

**A contextualized measure of Overall Life Satisfaction among adolescents:  
differences by gender.**

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### **Authors' Response to Reviewers' Comments**

**Reviewer #2: Though the author(s) have made substantial changes of the manuscript entitled "A contextualized measure of Overall Life Satisfaction among Adolescents: Differences by Gender", there are major methodological issues in the analyses.**

**It is reasonable to examine convergent validity in correlating POLS with SWLS and SLSS and divergent validity in correlating POLS with GADS. But it is queried to use path analysis to determine the factorial loads and SMC by examining the contributions of each latent construct made to the observed POLS variable (i.e., Table 3). The path analysis could not determine the factor loadings of an observed variable. POLS is a one-item measurement and does not have any factor loadings.**

We apologise because a wrong sentence in the Data Analysis section had some consequences in the Factor Loadings section wording – and the two together have probably confused the reviewer understanding of our analysis. We are so sorry. Therefore:

1. The sentence "...to determine the contribution each latent variable made to the observed POLS variable" has been changed by "...to determine the contribution of the POLS observed variable to each latent construct in the model".
2. The sentence "...the variance of the POLS explained by the SLSS5 ..., by the SWLS..., by GADS-depression and by GADS-anxiety..." has been change by "...the variance of the SLSS5 explained by the POLS..., of the SWLS..., of the GADS-depression... and of the GADS-anxiety..."

**With this understanding, the difference in relationship between POLS and other latent variables between boys and girls could not be considered as measurement invariance of POLS across gender.**

We have not calculated the measurement invariance of the POLS, but the measurement invariance of the Model across gender in order to be sure answering styles are comparable for all measures. The multi-group SEM results suggest that all statistics (correlations, regressions and means) are comparable across gender, for any of the relations between variables included in the Model.

**Please also differentiate measurement invariance of POLS between boys and girls from examining the difference of life satisfaction between boys and girls.**

Please see our answer to the previous comment.

**Please report the Cronbach Alpha values of each scale.**

It has been done accordingly

**The conclusion is simply a repetition of the discussion section, without clearly stating the theoretical and practical implications of the study.**

The Conclusion has been completely rewritten.

# A contextualized measure of Overall Life Satisfaction among adolescents: differences by gender.

## ABSTRACT

The main aim of the present study is to explore and test an indicator of subjective wellbeing for adolescents: the *Present Overall Life Satisfaction* (POLS), derived from subjects' consciously contextualized reflections on their own life cycle. We believe this to be a novel and innovative approach compared to those instruments traditionally used to date, given that it relates SWB measurement to its time axis. The article also explores this indicator's performance in relation to gender and levels of anxiety and depression. The sample comprised 614 adolescents with an average age of 16.6 years ( $Dt = 0.74$ ; age range=16-19), 58.1% of whom were girls and 41.9% boys. As well as the proposed indicator, the *Satisfaction with Life Scale* (SWLS) and *Students' Life Satisfaction Scales* (SLSS) were used as indicators of subjective well-being, and the *Goldberg Anxiety and Depression Scale* (GADS) as indicators of unease. Life satisfaction scores were higher among boys than among girls. These significantly lower levels of satisfaction in adolescent girls are also associated with higher levels of anxiety and depression than among boys. The results confirm that the *Present Overall Life Satisfaction* (POLS) is a good indicator of subjective well-being, since it captures core aspects that are considered to form part of that construct. That said, it is also evident that it captures different aspects than those of traditional indicators based on context-free scales, thereby opening new avenues of research to better understanding how adolescents evaluate their overall satisfaction with life.

**Key Words:** Adolescents, Life satisfaction, Subjective Well-Being, Anxiety, Depression, Time axis.

1  
2 In recent years, interest has grown in studying life satisfaction among adolescents. Life  
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4 satisfaction is understood as the overall assessment that a person makes about their life  
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6 by comparing what they have achieved with their challenges and expectations (Diener,  
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8 Larsen & Griffin, 1985; Veenhoven, 1996). This definition is equally applicable to  
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10 adults and adolescents (González-Carrasco, Casas, Viñas, Malo, Gras & Bedin, 2017).  
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16 Although early work in the field focused on objective indicators of quality of life (e.g.,  
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18 access to health, educational or recreational resources), researchers have now turned  
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20 their attention to subjective indicators, including subjective well-being (SWB).  
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24 Nowadays, subjective well-being (SWB) is considered to comprise three components of  
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26 one's own experience: positive affect (the frequency of positive emotions, such as joy or  
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28 pride), negative affect (the frequency of negative emotions, such as anger or sadness),  
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30 and a cognitive process related to the overall perceived quality of life or life satisfaction  
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32 (Huebner, Suldo, Smith & McKnight, 2004). Although the three components are  
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34 related, they represent distinct constructs (Diener, Suh, Lucas & Smith, 1999).  
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38 However, some authors claim that the time axis has not been given enough importance  
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40 in the study of children's and adolescents' SWB and point out that many instruments do  
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42 not capture this important facet (Casas & Frønes, 2019).  
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### 48 **1. Measurent instruments of life satisfaction in adolescence**

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50 Available instruments for assessing young people's life satisfaction can be divided into  
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52 two types: context-free and domain-based. Context-free scales provide an overall score  
53  
54 that indicates levels of life satisfaction (LS) derived from the unique weightings  
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56 individuals give to different aspects of their lives (Pavot & Diener, 1993). Domain-  
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1 based measures provide a profile of life satisfaction (LS) across various domains (i.e.  
2 family life, friends, school experience, own body, area where you live) (Proctor, Liney  
3 & Maltby (2009).  
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7 Examples of context-free scales widely used with adolescents include the following:  
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9 single-item scales such as the OLS (Overall Life Satisfaction) (Campbell, Converse &  
10 Rogers 1976); multiple-item scales on overall Life Satisfaction, such as the SWLS  
11 (Satisfaction With Life Scale) (Diener et al.,1985) and the SLSS (Students' Life  
12 Satisfaction Scale) (Huebner, 1991); among the domain-based scales used with  
13 adolescents we find those such as the BMSLSS (Brief Multidimensional Students' Life  
14 Satisfaction Scale) (Seligson, Huebner & Valois, 2003). All of these scales measure  
15 global cognitive judgements of one's own life; they cannot provide information about  
16 particular domains of life satisfaction that contribute to the individual's sense of well-  
17 being, due to their level of abstraction. Despite their frequent use, many researchers  
18 have highlighted problems related to the adequate understanding or interpretation of the  
19 various verbal items that make up these scales, as well as problems associated with their  
20 meaning in different languages and cultures (Casas, 2017; Casas et al., 2012; Casas et  
21 al., 2013), reflecting the diverse connotations they may have in different socio-cultural  
22 environments (Casas et al., 2015; Cummins, 2016; Extremera & Fernández-Berrocal,  
23 2013).  
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49 On the other hand, single-item scales such as the *Overall Life Satisfaction* scale (OLS)  
50 have been more frequently used with adolescents in international studies (Cummins,  
51 2016; Holte et al., 2014). Despite overcoming some of the limitations of the  
52 aforementioned scales, single-item scales are psychometrically weaker and display  
53 another important limitation: it is not known what frame of reference or comparison  
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adolescents use to gauge their level of well-being or current satisfaction with their life.

According to social comparability theories, all human beings need to compare themselves with some standards of reference in order to construct their social identity (Michalos, 1985; 1995; Casas, González & Navarro, 2013). In other words, what anchor points or reference points do they adopt to determine how satisfied they are with their life?

The most sophisticated attempt to evaluate life satisfaction using standards of comparison is without a doubt Michalos' Multiple Discrepancies Theory (MDT) (1985). Michalos' research based on MDT shows that humans can use up to 7 combined comparison standards to provide an answer (Michalos, 1985; 1986; 1995; 2014). There is broad consensus among researchers with regard to the undoubted explanatory capacity of Multiple Discrepancies Theory, which shows that the intersubjective comparability of subjective well-being (SWB) is particularly complex and delicate. This theory states that own well-being may be decided taking into account the discrepancies perceived between what each person has and what he or she wants, what other significant people around them have, the best he or she have had in the past, what he or she expected to have three years ago, what he or she deserves and what he or she needs. That said, it does not provide a satisfactory solution to guarantee that the individual results obtained in terms of life satisfaction are comparable with each other. This article presents an innovative proposal in this regard by providing a framework of reference on which to base the individual's response regarding their current level of satisfaction.

Another aspect to have generated controversy regarding the evaluation of subjective well-being refers to the degree of sensitivity that Likert-type scales use to measure it. Most scales use 5 or 7-point Likert-like scales, which are commonly used to assess

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psychological constructs. However, it is very well-known that data related to SWB – at least in industrialized countries - are negatively skewed, which means that most people will respond only to a restricted portion of the conventional scale. Therefore, these scales crucially need to be not only valid and reliable, but particularly sensitive (Casas, Tiliouine & Figuer, 2014). Moreover, when subjective quality of life measures are used as outcomes, scale sensitivity becomes a critical concern, since this construct has a high trait component, and small deviations are highly meaningful. It is really quite curious that this crucial fact regarding the sensitivity of SWB scales has been ignored so often. The only solution to such a challenge is to expand the number of choices. Cummins and Gullone (2000) used an 11-point scale and underlined that the increased number of choices in relation to previous studies provided a more accurate and sensitive measure of LS. Subsequent authors have also confirmed that 11-point scales increase sensitivity if they alter the psychometric properties of the scales (Casas et al., 2014). These offer a means of rating (0 to 10) that lies within the common experience of children and adolescents (and adults) in most countries and produce increased sensitivity of the measurement instrument. This solution has also been discussed with groups of adolescents and has been adopted by different researchers when administering these scales to children and adolescents, resulting in a good understanding (Casas, et al., 2014; Casas et al., 2012).

Finally, it should be highlighted that correlations between scales for measuring life satisfaction and subjective well-being have been moderate to high. Studies conducted with the adult population have obtained correlations that range between .46 and .81 (Diener et al. 1985), while studies carried out with the child population place them at between .47 and .53 (Strózik, Strózik & Szwarc, 2016). This situation has led some authors to question whether they are actually measuring identical constructs or not

(Casas et al., 2013; Casas & González-Carrasco, 2018; Cheung & Lucas, 2014; Diener, et al., 2014).

## 2. Gender and Life Satisfaction in adolescence

Research supports the existence of gender differences in relation to SWB in adults.

Gender differences have also been reported for SWB in the case of adolescents, not so much in regard to SWB in general but to specific life domains (academic satisfaction, standard of living, health, personal relationships, feeling part of the community, etc.) (González-Carrasco, et al., 2017).

However, there are contradictory findings regarding gender differences in ratings of overall life satisfaction among adolescents. Some researchers have found significant differences in levels of overall life satisfaction, with boys having higher levels of satisfaction than girls (Goldbeck, Schmitz, Besier, Herschbach & Henrich, 2007; Moksnes & Espnes, 2013), whereas others have found comparable levels of overall life satisfaction (Huebner, Funk & Gilman, 2000). Several authors (Llosada-Gistau, Montserrat & Casas, 2015; Tomy, Cummins & Norrish, 2015) did find some gender differences in subjective well-being among adolescents considered to be at-risk, with males scoring higher than females.

Empirical studies routinely find that boys and girls report comparable levels of overall life satisfaction (Huebner, Funk & Gilman, 2000). However, findings suggest that despite the lack of gender differences in levels of life satisfaction, boys and girls may differ in the structure of its correlates (Piko & Hamvai, 2010).



## The aims of this research

1  
2 The main aim of this article is to present an indicator of Life Satisfaction for  
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4 adolescents, which we shall call POLS (Present Overall Life Satisfaction). This  
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6 instrument is designed to overcome both the limitations of multi-item scales outlined  
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8 above and the main drawback of single-item scales, namely, that of not knowing the  
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10 frame of reference used by different participants when responding to the scale, making  
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12 it difficult to compare them given that they may have chosen different timeframes.  
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19 The POLS represents an 11-point (0 to 10) Likert-type single-item scale that  
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21 adolescents answer after situating themselves within a specific frame: the graphic  
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23 representation of their own life pathway. As we will see in the description of the  
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25 instrument, the fact that the POLS indicator is obtained from a review of the  
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27 participants' life trajectory positions them within a predetermined framework that  
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29 compares their current satisfaction with respect to their life path, meaning that the time  
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31 axis of the respondent's personal life cycle is taken into account. This prevents  
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33 participants from using heterogeneous comparison criteria when assessing their current  
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35 level of life satisfaction, which undoubtedly makes it difficult to compare the results  
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37 obtained in terms of validity.  
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45 This indicator will be tested against other instruments measuring multiple elements of  
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47 SWB. It is expected to show a significant and positive correlation with these, although  
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49 only to a moderate degree given that the POLS indicator incorporates a means to correct  
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51 the subject's responses, as explained above. The functioning of this indicator will also  
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53 be tested in relation to gender and in comparison with scales for anxiety and depression,  
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55 which it should hypothetically display a negative correlation with.  
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## Method

### *Participants*

The sample of participants consisted of a total of 614 adolescents in the first and second years of upper secondary education at schools in Spain. 58.1% of the participants were female (n=357) and the remaining 41.9% male (n=257). They were aged between 16 and 19, with the mean age being 16.6 years (Dt = 0.74). As Table 1 shows, the most common ages are, in this order, 16 (n=304), 17 (n=242), 18 (n=54) and 19 (n=14). The number of girls is slightly higher than that of boys in all groups, this difference being greater in the group of 16 year-olds.

*Insert Table 1 around here*

### *Instruments*

To test the Present Overall Life Satisfaction (POLS) as an indicator of Life Satisfaction in the adolescent population, three additional instruments were administered: the Subjective with Life Scale (SWLS), the Students' Life Satisfaction Scales (SLSS) and the Anxiety and Depression Scale (GADS), the characteristics of which are described below.

#### *- POLS (Present Overall Life Satisfaction)*

The POLS is a single-item psychometric scale that is obtained by considering the present value of the subject's score on the Life Satisfaction Chart (LSCh) (Aymerich, 1999). The LSCh is a technique for evaluating subjective well-being and its informed evolution; it involves the subject taking into account the passage of time and events that have taken place in their life (see Figure 1). This tool has demonstrated its clinical usefulness in various therapeutic contexts, such as in patients with Eating Disorders

1 (Aymerich & Balde, 2016) or patients with Disruptive and Conduct Disorder (Aymerich  
2 & Lozano, 2016).  
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7 It is presented to the subject via a suggestion that induces them to reflect on their  
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9 personal evolution, using a sample graph and complemented by the evaluator's  
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11 explanations. The presentation of the example is as follows:  
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14 *“As can be seen in the following example, we have a graph on which a young*  
15 *person like yourself has represented how their well-being has evolved with the*  
16 *passing of the years and the events that have taken place since they started*  
17 *primary school until now when they are studying upper secondary like you. The*  
18 *horizontal line (x-axis) corresponds to years lived and the vertical line that*  
19 *oscillates between the values of 0 and 10 (y-axis) represents possible levels of*  
20 *well-being. The scores correspond to the following: 0 to 2.5 = Very dissatisfied;*  
21 *3 to 4.5 = Dissatisfied; > 5 to 6.5 = Moderately satisfied; 7 to 8.5 = Satisfied*  
22 *and 9 to 10 = Very satisfied”.*  
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36 We then comment on what the sample graph represents for the subject's levels of well-  
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38 being (how the subject was affected by having to change school year, the birth of his  
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40 brother, a change of school, the beginning of a relationship, etc...) and the participant is  
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42 asked to draw and represent his or her own graph.  
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48 It is emphasized that each person has a different graph depending on what they have  
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50 experienced in their life, and that all graphs are valid. They are also informed that all  
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52 answers will be treated completely anonymously and that they can erase and redraw  
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54 their graph as often as they think necessary, which is why they are to use a pencil and  
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56 rubber to represent their LSCh. It is also emphasized that the graph must correspond to  
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the levels of well-being they remember having experienced throughout their lives, from the beginning of primary school to the present day. The instructions on the LSCh response sheet are the following:

*Please, mark with an “x” on the horizontal age axis, the age at which you started primary, secondary and upper secondary. Then, draw a graph from first year of primary to now, how your well-being / discomfort, happiness / unhappiness, satisfaction / dissatisfaction with your life has evolved at different ages. 0 is extremely dissatisfied and 10 extremely satisfied. Note down the events that have determined the ups and downs (increasing or decreasing) in your levels of well-being / discomfort, happiness / unhappiness.*

In the present study we only take the last value reported in the LSCh, that is, the level of satisfaction or dissatisfaction young people display in the present moment of their life (POLS) after representing the level of satisfaction experienced throughout their life pathway.

It is expected that this instrument will work in a similar but not identical way to other single-item scales on OLS because their values are “corrected” and improved by the fact that the response is contextualized via each subject’s reflection on the evolution of their idiosyncratic life path.

*Insert Figure 1 around here*

- SWLS

The *Satisfaction With Life Scale* (SWLS), designed by Diener et al. (1985), is a 5-item scale that evaluates people’s overall assessment of their satisfaction with life. The items

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are: 1) *In most ways my life is close to my ideal*; 2) *The conditions of my life are excellent*; 3) *I am satisfied with my life*; 4) *So far, I have gotten the important things I want in life*; 5) *If I could live my life over, I would change almost nothing*. Answers are encoded on a Likert scale of 1-7 according to the level of agreement with the statement, from 1 being *Strongly disagree* to 7 *Strongly agree*. For the data collection, we used the Spanish adaptation of Mañas, Salvador, Boada, González & Agulló (2007).

- SLSS

Huebner developed a multi-item scale, the *Students' Life Satisfaction Scale* (SLSS; Huebner, 1991), to allow researchers to determine adolescents' overall evaluation of their lives. It consists of seven items: 1) *I like the way things are going for me*; 2) *My life is going well*; 3) *My life is just right*; 4) *I have a good life*; 5) *I have what I want in life*; 6) *My life is better than most kids*; 7) *I would like to change many things in my life*; 8) *I wish I had a different kind of life*; 9) *I am happy with my life*, encoded on a Likert scale of 1-4 according to level of agreement with the statement, 1 being *Almost never* and 4 *Almost always*.

Galíndez and Casas (2010) adapted a short version of the SLSS scale to Spanish, using five of the items. The overall score ranges from 7, the theoretical minimum level of dissatisfaction, to 28, the theoretical maximum level of satisfaction. The results obtained by the authors show the reliability of the scale (Cronbach's alpha reliability coefficient of 0.81) and both its convergent and concurrent construct validity, providing a brief and precise instrument for measuring adolescents' overall life satisfaction. The present study is based on the administration of this latest abbreviated version by Galíndez & Casas (2010), using scales with values from 1 to 4.

- *GADS*

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2 The *Goldberg Anxiety and Depression Scale* (GADS) devised by Goldberg,  
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4 Bridges, Duncan-Jones & Grayson (1988) was developed by this author using a  
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6 modified version of the Psychiatric Assessment Schedule, with the aim of  
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8 obtaining a brief questionnaire that could detect possible problems related to  
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10 anxiety and depression. The Spanish version was validated by Montón, Pérez-  
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12 Echevarría, Campos, García-Campayo, & Lobo (1993).  
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19 It consists of a total of 18 items, with individuals responding dichotomically as to  
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21 whether they have or have not experienced the symptoms mentioned in the past two  
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23 weeks. The first 9 items constitute the anxiety subscale and the following 9 the  
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25 depression subscale, the maximum score for each being 9 and the total for the  
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27 instrument 18. The cut-off points are set at 4 or more for the anxiety subscale, and 2 or  
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29 more for that pertaining to depression, the problem being more severe the higher the  
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31 score obtained.  
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38 The GADS scale is widely recommended as a screening tool for anxiety and depression  
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40 given its excellent simplicity, good sensitivity (83%) and specificity (82%) indices, high  
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42 discriminating and evaluative capacity with regard to levels of severity, and high  
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44 convergent validity with other specific clinical instruments designed to assess anxiety  
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46 and depression (Montón et al., 1993).  
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53 ***Procedure***

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55 After contacting the schools and obtaining their and parents' written consent for their  
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57 children to participate in the study, the researchers arranged a visit to administer the  
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59 scales.  
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1 The instruments were distributed to all participants in each class group. Participants  
2 were reminded that their collaboration was voluntary and anonymous. Each adolescent  
3 answered the scales individually and in silence while their classmates performed the  
4 same task. The researcher was present at all times to resolve any problems and answer  
5 any questions that might arise. When the participants finished, they waited for others to  
6 finish before all administered instruments were collected.  
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16 The LSCh was given to the participants together with the example, the response sheet  
17 and the other evaluation instruments. They were then given detailed instructions on how  
18 to complete it and told that they would answer the questions from the other instruments,  
19 SWLS, SLSS and GADS, once the LSCh was completed.  
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### 28 *Data analysis*

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31 First, a Confirmatory Factorial Analysis (CFA) was performed for each of the multi-  
32 item psychometric scales used in the study in order to verify their fit with the sample  
33 used. The scales were then related to the current value each subject in our sample  
34 awarded to their own present subjective well-being (POLS) in the responses given to the  
35 LSCh, Structural Equation Modelling (SEM) being used for this purpose. The first  
36 model analysed correlations between scales in order to test the concurrent and divergent  
37 validity of the LSCh, while the second analysed factorial loads and Squared Multiple  
38 Correlations (SMC) to determine the contribution of the POLS observed variable to  
39 each latent construct in the model.  
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56 The fit indices considered were the CFI (Comparative Fix Index), RMSEA (Root Mean  
57 Square Error of Approximation) and SRMR (Standardized Root Mean Square  
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1 Residual). We assumed that results higher than .950 for the CFI and results below .05  
2 for the RMSEA and SRMR are excellent, in accordance with Arbuckle (2010) and  
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4 Byrne (2016). According to some other authors, RMSEA values up to .08 represent  
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6 acceptable errors of approximation in larger samples (Browne & Cudeck 1993; Byrne  
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8 2016), while CFI values greater than .90 reflect acceptable fit to the data.  
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14 We analysed the Squared Multiple Correlations (SMC) obtained with this model  
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16 because they indicate how accurately each variable is predicted by the other variables in  
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18 the model (Arbuckle 2010; Byrne 2016). Additionally, the remaining % variance is  
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20 accounted for by its unique factor *error*. If *error* represented measurement error only,  
21  
22 we could say that the estimated reliability of the variable is the value displayed for each  
23  
24 variable SMC. Therefore, each SMC value is an estimate from the lower band of  
25  
26 reliability relating to its variable (Arbuckle 2010; Byrne 2016).  
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34 Finally, we analysed how the responses of both sexes compare, as well as the  
35  
36 correlations and standardized weights of the multigroup SEM for each of the sexes. In  
37  
38 order to meaningfully compare statistics across groups, the measurement invariance of  
39  
40 the model was tested. When any constraint is added to a model, a change in the CFI of  
41  
42 more than .01 is considered unacceptable (Chen 2007; Cheung & Rensvold 2002). All  
43  
44 calculations were made using the AMOS 21 program.  
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## 50 **Results**

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53 The CFA performed on the SWLS scale to check its correct functioning with this  
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55 sample revealed excellent fit indices (Model 1 in Table 2). The Cronbach's alpha was  
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57 .790.  
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2 The CFA performed on the initial model of the SLSS showed an excessively high  
3  
4 RMSEA (Model 2 in Table 2), so we proceeded to analyse the possibilities of  
5  
6 improving its fit using the modification indices provided in AMOS 21. A model in  
7  
8 which the two negative items on the original scale were eliminated showed excellent fit  
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10 indices (Model 3 in Table 2), and was therefore the one used in later SEMs in this  
11  
12 study; it was given the name SLSS5. The Cronbach's alpha for this modified version  
13  
14 was .836.  
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21 The CFA performed on the initial model for the GADS scale, composed of two  
22  
23 correlated dimensions (anxiety and depression), showed excessively poor fit indices  
24  
25 (Model 4 in Table 2), so we proceeded to analyse the modification indices, observing  
26  
27 that by adding three error covariances the fit was good enough (Model 5 in Table 2).  
28  
29 The Cronbach's alpha for GADS-anxiety was .700 and for GADS-depression.677.  
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36 *Insert Table 2 around here*  
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#### 41 *Convergent validity*

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43 After checking the fit of each of the multi-item psychometric scales used here, they  
44  
45 were incorporated into a single SEM and correlated with each other and the observed  
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47 POLS variable (Figure 2). After adding a error covariance between item 6 of the SLSS5  
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49 and item 4 of the SWLS the model showed sufficiently acceptable fit indices (Model 6  
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51 in Table 2).  
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2 As expected, the SLSS5 and SWLS displayed a high correlation with one another ( $r$   
3  $=.917$ ;  $p<.001$ ), since they are in fact very similar scales, as has been pointed out.

4  
5 Additionally, the two GADS dimensions (anxiety and depression) also displayed a very  
6  
7 high correlation with one another ( $r=.886$ ;  $p<.001$ ).

8  
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11 The correlations between the observed POLS variable and the model's latent variables  
12  
13 were moderate in all cases with both the SWLS ( $r=.399$ ;  $p<.001$ ) and SLSS5 ( $r=.449$ ;  
14  
15  $p<.001$ ), which indicates a moderate convergent validity with the multi-item subjective  
16  
17 well-being scales used.  
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#### 24 *Divergent validity*

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26 The correlations between the SLSS5 and the two GADS dimensions were negative and  
27  
28 moderate: being  $r=-.596$  ( $p<.001$ ) with GADS-depression and  $r=-.500$  ( $p<.001$ ) with  
29  
30 GADS-anxiety. The same happened between the SWLS and the two GADS dimensions:  
31  
32 being  $r=-.592$  ( $p<.001$ ) with GADS-depression and  $r=-.448$  ( $p<.001$ ) with GADS-  
33  
34 anxiety. In addition, the correlations between the POLS and the two GADS dimensions  
35  
36 were  $r=-.407$  with GADS-depression and  $r=-.233$  with GADS-anxiety, with a  
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41 significance level of  $p<.001$  for both.  
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46 The correlation between POLS and GAD-depression is very similar in absolute terms  
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48 from those observed with the SLSS5 and SWLS scales, which suggests a good  
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50  
51 divergent validity of the POLS with the depression measures. However, its correlation  
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53 with GAD-anxiety was lower than that observed with the SLSS5 and SWLS.  
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56 *Insert Figure 2 around here*

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### *Factor loadings*

When relating the observed exogenous POLS variable to the latent variables considered endogenous, we observed that factor loadings were relatively high in relation to the SLSS5 ( $r=.449$ ;  $p<.001$ ), SWLS ( $r=.399$ ;  $p<.001$ ) and GADS-depression ( $r=-.407$ ,  $p<.001$ ), while they were moderate with GADS-anxiety ( $r=-.233$ ,  $p<.001$ ). In parallel, the Squared Multiple Correlations (SMC) showed that the variance of the SLSS5 explained by the POLS was 20.2%; this figure was 16% for the SWLS, 16.5% for the GADS-depression and 5.4% for the GADS-anxiety (Figure 3).

*Insert Figure 3 around here*

### *Differential analysis by gender*

Table 3 shows the mean scores observed by gender for each of the SWB indicators used here (POLS, SWLS and SLSS5), anxiety (GADS-A) and depression (GADS-D) after linearly transforming their global values to facilitate visual comparison.

*Insert Table 3 around here*

With the sample used here, consistently higher scores were observed for boys than for girls in all SWB indicators, while higher scores were observed for girls than boys in levels of both anxiety and depression.

These differences were significant in all cases, as indicated by the results of the t comparison tests. Specifically, for the POLS ( $t=77,19$ ;  $p<.001$ ), SLSS5 ( $t=184,3$ ,

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p<.001), SWLS (t=108,6; p<.001), GADS-A (t=54.11; p<.001) and GADS-D (t=40.22; p<.001). However, the effect measure is small (d= 0,14 for the POLS).

The results of the multigroup SEM by gender reflect that both groups answered all items on the SWB indicators used here, including the POLS, with comparable response styles, the model displaying a good fit with constrained loadings and constants (Models 7, 8 and 9, Table 2). CFI values displayed changes of less than .010 with each new constraint, indicating that correlations, regressions and the mean values of the variables are comparable between the two groups.

When relating each latent variable of each psychometric scale used here with the POLS the factor loadings were similar, although they were somewhat higher for girls with regard to GADS-depression, and for boys in the other cases (Table 4). The correlations between the variables analysed here were relatively similar for both genders. The correlation between the POLS and GADS-depression was slightly higher among women, while correlations between the POLS and all other scales was slightly higher among boys. It is worth noting the marked difference observed between boys and girls in the correlation between GADS-depression and GADS-anxiety.

*Insert Table 4 around here*

In summary, the POLS displayed a good consistency by reflecting results congruent with the other two SWB measurement instruments used here, even when differentially analysing the statistics obtained for each gender.

## Discussion

This work addressed various aims related to measuring life satisfaction in adolescence:

1.- The first and most important aim was to present the POLS (Present Overall Life Satisfaction), an indicator of life satisfaction that includes the perspective of the personal historical time axis as an notable facet of SWB (Casas & Frønes, 2019), and overcomes some of the limitations associated with instruments evaluating SWB, including the following: difficulties with verbal comprehension of the multi-item scales and applying and comparing them in different sociocultural environments, as well as the lack of framing or prior positioning of subjects when considering how satisfied they are with their life at the present time. In this sense, the POLS indicator incorporates into traditional scales a prior exercise comprising a retrospective review of subjects' own biographies and a graphic representation of how their life satisfaction has evolved, specifically from the beginning of schooling up to the present day.

The results obtained in the present study show that on the one hand the POLS indicator displays a significant and positive correlation with the multi-item scales SWLS and SLSS and on the other that this correlation is moderate. This result comes as no surprise, given that a moderate correlation among SWB scales has already been identified in many research reports, including the following: Casas et al., (2013); Casas & González-Carrasco, (2018); Diener, et al., (1999); DeJonge, et al., (2014).

The POLS offers greater sensitivity than other scales in relation to ranking responses since it is an 11-point Likert-type scale (from 0 to 10) compared to the multi-item scales SWLS (from 1 to 5 points) and SLSS (from 1 to 7 points), and thus follows the recommendations of several researchers who highlight the improved sensitivity of SWB

1 scales, especially those addressing young adolescents accustomed to this interval of  
2 evaluation (Casas, et al., 2014; Casas et al., 2012; and Cummins & Gullone, 2000).  
3

4  
5 However, more importantly, the correlation between the POLS and the multi-item  
6 scales was expected to be moderate precisely because the former takes a different  
7 approach to the multi-item context-free scales (the SWLS and SLSS) by intentionally  
8 framing and contextualizing adolescents before obtaining their responses, expressly  
9 introducing a degree of correction with respect to previous scales. This element of  
10 correction and differentiation in the POLS with regard to the multi-item context-free  
11 scales comprises the use of subjects' own remembrances of their life pathway based on  
12 a reflection of the anchoring points they perceive on that pathway, inviting them to  
13 become aware of how their well-being has evolved over time and how this relates to the  
14 life events they have experienced.  
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31 2.- The second aim of this work was to test the POLS in relation to screening scales for  
32 anxiety and depression, which it is expected to display a significant and negative  
33 correlation with given they are addressing opposite constructs. The greater the life  
34 satisfaction, the lower levels of anxiety and depression and vice versa.  
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42 As expected, the data obtained in the present study showed a significant and high  
43 negative correlation between the POLS indicator and depression, and the same is true of  
44 the results obtained through the SWLS and SLSS scales.  
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50 Furthermore, a negative and significant correlation with anxiety was also obtained,  
51 although the POLS indicator displayed a lower correlation with this construct than the  
52 multi-item SWB scales used. This suggests that the POLS, like other SWB  
53 measurement scales, is measuring an opposite construct to that of depression, although  
54 this is not necessarily the case for anxiety, despite the very high correlation observed  
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1 between anxiety and depression (.890). In fact, Cummins (2014, page 644) noted that  
2 the results of all of his studies with large samples of the Australian population indicate  
3  
4 “there is no systematic relationship between levels of anxiety and SWB”. In respect of  
5  
6 this, the POLS is more sensitive and discriminating than the other scales, this being  
7  
8 another point in favour of the proposed indicator.  
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12 3.- Finally, the study aimed to present the levels of life satisfaction reported by  
13  
14 adolescents participating in the study and analyse their differences in terms of gender.  
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18 The results indicate, in both a clearly consistent and significant way, that the life  
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20 satisfaction scores obtained through the POLS and through the SWLS and SLSS multi-  
21  
22 item scales were higher among boys than among girls at Spanish secondary schools.  
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24 These significantly higher levels of dissatisfaction in adolescent girls are also associated  
25  
26 with their suffering higher levels of anxiety and depression than boys.  
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31 Gender differences in the sample studied in terms of life satisfaction and levels of  
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33 anxiety and depression may be a result of the interaction between the biophysiological  
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35 and socio-cultural factors present in adolescent development.  
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40 Among the former, we could mention the sharp increase in sex hormones (estrogen,  
41  
42 progesterone and testosterone), which, despite marking the onset of puberty for both  
43  
44 genders, are present in very different concentrations according to gender, there being  
45  
46 much higher testosterone levels in boys and estrogen and progesterone levels in girls.  
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50 The differential effect of these sex hormones according to gender has repercussions on  
51  
52 multiple levels, both in the appearance of physical changes associated with external  
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54 sexual characteristics and the maturation rate of brain structures such as the  
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56 hippocampus, the amygdala, the insula (involved in self-knowledge and empathy) and  
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58 the anterior cingulate cortex, which is responsible for complex emotions. The  
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1 architectural remodeling during the adolescent phase of sexual differentiation of the  
2 brain may underlie the sex differences in vulnerability to psychiatric disorders that  
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4 emerge during this developmental period (Ellis et al., 2019; Juraska, Sisk & DonCarlos,  
5  
6 2013).  
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10 Among the sociocultural factors that may be involved in these gender differences in life  
11 satisfaction and levels of anxiety and depression, we must mention cultural  
12  
13 conditioning, which establishes adolescents' perception of the body, beauty, affection  
14  
15 and sexual identity, meaning they can perceive themselves as meeting the standards of  
16  
17 "attractive teenager" for the opposite/their own gender to a greater or lesser extent. All  
18  
19 of this is related to the degree of self-esteem and acceptance within the peer group and  
20  
21 the opposite sex. To this we must add the fact that many societies impose culturally  
22  
23 specific and differentiated stressors between boys and girls. Thus, in many societies  
24  
25 girls are expected to be more emotionally sensitive (Rosenfield & Mouzon, 2013), to  
26  
27 show more empathy and understanding towards others (Matud, 2004), to be exposed to  
28  
29 more pressure regarding the appearance of their body (Haugen, Johansen &  
30  
31 Ommundsen, 2014; Rodríguez-Cano, Beato-Fernández & Llario, 2006) or to brood as a  
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33 coping strategy in the face of more externalizing strategies (Elliott, 2001; Nolen-  
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35 Hoeksema, Larson & Grayson, 1999).  
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## 49 **Conclusions**

50 The contributions of this work can be summarized as follows:  
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54 1.- The POLS is a promising new indicator for measuring SWB. It displays several  
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56 advantages over other traditional SWB instruments: on the one hand, it does not include  
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58 a battery of items that require certain literacy skills, thus avoiding the corresponding  
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1 cultural and comprehension difficulties; and on the other, it introduces a reflection and  
2 anchoring exercise prior to responding, which consists of reviewing life satisfaction  
3  
4 experienced from childhood to the present moment. This avoids the typical issue  
5  
6 associated with SWB scales of obtaining decontextualized responses.  
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10 2.- The POLS displays good convergent validity with the other SWB measurement  
11  
12 instruments used on the adolescent sample studied and good divergent validity with  
13  
14 respect to anxiety and especially depression. We are therefore able to assert that it can  
15  
16 be confidently used as an indicator of SWB in adolescent samples.  
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21 3.- The POLS displays moderate correlation values with the other SWB scales used  
22  
23 (SLSS5 and SWLS), suggesting that it does not evaluate exactly the same aspects. This  
24  
25 is presumably due to the incorporation of a time axis perspective, or subjects' prior  
26  
27 reflection on their personal biographical history in relation to life satisfaction. Future  
28  
29 research should aim to further specify which aspects it captures that may fall beyond the  
30  
31 scope of other instruments.  
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36 4.- Boys obtained higher levels of life satisfaction than girls in all of the SWB  
37  
38 instruments used in the study, while girls reported higher levels of anxiety and  
39  
40 depression than boys. These results highlight the need to study gender differences in  
41  
42 greater depth so as to prevent the level of unease detected among the female adolescent  
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44 group.  
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49 One limitation of this study is that, despite its size, the selected sample is not  
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51 representative of the Spanish adolescent population. The levels of satisfaction, anxiety  
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53 and depression are therefore not generalizable to other adolescent groups.  
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1 Due to the inclusion of the personal and historical contextualization exercise when  
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3 using the LSCh instrument, it seems reasonable to conclude that, while it measures core  
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5 aspects of SWB, the POLS indicator also captures different aspects than those detected  
6  
7 using traditional indicators based on context-free scales. Evidently, far more research  
8  
9 can be done to gather more data in this regard. By way of summary, the POLS  
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11 overcomes some of the inconveniences associated with many scales used with  
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13 adolescents, opening up an interesting and promising path to better understanding the  
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15 possibilities and different nuances of how they evaluate their overall life satisfaction.  
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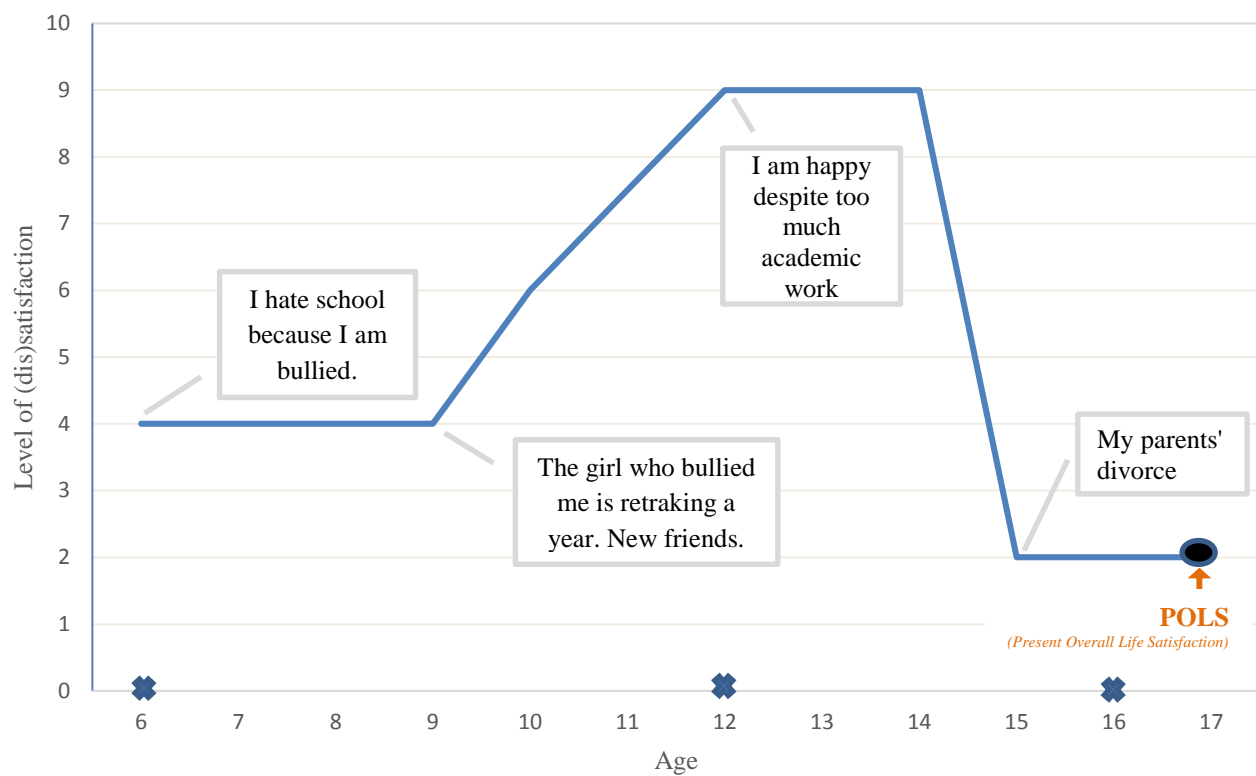
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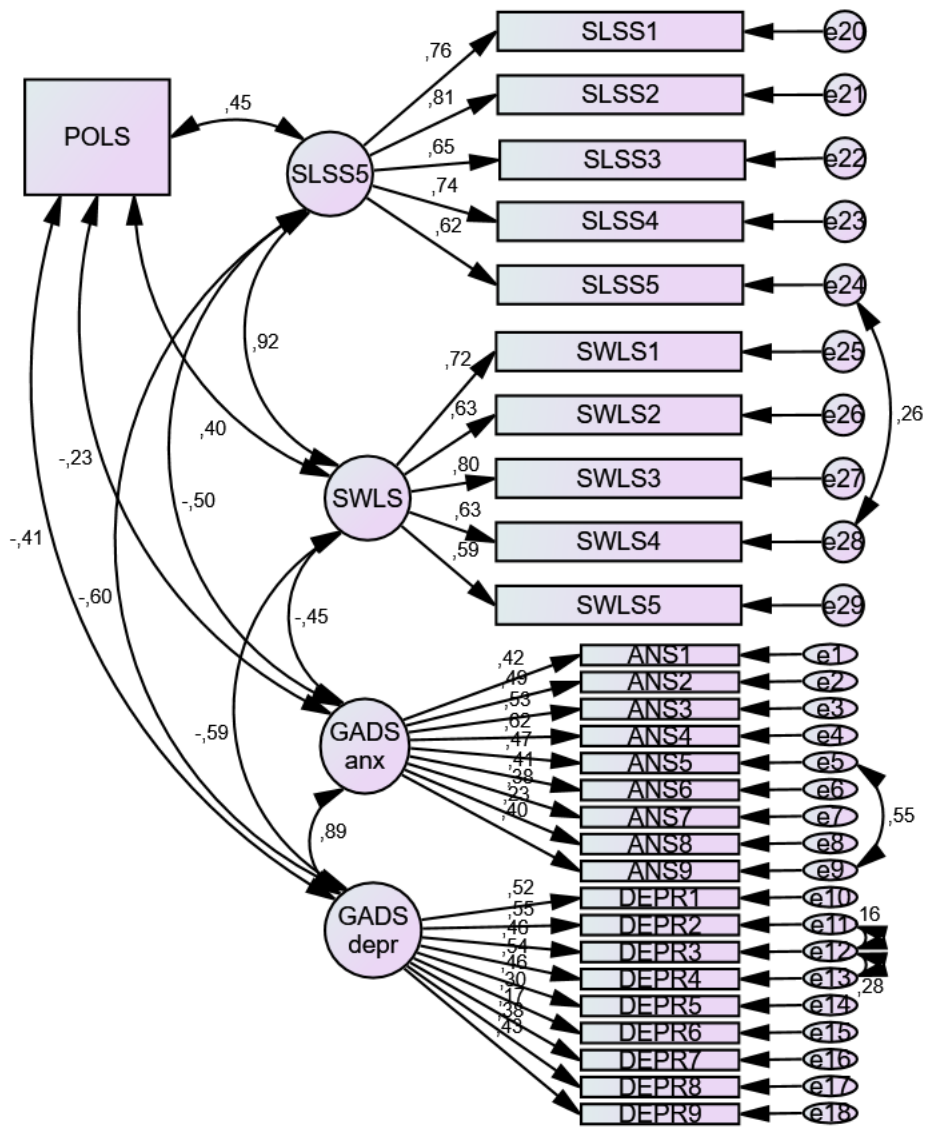
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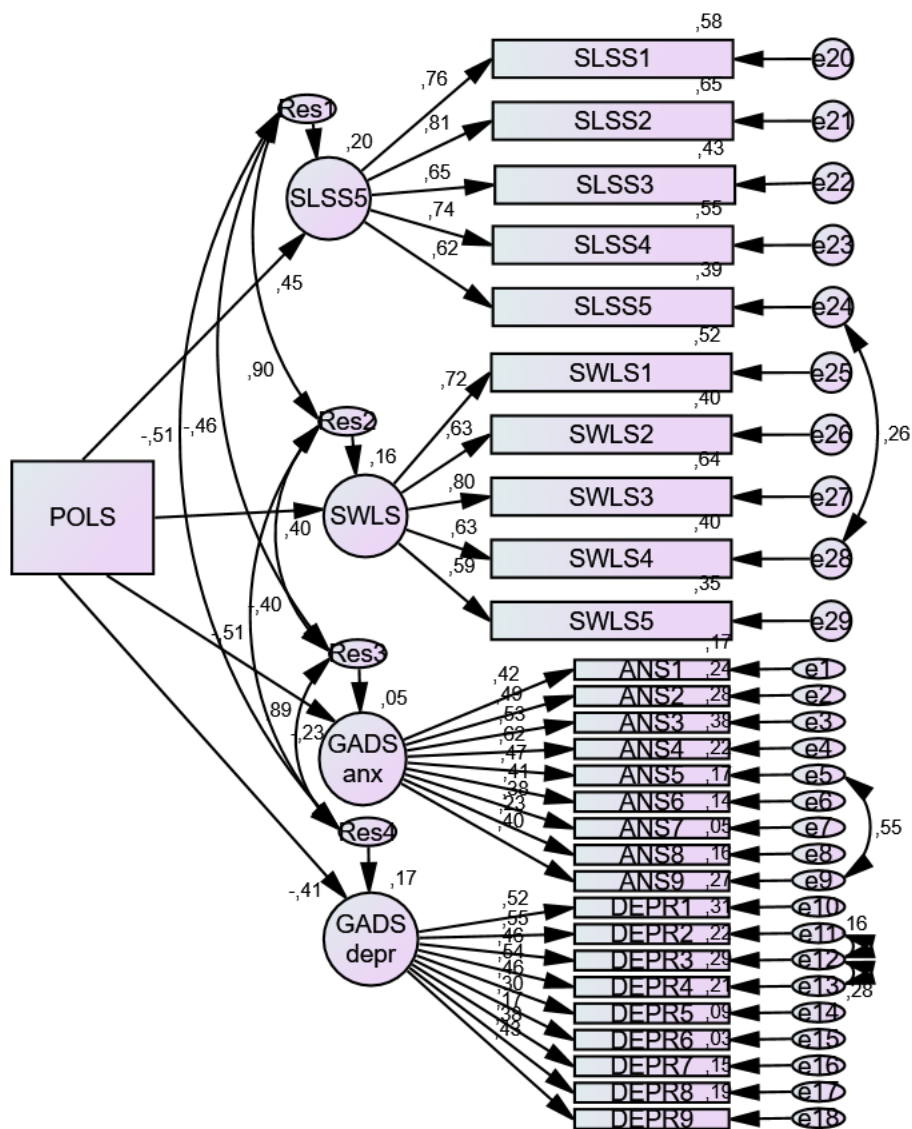


**Figure 1. Life Satisfaction Chart (LSCh) response sheet administered to adolescents, with sample response**



CHI=628,458;CFI=,945;RMSEA=,034; SRMR=.043

Figure 2. Path diagram for SEM of correlations between the latent variables of the four scales used in the study and the POLS



CHI=628,458;CFI=,945;RMSEA=,034; SRMR=.043

Figure 3. Path diagram of the SEM of factor loadings and Squared Multiple Correlations when relating the POLS with the latent variables related to each of the psychometric scales used.

**Table 1. Characteristics of the sample**

		<b>Boys</b>		<b>Girls</b>		<b>Total</b>	
		N	(%)	N	(%)	N	(%)
<b>Age</b>	16	118	(19,22)	186	(30,29)	304	(49,51)
	17	111	(18,08)	131	(21,34)	242	(39,42)
	18	23	(3,75)	31	(5,05)	54	(8,80)
	19	5	(0,81)	9	(1,46)	14	(2,27)
<b>Total</b>		257	(41,86)	357	(58,14)	614	(100,00)



**Table 2. Fit statistics of the CFA of the multi-item scales used in this study**

<b>Model</b>	<b><math>\chi^2</math></b>	<b>df</b>	<b>p-value</b>	<b>CFI</b>	<b>RMSEA (conf interv)</b>	<b>SRM R</b>
1 SWLS	6.77	5	.238	.998	.024 (.000-.065)	.016
2 SLSS Inicial (7 ítems)	73.88	14	.000	.956	.084 (.065-.103)	.042
3 SLSS5 (5 ítems)	4.47	5	.483	1	.000 (.000-.053)	.012
4 GADS (2 correlated latent variables)	515.07	134	.000	.784	.068 (.062-.074)	.056
5 GADS (2 correlated latent variables + 3 error cov)	246.11	131	.000	.935	.038 (.031-.045)	.042
6 SLSS+SWLS+GADSanx+GADS depr correlated to BS-present (+4 error cov)	628.63	364	.000	.945	.034 (.030-.039)	.043
7 Modelo 6 multi-group by Gender. Unconstrained	1028.60	728	.000	.937	.026 (.022-.030)	.056
8 Modelo 6 multi-group by Gender. Constr. Loadings	1065.09	752	.000	.934	.026 (.022-.030)	.061
9 Modelo 6 multi-group by Gender. Constr load & interc	1127.86	776	.000	.926	.027 (.024-.031)	.060

**Table 3. Indices of the psychometric scales used, linearly transformed to scales of 0-100. Mean scores and standard deviations by gender.**

	<b>Boys</b>		<b>Girls</b>		<b>Total</b>	
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>
POLS on 100	70.32	21.09	66.64	22.35	68.18	21.89
SWLS on 100	66.19	17.23	62.15	18.97	63.84	18.35
SLSS5 on 100	58.95	14.25	55.84	14.80	57.14	14.64
GADSanxiety100	50.41	25.67	60.91	23.81	56.51	25.12
GADSDepression100	36.66	23.73	45.44	25.19	41.77	24.95

**Table 4. Correlations and factor loadings for the latent variables of each psychometric scale related to the observed POLS variable for each gender in a multigroup SEM with constrained loadings and intercepts (Model 9 in Table 2).**

			<b>Boys</b>	<b>Girls</b>	<b><math>\Delta</math></b>	
SLSS-5	<---	POLS	,457	,437	.020	↓
SWLS	<---	POLS	,397	,390	.007	↓
GADS-Anxiety	<---	POLS	-,229	-,216	.013	↓
GADS-Depression	<---	POLS	-,400	-,404	.004	↑
SLSS-5	<-->	SWLS	,895	,901	.006	↑
SWLS	<-->	GADS-Anxiety	-,420	-,374	.046	↓
GADS-Anxiety	<-->	GADS-Depression	,972	,838	.134	↓
SWLS	<-->	GADS-Depression	-,495	-,524	.029	↑
SLSS-5	<-->	GADS-Anxiety	-,458	-,463	.005	↑
SLSS-5	<-->	GADS-Depression	-,460	-,541	.019	↑