

Measurement of School Happiness: An Analysis from the SOPHIE Model in Schools in Colombia

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Abstract

Objective: To design and validate a multidimensional instrument to measure school happiness in Colombian adolescents. **Methods:** Instrumental study with 963 students (10–17 years) from two schools in Valle del Cauca, Colombia. A 37-item Likert (1–5) scale was developed; content validity was examined; an exploratory factor analysis (EFA) using generalized least squares with Promin rotation and parallel analysis ($n=200$) and an independent confirmatory factor analysis (CFA) ($n=200$) were conducted. Model fit indices (RMSEA, RMSR, TLI/CFI, GFI/NNFI), Cronbach's alpha, and convergent validity against a single-item happiness question were estimated. **Results:** The final version retained 23 items across five dimensions (relationships with friends; purposes and goals; relationship with family; diet; altruism), with total $\alpha=0.906$ (dimension alphas: 0.871; 0.798; 0.856; 0.768; 0.791), acceptable fit in EFA (RMSEA=0.059; RMSR=0.044; TLI=0.829; CFI=0.885) and CFA (RMSEA=0.063; RMSR=0.061; GFI=0.966; NNFI=0.899; CFI=0.912). No differences were found by sex or school ($p>0.05$). The strongest correlations with self-reported happiness were family, friends, and purposes. **Conclusions:** The instrument shows

a stable factor structure, high reliability, and convergent validity, and is useful for monitoring school happiness and guiding adolescent well-being interventions.

Keywords: School happiness; Adolescence; Instrument validation; Exploratory factor analysis; Confirmatory factor analysis; Reliability; Well-being.

Received: 08-April-2024 **Revised:** 06-May-2024 **Accepted:** 23-June-2024

Introduction

Adolescence is a critical moment in the evolutionary development of the human being, since during this period the person experiences a series of physical, psychological and social changes in their transition to adulthood. Psychologically, conflicts with parents and the development of a certain independence begin. And at the social level, strong relationships are established between peers and couple (Gaete, 2015).

If the school stage is taken into account as an environment where children and adolescents face difficult situations where they require their abilities to cope with them, for example, the school load can be a trigger for mental health problems such as anxiety or depression (Maturana & Vargas, 2015). In addition to this, the school stage can be an environment of social isolation, since it has been found that children who do not have friends are ignored by their peers, being excluded from the social circle (Lanza Escobedo et al., 2012).

In this context, assessing adolescent happiness is important, as it is related to better psychophysical health and longevity (Lukoševičiūtė et al., 2022), with higher self-esteem (Reddy et al., 2019) and fewer negative affects (Lyubomirsky & Lepper, 1999). Happiness can be defined as a complex emotional state characterized by positive feelings, satisfaction with life, and well-being, reflecting a subjective sense of satisfaction and joy (Barak & Achiron, 2009; Barboza et al., 2007; Flores, 2019; Szymanski, 2000). It is influenced by various factors, such as physical and mental health, personal strengths, self-perception and social dispositions (Barboza et al., 2007; Szymanski, 2000). Although happiness is predominantly subjective, it is associated with psychological and sociocultural traits rather than external factors such as age, gender, or wealth (Barboza et al., 2007). Therefore, this study aims to address happiness in adolescents and its measure, given the importance that this has for their well-being as they transition into adulthood.

In this sense, the family plays a fundamental role in the well-being of young people, especially if they are positive since they provide security and confidence, reducing the appearance of potential symptoms of anxiety and depression (Calderón Alfaro et al., 2023). The presence of fathers in the home is fundamental for the psychosocial development of young people, since it has been found that young people with absent fathers tend to be more violent from an early age (Reidelberger et al., 2021). In this sense, parents can provide emotional support that allows young people to develop better in society (Miller-Slough & Dunsmore, 2023).

On the other hand, adolescence begins a stage where young people establish personal relationships (Walsh & Nicholson, 2022). Relationships with friends are very important in the lives of young people, as they begin to forge an external bond with their family where they strengthen their confidence by allowing themselves to interact with their peers. It is said that friendship begins from a conversation that in many cases starts activities such as playing, in addition, having things in common speeds up the process of forming friendship (Lanza Escobedo et al., 2012).

In adolescence it is vitally important to develop good eating habits, since it is a stage where the young person requires important nutrients to perform physical activities, in addition, healthy eating implies a good state of health. (Vilaplana & Batalla, 2015). In the school stage, adolescents can strengthen their eating habits and adopt habits similar to those of their peers, finding that adolescents consume different foods according to their company, and, if they are in a state of loneliness, they can develop eating disorders (Osorio-Murillo & Amaya-Rey, 2011).

A life purpose in adolescents can generate a source of motivation for the young person to apply their skills responsibly; In addition, it is said that encouraging purpose in young people improves their lives and those of the people with whom they live (Bronk et al., 2010). It has been reported that adolescents with goals focused on themselves and others represent a balance between recognizing the importance of satisfying their own needs and the desire to help others; Likewise, this demonstrates a degree of maturity that can be developed through great social support and an education focused on subjective well-being. (Blau et al., 2019).

The instruments used to assess happiness in adolescents, such as the subjective happiness scale (Lyubomirsky & Lepper, 1999) and the Oxford Happiness Quiz (Hills & Argyle, 2002) They are very general, and do not allow us to determine in a specific

way the factors that determine happiness in young people. On the other hand, in Latin America, no instruments have been designed to allow an assessment of happiness in adolescents, so this study aims to provide a multidimensional test and provide information on its psychometric validity.

Methods

Sample

The sample was intentional and involved 963 adolescents from two schools in Colombia, from two schools in Valle del Cauca, aged between 10-17 years. From school A, 498 students responded to the instrument (mean age 15.1 years, SD = 1.2 years; 50.2% of girls) and from school B 495 students responded (average age 14.0 years, SD = 1.7 years; 51.8% of girls).

Data Collection Instrument

A survey was designed to evaluate happiness in adolescents (10-17 years), which contains the main elements that, according to the literature consulted, have a significant effect on psychosocial health and happiness in adolescence. A total of 37 questions were asked, such as "The relationship with my relatives is good", which were reviewed by two psychologists and two methodologists, to verify both the adequacy of the questions to the age of the respondents, as well as their validity in terms of the design and construction of the instrument. Similarly, the instrument was tested with a small sample of children and young people aged between 10-15 years to verify if there was difficulty with the interpretation of the questions and the use of the response scale. In this pilot test, no problems of understanding were found. To assess the respondents' questions, a 5-point Likert scale was used, ranging from "Strongly agree" (with 5 points) to "Strongly disagree" (with 1 point). All the questions were written in the affirmative, so that a higher score on the test implies a higher level of happiness.

To assess the concurrent validity of the proposed happiness instrument, the level of happiness in the sample was assessed with a single-question scale, similar to the approach employed by Abdel.Khalek (2006) with the question "*Do you feel happy in general?*" (Do you feel happy in general?). According to the author's results, the scale has good concurrent, convergent and divergent validity. For this study, the approach formulated was "My current life makes me happy", and the answer was with the same scale used in the instrument proposed in this work.

To collect the responses from the adolescents, a link was sent to access the online survey and thus answer all the items of the test.

Statistical data processing

For the factor analysis of the items of the instrument designed to assess happiness in adolescents, a random sample of 200 participants was prepared from the dataset. This was done in this way, since both samples are homogeneous in terms of age and sex. Prior to the next stage of the statistical analysis of the data, the distribution of the data, the coefficient of variation of the items and the reliability of the instrument were reviewed considering the total number of items.

An exploratory factor analysis (EFA) was performed with this random sample (Gorsuch, 1988; Izquierdo et al., 2014) and to select the factors a parallel analysis (Hayton et al., 2004; Timmerman & Lorenzo-Seva, 2011). Generalized least squares (GCS) were used to factor and promax rotation which assumes that the factors are correlated (Izquierdo et al., 2014). For the inclusion of the items in the factors obtained, the criteria suggested by Lloret-Segura et al. were used. (2014) which are mentioned below: a) that the factorial load of the item is equal to or greater than 0.4; b) that the value of the item's commonality is greater than 0.2, and c) that the item saturates in a single factor. Similarly, only factors containing at least three items were considered.

For the validation of the preliminary model obtained with the EFA, a confirmatory factor analysis (CFA) was applied (Fox, 2010) to another random sample of 200 participants. For the EFA, the mean square error of approximation (RMSEA), normalized root mean square (RMSR), Tucker-Lewis index (TLI) and the comparative fit index (CFI) were obtained. For the TFA, the RMSEA, the RMSR, the goodness of fit index (GFI), the CFI and the non-normalized Bentler-Bonnet fit index (NNFI) were obtained. All calculations were made with the JASP program (JASP Team, 2023).

Results

The preliminary review of the items indicated that they do not have a normal distribution (Kolmogorov-Smirnov test) and with coefficients of variation ranging from 21% to 41%. The reliability of the instrument taking into account all the items was 0.921. The Kaiser-Meyer-Olkin (KMO) test gave a value of 0.872, which is adequate (Kaiser, 1974). Bartlett's sphericity test was significant ($\chi^2 = 3460.05$, $df =$

666, $p < .001$), indicating that the matrix of correlations between variables is significantly different from an identity matrix and that factor analysis is appropriate. According to the EFA, six factors should be maintained (Figure 1, parallel analysis) that together explain 46.4% of the observed variance. However, factor 6 only contains a single item (Table 1), therefore, it was not considered for the conformation of the instrument. In this sense, only five factors were retained that explain 43.1% of the observed variability.

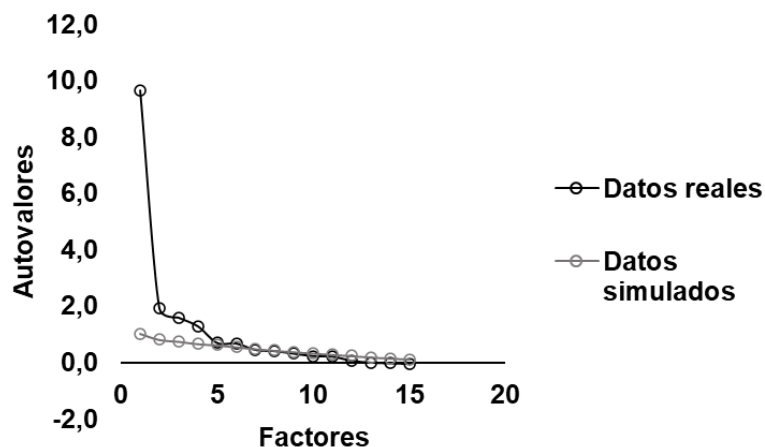


Figure 1. Sedimentation diagram of real and simulated data. In original Spanish language

Table 1. Factor loads for each item

Items	Factors						Commonality
	1	2	3	4	5	6	
19	0,911						0,641
20	0,823						0,691
8	0,777						0,552
25	0,681						0,506
12	0,565						0,553
13	0,552						0,479
5		0,946					0,797
4		0,829					0,619
32		0,716					0,507
33		0,635					0,442
18		0,552					0,611
17			0,762				0,564
16			0,569				0,601
27			0,563				0,579
30			0,527				0,451

1	0,515	0,309
14	0,784	0,449
24	0,757	0,588
34	0,696	0,371
6	0,527	0,312
37	0,852	0,620
31	0,774	0,539
35	0,684	0,513
10	0,746	0,387

For the EFA, the adjustment indices obtained were: RMSEA = 0.059; RMSR = 0.044; TLI = 0.829 and CFI = 0.885. According to the literature, these are acceptable values for the model with six factors (Ferrando & Anguiano-Carrasco, 2010; Harrington, 2008; Ruiz et al., 2010).

The adjustment indices obtained by applying the TFA were: RMSEA = 0.063; RMSR = 0.061; GFI = 0.966; NNFI = 0.899 and CFI = 0.912. The final instrument has a total of 23 items with a reliability level of 0.906. The reliability values for each of the dimensions are: relationship with friends 0.871; purposes and goals 0.798; relationship with the family 0.856; food 0.768 and altruism 0.791. Figure 2 shows the results by school for each of the dimensions and for the question on happiness. No significant differences were found in these variables when the school of origin and sex were used as categorical variables ($p > 0.05$).

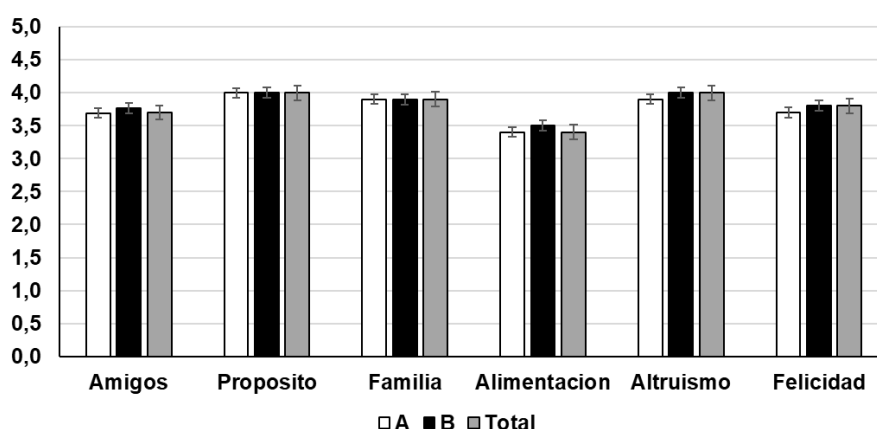


Figure 2. Average values and 95% confidence interval for the test results by school and total. In original Spanish language

According to the correlation analysis performed, what correlates most with self-reported happiness is the relationship with family, relationship with friends, and purposes and goals (see Figure 3).

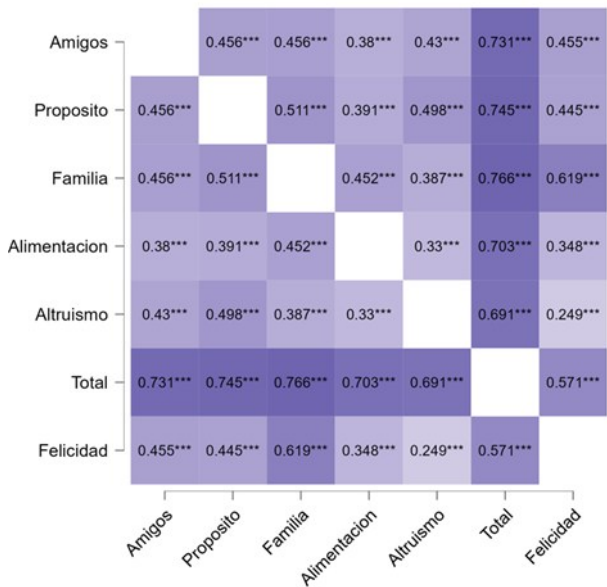


Figure 3. Spearman's correlation coefficients between the dimensions of the instrument and the level of self-reported happiness. *Note:* *** significant correlations at a level of $p < 0.001$, $N = 993$. In original Spanish language

Discussion

Instrument Properties

Happiness in adolescents is a multifaceted topic that encompasses emotional, psychological and social dimensions. This research contributes to understanding the factors that affect the happiness of adolescents, to promote their well-being and general development. In this sense, the factor analysis applied allowed us to identify factors that are relevant for their impact on the happiness of young people. The values of the fit indices for the five-factor model were adequate as reported in other studies (Romero-Ramos et al., 2021) and with a Cronbach's alpha that suggests reliability for the instrument and each of the subdimensions (Oviedo & Campo-Arias, 2005). In addition, the total score of the test converges to the assessment of self-reported happiness by adolescents.

Unlike other tests used to assess happiness in adolescents, such as the subjective happiness scale (Lyubomirsky & Lepper, 1999; Ruiz-Ariza et al., 2020) or the Oxford Happiness Quiz (Hills & Argyle, 2002; Talaeizadeh, 2020), the test developed specifically includes dimensions, such as the quality of social and family

relationships, purpose in life, diet and altruism that different studies have shown predict the level of happiness in adolescents.

Test dimensions

Various studies have found that the happiness of adolescents is related to the quality of relationships with their peers. Chui and Wong (2016) found that in a group of Hong Kong teenagers, happiness was associated with having very close friends. It has also been reported that teens' social relationships, including peer group affiliations, friendships, and romantic relationships, can predict social anxiety and depression (La Greca & Harrison, 2005). It can be noted that empathy is positively related to peer attachment and the quality or closeness of friendship in adolescents (Portt et al., 2020). In addition, sociocultural factors, such as gender, immigrant status, and socioeconomic background, have been found to influence adolescents' positive emotions at school, and peer relationships play a key role in fostering these relationships (Alivernini et al., 2019). Therefore, the good relationships that adolescents have with their peers allows them to cultivate and consolidate positive qualities and feelings that will contribute to their happiness.

The dimension that groups questions about family relationship was strongly correlated with perceived happiness (Figure 3). This result is consistent with studies suggesting that family functioning, including cohesion, communication, time spent together, and parental support, positively influences the happiness of adolescents in different cultures and age groups (Izzo et al., 2022; Schwarz et al., 2012; Telzer & Fuligni, 2009). Strong family bonds and supportive interactions are therefore universally important, although cultural contexts can modulate these relationships. In general, any instrument that aims to assess happiness must consider the family environment as a determining factor in the well-being of adolescents.

The dimension that takes into account the purposes of adolescents was also strongly correlated with perceived happiness (Figure 3). According to some studies, adolescent happiness is related to the types of goals and purposes they pursue, where a combination of goals focused on themselves and others tends to increase satisfaction and meaning with life (Blau et al., 2019; Yeager et al., 2012). International data indicate that the happiness ratings of adolescents are high (van de Wetering et al., 2010), which is consistent with the average rating reported in this study (Figure 2). Happiness at home, school and leisure are all contributors to

overall happiness, and are associated with different personal and contextual characteristics (van de Wetering et al., 2010). Adolescents' own goals in academics and physical activity can positively impact the level of happiness (Csibi & Csibi, 2019; Scherrer et al., 2020). The support of parents, teachers, and friends plays an important role in furthering these goals and their effect on adolescent well-being. The relationship between healthy eating and happiness in adolescents is an area of growing interest in research, especially because it has implications for public health. In this study, the final test contains questions about healthy eating, which correlate with the adolescents' perceived happiness. According to some studies, there is a strong link between healthy eating habits, such as regular consumption of fruits, vegetables, and breakfast, and increased happiness in adolescents (Fararouei et al., 2013; Kye et al., 2016). In addition, adherence to the Mediterranean diet and regular physical activity contribute to improving emotional well-being (Ferrer-Cascales et al., 2019). Taking diet into account in the assessment of happiness can help guide the promotion of healthy lifestyles to significantly improve the physical and mental health of adolescents.

Finally, a dimension that was not initially considered was incorporated into the instrument, and that is the one that groups questions that evaluate altruism. Altruism refers to persistent behavior that selflessly seeks to help others and includes elements such as empathy, social responsibility, interpersonal trust, and sociability (Lu et al., 2020). Among adolescents in South Korea, Japan, and China, benevolence and altruism were positively associated with adolescents' reported happiness (Heo et al., 2019). It has also been found that adolescents who do altruistic acts increase their positive affects while decreasing their negative affects (Tashjian et al., 2021) and have more satisfaction with life (Lu et al., 2020). In general, evaluating this behavior allows us to guide educational policies that encourage altruistic behaviors in adolescents that can have a positive impact on their emotional well-being and life satisfaction.

Conclusions

An instrument was designed for the measurement of happiness in adolescents that contains 23 questions and 5 dimensions. The factor structure showed adequate fit indices and the reliability of the instrument is excellent.

The correlation found between the dimensions and the subjective measure of happiness suggests convergent validity.

The application of the instrument to young people in schools indicated adequate levels of happiness. These preliminary data can serve as a basis for assessing the impact of educational policies that may condition the well-being of adolescents.

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