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Examining the Relationship between Subjective Well-being and Psychological Well-being among 12-Year-Old-Children from 30 Countries

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Abstract
Cross-cultural studies on the relationship between subjective and psychological well-being in children are still very limited. Consequently, proposing a model that considers the interaction of these constructs and examining its applicability in several countries would enhance the understanding of these phenomena in childhood. Thus, the objective of this study is to identify the latent relationship between subjective and psychological well-being, and to measure invariance in a sample of 12-year-old children from 30 countries. Through a quantitative methodology with a correlational design, we analyze data from 44,358 children who participated in the third wave of the International Survey of Children's Well-Being (ISCWeB), using Structural Equations Modeling (SEM). Results suggest that levels of subjective and psychological well-being are moderate and high, respectively, and point to significant differences in well-being indicators by country. In addition, subjective well-being is related to psychological well-being through a general adjustment model with oblique factors. Finally, the model of latent relationships presents metric invariance across nationalities.

Keywords Affect · Children · Overall satisfaction · Subjective well-being · Psychological well-being

1 Introduction

Well-being is a construct widely studied in recent decades, despite the evidence collected suggesting a complex composition (Diener et al., 2018). From an individual perspective, well-being is studied from two approaches. The first approach is Subjective Well-being (SWB), which focuses on the ability to experience the maximum amount of pleasure and happiness to reach an ideal state of well-being (Diener et al., 1985, 1999). This approach divides well-being into two components: an affective

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component that refers to the experience of positive affect (PA) and the absence of negative affect (NA), and a cognitive component that includes the evaluation of one's own life as a whole, i.e., overall life satisfaction (OLS) (Padrós Blázquez et al., 2012; Watson et al., 1988). This approach has been the most studied in recent years in children and adolescent populations, especially through research from the International Survey of Children's Well-Being (ISCWeB or "Children's Worlds"), which has promoted a significant increase of studies aimed at evaluating SWB in childhood and adolescence in different countries around the world (Ben-Arieh, 2019; Casas, 2011), whose results invite a deep review of the 'perception' concept applied to well-being in early stages.

However, despite this important increase, the number of studies on these ages still requires more evidence to show that theoretical constructions around well-being, generally theorized from adults' data, are replicable in children and adolescents (Casas & González-Carrasco, 2019; Nahkur & Casas, 2021; Opree et al., 2018). One relevant discussion revolves around the structure of SWB, the relationship between its affective and cognitive components, and the changes that these components may have at these ages (Casas, 2011; Diener et al., 2018). For example, some studies have shown that PA and NA are different from each other, but they are slightly correlated, so they cannot be considered opposites. The presence of this correlation has been confirmed in several studies in children (Casas & González-Carrasco, 2020), adolescents (Ben-Zur, 2003), and adults (Moreta-Herrera et al., 2021). In addition, it should be noted that the interaction between PA and NA is simultaneous, and the two constructs are not self-exclusive.

Different studies at these ages have also shown that the presence of PA is stronger than that of NA during childhood; however, as age increases (especially during adolescence) PA decreases while NA increases (Casas & González-Carrasco, 2020). Regarding the cognitive component of wellbeing, this is characterized by subjective assessments of life that are nourished by information from the context over time. These assessments are compared with the notion of "ideal life" to identify how close these two constructs are, and thereby have an assessment of current life (Diener, 2000; Diener et al., 1985). Therefore, the cognitive component is usually more stable than the affective component over time (Moreta-Herrera et al., 2023; Rees, 2018). PA, NA, and OLS are relatively independent from each other (Zuckerman & Diener, 2017) but significantly associated (Bastian et al., 2014; Casas & González-Carrasco, 2020; Torres-Salazar et al., 2020; Yánez-Ramos & Moreta-Herrera, 2020). This has led to the belief that this form of well-being is characterized by a multidimensional tripartite structure (Busseri & Sadava, 2011; Lucas et al., 1996), which has been observed mainly in the adult population.

Concerning the children and adolescent population, studies of the Children's Worlds project, among others, have generated an important debate about the instruments that better capture SWB, especially the cognitive component, during these stages of development and in diverse cultural contexts (Casas, 2017). In this sense, cross-national and cross-cultural studies have concluded that models are necessary that include several SWB measures rather than a single scale (Kaye-Tzadok et al., 2019). From this perspective, a certain consensus has been reached on how to assess the cognitive component of SWB to better measure it in children and adolescents from different countries and different cultural contexts by: 1) assessing overall life

satisfaction with a single item or a context-free multi-item scale and, 2) evaluating the most-relevant life-domains of children and adolescents (Casas & Rees, 2015; Kaye-Tzadok et al., 2019). This allows for a more precise and objective measurement of the phenomenon.

To respond to this consensus, the studies conducted within the framework of the Children's Worlds project have incorporated a context-free single-item scale that assesses Overall Life Satisfaction (OLS), the context-free multi-item scale of CW-SWBS (Children's Worlds Subjective Well-Being Scale), and a scale that allows for evaluating the cognitive component through the satisfaction with different life domains called CW-DBSWBS (Children's Worlds Domain Based Subjective Well-Being Scale) (Casas & González-Carrasco, 2021). This has opened the debate about the need to contemplate SWB models with more complex structures than the traditional tripartite model applied in adult population. For example, tetrapartite models are necessary that comprise the domain-bases scales as a complement to the other traditional scales that measure the cognitive component of SBW. However, the inclusion of the scales raises concerns about the model that best reflects the structure of subjective well-being at these ages. In this sense, a review by Busseri and Sadava (2011) identified different structural conceptualizations of SWB, for example, three separate components, a hierarchical construct and a causal system between components, which shows the complexity of this construct. A recent study conducted by Savahl et al. (2021) within the framework of the Children's World Project, tested a hierarchical model including the four factors of SWB as first-order factors plus a second-order factor with children from the different countries of the project. As a result, adequate psychometric fits were observed. Nevertheless, more studies are necessary that demonstrate the different structural conceptualizations observed by Busseri and Sadava (2011) at these ages. It should be noted that these conceptualizations included different ways of assessing the cognitive component of SWB, as previously reported.

The second approach to well-being is Psychological or Eudaimonic Well-being (PWB), which considers that measuring well-being with the presence of happiness and satisfaction is insufficient. Rather, this approach supports the need of working on human potential, the development of capacities and internal strengths of individuals through the achievement of personal life goals, as well as care and self-realization processes (Ryff et al., 2021), essentially dealing with lasting and long-term happiness (McMahan & Estes, 2011). The most studied model of psychological well-being is the one developed by Ryff (1989ab), which comprises the factors of self-acceptance, environmental mastery, positive relations with others, autonomy, purpose in life, and personal growth (Ryff, 2014). The abundant data obtained from studies especially in adults has led to attempts to transfer the usefulness of this approach to adolescents and children, with relatively favorable results despite the need for further research.

Unlike SWB, PWB is less studied in children and thus the scientific literature on this topic is scarce. One of the main limitations to its appropriate study is that instruments are uncommon and difficult to adapt to children. Since the degree of abstraction of the items can complicate children's ability to understand and answer, especially younger children, the viability of the theoretical model

is challenged; furthermore, there is not enough evidence yet to confirm its applicability in children (Nahkur & Casas, 2021). Nevertheless, within the framework of the Children's Worlds Project, the Children's Worlds Psychological Well-Being Scale (CW-PSWBS) was recently developed. This scale based on the Ryff model (1989b) was adapted for children and adolescents. It has shown adequate psychometric properties when used in children and adolescents from different countries and cross-cultural contexts (Nahkur & Casas, 2021). This has allowed for more accurate measurements in this segment of populations in the face of this phenomenon, and has also encouraged new cross-cultural studies that compare both forms of well-being to identify the most appropriate conceptual structure of well-being that manifests during childhood and adolescence. In this sense, both the hedonic and eudaimonic approaches have provided a solid foundation for understanding individual well-being, despite following two different theoretical paths. However, these theoretic models are not mutually exclusive, and in many aspects, they seem to complement each other (Díaz et al., 2011; Garcia et al., 2017; Joshanloo, 2019; Yánez-Ramos & Moreta-Herrera, 2020). It is even hypothesized that SWB and PWB form a single construct, but this still requires more analysis and supporting evidence.

What is clear, at least within the adult population, is that SWB and its components are significantly related to PWB (Anglim et al., 2020; Díaz et al., 2015; Joshanloo, 2019; Kafka & Kozma, 2002; Torres-Salazar et al., 2020); but they are poorly related in adolescents (Brouzos et al., 2016; Garcia et al., 2017; Larzabal-Fernandez et al., 2023; Strelhow et al., 2020) and almost non-related in children (Opree et al., 2018). This rises several questions about the performance of SWB and PWB scales for children that need to be resolved, for example, the intensity changes in the emotional component of SWB (Casas & González-Carrasco, 2020) and the asymmetric development of PWB across age brackets (Springer et al., 2011). Similarly, it remains to be confirmed whether the theoretical structure of SWB and PWB is replicable in children or not, given that these models arise from studies in adults.

SWB (especially in the cognitive component) and PWB apparently vary according to certain cultural characteristics such as nationality and social representation of the individual—which seemingly shape cognitive judgments about the "ideal of life" that one should have (Garcia et al., 2017)—and socioeconomic status—since income, access to goods, services and resources influence well-being levels, and especially SWB levels (Diener et al., 2018). However, these apparent differences in SWB and PWB caused by cultural factors cannot be confirmed unless the invariance of the structural model of well-being is verified; without this, cross-cultural studies are unfeasible since they would have a bias that would affect the conclusions of the analyses. Therefore, this kind of research on children should be deepened to clear up these concerns, providing a significant response in the field of child well-being (Casas & González-Carrasco, 2021). In the future, better decisions should be made about research and application of psychology in children.

1.1 Present Study

As the literature suggests, different cross-cultural studies in adults have attempted to verify the relationship between two theoretical models of well-being (SWB and PWB). In these studies, strong correlations are observed between the models, regardless of the country of origin (e.g., Joshanloo, 2016, 2019). However, this type of research is scarce in children and adolescents. Furthermore, most studies on adults use the single-item scale (OLS) to assess the cognitive component of SWB, while there is an increasing tendency to use different types of scales with children and adolescents to ensure a robust assessment and improve comparisons between countries.

Based on previous literature, we hypothesize that there is a relationship between SWB and PWB, and that both form a consolidated structure; in addition, the contribution of SWB originates from a more complex structure where different scales are included that generate a more robust model than the traditional model identified in adults. Finally, we hypothesize that regardless of the country of origin, the interpretation mechanism of the relational model will not change in its essence. In this sense, the general objective of the study is to identify the relationship between SWB and PWB through an adjustment model in a sample of 12-year-old children from 30 countries, and to assess the measurement invariance of the relational model based on the nationalities of the participants.

2 Method

2.1 Design

This study is based on a quantitative methodology, with a descriptive and correlational design (Ato et al., 2013) that uses Structural Equation Modeling (SEM). We analyzed the levels of SWB and PWB, construct validity, and the relationship between SWB and PWB in a sample of 12-year-old children from 30 countries that are part of the International Survey of Children's Well-Being (ISCWeB).

2.2 Participants

The sample consisted of 44,358 children data from the database of the third wave of the International Survey of Children's Well-Being (ISCWeb). All participating countries obtained approval from an appropriate ethics committee in each of their jurisdictions before conducting the survey. More details of the sample collection procedure can be seen on the project website: www.isciweb.org. The sample is composed of 41% of boys, and 59% of girls. All of them were 12 years old at the time of the survey and came from 30 countries in Africa, South America, Asia, and Europe. The distribution of the sample by country, as well as by gender, can be observed in Table 1.

Table 1 Descriptive analysis by country of SWB and PWB scales

Country	*N*	*% B / G*	*PA* *M (SD)*	*NA* *M (SD)*	*OLS* *M (SD)*	*CW-PSWBS* *M (SD)*	*CW-DBSWBS* *M (SD)*	*CW-SWBS* *M (SD)*
Albania	1,161	48.8% / 51.1%	9.35 (3.83)	1.98 (8.17)	9.72 (1.00)	9.57 (5.30)	9.43 (5.25)	9.61 (5.79)
Bangladesh	1,007	43.5% / 56.2%	7.28 (6.33)	4.13 (8.16)	8.12 (2.37)	8.44 (9.15)	8.19 (8.54)	8.59 (11.13)
Belgium	1,044	48.8% / 49.3%	7.85 (4.25)	3.76 (6.44)	9.08 (1.40)	8.69 (7.64)	8.82 (5.75)	8.80 (9.06)
Brazil	896	45.4% / 52.9%	7.38 (7.06)	5.05 (8.25)	8.07 (2.66)	7.80 (12.83)	7.87 (9.15)	7.81 (15.28)
Chile	998	53.8% / 45.2%	7.56 (6.73)	4.41 (7.78)	8.36 (2.34)	7.83 (12.70)	8.38 (9.11)	8.19 (14.08)
Germany	1,453	–	5.85 (4.70)	3.75 (6.21)	8.58 (2.03)	8.05 (9.78)	8.58 (6.89)	8.30 (11.74)
Algeria	1,034	42.2% / 50.5%	8.35 (6.03)	3.20 (8.67)	9.08 (2.18)	8.79 (10.25)	8.79 (9.22)	8.85 (12.37)
Estonia	1,071	50.5% / 49.3%	7.71 (5.83)	4.22 (7.45)	8.65 (2.07)	8.21 (10.64)	8.46 (8.54)	8.13 (12.72)
Spain	1,981	50.3% / 49.7%	7.90 (4.84)	3.79 (6.94)	9.16 (1.53)	8.68 (8.00)	8.79 (6.55)	8.90 (9.13)
Finland	1,059	46% / 54%	7.67 (4.90)	4.06 (7.57)	8.68 (2.03)	8.39 (9.85)	8.73 (7.25)	8.54 (11.23)
Hong Kong	813	56.4% / 43.6%	6.86 (6.18)	4.86 (7.91)	7.90 (2.24)	7.34 (12.40)	7.67 (9.77)	7.28 (13.79)
Croatia	1,139	49.1% / 50.1%	8.24 (5.38)	3.58 (7.34)	9.16 (1.68)	8.70 (8.79)	9.02 (6.17)	8.81 (10.50)
Hungary	987	46.2% / 53.5%	8.11 (5.30)	3.51 (7.19)	8.89 (1.82)	8.27 (8.82)	8.93 (5.92)	8.73 (10.44)
Indonesia	7,983	48.5% / 50.8%	8.47 (4.64)	4.37 (7.36)	8.52 (1.80)	8.28 (8.79)	8.38 (7.05)	8.66 (9.01)
Israel	1,421	49.9% / 49.9%	8.28 (5.46)	4.37 (8.00)	9.23 (1.79)	8.69 (9.15)	8.95 (7.59)	8.99 (10.00)
India	977	50.1% / 49.9%	8.10 (5.15)	4.40 (7.95)	9.05 (1.70)	8.96 (6.87)	8.55 (6.85)	9.02 (8.14)
Italy	1,166	50.3% / 49.7%	7.72 (5.31)	4.12 (7.51)	8.89 (1.70)	8.32 (9.68)	8.50 (7.06)	8.57 (10.52)
South Korea	3,364	49.7% / 50.3%	7.26 (5.39)	4.85 (7.19)	8.18 (2.05)	7.83 (10.89)	7.96 (8.72)	7.93 (12.31)
Sri Lanka	1,212	55.8% / 42.8%	8.05 (5.96)	3.67 (8.46)	8.84 (2.22)	8.84 (10.10)	8.65 (9.49)	9.03 (10.49)
Malta	666	60.5% / 39.5%	8.11 (5.50)	3.66 (8.03)	9.06 (1.91)	8.88 (9.82)	8.86 (7.82)	8.84 (11.19)
Namibia	1,094	40.4% / 59.6%	7.60 (6.41)	4.62 (8.05)	8.46 (2.38)	8.18 (9.81)	8.06 (8.98)	8.21 (12.85)
Norway	786	44.5% / 55.5%	7.41 (4.93)	3.60 (6.29)	9.07 (1.64)	8.59 (8.97)	9.02 (6.30)	8.91 (9.80)
Nepal	1,032	50.5% / 49.4%	7.85 (6.18)	3.41 (7.99)	8.48 (2.13)	8.40 (9.17)	8.32 (8.41)	8.63 (8.80)
Poland	1146	48% / 51.9%	7.34 (5.90)	3.95 (7.43)	8.65 (2.17)	7.91 (11.07)	8.52 (8.59)	8.15 (13.75)

Table 1 (continued)

Country	*N*	% *B / G*	*PA* *M (SD)*	*NA* *M (SD)*	*OLS* *M (SD)*	*CW-PSWBS* *M (SD)*	*CW-DBSWBS* *M (SD)*	*CW-SWBS* *M (SD)*
Romania	1125	48% / 46.3%	8.57 (4.84)	4.23 (8.20)	9.52 (1.17)	8.69 (8.32)	9.25 (5.11)	9.39 (6.99)
Russia	951	49.6% / 50.4%	7.71 (6.25)	4.63 (8.67)	8.79 (1.87)	7.91 (13.13)	8.33 (8.93)	8.20 (13.37)
Taiwan	1499	49% / 50.8%	6.84 (6.46)	4.70 (7.41)	8.30 (2.11)	7.93 (11.93)	7.99 (9.39)	7.71 (13.97)
Vietnam	1075	52.9 / 46.8%	7.54 (6.02)	4.60 (8.23)	8.28 (2.19)	7.50 (11.57)	7.66 (8.90)	7.60 (13.47)
Wales	1582	47.7% / 52.1%	7.42 (6.35)	4.44 (8.08)	8.28 (2.47)	7.03 (11.72)	8.21 (9.82)	7.96 (14.69)
South Africa	3589	44.2% / 55.8%	8.19 (5.53)	4.24 (8.32)	8.83 (2.19)	8.59 (9.49)	8.55 (8.00)	8.80 (10.49)
Total	44,358	49% / 51%	7.85 (5.78)	4.17 (7.83)	8.68 (2.01)	8.41 (9.86)	8.46 (8.11)	8.52 (11.44)
ANOVA			184.18^{***}	70.65^{***}	63.37^{***}	98.94^{***}	86.13^{***}	95.72^{***}

*** $p < 0.001$; *N* sample size; *B* boys; *G* girls; *PA* Positive Affect; *NA* Negative Affect; *OLS* Overall Life Satisfaction Scale; *CW-DBSWBS* Children's Worlds Domain-Based Subjective Well-Being Scale; *CW-PSWBS* Children's Worlds Psychological Well-Being Scale; *CW-SWBS* Children's Worlds Subjective Well-Being Scale

2.3 Instruments

For this study, we used a context-free multi-item scale, namely the OLS single scale, a domain-based multi-item scale, and a Positive and Negative Affects scale. All these instruments assess SWB and are part of the International Survey of Children's Well-Being (ISCWeB). Additionally, to measure PWB, the ISCWeB incorporated a scale developed for the project that has been recently used in different countries (Nahkur & Casas, 2021).

Children's Worlds Positive and Negative Affect (CW-PNAS) Adapted from Russell's Core Affect Scale (Barrett & Russell, 1998; Russell, 2003), it measures positive affects (happy, calm, and full of energy) and negative affects (sad, stressed, and bored). The scale displays a one-factor structure and six items answered through a scale of 11 options between 0 ("never feel like this") and 10 ("always feel like this"), in response to the question "Check the box that best describes how you have felt over the last two weeks."

Overall Life Satisfaction (OLS; Campbell et al., 1976; International Wellbeing Group, 2013) It is a single-item scale ("How satisfied are you with your life as a whole?") that assesses general satisfaction with life. It is answered on a 11-option scale in which 0 ("Not satisfied at all") and 10 ("Totally satisfied").

Children's Worlds Domain-Based Subjective Well-Being Scale (CW-DBSWBS) The scale was developed based on the results of Seligson et al. (2003), and assesses subjective well-being in school children aged 8 to 12 years through satisfaction with different domains of life. The scale displays a one-factor structure and 5 items answered through a scale of 11 options between 0 ("Not satisfied at all") to 10 ("Totally satisfied").

Children's Worlds Subjective Well-Being Scale (CW-SWBS) It is a new version of the context-free multi-item SWB scale, based on the Student´s Life Satisfaction scale developed by Huebner (1991). It measures the level of satisfaction with life of schoolchildren. The scale presents a one-factor structure and 6 items answered through a scale of 11 options between 0 ("Not satisfied at all") to 10 ("Totally satisfied").

Children's Worlds Psychological Well-Being Scale (CW-PSWBS) A scale adapted to assess psychological well-being in schoolchildren based on the postulates of Ryff (1989ab). The internal structure of the scale is unifactorial and consists of six items that are answered on a scale of 11 options that range from 0 ("Not satisfied at all") to 10 ("Totally satisfied").

2.4 Procedure

The International Project Children's Worlds (International Survey of Children's Well-Being: www.isciweb.org) is an international project in charge of collecting data on children's lives, with special emphasis on their well-being, to generate

proposals to promote this construct. Data collection was carried out by different research groups of the participating countries around the world, and approved by several ethics committees at the national level.

The data set used for this study was refined and prepared from the available database. Boys and girls who were not part of the 12-year-old age group were excluded, since not all of the instruments used were available to all age groups (8, 10, and 12 years old). The filtering also included the identification and exclusion of cases with high proportions of missing data and with systematic response patterns.

2.5 Data Analysis

We carried out data analysis through a series of blocks. The first block comprises a descriptive analysis of the scores of the CW-PNAS, OLS, CW-PSWBS, and CW-DBSWBS scales classified by country. We analyzed measures of central tendency such as arithmetic mean (M), and of dispersion such as standard deviation (SD).

In the second block, we analyzed the construct validity of the scales through Confirmatory Factor Analysis (CFA) to determine the level of fit of the participants' data with the pre-established construct of the measure, as well as internal consistency reliability to obtain the level of confidence shown by the scores. We used Maximum Likelihood with the robust standard errors (MLR) estimator in CFA due to the absence of the multivariate normality assumption (Li, 2016). The adjustments found in each of the measures are presented through absolute fit indexes such as Chi-Square (χ^2) and Standardized Mean Square Residual (SRMR), relative fit indices such as the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI), and non-centrality-based index such as the Mean Square Error of Approximation (RMSEA); in addition, the factor loadings or saturation (λ) of the items are also presented. An instrument is considered to have an adequate fit when it does not present statistical significance ($p < 0.05$) in χ^2 (although this indicator is sensitive to sample size); displays a CFI and TLI greater than 0.90; and its SRMR and RMSEA values are lower than 0.06 and λ greater than 0.40 (Brown, 2015; Byrne, 2008; Dominguez-Lara, 2018; Moreta-Herrera et al., 2022; Mueller & Hancock, 2018; Wolf et al., 2013).

The third block comprises the formulation of the general adjustment model (see Fig. 1) using Structural Equation Modeling (SEM) techniques to identify the level of latent relationship that the variables have with one another. The general fit model is analyzed according to the fit indices aforementioned and are expected to be adequate to determine the existing approximation between the theoretical and the empirical model. Finally, a Multigroup Confirmatory Factor Analysis (CFA-MG) with MLR estimation is performed to identify the measurement invariance of the general adjustment model by country. To accomplish this, based on the CFA baselines, we added restrictions through nesting (metric, strong and strict) to determine the differential (Δ) in fit indices (χ^2, CFI, RMSEA). Differentials are expected to be non-significant in χ^2 (although this may vary due to group sample sizes), ΔCFI to be > -0.01 and ΔRMSEA ≤ 0.01 or ΔCFI to be > -0.002 and ΔRMSEA ≤ 0.007 (Asparouhov & Muthén, 2014; Brown, 2015; Chen, 2007; Meade et al., 2008).

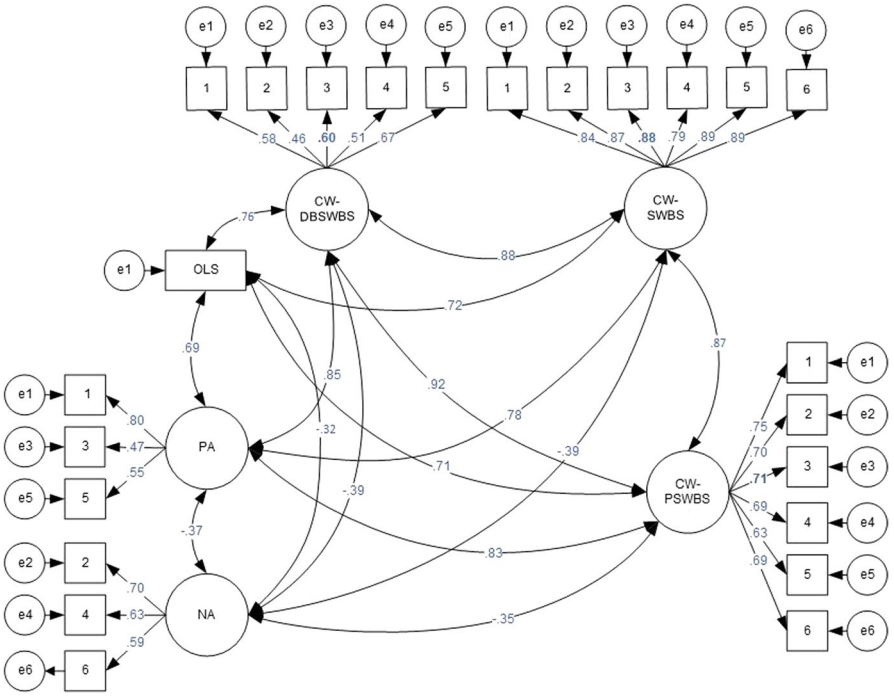

Fig. 1 General adjustment model of positive and negative affects with overall life satisfaction, life domains of subjective well-being and psychological well-being. Note: *PA: Positive Affect; NA: Negative Affect Scale; OLS: Overall Life Satisfaction Scale; CW-DBSWBS: Children's Worlds Domain-Based Subjective Well-Being Scale; CW-PSWBS: Children's Worlds Psychological Well-Being Scale; CW-SWBS: Children's Worlds Subjective Well-Being Scale. The squares correspond to the observable variables that are the items, while the circles correspond to the latent variables. The values of the unidirectional arrows correspond to the saturations of the items, while those of the bidirectional arrows are the values of the covariances*

Data management was carried out using the R software version 4.02 (R Core Team, 2019) through the Lavaan, Foreign, SemTools, MNV, and MBESS packages.

3 Results

3.1 Descriptive Analysis

Table 1 shows the total mean and mean by country on the CW-PNAS, OLS, CW-DBSWBS, CW-PSWBS, and CW-SWBS scales. Regarding the affective dimension, all children presented higher levels of PA than NA. Children who expressed the highest levels of PA came from Albania, while the lowest levels were found in children from Germany. In turn, children with the highest NA values were from Brazil, whereas children with the lowest presence of NA were from Albania. The greatest difference between PA and NA was found in children

from Albania, while the smallest difference was observed among children from Germany and Brazil. In the OLS and CW-SWBS, scores were high among participants. Albanian and Romanian children showed the highest levels of OLS and SWBS, while children from Hong Kong and Brazil displayed the lowest OLS scores and children from Hong Kong and Vietnam obtained the lowest SWBS scores. In the CW-DBSWBS scale, which measures the cognitive component of SWB, moderate-high levels were identified among children in the study. At the country level, the countries that showed the highest levels were Albania, followed by Romania, whereas the lowest levels on this scale corresponded to children from Hong Kong and Vietnam.

Finally, regarding the CW-PSWBS scale, which measures PWB, the global mean is moderate-high. Children from Albania and India showed the highest levels on this scale, while those from Wales and Hong Kong expressed less intense levels. In all cases, the mean scores achieved by the studied countries were higher than the median of the respective scales.

3.2 Construct Validity and Internal Consistency Reliability

Table 2 displays the results of construct validity analyses of the SWB and PWB scales through CFA using the MLR estimator. In all cases, the scales have an adequate fit for the sample analyzed. Concerning factor loadings, they are adequate, fluctuating between $\lambda_{(\text{ítem } 5)} = 0.46$ and $\lambda_{(\text{ítem } 2)} = 0.70$ for the PNAS scale; $\lambda_{(\text{ítem } 5)} = 0.64$ and $\lambda_{(\text{ítem } 1)} = 0.72$ in the CW-PSWBS scale; $\lambda_{(\text{ítem } 2)} = 0.52$ and $\lambda_{(\text{ítem } 3)} = 0.63$ for the CW-DBSWBS scale, and $\lambda_{(\text{ítem } 4)} = 0.78$ and $\lambda_{(\text{ítem 5 y } 6)} = 0.89$ in the CW-SWBS scale. Regarding the analysis of internal consistency reliability, in the case of the CW-PNAS, the internal consistency (α) and confidence intervals (95% CI) are within the acceptable limit, while the CW-PSWBS, CW-SWBS and CW-DBSWBS scales present adequate consistencies.

Table 2 Construct validity analysis of SWB and PWB scales

Scales	χ^2	*df*	*CFI*	*TLI*	*SRMR*	*RMSEA*	*α IC 95%*
CW-PNAS	1086.3^{***}	8	0.970	0.943	0.030	0.059 [0.056—0.062]	0.620 [0.615—0.672] 0.670 [0.667—0.678]
CW-SWBS	1086.4^{***}	9	0.981	0.968	0.017	0.054 [0.053—0.055]	0.941 [0.940—0.942]
CW-DBSWBS	203.3^{***}	5	0.987	0.974	0.017	0.031 [0.029—0.034]	0.703 [0.698—0.707]
CW-PSWBS	334.6^{***}	9	0.992	0.986	0.015	0.029 [0.027—0.030]	0.846 [0.844—0.848]

PNAS Positive and Negative Affect Scale; *CW-DBSWBS* Children's Worlds Domain-Based Subjective Well-Being Scale; *CW-PSWBS* Children's Worlds Psychological Well-Being Scale; *CW-SWBS* Children's Worlds Subjective Well-Being Scale

χ^2 Chi-square; *** $p < 0.001$; *df* degrees of freedom; *CFI* Comparative Fit Index; *TLI* Tucker-Lewis Index; *SRMR* Standardized Mean Square Residual; *RMSEA* Mean Square Error of Approximation; *α IC 95%* Cronbach Coefficient and Confidence Intervals at the 95% level

3.3 General Fit Model

The general adjustment model was obtained considering two proposals. The first one correlated PWB with SWB, considering the components of SWB as a latent variable in a hierarchical causal structure that followed the conceptualization proposed by Savahl et al. (2021). The results obtained showed that the fit of the model was not optimal, with values of $\chi^2 = 21{,}801.6$; $p < 0.001$; $df = 250$; $CFI = 0.92$; $TLI = 0.912$; $SRMR = 0.183$; $RMSEA = 0.047$ [0.046—0.048]. Therefore, it was considered inappropriate, especially due to the difficulty in estimating the absolute fit in a complementary way between χ^2 and SRMR (both overflow). The second proposal performed was a general adjustment model comprising the three components of SWB and PWB from the quadripartite approach of oblique factors (see Fig. 1).

In this article, the relationships among the components of SWB were significant, although they were greater between PA, Satisfaction with Life (OLS and CW-SWBS), and the Base Domains of SWB (CW-DBSWB), than between NA with PA, Satisfaction with Life, and the Base Domains of SWB. In essence, these elements form the quadripartite structure of SWB that presents a high and positive relation (PA, Life Satisfaction, and Life Domain) with PWB and a mild and negative relation with NA. The structural analysis through SEM showed that the general model of latent relationships between SWB-PWB displayed a good fit for the data provided by the boys and girls who are part of the study.

3.4 Measurement Invariance across Countries

Since the second proposal for the quadripartite model with oblique factors showed an adequate adjustment, a Multigroup Confirmatory Factor Analysis (MGCFA) was conducted to identify the measurement invariance by country. Specifically, Table 3 shows the MGCFA of the general adjustment model of latent relationships, clustered by the nationality of participants. The results show that the model had a good fit, with the slight exception of Nepal, whose fit was not optimal. The second segment of the table shows the results of measurement invariance. It is observed that as the restrictions (metric, strong, and strict) increase, the differentials in the adjustment indices exceeded the invariance tolerance. In that sense, it can only be considered that the proposed adjustment model of latent SWB-PWB relationships is invariant at the metric level.

4 Discussion

The objectives of the study were to explore the scores obtained by the participants in the SWB and the PWB scales used, the relationships between these constructs through SEM, and the measurement invariance across the 30 participating countries.

Regarding the intensity of the well-being indicators (see Table 1), both in SWB through its components (affective and cognitive), and in PWB, the scores were

Table 3 Measurement invariance analysis of the general adjustment model by country

Baseline and restrictions	*(df)* χ^2	*CFI*	*RMSEA*	$\Delta\chi^2$	*ΔCFI*	*Δ RMSEA*
Albania	(238) 462.4	0.921	0.043	–	–	–
Bangladesh	(238) 459.4	0.961	0.039	–	–	–
Belgium	(238) 720.9	0.932	0.062	–	–	–
Brazil	(238) 595.6	0.947	0.057	–	–	–
Chile	(238) 669.4	0.952	0.060	–	–	–
Germany	(238) 814.8	0.911	0.076	–	–	–
Algeria	(238) 442.2	0.952	0.043	–	–	–
Estonia	(238) 632.3	0.958	0.055	–	–	–
Spain	(238) 883.4	0.940	0.057	–	–	–
Finland	(238) 709.4	0.956	0.063	–	–	–
Hong Kong	(238) 708.7	0.952	0.065	–	–	–
Croatia	(238) 684.2	0.932	0.063	–	–	–
Hungary	(238) 1036.3	0.902	0.080	–	–	–
Indonesia	(238) 1295.6	0.974	0.033	–	–	–
Israel	(238) 733.8	0.930	0.060	–	–	–
India	(238) 515.9	0.919	0.042	–	–	–
Italy	(238) 604.5	0.962	0.050	–	–	–
South Korea	(238) 1814	0.957	0.059	–	–	–
Sri Lanka	(238) 532.1	0.950	0.049	–	–	–
Malta	(238) 490.2	0.946	0.056	–	–	–
Namibia	(238) 519.8	0.951	0.043	–	–	–
Norway	(238) 611.3	0.942	0.061	–	–	–
Nepal	(238) 1175.6	0.844	0.078	–	–	–
Poland	(238) 909.7	0.936	0.065	–	–	–
Romania	(238) 592.6	0.933	0.055	–	–	–
Russia	(238) 844.6	0.941	0.064	–	–	–
Taiwan	(238) 860.1	0.960	0.054	–	–	–
Vietnam	(238) 583.6	0.949	0.049	–	–	–
Wales	(238) 844.6	0.936	0.064	–	–	–
South Africa	(238) 795.2	0.961	0.036	–	–	–
No restrictions	(7140) 37574	0.946	0.040	–	–	–
Metric	(7662) 44239	0.935	0.043	(552) 3317.4***	0.011	0.002
Strong	(8213) 71818	0.875	0.057	(551) 24543.9***	0.059	0.014
Strict	(8358) 78678	0.860	0.060	(145) 4700.7***	0.015	0.003

*** $p < 0.001$; *df* degrees of freedom; χ^2 Chi-square; *CFI* Comparative Fit Index; *RMSEA* Mean Square Error of Approximation; *Δ* Delta

moderate and high. These results are consistent with similar studies in children both in SWB (Klocke et al., 2014) and PWB (Opree et al., 2018). It is estimated that these attributes usually present in this way in children. Particularly in SWB, PA is above NA, which is consistent with the findings of Casas and González-Carrasco (2020), who suggest that this characteristic is expected during this age; although as

the child grows (especially in adolescence), this dynamic seems to change and NA begins to manifest with greater intensity than PA.

From this descriptive analysis, it is noteworthy that children from Albania are the ones with the highest scores in well-being indicators, followed by those of Romania; while in the case of the lowest levels, the scores of Hong Kong´s children are recurrent or systematic. There are significant differences ($p < 0.05$) in all measures of children well-being by country. Authors such as Garcia et al. (2017) and Diener et al. (2018) do mention that cultural conditions associated with nationalities cause variation in these indicators (e.g., the academic requirement in children from certain Asian countries such as South Korea or Japan can make children feel less PA than children from other countries), which is consistent with the present study. However, the current evidence is limited, and further exploration of this aspect is required.

Regarding latent relationships (see Fig. 1), on the one hand, the affective component of SWB (PA and NA) and the cognitive component (measured through the OLS, the CW-SWBS and the CW-PSWBS scales) covary with each other, suggesting a marked association between these elements. These findings converge with similar reports by Bastian et al. (2014), Yánez-Ramos and Moreta-Herrera (2020), and especially, Casas and González-Carrasco (2020), who carried out a study with children aged 8 to 12 years, and established a view of SWB from the tripartite perspective (PA-NA-OLS). However, results also show that the fourth component (Domain-based Life Satisfaction) of the SWB harmonizes with the other components (especially with Life Satisfaction [CW-SWBS], without falling into multicollinearity); therefore, we confirm the existence of a quadripartite structure of SWB in the children of the study. This finding agrees with what was expressed by Diener (1984) and especially with the work of Savahl et al. (2021), who identified this structure traditionally reported in adults in children. This is relevant because satisfaction with specific life domains in children seems to be key to generate a more precise assessment of the cognitive component and SWB in general.

In turn, the fact that the quadripartite structure of SWB is related to PWB is relevant as it provides evidence of the complementarity between SWB and PWB in children. This relationship has been observed in studies with adolescents and adults (Anglim et al., 2020; Brouzos et al., 2016; Díaz et al., 2011; Joshanloo, 2019; Garcia et al., 2017; Kafka & Kozma, 2002; Yánez-Ramos & Moreta-Herrera, 2020; Strelhow et al., 2020; Torres-Salazar et al., 2020), and even in children but in a very limited way, with the work of Opree et al. (2018) as the only study addressing this population. Our findings provide more evidence for the existence of this dynamic in child population. However, it should be considered that these referential studies address SWB as a tripartite construct, while our results do so from a quadripartite structure; thus, this finding is pioneering in revealing this complementarity of SWB and PWB in a large sample of children worldwide. Along with this, this relationship is expressed through a general adjustment model with SEM techniques, which from the methodological point of view corrects certain biases caused by classic bivariate measurements, since these techniques work with the measurement errors of the items that make up the model (Byrne, 2008) and offer more precise results. Therefore, it provides a structural and global model of child well-being from a comprehensive perspective.

Regarding the treatment of SWB as a quadripartite model to covary with PWB in the study, we started with an oblique factor model with SWB indicators, as proposed by Joshanloo (2019), which proved to be more efficient than the approach of Savahl et al. (2021), (especially for SRMR). This difficulty in proposing a more complex but comprehensive interpretation model of SWB can be explained by several reasons. First, only 12-year-old children took part in our study, whereas the mentioned study of Savahl et al. covered a broader age range. Second, there may be differences in the interpretation of SWB due to the cultural, linguistic and social differences of each country. And third, the complexity of the general fit model led to significant fit difficulties. In this way, it is not prudent to rule out one model like the hieratical model or any other, since they are relatively new models that require further study and supporting evidence for the optimization of SWB interpretive models.

With respect to measurement invariance of the general adjustment model (Table 3), as the restrictions (metric, strong and strict) to the model increase, the differences (Δ) of the fit indicators (χ^2, CFI, RMSEA) exceed the tolerance at a second level, and therefore only metric invariance was found. Thus, each factor item contributes to the latent construction in a similar degree at all points by equating the loads. This indicates that the SWB-PWB relationship is widely shared between 12-year-old children in several countries as an attribute of this age, despite not being generalizable to all countries (e.g., Nepal). This is because certain social and cultural aspects of these countries (not included in this study) do not allow for the interpretation of the model variables in the same way as the rest of the groups. There is no preliminary evidence of equivalent studies of multi-country SWB-PWB models, and thus this finding is a novel to this field and its contribution is significant for the development of this line of research. However, more confirmatory studies are required not only among 12-year-olds but also in children of other ages and from other countries around the world, given that cultural differences affect the variability of child well-being scores to some degree, mainly for SWB (Diener et al., 2018; Garcia et al., 2017).

4.1 Conclusions and Implications

The results here obtained contribute with new information on the performance of child well-being indicators, the dynamics of affects (covariance), the quadripartite structure of SWB considering different scales of the cognitive component, such as the multi-item scales of SWB and the OLS, and the relationship between the SWB and PWB through SEM techniques. In this sense, the results of this study show the existence of a model that integrates the two forms of well-being (SWB and PWB) in 12-year-old children from different countries. Specifically, the model that presents an adequate fit is an oblique factor model. Conversely, the hierarchical model considering the different components of SWB as latent variables did not show an adequate fit compared to previous studies. We believe that this raises important concerns: 1) the inclusion of several scales in the same model can make the adjustment of a second-order model difficult, and therefore it is necessary to continue exploring different structural conceptualizations of models integrating SWB and PWB with data from children and adolescents; 2) the inclusion of PWB in the model can condition the relationships between different components of SWB. In this sense, it is

necessary to delve into the relationships of PWB with the different SWB scales, as studies relating both forms of well-being at these ages are still scarce.

The study presents significant implications at both theoretical and practical levels. The extensive study offers a broader view of child well-being by examining the hedonic and eudaimonic traditions, which are still under debate and analysis. However, the findings provide a comprehensive understanding of the functioning of these constructs across various countries.

At a practical level, the results of this study can be used as a reference point for developing evaluation processes, as the specific measures used have yielded valid criteria for assessing children's subjective well-being. Additionally, the findings can inform the development of intervention processes aimed at strengthening children's well-being, including psychological well-being, which is often overlooked. Furthermore, the study's insights can be used to design preventive and corrective assistance programs to address serious difficulties faced by children.

4.2 Limitations

The study has some limitations that should be considered for future studies. First, given the significant amount of data and prioritizing the analysis of the information related to the objectives of the study, the existing differences in well-being indicators by country were not explored in depth, so multi-country comparative studies should be carried out in the future to observe, for example, the impact of culture on changes in scores. Finally, a general adjustment model of the latent relationships between SWB and PWB was proposed; however, this study is not a search for the change in variance on the PWB or much less causality yet, and thus future explanatory studies are recommended that employ longitudinal regressions or experimental studies to provide more solid evidence to the study of children well-being.

Data Availability The data associated with these results are available to those interested and can be requested from the corresponding author of the study. It is important to note that the use of the same will be used solely for research and academic purposes and under no pretext for commercial purposes.

Declarations

Ethical Approval The project ethical approval was granted by the Universitat de Girona Ethics Committee.

Informed Consent Participant's parent/guardian provided written informed consent before participating in this study.

Conflict of Interest The authors report no conflict of interest.

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