselves, while
2
3 considering them active social actors who can reliably explain the experiences and meanings
4
5 constituting their well-being.
6

7
8 It is important to point out some of the limitations of the study presented in this article. The
9
10 sample used comprised schools that expressed an interest in taking part in the study. There is
11
12 no way of knowing whether the sample is somehow skewed with respect to the rest of the
13
14 schools in the region of Osona. It is possible that the schools not involved might exhibit
15
16 distinctive characteristics in relation to the variables explored in this article. Ideally, future
17
18 studies would collect data from a larger pool of schools.
19

20
21 The cross-sectional approach adopted in this study limits our ability to comprehend how the
22
23 variables studied change over time. In other words, whether the children who are satisfied at
24
25 present cease to be so over time or whether their well-being varies as a result of changes in the
26
27 importance of food in their lives. It would be necessary to carry out a longitudinal study to
28
29 examine this evolution.
30

31
32 Finally, it is worth contemplating the possible value of applying qualitative methodologies (such
33
34 as discussion groups) in future studies in order to be able to investigate the different aspects
35
36 discussed in this article in greater depth, as well as considering further work on the promotion of
37
38 healthy eating habits based on the levels of interest in food shown in this study. This could
39
40 serve as a starting point to improve children's motivation and participation with respect to both
41
42 developing healthy practices initially promoted at a young age and maintaining them throughout
43
44 adolescence, thereby fostering good eating habits.
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47 48 49 ACKNOWLEDGMENTS

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1 **Figure 1** Importance given to different indicators for food decision-making
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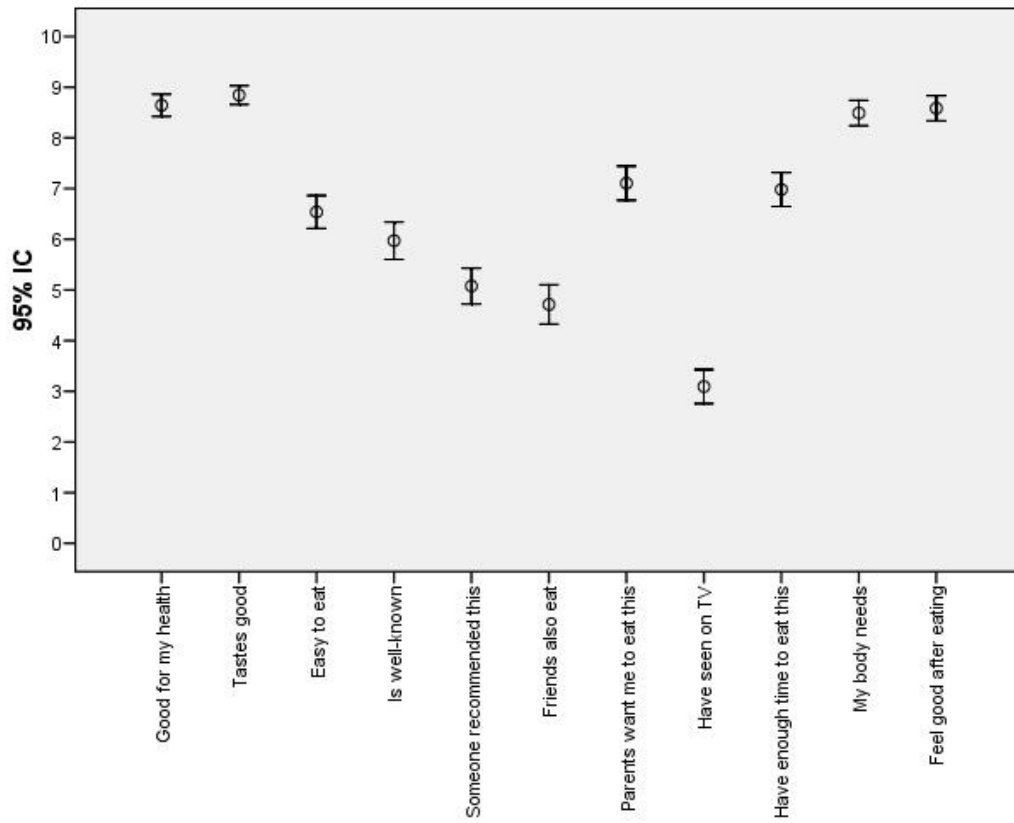


Table 1 Principal component analysis (PCA): Rotated component matrix of the different indicators related to food decision-making (loadings below .2 are not displayed)

	Component 1: Social Influence	Component 2: Health	Component 3: Hedonic
I have seen this food on TV	.768		
My friends also eat this food	.743		
Someone recommended this food to me	.680	.252	
This food is well-known	.647		.240
I have enough time to eat this food	.389	.245	
My body needs this food		.843	
My parents want me to eat this food		.703	
This food is good for my health	.266	.694	
This food makes me feel comfortable	.303	.555	
This food tastes good			.937
Eigenvalues	3.068	1.484	1.027
Variance explained	23.55	21.60	10.66
Cumulative variance	23.55	45.14	55.80
Alpha	0.622	0.694	0

Correlation matrix determinant: 0.140

Kaiser-Meyer-Olkin measure of sampling adequacy: 0.763

Bartlett's test of sphericity: $\chi^2 = 667.173$, 45; $p < 0.001$

Table 2 Means and standard deviations of items from the PWI-SC

Satisfaction...	Mean	SD
With getting on with the people you know	9.23	1.46
With your health	9.19	1.45
With the things you have	8.69	1.78
With the things you want to be good at	8.55	1.80
With how safe you feel	8.46	1.80
With what may happen to you later in life	8.25	2.07
With doing things away from your home	8.11	2.19

Table 3 Means and standard deviations for complementary satisfaction with life domains explored

Satisfaction...	Mean	SD
With your family	9.71	1.00
With your friends	9.26	1.59
With the sports you play	8.86	2.18
With your body	8.77	1.83
With food	8.62	2.94

Table 4 Spearman correlations between interest in food, satisfaction with the other life domains explored and OLS

Satisfaction...	Interest in food
With your friends	.13, p = .015
With your family	.14, p = .008
With the sports you play	.18, p = .001
With your body	.23*
OLS	.28*

* Significant difference, p < 0.001

Table 5 Spearman correlations between the three components identified in the PCA with OLS and other satisfaction with life domains

Satisfaction...	Health Component	Hedonic Component	Social influence Component
With your friends	.16, p = .003	.16, p = .003	-
With your family	.22*	.12, p = .039	-
With the sports you play	.23*	.11, p = .038	-
With your body	.24*	.14, p = .008	.12, p = .025
OLS	.25*	.14, p = .010	-

* Significant difference, p < 0.001

Table 6 Linear regression of the three components related to food decision-making and interest in food on Satisfaction with food

	β	t	Sig.
Health	.37	7.70	p < .0001
Component			
Interest in food	.25	5.10	p < .0001

Table 7 Linear regression of OLS on Satisfaction with food

	β	t	Sig.
OLS	.47	10.12	p < .0001

Table 8 Linear regression of PWI-SC domains and OLS on Satisfaction with food

	β	t	Sig.
OLS	.47	10.12	p < .0001
With the things you want to be good at	.38	2.74	p = .006
Satisfaction with health	.31	6.20	p < .0001
With doing things away from your home	.15	3.05	p = .002
With what may happen to you later in life	.12	2.42	p = .016

Table 9 Linear regression of other satisfaction with life domains on Satisfaction with food

Satisfaction with...	β	t	Sig.
With your body	.36	7.44	p < .0001
With your family	.17	3.44	p = .001
With your friends	.11	2.20	p = .028

Table 10 Final linear regression of previous statistically significant indicators on Satisfaction with food

	β	t	Sig.
OLS	.325	6.50	p < .0001
Health Component	.288	6.27	p < .0001
Satisfaction with your health (PWI-SC)	.175	3.62	p < .0001
Satisfaction with your body	.105	2.06	p = .040

Table 11 Final linear regression of previous statistically significant indicators on Satisfaction with food by gender

	Girls			Boys			
	β	t	Sig.		β	t	Sig.
Health Component	0.40	5.96	p < .0001	OLS	0.47	7.73	p < .0001
Satisfaction with your health (PWI-SC)	0.24	3.47	p = .001	Health Component	0.22	3.56	p < .0001
Satisfaction with your body	0.23	3.36	p = .001	Satisfaction with your health (PWI-SC)	0.130	2.11	p = .031
				Satisfaction with your family	0.132	2.18	p = .036

The paper is carefully written and the importance of the field is highlighted. However, there are some suggestions that could improve the writing of the paper so that readers can get the best of it.

1. The use of the term "indicator" must be reviewed, in some parts of the text the relation of the predictor x indicator is not clear (ex. "The results obtained suggest that satisfaction with food is a relevant indicator in the exploration of children's subjective well-being?" in the abstract suggesting that satisfaction with food is the indicator of subjective well-being, but it is the opposite. **The use of the term indicator has been reviewed and substituted by predictor or variable when necessary.**

2. There is a key word "subjective children". Is this correct? **Thanks for saying; the correct key word is children without the word subjective.**

3. In page 2, the last phrase of the last paragraph is not clear ("However, these largely focus on an assessment of the service received and the nutritional quality of?"). **The verb has been changed to increase comprehension.**

4. In the sample, page 5, the last paragraph initiate with numbers, what is not recommended to be used. **The sentence has been rephrased, now it begins with "In terms of gender..."**

5. The OLS mentioned in the instruments could have the reference of Campbell, A., Converse, P.E., & Rogers, W.L. (1976). The quality of American life: Perceptions, evaluations, and satisfactions. New York: Russell Sage. **Done**

6. In the procedure, the author(s) inform that they requested the consent of school's directors, but t! here is no information about parents and children consent. **Additional information on this issue has been added in the text.**

7. In results, the differences are presented using the t test. I suggest presenting also the effect size of the differences, because they can be significant but with very low effect size. **The eta value has been added in order to offer information about the effect size of the differences.**

8. The PCA does not seem to be necessary. The results do not appear to contribute to the objectives of the paper. The items can be directly regressed with satisfaction with food. **The PCA has been preserved because we consider interesting the three components coming from this analysis as they can be connected with the scientific literature. However, in order to avoid confusion, it has been deleted in the results section any regression model calculated directly with the items.**

9. Linear Regression is used, but the author(s) don't mention the method used (enter, stepwise?). **The stepwise method has been the one used. Now it is explained in the text.** In addition, tables 6 to 11 should present the Confidence Interval, according to APA style. **The confidence interval for those tables has been added.**

10. Results showed in table 7 are repeated in table 8. I suggest removing table 7. **According to the reviewers' comments, the results displayed in table 8 have been modified so now results presented in table 7 are different from table 8.**

11. In page 13, the corrected R is written as R2 corregida three times. It must be corrected. **It has been corrected. Thanks for saying.**

12. In page 16, the last phrase is not clear ("This might be due to the fact that none of the PWI-SC indicators explicitly refer to something as specific as food, their?"). **The sentence has been rephrased.**

I hope the author(s) finds the comments helpful in a further revision of their paper.

Reviewer #2: This article describes an interesting study focusing on what appears to be an under-researched aspect of children's life satisfaction. It has the potential to make an important contribution to the research literature and to stimulate further research on the role which food plays in children's lives and the links between this topic and life satisfaction. Overall, I felt that the material described in the paper is definitely worthy of publication. However I feel that there is a need to do further work on the conceptual approach to exploring connections between the variables of interest and on the approach to statistical analysis, and for these aspects of the study to be more fully explained in the paper before presenting the results. I also thought that the structure of presentation of the results could be made clearer to enable the reader to follow the line of argument. **An additional section on the structure of the analysis has been included before the results with the intention of clarifying all the analysis performed and the justification of the variables included.**

I think the most important thing is to clarify the approach taken to the various levels of measurement of life satisfaction. As I understand it, there is a need to view life satisfaction as hierarchical with overall life satisfaction as the highest order. At the moment the article uses variables from different levels in the same analysis. For example the analysis in Table 8 uses overall life satisfaction and satisfaction with particular domains in a regression model to explain satisfaction with food. I think some theoretical justification is needed for this approach and for the direction of analysis here as it is more typical (as in Cummins' work using the PWI) to use domain satisfaction items as explanatory variables to predict overall life satisfaction. **According to this suggestion, OLS in table 8 has been removed from the analysis, so only the domains of the PWI-SC have been included. Because we wanted to explore predictors of satisfaction with food, this is the only independent variable considered in the paper.**

Some other more detailed suggestions are as follows:

- In the abstract and on page 17, the paper suggests that there is a belief that food is not an important issue for children. Some evidence is needed to support this statement. **As there is not much literature on that issue reinforcing that idea, we've decided to delete this statement in the abstract and to add additional information on page 17.**

- On page 2 it would be helpful to review any previous literature (relating to children or adults) on the links between food and life satisfaction. **Two additional references have been added in the text. The literature is very scarce in relation to that issue, that's why we cannot extend on that point.**

- Regarding page 3, Lines 1 to 15, it did not seem to me that the article fully pursued the argument described here and this paragraph may need to be revised. **A paragraph has been re-phased in order to make clearer what the paper focuses on.**

- On page 5, Lines 19 to 21, it would be helpful here or in the Discussion section to explain any implications of the fact that all participating children were regular users of school food. Does

this have any particular implications in terms of the socio-economic status of these children?

Additional information in the method section has been added.

- In the section describing the measures used, pages 6 and 7, it would be important to provide some more explanation on the origin of, and reasons for, the use of the measures making up the second set of items (page 6, lines 19 to 29) and the last set of items (page 7, lines 6 to 13).

Additional information has been added in order to explain the correspondence between items and scales and the objectives.

- Page 14, Lines 7 to 19. This paragraph seemed hypothetical and should be considered for deletion. **The authors present the statement as an hypothesis worth considering. For that reason the paragraph has not been deleted but complemented with another sentence to make things clearer.**

- There is some interesting material on gender differences in the analysis, this does create additional complexity given the amount of material and analysis presented in the paper. One option would be to exclude this material and publish it separately. On the other hand, if it is to remain in the paper, I think that there is a need to draw some clearer conclusions from this aspect of the analysis. **We think it is important to preserve in this paper the exploration of gender differences. But as we understand the point raised, some extra explanation have been added both in the introduction and in the discussion.**

All in all, there is some very interesting and useful material in the paper, but I feel there is a need for a clearer and more clearly explained framework for the analysis.

FOOD INDICATORS AND THEIR RELATIONSHIP WITH 10 TO 12 YEAR-OLDS'

SUBJECTIVE WELL-BEING

Cristina Vaqué^a, Mònica González^b, Ferran Casas^b

^aUniversity of Vic (Spain). Faculty of Health Sciences and Well-being. C/ Sagrada Família, 7.
08500 Vic. (Barcelona-Spain). cristina.vaque@uvic.cat

^bUniversity of Girona (Spain). Quality of Life Research Institute. M-20. Campus Montilivi. 17071
Girona. monica.gonzalez@udg.edu, ferran.casas@udg.edu

FOOD INDICATORS AND THEIR RELATIONSHIP WITH 10 TO 12 YEAR-OLDS'

SUBJECTIVE WELL-BEING

ABSTRACT

This study aims to test subjective indicators designed to analyze children's predisposition towards food consumption, to assess their subjective well-being, and to explore the relationship between subjective well-being, predisposition towards food consumption and satisfaction with food. Gender differences are analyzed. It was conducted on 371 children aged 10 to 12 by means of a self-administered questionnaire.

Results show that children's motivations in relation to taste and health are relevant subjective indicators of their predisposition towards food consumption. They demonstrate a high subjective well-being, measured using Cummins & Lau's adapted version of the Personal Well-Being Index–School Children (PWI-SC) (2005), overall life satisfaction (OLS) and satisfaction with various life domains (friends, family, sports, food and body).

In order to analyze the relationship between the three aforementioned constructs, regression models were conducted. The interest children have in food, the importance they give to different reasons for eating, scores from the PWI-SC, OLS and satisfaction with various life domains were regressed on satisfaction with food. It was observed that OLS, health motivations, satisfaction with health from the PWI-SC and satisfaction with doing things away from home (also from the PWI-SC), contribute to explaining satisfaction with food.

The results obtained suggest that the different indicators for children's predisposition towards food consumption explored here and subjective well-being are relevant determinants of satisfaction with food. They also appear to reinforce the importance of exploring food satisfaction in any study aimed at analyzing the well-being of the 10 to 12 year-old population.

KEY WORDS: Personal well-being, children, subjective indicators, satisfaction with food.

INTRODUCTION

The scientific community first began to take an interest in the relationship between food and health in the 1950s, a decade that saw the discovery of the link between certain eating habits and a decreased risk of arteriosclerosis. Besides being a nutritional process, eating has significant connotations relating to pleasure, and indeed serves as an element of social, cultural and religious identification all at once. It also promotes and intervenes in the establishment of interpersonal and emotional relationships that ultimately shape individuals' eating habits, thereby having a bearing on their long-term health (Departament de Salut de la Generalitat de Catalunya 2005a).

Food is also one of the key exogenous factors that affect children's proper growth and development (Aranceta et al. 2004). This highlights the importance of addressing the issue of food from an early age. Children grow and change quickly during their school years, with the period between the ages of 6 and 12 representing one of the most important for the development of their cognitive, physical and social skills. Although children begin to develop causal reasoning during this stage, the criteria that affect their choice of food remain rather immediate. That said, children at this age do start to take an interest in the links between food and health (Contento 2007). Furthermore, they display an increasing amount of independence, leading to the expansion of their relationships and a heightened capacity to make decisions (Aranceta 1995), some of which may revolve around aspects relating to food.

With regard to gender, although not considered a determinant variable like availability of food, upbringing, taste, or friends' influence, some studies highlight that it does have some impact on food preferences. In this respect, girls seem to be more likely to select healthier foods than boys in order to control weight, whereas boys' greater energy requirements and desire to become stronger could provide some explanation for their preference for more energy-dense food groups (Pich et al 2010; Neumark-sztainer et al 1999; Cooke & Wardle 2005). Further research is needed, however, in order to take a more in-depth look at boys' and girls' motivations when it comes to eating.

1 Research conducted on child nutrition in recent years (Serra et al. 2002; Contento et al. 2007,
2 among others) has demonstrated a need to deal with this issue, in part due to the dietary
3 imbalance and health issues in evidence among the child population. Studies have also been
4 carried out to analyze eating habits and satisfaction in relation to food received in specific
5 contexts (in schools, hospitals, etc.). However, these largely focused on evaluating the service
6 received and the nutritional quality of the menus served (Watters et al. 2003; Mavrommatis et
7 al. 2011) and fail to take into account the possible role of food in children's subjective well-being
8 and how it relates to their opinions, perceptions and evaluations.

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18 Two exceptions to the above are the study by Proctor, Linely & Maltby (2009), which reports
19 lower levels of life satisfaction in children with obesity and food disorders, and the study by
20 Valois, Zulling, Huebner & Wanzer (2003), who found that lower levels of subjective well-being
21 in children are associated with poorer diet habits.

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27 This article argues that in order to understand individuals' eating habits and their predisposition
28 towards food consumption one must go beyond strictly dietary and nutritional indicators for
29 different foods and consider a range of possible psychosocial indicators. These indicators
30 concern the immediate context in which food is consumed (eating habits in the family home and
31 environmental aspects of food, relationships with dining companions), a wider social context
32 (the importance given to food, beliefs about particular foods, the application of regulations on
33 dietary matters) and a more individual dimension: each person's judgments with respect to
34 different aspects of life, including subjective well-being and personal food preferences.

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44 This study will focus on the last of the aforementioned areas (the more individual dimension),
45 leaving the exploration of other aspects for future research. A key concept we aim to analyze in
46 this research is children's satisfaction with food as a potential component of children's
47 subjective well-being. By satisfaction with food we are referring to the evaluation of those
48 aspects that can help children enjoy their food and lead them to consider it a pleasurable and
49 important element for their well-being and quality of life.

1 Subjective well-being is generally held to be a multidimensional assessment reflecting the
2 combination of a cognitive process (satisfaction with life both as a whole and in relation to
3 various specific domains: health, school, family, friends and relationships with other people,
4 among others) with two affective processes (presence of positive affect and absence of
5 negative affect) (Argyle 1987; Diener 1984; Diener & Larsen 1993; quoted in Eid & Diener
6 2004). This study focuses on the more cognitive side of well-being, leaving an analysis of the
7 more affective aspects for future research.

8
9 Major contributions to the study of subjective well-being have been made by Cummins (1998;
10 2003), who argues for the inclusion of various domains when it comes to analyzing the
11 judgments that people make about their lives when questioned about their **personal well-**
12 **being**. He also contends that measuring the variable of overall life satisfaction involves a
13 homeostatic control mechanism; similar to the way in which blood pressure is measured, but
14 psychological. This means that the range of variation in personal well-being scores recorded
15 among people from the same country and between different countries tends to be limited,
16 pointing to the existence of normative values for well-being.

17
18 Cummins et al. (2003) have developed a tool to investigate subjective well-being, which they
19 called the Personal Well-being Index (PWI). It assesses responses regarding level of
20 satisfaction in the following domains: standard of living, personal health, life achievement,
21 personal relationships, personal safety, community-connectedness, future security, and
22 spirituality and religion. It also includes satisfaction with life as a whole. Various versions of this
23 index have been designed to meet the specific needs of different age groups: adults (PWI-A)
24 (Cummins & Lau 2006), school children (PWI-SC) (Cummins & Lau 2005) and pre-school
25 children (PWI-PS) (Cummins & Lau 2004).

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27
28 In relation to gender, the results of different studies carried out on Australian and Spanish
29 adolescents and young adults (Tomyn & Cummins 2011; Tomyn et al. 2011; González et al.
30 2012), some using an adaptation of the PWI-A and others the PWI-SC, are not conclusive. In
31 one study, females' scores are higher than males', and in two others this trend is reversed. No

1 studies have explored the personal well-being of children under 12, however. This is therefore a
2
3 pending issue that this paper will attempt to cover.
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7 In light of the above, the aims of this study are: (1) to test subjective indicators designed to
8
9 analyze the predisposition of children aged 10 to 12 towards food consumption, (2) to assess
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11 their subjective well-being, (3) to explore the relationship between these two phenomena and
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13 satisfaction with food, and (4) to explore the different patterns displayed by participants in
14
15 relation to these phenomena according to gender.
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21 METHOD

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24 The data analyzed in this study were collected within the context of a larger research study on
25
26 school food carried out in 2008 in the region of Osona (Catalonia, north-east Spain), which was
27
28 funded by the Government of Catalonia's Department of Health and the University of Vic.
29

30 Of the 79 schools in the region, 26 (32.9%) expressed an interest in participating. The target
31
32 population of this study was recruited from 18 of these schools. Eight schools were excluded
33
34 because they did not include primary-age students; another school with a special education
35
36 programme serving intellectually-impaired children was also excluded.
37
38

39 In light of the fact that the data analyzed in this article are extracted from a school dining-room
40
41 study, it is clear that participating children are all regular users of school-provided food services.
42

43 In Spain, these services are accessible to all families, they are organized by the Parents'

44 Associations and using them does not reflect a particular socio-economic status.
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49

50 *Sample*

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53 Data are taken from a total of 371 children in the region of Osona in their last two years of
54
55 primary school (students were between 10 and 12 years of age). This sample comprises
56
57 25.82% of all children enrolled in the last two years of primary school in the 18 participating
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1 schools. This age group was selected for two reasons: the difficulty of assessing the well-being
2 of children under 10, and the fact that other studies have reflected a growing interest in dietary
3 issues for children in this cohort.
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7
8 The majority of participating schools were state schools (77.8%, mirroring the total distribution of
9 state schools in the region), while the remainder of participating entities were publicly-funded
10 private schools from the region (22.2%). Half of these schools (50%) were located in semi-rural
11 areas (with populations between 2,000 and 5,000 residents), while 33.3% were in urban areas
12 (with more than 5,000 residents) and 16.6% of schools were in rural areas (with less than 2,000
13 residents).
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21 **In terms of gender,** 53.6% of the students were male ($n = 199$) and 46.4% were female ($n =$
22 172). The mean age of these students was 10.73 years old ($SD = 0.65$). 38.5% of students were
23 10 years old (21% boys and 17.5% girls), 50.1% were 11 (26.7% boys and 23.5% girls), and the
24 remaining 11.3% were 12 (5.4% boys and 6% girls).
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31 *Instruments*

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34 Data were collected using a questionnaire designed specifically for this study and containing the
35 scales **and items described below. In order to test objective 1, the following questions were**
36 **included in the questionnaire:**
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- 40
41 I. One item regarding children's global interest in food scored on an 11-point scale, with 0
42 representing not interested at all and 10 representing extremely interested.
43
44
- 45 II. A group of items evaluating the importance attributed to various eating-related topics:
46 "this food is good for my health," "this food tastes good," "this food is easy to eat," "this
47 food is well-known," "someone recommended this food to me," "my friends also eat this
48 food," "my parents want me to eat this", "I have seen the food on TV", "I have enough
49 time to eat", "my body needs this food," and, finally, "I feel good after eating this food"
50 (scored from 0 = not at all to 10 = very much).
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58 **Objective 2 has been developed through the application of:**
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- 1 I. The adapted version of the Personal Well-being Index—School Children (PWI-SC;
2 Cummins & Lau, 2005) was used to indicate the subjective well-being of children. The
3 instrument was measured using an 11-point scale, 0 meaning *Completely dissatisfied*
4 and 10 *Completely satisfied*. The instrument begins each question by asking “Right
5 now, how satisfied are you...” and concludes with the following endings: “about the
6 things you have?”, “with your health?”, “with the things you want to be good at?”, “about
7 getting on with the people you know?”, “about how safe you feel?”, “about doing things
8 away from your home”, and “about what may happen to you later in life?” The exact
9 questions used in our study were not a literal Catalan translation of the questions posed
10 by the aforementioned authors; a pilot study demonstrated that students who
11 participated in the study struggled with the cognitive difficulty of the exact translations of
12 these questions, and consequently the questions were reformulated for the purpose of
13 this questionnaire.
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28 II. A single item scale on overall life satisfaction (OLS) (Campbell, Converse, & Rogers,
29 1976). The item was measured using an 11-point scale, 0 meaning *Completely*
30 *dissatisfied* and 10 *Completely satisfied*.
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35 III. Four items assessed satisfaction with additional specific life domains. The questionnaire
36 asked: “Right now, how satisfied are you ...” “with your friends?”, “with your family?”,
37 “with the sports you play?”, “about your body?” These items were measured using an
38 11-point scale, 0 meaning *Completely dissatisfied* and 10 *Completely satisfied*.
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43 With the aim of testing objective 3, an additional item on satisfaction with food was included in
44 the questionnaire, using the same 11-point scale and the same question.
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47 The pilot study was conducted on a group of children displaying similar characteristics to the
48 final sample (i.e. with regard to age, gender, school year, and school location) in order to test
49 the degree of comprehension of the draft questionnaire. Consequently, the language in the tool
50 was changed; the most important of these modifications entailed substituting the word *feliç*
51 (happy) for the word *content* (content) in light of the fact that the latter word was more
52 comprehensible than the former for children in this particular sociocultural context.
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1 *Procedure*

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3 After drafting the final version of the data collection tool, the directors of participating schools
4 were contacted in order to explain the goals and progress of the study, underscore the
5 importance of their collaboration, and request their consent. Regular ethical procedures for
6 research involving children in Spain accept the passive consent of parents when Parents'
7 Associations have been informed and the questionnaires are anonymous and do not include
8 personally sensitive items, which is the case of the questionnaire used here. Children were
9 asked for their co-operation after being informed of the aims of the research and the fact that
10 they were free to stop answering the questionnaire at any time.
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20 The questionnaire was self-administered by students in their normal classroom during the
21 school hours. During each administration of the questionnaire, a researcher and one of the
22 student's teachers were always on hand in order to explain the study and answer any potential
23 questions which might arise.
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31 *Structure of the analysis*

32 The results of this paper have been divided into three different sections. The first section on
33 "interest in food and eating-related decision-making" responds to the first objective of testing
34 indicators designed to analyze 10 to 12 year olds' predisposition towards food consumption.
35 Some studies have been conducted to analyze reasons for children's preferences on different
36 kinds of food. However, they do not consider children's interest in their exploration of food-
37 related behaviors. We believe that interest might play an important role in decisions about food
38 as it may be connected to different attitudes towards food consumption. This is why, contrary to
39 other studies we have found in the literature, this variable has been included in the paper.
40 Means and standard deviations of the item regarding children's global interest in food and a
41 group of items evaluating the importance attributed to various eating-related topics are therefore
42 calculated. A principal component analysis (PCA) of these last items was performed in order to
43 extract different components which could be used for subsequent analysis. Gender differences
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1 are explored through the Student's T-test. Finally, Spearman correlations between interest in
2
3 food and the components emerging from the PCA were also performed.
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8 The second section, related to "the subjective well-being of children", deals with calculating the
9
10 means and standard deviations of the adapted PWI-SC domains, the OLS and satisfaction with
11
12 additional specific life domains, including satisfaction with food. This section responds to the
13
14 second objective of assessing children's subjective well-being. Again, gender differences are
15
16 explored through the Student's T-test.
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21 The third section is related to the third objective (studying potential links between food and
22
23 subjective well-being). With this in mind, Spearman correlations were calculated between food-
24
25 related indicators and subjective well-being indicators. Finally, different regressions models
26
27 were performed using the stepwise method taking satisfaction with food as the independent
28
29 variable and food-related and subjective well-being indicators as predictors. Models for boys
30
31 and girls were also calculated separately in order to respond to objective 4 (exploring the
32
33 different patterns displayed by participants in relation to the explored phenomena according to
34
35 gender). As explained in the introduction, satisfaction with food is generally understood in the
36
37 literature as a variable that allows the quality of a food-providing service to be evaluated, but not
38
39 as something that can be both related to children's predisposition towards food consumption
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41 and their subjective well-being. Results are expected to broaden researchers' perspectives on
42
43 the explored issues and they cannot therefore be easily compared to other studies carried out to
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45 date.
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51 RESULTS

52 *Interest in food and eating-related decision-making*

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55 The mean response to the question about student interest in food was 7.88 (SD = 2.43) on a
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57 scale of 0 to 10.
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1 51.1% of participants indicated that food is very interesting to them (they responded with either
2 a 9 or a 10), while 31.1% expressed solid interest (responses between 6 and 8) and 17.8% said
3 the topic was of little interest to them (responses ≤ 5). There were no significant differences
4 between these three groups in terms of gender.
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10 The degree of importance children gave to different indicators which may influence eating are
11 shown in Figure 1.
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14
15 Insert Figure 1 about here
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17

18 The main motivation when it comes to eating is the taste of food (“it tastes good”), followed by “it
19 is good for my health.” The indicators which received the lowest scores were those most closely
20 connected to external influences (“someone recommended this food to me,” “my friends also
21 eat this food,” and “I have seen the food on TV”). Girls scored “feeling good after eating” higher
22 than boys ($t(348.67) = 2.70, p = .007$ (two-tailed), $\eta = .136$), while boys gave greater importance
23 to things they saw in advertisements ($t(367) = -2.17, p = .031$ (two-tailed), $\eta = .112$).
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31 The major indicators described in Table 1 were analyzed by means of a Principal Component
32 Analysis (PCA) using Varimax rotation, yielding 3 components explaining 55.80% of all
33 variance. These components were as follows (see Table 1):
34
35
36

- 37 - Component 1 could be labeled “social influence” and explained 23.55% of the total
38 variance. It included the following items: “I have seen this food on TV,” “my friends also
39 eat this food,” “someone recommended this food to me,” “this food is well-known,” and
40 “I have enough time to eat this food.”
41
42
43
44
- 45 - Component 2 was mainly related to health and explained 21.60% of the total variance. It
46 included the following items: “my body needs this food,” “my parents want me to eat this
47 food,” “this food is good for my health,” and “this food makes me feel comfortable.”
48
49
50
- 51 - Component 3, which we have labeled “hedonic,” was composed of one item related to
52 the taste associated with foods (“this food tastes good”). This component explained
53 10.66% of total variance.
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Insert Table 1 about here

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5 The indicator corresponding to “this food is easy to eat” was removed from the analysis as it
6 loaded equally in two of the three aforementioned components. No statistically significant
7 differences were observed in any of the three components with regard to gender.
8
9

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11
12 Interest in food correlates positively and significantly with two of the three components: the
13 health component – for both boys ($\rho = .24, p = .001$) and girls ($\rho = .28, p < .001$) – and the
14 hedonic component, for girls only ($\rho = .26, p = .001$).
15
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20 *The subjective well-being of children*
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23 The responses study participants gave to items on the PWI-SC are shown in descending order
24 in Table 2.
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26

Insert Table 2 about here

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31 As Table 2 shows, the items of satisfaction which received the highest mean score were
32 “getting on with the people you know” and satisfaction “with your health” (the mean was higher
33 than 9 for both). The overall mean score on the PWI-SC on a scale of 0 to 100 was 86.54 (SD =
34 10.54).
35
36
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38

39
40 In keeping with the recommendations of the tool’s authors, the index was recalculated,
41 excluding the 29 subjects who gave extreme responses to all questions (responses of 0 or 10),
42 resulting in a mean score of 85.25 (SD = 10.17). As there were no statistically significant
43 differences between the two means, this study continued to utilize the data from all
44 respondents.
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50
51 There were no statistically significant differences with regard to gender for the PWI-SC index,
52 but there were for the indicator “satisfaction with what may happen to you later in life” ($t(365) =$
53 $2.206, p = .028$ (two-tailed), $\eta = .115$), girls (M = 8.50; SD = 2.01) being the ones with the
54 higher mean score compared to boys (M = 8.03; SD = 2.11).
55
56
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58
59

1 The OLS score ($M = 9.09$, $SD = 1.54$) and satisfaction scores for other complementary life
2 domains are high (means range from 8.62 to 9.71). The highest mean corresponded to
3 satisfaction “with your family,” while the lowest corresponded to satisfaction “with food” (see
4 Table 3). There were no statistically significant differences with regard to gender for OLS or any
5 of the items described in Table 3.
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10
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12 Insert Table 3 about here
13
14

15 *Food and well-being*

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17
18 The correlation between interest in food and the PWI-SC was significant yet moderate ($\rho = .38$,
19 $p < .001$). Correlations were similar for both genders (girls: $\rho = .38$, $p < .001$; boys: $\rho = .35$, $p <$
20 $.001$).
21
22
23
24

25 Correlations were lowest between interest in food and OLS and other indicators of satisfaction
26 which are not included on the PWI-SC, presented in Table 4.
27
28
29

30 Insert Table 4 about here
31
32

33 The highest correlation for boys was with satisfaction “with your body” ($\rho = .22$, $p = .001$), while
34 the highest correlation for girls was for satisfaction “with the sports you play” ($\rho = .30$, $p < .001$).
35
36 The lowest correlations were satisfaction “with your family” for boys ($\rho = .15$, $p = .03$) and
37 satisfaction “with your friends” for girls ($\rho = .17$, $p = 0.28$).
38
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41

42 The three principal components encapsulating the degree of importance which participants
43 attributed to different components when it comes to eating (health, hedonism, and social
44 influence) reflected statistically significant correlations with the PWI-SC, although these
45 correlations are not particularly strong (health component: $\rho = .34$, $p < .001$; hedonic
46 component: $\rho = .27$, $p < .001$; social influence component: $\rho = .19$, $p < .001$).
47
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53 Correlations between the PWI-SC and the 3 aforementioned components varied according to
54 gender: for girls, the PWI-SC only showed a statistically significant positive correlation for the
55 health component ($\rho = .26$, $p = .001$) and the hedonic component ($\rho = .25$, $p = .002$), while
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1 statistically significant positive correlations were found for all three components in boys (health:
2 $\rho = .38, p < .001$; hedonic: $\rho = .29, p < .0001$; social influence: $\rho = .28, p = .002$).

3
4
5
6 The strongest correlation between the 3 components (health, hedonism, and social influence)
7 and OLS were found in the importance given to questions of health. Only satisfaction “with your
8 body” correlates with the three components (see Table 5).
9

10
11
12
13 Insert Table 5 about here
14

15
16 OLS correlates positively although modestly with the health component (girls: $\rho = .21, p =$
17
18 $.008$, boys: $\rho = .27, p < .001$) and with the hedonic component, though in this case only for girls
19
20 ($\rho = .21, p = .008$).
21

22
23 The highest correlation for both boys and girls was found between the health component and
24 the indicator entitled satisfaction “with your body” ($\rho = .24, p = .002$ and $\rho = .24, p = .001$,
25
26 respectively). There were statistically significant correlations between the hedonic component
27 and satisfaction “with your friends” ($\rho = .22, p = .006$), and “with your family” ($\rho = .16, p = .048$),
28
29 again only for girls.
30
31

32
33
34 After conducting the analyses described above, a series of regression models were run using
35
36 the stepwise method in order to gain additional insight into the relationships between indicators
37 related to food and personal well-being, using “satisfaction with food” (SATFOOD) as the link
38
39 between these two constructs.
40
41

42
43 An analysis of SATFOOD results in terms of the three principal components classifying eating-
44 related motivations and interest in food revealed that the model was significant (Adjusted $R^2 =$
45
46 $.25, F(2.339) = 56.47, p < .001$). As Table 6 shows, the health component and interest in food
47
48 appear as significant predictors when it comes to explaining SATFOOD.
49
50

51
52
53 Insert Table 6 about here.
54

55 Running this model with responses from only boys and then only girls revealed that for girls
56
57 (Adjusted $R^2 = .31, F(2.157) = 36.37, p < .001$) the variable which best explained the SATFOOD
58
59

1 scores was the health component, followed by the hedonic component, whereas for boys
2
3 (Adjusted $R^2 = .23$. $F(2.181) = 27.92$, $p < .001$) the variable reflecting the highest beta value
4
5 was interest in food, followed by the health component.
6

7
8 In order to explore which subjective well-being indicators act as predictors for SATFOOD we ran
9
10 additional regression models with the OLS and the PWI-SC separately.

11
12 Both models are significant (OLS: Adjusted $R^2 = .21$. $F(1.368) = 102.331$, $p < .001$ (Table 7);
13
14 PWI-SC: Adjusted $R^2 = .22$. $F(4.356) = 26.363$, $p < .001$). Only 4 domains of the PWI-SC
15
16 explain SATFOOD (see Table 8).
17

20 Insert Table 7 about here.

26 Insert Table 8 about here.

28
29 The results show that the only two domains with a statistically significant beta value are “health”
30
31 and “the things you want to be good at” in the girls model (Adjusted $R^2 = .22$. $F(2.166) = 24.91$,
32
33 $p < .001$), whereas the model for boys included “health”, “getting on with the people you know”,
34
35 “doing things away from your home” and “what may happen to you later in life”, and in
36
37 decreasing order (Adjusted $R^2 = .27$. $F(4.189) = 18.80$, $p < .001$).
38

39
40 The degree to which complementary indicators of life satisfaction contribute to predicting
41
42 SATFOOD values was explored through a linear regression model. The model revealed that all
43
44 of the aforementioned indicators made a significant contribution, with the exception of
45
46 satisfaction “with the sports you play” (Adjusted $R^2 = .21$. $F(3.361) = 32.45$, $p < .001$) (see Table
47
48 9).
49

52 Insert Table 9 about here.

54 The beta values suggest that the predictor to best explain SATFOOD in the model described in
55
56 Table 9 is satisfaction “with your body”, while the variable to least explain it is “your friends”.

57
58 Subsequently, the same model was run separately for both boys and girls. The only predictor
59

1 for girls (Adjusted $R^2 = .18$. $F(1.168) = 39.25$, $p < .001$) was satisfaction “with your body,” By
2
3 contrast, results for boys (Adjusted $R^2 = .25$. $F(3.192) = 31.12$, $p < .001$) showed that the
4
5 predictor with the highest beta value was satisfaction “with your body,” followed by satisfaction
6
7 “the sports you play” and “with your family”.

8
9
10 Finally, in order to analyze which indicators are significant in the above partial models when
11
12 grouped together, we calculated a last linear regression model to explain SATFOOD. It is
13
14 observed that this model includes 4 predictors, OLS being the indicator with the highest
15
16 contribution (Adjusted $R^2 = .41$. $F(4,328) = 58.29$, $p < .001$) (Table 10).

19 Insert Table 10 about here.

21
22 The indicators with the highest explanatory capacity for SATFOOD using this model, after OLS,
23
24 are the health component, “satisfaction with health” from the PWI-SC and “satisfaction with
25
26 doing things away from home”, for both genders, “satisfaction with your body” (Adjusted $R^2 =$
27
28 $.43$. $F(4.153) = 29.41$, $p < .001$) in the model for girls only and OLS and satisfaction with doing
29
30 things away from home and satisfaction with family (Adjusted $R^2 = .45$. $F(4.174) = 37.49$, $p <$
31
32 $.001$) in the model for boys only (Table 11).

35 Insert Table 11 about here.

41 DISCUSSION

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43
44 The children who took part in this study displayed a high level of interest in food-related issues.
45
46 Although there are no data to demonstrate it categorically, we believe that this keen interest
47
48 could be attributed to the effectiveness of the various strategies implemented in Spanish
49
50 schools to raise awareness about and promote healthy lifestyles among the child population
51
52 (namely the Strategy for Nutrition, Physical Activity and the Prevention of Obesity, Agencia
53
54 Española de Seguridad Alimentaria y Nutrición 2005), and the Integral Plan for Health
55
56 Promotion through Physical Activity and Healthy Eating (Departament de Salut de la Generalitat
57
58 de Catalunya 2005b). In order to test this hypothesis, it would be necessary to evaluate the

1 impact of this kind of program on children by measuring their interest in food-related issues
2
3 before and after the implementation of the specific program. Motivations for the sample
4
5 children's food choices coincide with the results obtained by De Moura (2007), with sensory
6
7 factors such as taste being the most prevalent factor, closely followed by health-related aspects.
8
9 An analysis of the predominant reasons for children's evaluation of food reveals some
10
11 differences between the genders. Girls prioritize feeling good after eating, unlike boys, who
12
13 attach more importance than girls to eating things that they have seen in television
14
15 advertisements.

16
17
18 Feeling good after eating has both a physical and a psychological dimension. The ingestion of
19
20 healthy food may contribute to both dimensions, as it is easier to digest compared to non-
21
22 healthy food and it is one of the most important means of controlling weight, something very
23
24 important for girls according to the reviewed literature. Food-related advertisements which have
25
26 children and adolescents as the main target are generally for fatty and sugary foods like
27
28 biscuits, snacks and soft drinks. This could be a plausible explanation for boys giving more
29
30 importance than girls to eating things previously seen in advertisements, in that the existent
31
32 literature points to their stronger preference for this kind of food. To understand the source of
33
34 these differences, however, it will be necessary in the future to apply qualitative methodology
35
36 techniques such as in-depth personal interviews or focus groups.

37
38
39 The importance of the component of "health" as an indicator of motivations influencing food
40
41 choices, widely recognized among the adult population (Neumark-Sztainer et al. 1999), is also
42
43 apparent in our results, demonstrating the extent to which the children surveyed are conscious
44
45 of the link between food and health. This finding supports the claims of authors such as
46
47 Contento (2007), who argues that it is during preadolescence that children start to become
48
49 aware of the consequences of their actions in relation to what they eat.

50
51
52 As far as motivations for eating are concerned, the lowest means correspond to variables
53
54 related to an external influence factor such as, for example, foods having been seen in
55
56 advertisements. This contrasts with previous studies that suggest that children are particularly
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1 vulnerable to the influence of advertisements with respect to their eating habits (Mehta et al.
2
3 2010; Medeiros et al. 2008).

4
5
6 In line with the results obtained by De Moura (2007), the children in our sample who are most
7
8 interested in food are those whose eating preferences are most influenced by health-related
9
10 issues. The fact that girls of this age display a positive correlation between interest in food and a
11
12 component of hedonic motivation for eating while boys do not is a phenomenon which would be
13
14 worth studying in the future. The correlation between the factor of external influences and
15
16 interest in food is weak and statistically insignificant.

17
18
19 The subjective well-being of children under 12 is an issue which has hardly been addressed in
20
21 the literature owing to the difficulty involved in using concepts that are somewhat abstract in
22
23 nature. We studied this notion by using an adapted version of the Personal Well-being Index
24
25 (Cummins & Lau 2005) to facilitate comprehension among the sample group of Catalan
26
27 children.

28
29
30 The mean PWI-SC index scores for the children surveyed show that they have high levels of
31
32 well-being, corroborating the positive opinions about their lives as a whole expressed by many
33
34 children and teenagers in other research (Tomy & Cummins 2011). The results obtained
35
36 in our study are slightly higher and contain less variability of responses than the normative
37
38 values defined by the authors for the Australian population ($M = 75$, $SD = 12.65$; Cummins & Lau
39
40 2005). This difference could be due to factors such as the size of the sample. It could also be
41
42 attributed to the different sociocultural context involved. To verify this hypothesis, this study
43
44 would have to be extended to include larger samples. Another hypothesis worth exploring in
45
46 greater detail in the future, and one which we would particularly like to emphasize, is that
47
48 normative values for the Australian population may be higher for the child population than for
49
50 the adolescent and adult population.

51
52
53 In a previous study (González et al. 2012) based on a sample of adolescent and young adults
54
55 (15-24 years old) regarding their personal well-being (using the adult version of the Personal
56
57 Well-being Index by Cummins and Lau (2006)), differences were found according to the gender
58
59

1 of the participants. Contrarily, in our study there are no significant differences between boys and
2 girls for the whole PWI-SC, but there is in relation to one specific domain “satisfaction with what
3 may happen to you in later life”, with girls scoring higher. This same result was found in the
4 study by Tomy & Cummins (2011) using the same index (PWI-SC), but applied to 351 students
5 aged 12 to 20.
6
7
8
9

10
11 The life satisfaction domain to obtain the highest mean from the PWI-SC was “having good
12 relationships with other people”, which the children displayed a high awareness of,
13 demonstrating the importance of interpersonal relationships and presumably the social support
14 children receive from parents, classmates, teachers and close friends (Demaray & Malecki
15 2002; Casas, 2010; Goswami 2011).
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23 The next most important domain (according to the mean scores obtained) is health, indicating
24 that this is a prominent life concern among the child population. One of the domains to produce
25 a low mean was security for future. A similar trend was observed with samples of teenagers and
26 young people aged 15 to 24 (González et al. 2012), and this result could be attributed to a
27 heightened sense of uncertainty when thinking about the future. In light of this consideration,
28 subsequent questionnaires might designate a specific period in the future (3 years, for example)
29 to make it easier for participants from these age groups to respond.
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38 As for OLS and satisfaction with other specific life domains studied in parallel to the PWI-SC,
39 the importance of interpersonal relationships is again borne out by the respondents' answers
40 concerning “satisfaction with family” and “satisfaction with friends”, with these domains obtaining
41 the highest scores. Both boys and girls scored high on OLS, and they were “satisfied with their
42 body” as well as “with food”, although the mean score for these specific aspects is slightly lower
43 than the figures for “satisfaction with family” and “satisfaction with friends”.
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51 There are correlations, albeit moderate ones, between interest in food and the PWI-SC and
52 between the three components of food motivations and the PWI-SC - for both boys and girls.

53 The fact that correlations are only moderate might be due to the fact that none of the PWI-SC
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1 indicators explicitly refer to something as specific as food, given that they are constructed on a
2
3 higher level of abstraction.
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6 Correlations between this interest in food and OLS and complementary domains of satisfaction
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8 explored alongside the PWI-SC are statistically significant yet weak, with the closest
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10 correspondence coming between interest and OLS. Boys and girls exhibit a different pattern of
11
12 responses, to the extent that the strongest correlation in the case of girls relates to interest and
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14 “satisfaction with the sports you play”, while for boys it is interest and “satisfaction with your
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16 body”, suggesting different roots for their respective interest in food.
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19 In this paper, SATFOOD has been understood as an element that allows us to evaluate those
20
21 aspects that can help children enjoy their food and bring them to consider it as a pleasurable
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23 and important element for their well-being and quality of life. It is worth mentioning that the
24
25 indicators that explain SATFOOD are not the same for boys and girls. Further studies are
26
27 needed in order to analyze the reasons for such differences in more depth.
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30 From the regression models we have run, we see that SATFOOD is explained through both
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32 food indicators and well-being indicators. These findings justify the consideration of SATFOOD
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34 as a variable for evaluating elements related to food (health motivations) and others related to
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36 well-being (satisfaction with health and with doing things away from home, from the PWI-SC,
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38 and the OLS) for the children participating in this study. The fact that satisfaction with doing
39
40 things away from home contributes to explaining SATFOOD may have to do with eating out in a
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42 bar or restaurant, something which children aged 10 to 12 probably enjoy doing with their
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44 families. The data obtained in this paper do not allow this hypothesis to be tested, however.
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47 The results obtained suggest that adults are probably underestimating the role played by food in
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49 the lives of children aged between 10 and 12, with this issue having long been considered
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51 solely of interest to adults or, at most, to older children. This statement is based on the fact that
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53 there are more studies carried out on adults than on children and, of the latter, only very few on
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55 young children.
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1 It is important to understand how eating practices are conditioned from a young age and what
2 affects this in order to be able to devise tools that help promote a more suitable dietary
3 education for different groups, one that would bear in mind similarities and differences between
4 each age bracket. There is a need to explore the role of indicators such as satisfaction with
5 food, young people's interest in food, and the child population's levels of subjective well-being in
6 order to open up new avenues of research in the field of health education and promotion. To
7 achieve this goal, future research must be carried out in which a prominent role is afforded to
8 children's perspectives, which will allow us to be able to look in greater depth at the connections
9 between this population group's subjective well-being and satisfaction with food.
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11 Children's well-being includes the evaluations and aspirations of children themselves, while
12 considering them active social actors who can reliably explain the experiences and meanings
13 constituting their well-being.
14

15 It is important to point out some of the limitations of the study presented in this article. The
16 sample used comprised schools that expressed an interest in taking part in the study. There is
17 no way of knowing whether the sample is somehow skewed with respect to the rest of the
18 schools in the region of Osona. It is possible that the schools not involved might exhibit
19 distinctive characteristics in relation to the variables explored in this article. Ideally, future
20 studies would collect data from a larger pool of schools.
21

22 The cross-sectional approach adopted in this study limits our ability to comprehend how the
23 variables studied change over time. In other words, whether the children who are satisfied at
24 present cease to be so over time or whether their well-being varies as a result of changes in the
25 importance of food in their lives. It would be necessary to carry out a longitudinal study to
26 examine this evolution.
27

28 Finally, it is worth contemplating the possible value of applying qualitative methodologies (such
29 as discussion groups) in future studies in order to be able to investigate the different aspects
30 discussed in this article in greater depth, as well as considering further work on the promotion of
31 healthy eating habits based on the levels of interest in food shown in this study. This could
32

1 serve as a starting point to improve children's motivation and participation with respect to both
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3 developing healthy practices initially promoted at a young age and maintaining them throughout
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5 adolescence, thereby fostering good eating habits.
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12
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16
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1 **Figure 1** Importance given to different indicators for food decision-making
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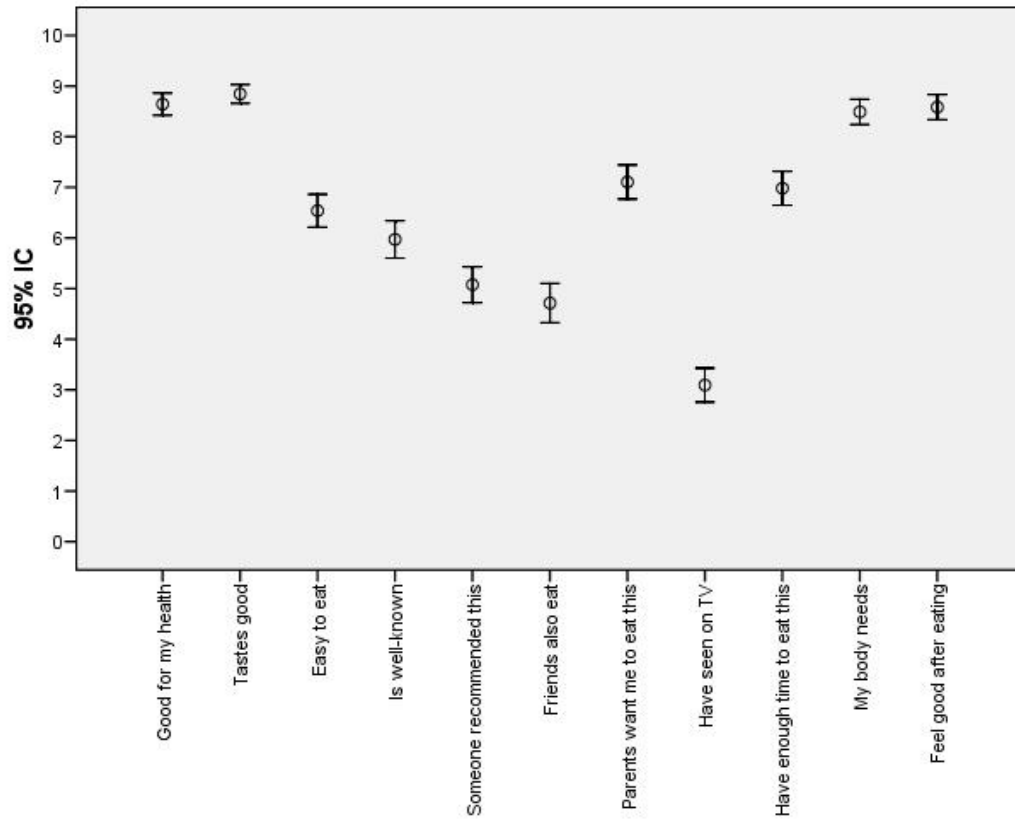


Table 1 Principal component analysis (PCA): Rotated component matrix of the different indicators related to food decision-making (loadings below .2 are not displayed)

	Component 1: Social Influence	Component 2: Health	Component 3: Hedonic
I have seen this food on TV	.768		
My friends also eat this food	.743		
Someone recommended this food to me	.680	.252	
This food is well-known	.647		.240
I have enough time to eat this food	.389	.245	
My body needs this food		.843	
My parents want me to eat this food		.703	
This food is good for my health	.266	.694	
This food makes me feel comfortable	.303	.555	
This food tastes good			.937
Eigenvalues	3.068	1.484	1.027
Variance explained	23.55	21.60	10.66
Cumulative variance	23.55	45.14	55.80
Alpha	0.622	0.694	0

Correlation matrix determinant: 0.140

Kaiser-Meyer-Olkin measure of sampling adequacy: 0.763

Bartlett's test of sphericity: $\chi^2 = 667.173, 45; p < .001$

Table 2 Means and standard deviations of items from the PWI-SC

Satisfaction...	Mean	SD
With getting on with the people you know	9.23	1.46
With your health	9.19	1.45
With the things you have	8.69	1.78
With the things you want to be good at	8.55	1.80
With how safe you feel	8.46	1.80
With what may happen to you later in life	8.25	2.07
With doing things away from your home	8.11	2.19

Table 3 Means and standard deviations for complementary satisfaction with life domains explored

Satisfaction...	Mean	SD
With your family	9.71	1.00
With your friends	9.26	1.59
With the sports you play	8.86	2.18
With your body	8.77	1.83
With food	8.62	2.94

Table 4 Spearman correlations between interest in food, satisfaction with the other life domains explored and OLS

Satisfaction...	Interest in food
With your friends	.13, p = .015
With your family	.14, p = .008
With the sports you play	.18, p = .001
With your body	.23*
OLS	.28*

* Significant difference, p < 0.001

Table 5 Spearman correlations between the three components identified in the PCA with OLS and other satisfaction with life domains

Satisfaction...	Health Component	Hedonic Component	Social influence Component
With your friends	.16, p = .003	.16, p = .003	-
With your family	.22*	.12, p = .039	-
With the sports you play	.23*	.11, p = .038	-
With your body	.24*	.14, p = .008	.12, p = .025
OLS	.25*	.14, p = .010	-

* Significant difference, p < .001

Table 6 Linear regression of the three components related to food decision-making and interest in food on Satisfaction with food

	β	t	Sig.	Confidence interval of 95%	
				Lower limit	Upper limit
Health Component	.37	7.70	p < .001	.499	.842
Interest in food	.25	5.10	p < .001	.111	.250

Table 7 Linear regression of OLS on Satisfaction with food

	β	t	Sig.	Confidence interval of 95%	
				Lower limit	Upper limit
OLS	.47	10.12	p < .001	.438	.650

Table 8 Linear regression of PWI-SC domains on Satisfaction with food

	β	t	Sig.	Confidence interval of 95%	
				Lower limit	Upper limit
Satisfaction with health	.31	6.20	p < .001	.260	.502
With doing things away from your home	.15	3.05	p = .002	.043	.198
With the things you want to be good at	.14	2.74	p = .006	.037	.227
With what may happen to you later in life	.12	2.42	p = .016	.019	.180

Table 9 Linear regression of other satisfaction with life domains on Satisfaction with food

Satisfaction with...	β	t	Sig.	Confidence interval (95%)	
				Lower limit	Upper limit
With your body	.36	7.44	p < .001	.256	.440
With your family	.17	3.44	p = .001	.132	.482
With your friends	.11	2.20	p = .028	.014	.236

Table 10 Final linear regression of previous statistically significant indicators on Satisfaction with food

	β	t	Sig.	Confidence interval (95%)	
				Lower limit	Upper limit
OLS	.34	7.32	p < .001	.304	.531
Health Component	.29	6.41	p < .001	.354	.667
Satisfaction with your health (PWI-SC)	.19	4.03	p < .001	.126	.366
Satisfaction with doing things away from home (PWI-SC)	.11	2.35	p = .019	.014	.160

Table 11 Final linear regression of previous statistically significant indicators on Satisfaction with food by gender

	β	t	Sig.	Confidence interval (95%)	
				Lower limit	Upper limit
Girls					
Health Component	0.39	5.80	p < .001	.479	.974
Satisfaction with your health (PWI-SC)	0.21	3.04	p = .003	.097	.458
Satisfaction with your body	0.18	2.45	p = .015	.034	.314
Boys					
OLS	0.44	6.90	p < .001	.351	.631
Health Component	0.24	4.16	p < .001	.209	.587
Satisfaction with doing things away from home (PWI-SC)	0.17	2.78	p = .006	.041	.240
Satisfaction with your family	0.15	2.64	p = .0009	.097	.671