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Opree, S.J.; Buijzen, M.; van Reijmersdal, E.A.

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Development and Validation of the Psychological Well-Being Scale for Children (PWB-c)

Suzanna J. Opree [1,*], Moniek Buijzen [2] and Eva A. van Reijmersdal [3]

[1] Erasmus School of History, Culture and Communication ESHCC, Erasmus University Rotterdam, 3000DR Rotterdam, The Netherlands
[2] Behavioural Science Institute BSI, Radboud University, 6503GG Nijmegen, The Netherlands; m.buijzen@maw.ru.nl
[3] Amsterdam School of Communication Research ASCoR, University of Amsterdam, 1001NG Amsterdam, The Netherlands; E.A.vanReijmersdal@uva.nl
* Correspondence: opree@eshcc.eur.nl

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Abstract: Research into children's psychological well-being is scarce and fragmented. To be able to study the predictors of children's psychological well-being and advance the field, a reliable and valid measure is needed. In studies among adults, psychological well-being (PWB) is commonly measured along six dimensions (environmental mastery, personal growth, purpose in life, self-acceptance, autonomy, and positive relations with others) using Ryff's PWB scale. Because the original scale was too abstract for use among children, we adapted its items to make them suitable for 8- to 12-year-olds. After a successful pretest, we conducted a pilot study (N = 157) and main study (N = 1877) to test the statistical properties of our Psychological Well-Being scale for children (PWB-c). Based on confirmatory factor analysis three versions were developed with, respectively, 24, 12, and 6 items. All versions were tested for internal consistency, test-retest reliability, and construct validity. We recommend using the 24- or 12-item versions of the scale, because they score high on all three criteria.

Keywords: psychological well-being; children; scale development; scale validation

1. Introduction

Research into children's well-being has taken a flight since the 1970s. Originally, such research was mainly conducted by governmental organizations, focusing on societal indicators such as child mortality and poverty rates. Yet, prosperous conditions in Western countries soon led the focus to shift to children's individual well-being [1]. Individual well-being research traditionally involves two distinct, yet overlapping paradigms [2]. The first paradigm is the hedonic paradigm, which focuses on *subjective* well-being. Subjective well-being consists of three components, being life satisfaction, the presence of positive mood, and the absence of negative mood. It pertains to a current state of mind [2]. The second paradigm is the eudaimonic paradigm, which focuses on *psychological* well-being. Psychological well-being refers to the cultivation of personal strengths, and the realization of one's true potential. As such, psychological well-being pertains to long-term and enduring happiness [3].

In order to detect both synergies and differences, it is important to study subjective and psychological well-being jointly [3–5]. Such an approach, however, has never been applied in research among children. Recent reviews indicate that most research into children's well-being has been conducted among adults, capturing parents' perception of their children's well-being while disregarding children's own experiences e.g., [6–8]. Admittedly, there is a wide range of validated subjective well-being scales for children, see [9]. However, children's psychological well-being remains an uncharted research area. Measuring children's psychological well-being is an important endeavor,

because it allows to investigate the link between children's subjective and psychological well-being, as well as the effectiveness of interventions that are designed to help children thrive [10]. By introducing and validating the Psychological Well-Being scale for children (PWB-c), we hope to provide academic and practical researchers with a tool that allows them to explore new aspects of children's well-being.

1.1. Development of the PWB-c

The PWB-c is developed for use among children between the ages of 8 and 12, a group that has received little attention in the well-being literature [1]. It is inspired by the original Psychological Well-Being scale of Ryff [11] which has been used in more than 500 published studies [12]. Using insights from philosophy and psychology, Ryff distinguished six dimensions of psychological well-being: environmental mastery, personal growth, purpose in life, self-acceptance, autonomy, and positive relations with others. Below we conceptualize each dimension and provide sample items from the original scale. Because the original PWB does not meet the methodological criteria set for surveys among children (in which difficult and/or abstract words, ambiguity, and negations should be avoided, and content validity should be assured by using age-appropriate examples) see [13,14], we constructed alternative items that are displayed in Table A1. These items were designed to resemble the meaning of the old set as close as possible. Below we explain how each dimension of psychological well-being may manifest itself among children (e.g., when do children experience environmental mastery?). These interpretations guided our translation.

1.1.1. Environmental Mastery

Environmental mastery pertains to the competence to manage one's environment and the ability to choose and create contexts suitable for one's needs [15]. In the original PWB this dimension is measured with items like "I have been able to create a lifestyle for myself that is much to my liking" and "In general, I feel I am in charge of the situation in which I live" [16]. For children, managing their environment entails making small decisions in everyday matters [17]. Environmental mastery can, therefore, be captured by asking children how often they make choices regarding their day-to-day life (e.g., time use, play dates, dinner).

1.1.2. Personal Growth

Personal growth refers to one's feelings of continued personal development [15]. It closely relates to self-actualization, which has been defined as 'the process of discovering the true self' ([18], p. 63). The original PWB measures personal growth with items like "I don't want to try new ways of doing things—my life is fine the way it is" and "There is truth to the saying that you can't teach an old dog new tricks" (both reversed) [16]. Although in-depth self-reflection develops late in childhood [19], young children show great potential for mental growth due to their inquisitiveness [20]. At the heart of personal growth is one's openness to new experiences [15]. Hence, children's personal growth can be assessed by asking them how often they like to engage in new experiences (e.g., visiting new places, meeting new people).

1.1.3. Purpose in Life

Purpose in life relates to one experiencing a sense of directedness and having goals in life [15]. The PWB measures purpose in life with items like "I enjoy making plans for the future and working to make them a reality" and "I live life one day at a time and don't really think about the future" (reversed) [16]. Generally, children are not long-term planners and tend to focus on the here and now [21]. However, many of them do like to contemplate about the future through daydreaming [22]. Asking children how often they do so (e.g., daydream about a future house or profession), may provide a good indication for their purpose in life.

1.1.4. Self-Acceptance

Self-acceptance entails having a positive attitude towards oneself [15]. It is closely linked to self-esteem, which is the extent to which people take pride in themselves [23]. The PWB measures self-acceptance with items like "In general, I feel confident and positive about myself" and "I like most parts of my personality" [16]. Children's self-acceptance can, thus, be assessed by asking how often they generally feel good (e.g., proud or happy) about themselves.

1.1.5. Autonomy

Autonomy consists of one's desire and ability to make independent decisions [15]. The PWB measures it with items like "My decisions are usually not influenced by what everyone else is doing" and "It is difficult for me to voice my opinions on controversial matters" (reverse) [16]. When it comes to autonomy, children require training. They can make minor decisions by themselves, but prefer to turn to their parents for guidance in big decisions [17]. Because the latter is a self-regulated decision, children's autonomy can be measured by asking how often they engage in individual and voluntarily shared decision making (e.g., making choices by themselves or actively asking for help when needed).

1.1.6. Positive Relations with Others

Positive relations with others pertains to one's warm and satisfying relationships with others. The PWB measures it with items like "I know I can trust my friends, and they know they can trust me" and "Maintaining close relationships has been difficult and frustrating for me" (reverse) [16]. In relationships with others, children find it important to spend time together and to be able to trust the other person [24]. Between the ages of 8 and 12, relationships with parents remain strong, but friendships with peers gradually intensify [25]. Thus, in order to properly measure children's positive relations with others, asking them about the nature of the bond with both their parents and peers (e.g., jealousy and trust) is imperative.

1.2. Validation of the PWB-c

The initial PWB-c item list was fine-tuned with a small group of experts in doing research with children. After consensus was achieved on the items' content and wording, the list was vetted in a focus group of children aged 8 to 12. These children were asked whether they understood and were able to answer all the 37 questions themselves and—more importantly—whether they believed that their peers were able to understand and answer the questions too. The latter strategy was used to allow children to make critical comments without losing face. After some small language adjustments, the PWB-c was first administered in a small-scale pilot study (n = 157, see Section 2). The subsequent validation of the PWB-c consisted of three steps in which its psychometric properties were assessed.

First, the factor structure of the PWB-c was verified using maximum likelihood estimation in structural equation modelling. Based on the theory of Ryff et al. [11,15,26], we modeled Psychological Well-Being to be a second-order construct with the six dimensions as underlying first-order constructs (see Figure A1). The factor structure of a model is confirmed when this model has a good fit to the data, which is indicated by a CFI-value of 0.95 or higher and a RMSEA-value of 0.08 or lower [27]. Essentially, these analyses show whether the theory that psychological well-being consists of six dimensions (i.e., environmental mastery, personal growth, purpose in life, self-acceptance, autonomy, and positive relations with others) holds true for children.

Second, the reliability of the PWB-c was assessed by determining the scale's internal consistency and test-retest reliability. Proper internal consistency is indicated by a Cronbach's alpha of 0.70 or higher, and test-retest reliability by Pearson's correlation coefficients of 0.50 or higher [28]. Third, the construct validity of the scale was examined by looking into the relation between the PWB-c and third variables. These correlations need to match the patterns found in earlier research [29]. After the analyses for the overall PWB-c were completed, the second and third step were repeated

for each dimension separately. This allowed us to determine whether the subscales for children's environmental mastery, personal growth, purpose in life, self-acceptance, autonomy, and positive relations with others could be used in isolation.

The core aim of the pilot study was to determine whether all 37 items were needed to measure children's psychological well-being. After its results indicated that 24 items sufficed, the shortened PWB-c was administered to a larger sample (N = 1877, see Section 3) in order to verify whether the previous findings regarding the scale's reliability and construct validity could be replicated.

2. Pilot Study

2.1. Sample and Measurements

Respondents for the pilot study were recruited at five schools located in different parts of the Netherlands. We administered paper-and-pencil questionnaires to all children in 7th grade (comparable to US 5th grade level). Children were informed that the questionnaire dealt with happiness, and that they could withdraw from the study at any time they wished. Prior to the implementation of the study, informed consent from both children and parents was obtained. The study was granted IRB approval. The questionnaire was administered twice by the same female researcher, with a two-week time period in between (Wave 1: N = 159; Wave 2: N = 163). The 157 children who participated in both waves were included in the final sample (54.8% girls; M_{age} = 9.93, SD_{age} = 0.56).

Apart from the PWB-c, the questionnaire contained a scale for subjective well-being which was based on the works of Huebner [30] and previously applied by Opree et al. [31] and Buijzen and Valkenburg [32]. Children were posed eight questions. In the first seven they were asked to indicate how happy they were with their lives, homes, parents, friends, classes, schools, and themselves. The eighth question asked how happy they felt overall. Children could choose from four answer categories: (1) *not happy*; (2) *not so happy*; (3) *a little happy*; and (4) *very happy*. Item scores were averaged to create scale scores (Wave 1: α = 0.84, M = 3.40, SD = 0.48; Wave 2: α = 0.84, M = 3.42, SD = 0.48).

2.2. Results

The aim of this pilot study was to assess the factor structure of the PWB-c and select which items from the full item list to include in the final scale. The fit of the original model, including all 37 PWB-c items, was $\chi^2(DF = 623, N = 150) = 1001.16$, p = 0.00, CFI = 0.66, RMSEA = 0.06 with p-close = 0.00. Because the CFI-value of the model was too low to be considered acceptable [27], we took three standard steps to increase model fit. More specifically, we (1) deleted variables with a non-significant factor loading and variables with factor loadings lower than 0.35, because these items are not relevant for the (sub)scale(s) [28]; and added correlations between error terms of variables with similar content based on (2) the modification indices (i.e., EPC-value $\geq$ 10.00) [27] and (3) the standardized residuals (i.e., for values ≤ -2.58 or ≥ 2.58) [33], because adding such correlations allows one to control for the fact that similar questions result in similar measurement error. With these steps, the fit of the model improved to respectively (1) $\chi^2(DF = 246, N = 150) = 381.08$, p = 0.00, CFI = 0.83, RMSEA = 0.06 with p-close = 0.07; (2) $\chi^2(DF = 244, N = 150) = 311.03$, p = 0.00, CFI = 0.92, RMSEA = 0.04 with p-close = 0.79; and, eventually, (3) $\chi^2(DF = 243, N = 150) = 300.55$, p = 0.00, CFI = 0.93, RMSEA = 0.04 with p-close = 0.87. The final model contained 24 items. This model had a superior fit to a one-factor model, $\chi^2(DF = 248, N = 150) = 578.56$, p = 0.00, CFI = 0.63, RMSEA = 0.09 with p-close = 0.00.

In addition to the 24-item PWB-c we developed two shorter versions (see Table A1). For each of the first-order constructs, we selected the items with the highest factor loadings. We selected two items per first-order construct to create the 12-item scale, and one item per construct to create the 6-item scale. The models for the shorter versions both resulted in a good fit to the data: For the 12-item scale, $\chi^2(DF = 49, N = 150) = 57.41$, p = 0.19, CFI = 0.97, RMSEA = 0.03 with p-close = 0.77; and for the 6-item scale, $\chi^2(DF = 9, N = 150) = 9.46$, p = 0.40, CFI = 0.99, RMSEA = 0.02 with p-close = 66.

The statistical properties of the three PWB-c scales are presented in Table 1. This table consists of three parts. The first part, "descriptive statistics," contains information on the scales' means and standard deviations, as well as the correlations between the scales, and their test-retest reliability. The means and standard deviations were comparable across the scales and all three were highly correlated with each other (i.e., $r > 0.84$ in both waves). However, the internal consistency of the 6-item scale lagged behind in comparison to the 12- and 24-item scales. More specifically, the Cronbach's alpha of the 6-item scale, being only 0.58 in Wave 1 and 0.51 in Wave 2, did not meet the threshold of 0.70 [28].

Table 1. Descriptive statistics, test-retest reliability, and construct validity of the psychological well-being scale for children observed in pilot ($N = 157$).

		24 Items	12 Items	6 Items
	Descriptive statistics			
	Wave 1			
	Correlation with 24-item PWB-c	10.00	0.93 ***	0.84 ***
	Correlation with 12-item PWB-c	0.93 ***	10.00	0.91 ***
	Correlation with 6-item PWB-c	0.84 ***	0.91 ***	10.00
	Mean	20.84	20.84	20.96
	Standard deviation	00.37	00.41	00.46
A	Cronbach's alpha	0.82	0.71	0.58
	Wave 2			
	Correlation with 24-item PWB-c	10.00	0.94 ***	0.87 ***
	Correlation with 12-item PWB-c	0.94 ***	10.00	0.92 ***
	Correlation with 6-item PWB-c	0.87 ***	0.92 ***	10.00
	Mean	20.88	20.85	20.92
	Standard deviation	00.41	00.44	00.49
	Cronbach's alpha	0.84	0.71	0.51
B	*Test-retest reliability*			
	Pearson correlation coefficient	0.82 ***	0.77 ***	0.71 ***
	Construct validity			
	Wave 1			
	Subjective well-being	0.45 ***	0.44 ***	0.44 ***
	Sex (0 = boy; 1 = girl)	0.00	0.05	0.07
C	Age	0.07	0.04	−0.01
	Wave 2			
	Subjective well-being	0.56 ***	0.51 ***	0.50 ***
	Sex (0 = boy; 1 = girl)	0.01	0.06	0.02
	Age	0.16 *	0.10	0.07

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

The second part of Table 1 contains information on the test-retest reliability of the three scales, and the third part information on their correlations with subjective well-being, sex, and age. The test-retest reliability was high (i.e., $r \geq 0.50$) [28] for the 24-, 12-, and 6-item PWB-c. As expected, the scores on the three scales were positively correlated with subjective well-being, and uncorrelated with sex and age in both waves. One exception is the positive correlation found between the 24-item PWB-c and age at Wave 2. Note, though, that this relation is negligible as the correlation was only weak (i.e., $r = 0.16$).

Table 2 contains the statistical properties for each of the six dimension-scales. In line with previous research, most but not all dimensions correlated significantly with each other [34]. The internal consistency of environmental mastery, purpose in life, and self-acceptance was acceptable, however the Cronbach's alphas for personal growth, autonomy, and positive relations with others did not meet the 0.70 threshold [28]. Still, the test-retest reliability was high for all six dimensions (i.e., $r \geq 0.50$) [28], and the correlations with subjective well-being, sex, and age matched the expected patterns—except for the non-significant correlation between purpose in life and subjective well-being, and the significant correlations between environmental mastery and self-acceptance with age.

Table 2. Descriptive statistics, test-retest reliability, and construct validity for each dimension of psychological well-being scale for children (Pilot study, 24-item version, $N = 157$).

		1. Environmental Mastery	2. Personal Growth	3. Purpose in Life	4. Self-Acceptance	5. Autonomy	6. Positive Relations
A	*Descriptive Statistics*						
	Wave 1						
	Correlations						
	1. Environmental mastery	1.00	0.08	0.18 *	0.31 ***	0.37 ***	0.24 **
	2. Personal growth	0.08	1.00	0.31 ***	0.19 *	0.21 **	0.32 ***
	3. Purpose in life	0.18 *	0.31 ***	1.00	0.22 **	0.29 ***	0.29 ***
	4. Self-acceptance	0.31 ***	0.19 *	0.22 **	1.00	0.26 ***	0.48 ***
	5. Autonomy	0.37 ***	0.21 **	0.29 ***	0.26 ***	1.00	0.53 ***
	6. Positive relations	0.24 **	0.32 ***	0.29 ***	0.48 ***	0.53 ***	1.00
	Mean	2.81	2.95	2.52	2.93	2.59	3.04
	Standard deviation	0.65	0.52	0.84	0.62	0.53	0.43
	Cronbach's alpha	0.67	0.58	0.74	0.84	0.40	0.48
	Wave 2						
	Correlations						
	1. Environmental mastery	1.00	0.11	0.11	0.29 ***	0.34 ***	0.30 ***
	2. Personal growth	0.11	1.00	0.36 ***	0.12	0.31 ***	0.36 ***
	3. Purpose in life	0.11	0.36 ***	1.00	0.19 *	0.41 ***	0.18 *
	4. Self-acceptance	0.59 ***	0.12	0.19 *	1.00	0.29 ***	0.43 ***
	5. Autonomy	0.34 ***	0.31 ***	0.41 ***	0.29 ***	1.00	0.42 ***
	6. Positive relations	0.30 ***	0.36 ***	0.18 *	0.43 ***	0.42 ***	1.00
	Mean	2.81	3.05	2.51	2.97	2.71	3.00
	Standard deviation	0.70	0.56	0.88	0.72	0.57	0.48
	Cronbach's alpha	0.72	0.64	0.75	0.89	0.33	0.59
B	*Test-Retest Reliability*						
	Pearson correlation coefficient	0.71 ***	0.62 ***	0.73 ***	0.78 ***	0.61 ***	0.68 ***
C	*Construct validity*						
	Wave 1						
	Subjective well-being	0.20 *	0.56 **	0.02	0.54 ***	0.24 ***	0.43 ***
	Sex	−0.09	0.01	0.03	−0.12	0.21 **	0.08
	Age	0.11	−0.11	0.07	0.12	−0.10	0.07
	Wave 2						
	Subjective well-being	0.26 ***	0.32 ***	0.03	0.63 ***	0.30 ***	0.47 ***
	Sex	−0.01	0.08	0.00	−0.13	0.18 *	0.07
	Age	0.20 *	−0.04	0.04	0.19 *	−0.01	0.12

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

3. Main Study

3.1. Sample and Measurements

The respondents for the main study were recruited through an online panel representative of the Dutch population. Adults known to have children within the desired age range (i.e., 8 to 12 years) were approached with information about the study and asked whether they would allow their child to participate. If so, parents were asked to complete a questionnaire about their household demographics and to open a questionnaire for their child to fill out. Both parents and children were informed that the study dealt with children's happiness. Prior to the implementation of the study, informed consent from both children and parents was obtained. The study was granted IRB approval. The questionnaire was administered twice with a six-week time period in between (Wave 1: $N = 2987$; Wave 2: $N = 1877$). We asked the research partner to close the survey once the desired sample size (i.e., 60% of the original) was achieved.

Only children who participated in both waves were included in the final sample (54.0% boys; $M_{age\_wave1} = 9.94$, $SD_{age\_wave1} = 1.38$). Based on the parents' responses, it was determined that 75.2 percent of these children lived with both parents in one home, 7.0 percent lived with both parents but in separate homes, 15.0 percent lived with their mother, and 1.8 percent lived with their father (the remaining 1.0% chose "other"). When asked for their own educational level, 56.9 percent of parents indicated to have taken vocational training, and 42.7 percent indicated to have attended either a university for applied sciences or 'regular' university (the remaining 0.4% selected "other" or "no answer"). A quarter of the parents (i.e., 24.2 percent) chose not to report their family income, but 21.0 percent reported a below modal income (i.e., <€31,000), 18.4 percent a modal income (i.e., €31,000–€34,000), and 36.4 percent an above modal income (i.e., >€34,000).

Apart from the PWB-c, the children's questionnaire contained scales to measure subjective well-being, quality of relationships with peers and parents, and social competence. For children's subjective well-being we used the same scale as in the pilot study (Wave 1: $\alpha = 0.85$, $M = 3.22$, $SD = 0.47$; Wave 2: $\alpha = 0.85$, $M = 3.17$, $SD = 0.46$). The quality of relationships with peers and parents were both measured on a 10-point scale, asking children to rate how happy they were with their friends (Wave 1: $M = 8.00$, $SD = 1.48$; Wave 2: $M = 7.88$, $SD = 1.54$) and their parents (Wave 1: $M = 8.60$, $SD = 1.26$; Wave 2: $M = 8.48$, $SD = 1.35$). Finally, social competence was measured with five items [35], asking children to reflect on the past six weeks and indicate how often they (1) felt disliked by others; (2) experienced difficulty making new friends; (3) felt like they had many friends; (4) felt accepted by others; and (5) felt like they were popular. For each item, children could answer (1) *yes*, *very much*; (2) *yes*, *a little*; (3) *no*, *not really* or (4) *no*, *not at all*. Children's responses on the three latter items were reversed coded before constructing scale scores (Wave 1: $\alpha = 0.81$, $M = 3.03$, $SD = 0.64$; Wave 2: $\alpha = 0.81$, $M = 3.03$, $SD = 0.62$).

3.2. Results

Similar to the pilot study, the 24-, 12-, and 6-item models resulted in a good model fit. For the 24-item PWB-c, $\chi^2(DF = 243, N = 1877) = 1475.13$, $p = 0.00$, CFI = 0.90, RMSEA = 0.05 with p-close = 0.10; for the 12-item PWB-c, $\chi^2(DF = 49, N = 1877) = 392.32$, $p = 0.00$, CFI = 0.93, RMSEA = 0.06 with p-close = 0.01; and for the 6-item PWB-c, $\chi^2(DF = 9, N = 1877) = 53.39$, $p = 0.00$, CFI = 0.91, RMSEA = 0.05 with p-close = 0.41. Again, the second-order model with six first-order constructs had a superior fit to a one-factor model, $\chi^2(DF = 248, N = 1877) = 5778.80$, $p = 0.00$, CFI = 0.56, RMSEA = 0.11 with p-close = 0.00. All items in the 24-, 12-, and 6-item models had a significant factor loading on their designated first-order construct. The statistical properties of the three PWB-c scales are presented in Table 3. Similar to Table 1, this table contains descriptive statistics and information on test-retest reliability and construct validity.

Table 3. Descriptive statistics, test-retest reliability, and construct validity of the psychological well-being scale for children observed in main study (N = 1877).

		24 Items	12 Items	6 Items
A	*Descriptive statistics*			
	Wave 1			
	Mean	2.67	2.65	2.73
	Standard deviation	0.31	0.35	0.38
	Correlation with 24-item PWB-c	1.00	0.92 ***	0.84 ***
	Correlation with 12-item PWB-c	0.92 ***	1.00	0.92 ***
	Correlation with 6-item PWB-c	0.84 ***	0.92 ***	1.00
	Cronbach's alpha	0.81	0.70	0.47
	Wave 2			
	Mean	2.67	2.64	2.71
	Standard deviation	0.32	0.35	0.38
	Correlation with 24-item PWB-c	1.00	0.93 ***	0.86 ***
	Correlation with 12-item PWB-c	0.93 ***	1.00	0.92 ***
	Correlation with 6-item PWB-c	0.86 ***	0.92 ***	1.00
	Cronbach's alpha	0.83	0.72	0.50
B	*Test-retest reliability*			
	Pearson correlation coefficient	0.68 ***	0.62 ***	0.56 ***
C	*Construct validity*			
	Wave 1			
	Subjective well-being	0.58 ***	0.53 ***	0.50 ***
	Sex (0 = boy; 1 = girl)	0.06 **	0.05 *	0.04
	Age	0.04	−0.02	−0.06 **
	Quality of relationship with peers	0.38 ***	0.36 ***	0.40 ***
	Quality of relationship with parents	0.42 ***	0.40 ***	0.38 ***
	Social competence	0.39 ***	0.33 ***	0.34 ***
	Wave 2			
	Subjective well-being	0.58 ***	0.55 ***	0.53 ***
	Sex (0 = boy; 1 = girl)	0.08 ***	0.07 **	0.06 *
	Age	0.05 *	−0.01	−0.02
	Quality of relationship with peers	0.37 ***	0.35 ***	0.38 ***
	Quality of relationship with parents	0.38 ***	0.36 ***	0.32 ***
	Social competence	0.40 ***	0.36 ***	0.36 ***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

The patterns found in the main study largely resembled those from the pilot study. Again, high correlations were found between the three scale versions (i.e., $r \geq 0.84$ in both waves). The internal consistency was high for the 24- and 12-item PWB-c, but low for the 6-item version. Furthermore, all three versions had high test-retest correlations (i.e., $r > 0.56$) and were positively correlated with subjective well-being. As expected, we also found positive correlations to the additional construct validity variables, being the quality of relationships with peers, the quality of relationships with parents, and social competence. Unexpectedly, some significant correlations with sex and age were found. Yet, the effect sizes associated with these correlations were close to zero and, therefore, negligible (cf. [28]).

Table 4 contains the statistical properties for each of the six dimension-scales. Similar to the findings of the pilot study and those of previous research [26,36,37], all dimensions correlated significantly with each other. The findings regarding the internal consistency of the subscales, for the large part, also corroborated those from the pilot: The Cronbach's alphas for environmental mastery, purpose in life, and self-acceptance were acceptable, but those for autonomy and positive relations with others were not. Unlike the findings from the pilot, the findings from the main study suggest that the internal consistency of personal growth is acceptable too. Here too, test-retest reliability was high for all six dimensions (i.e., $r \geq 0.46$), and the correlations with subjective well-being, sex, and agematched the expected patterns. The same holds for the positive correlations with the quality of relationships with peers, quality of relationships with parents, and social competence. Although some significant correlations with sex and age were found, these were quite small and negligible. The nonsignificant correlation between purpose in life and subjective well-being was replicated.

Table 4. Descriptive statistics, test-retest reliability, and construct validity for each dimension of psychological well-being scale for children (Main study, 24-item version, $N = 1877$).

		1. Environmental Mastery	2. Personal Growth	3. Purpose in Life	4. Self-Acceptance	5. Autonomy	6. Positive Relations
A	*Descriptive statistics*						
	Wave 1						
	Correlations						
	1. Environmental mastery	1.00	0.08 ***	0.09 ***	0.13 ***	0.27 ***	0.18 ***
	2. Personal growth	0.08 ***	1.00	0.23 ***	0.34 ***	0.29 ***	0.40 ***
	3. Purpose in life	0.09 ***	0.23 ***	1.00	0.08 ***	0.20 ***	0.12 ***
	4. Self-acceptance	0.13 ***	0.34 ***	0.08 ***	1.00	0.23 ***	0.39 ***
	5. Autonomy	0.27 ***	0.29 ***	0.20 ***	0.23 ***	1.00	0.31 ***
	6. Positive relations	0.18 ***	0.40 ***	0.12 ***	0.39 ***	0.31 ***	1.00
	Mean	2.82	2.83	1.97	2.65	2.64	2.87
	Standard deviation	0.53	0.57	0.69	0.56	0.47	0.41
	Cronbach's alpha	0.69	0.74	0.70	0.88	0.43	0.52
	Wave 2						
	Correlations	1.	2.	3.	4.	5.	6.
	1. Environmental mastery	1.00	0.12 ***	0.16 ***	0.14 ***	0.29 ***	0.19 ***
	2. Personal growth	0.12 ***	1.00	0.20 ***	0.36 ***	0.33 ***	0.43 ***
	3. Purpose in life	0.16 ***	0.20 ***	1.00	0.12 ***	0.23 ***	0.14 ***
	4. Self-acceptance	0.14 ***	0.36 ***	0.12 ***	1.00	0.23 ***	0.41 ***
	5. Autonomy	0.29 ***	0.33 ***	0.23 ***	0.23 ***	1.00	0.36 ***
	6. Positive relations	0.19 ***	0.43 ***	0.14 ***	0.41 ***	0.36 ***	1.00
	Mean	2.81	2.82	1.99	2.69	2.62	2.85
	Standard deviation	0.52	0.59	0.68	0.56	0.46	0.40
	Cronbach's alpha	0.72	0.78	0.71	0.90	0.44	0.54
B	*Test-retest reliability*						
	Pearson correlation coefficients	0.61 ***	0.62 ***	0.58 ***	0.65 ***	0.46 ***	0.60 ***
C	*Construct validity*						
	Wave 1						
	Subjective well-being	0.16 ***	0.40 ***	0.06 *	0.54 ***	0.30 ***	0.54 ***
	Sex	0.04	0.09 ***	0.07 **	−0.07 **	0.09 ***	0.05 *
	Age	0.16 ***	−0.11 ***	0.26 ***	−0.07 **	0.05 *	−0.10 ***
	Quality of relationships with peers	0.11 ***	0.26 ***	0.02	0.36 ***	0.12 ***	0.41 ***
	Quality of relationships with parents	0.18 ***	0.23 ***	0.08 ***	0.30 ***	0.28 ***	0.40 ***
	Social competence	0.14 ***	0.24 ***	−0.02	0.42 ***	0.13 ***	0.40 ***
	Wave 2						
	Subjective well-being	0.20 ***	0.44 ***	0.03	0.53 ***	0.30 ***	0.55 ***
	Sex	0.03	0.12 ***	0.09 ***	−0.03	0.07 ***	0.03
	Age	0.19 ***	−0.11 ***	0.23 ***	−0.03	0.03	−0.09 ***
	Quality of relationships with peers	0.13 ***	0.27 ***	0.04	0.34 ***	0.13 ***	0.39 ***
	Quality of relationships with parents	0.15 ***	0.27 ***	−0.02	0.31 ***	0.24 ***	0.43 ***
	Social competence	0.15 ***	0.25 ***	0.01	0.44 ***	0.14 ***	0.37 ***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

4. Discussion and Conclusions

Several scholars have called for a proper measure for children's psychological well-being to be developed [7,8]. Using the PWB scale of Ryff [11] as a reference, we created the Psychological Well-Being scale for children (PWB-c). Confirmatory factor analysis indicated that the PWB-c, similar to the original PWB, consisted of six underlying factors: environmental mastery, personal growth, purpose in life, self-acceptance, autonomy, and positive relations with others. Three different versions of the PWB-c were created. The test-retest validity and construct validity of all three versions are good, yet we recommend using either the 24- or the 12-item version, because of their superior internal consistency over the 6-item PWB-c.

In addition to our primary goal of developing and validating the overall PWB-c, we tested the internal consistency, test-retest reliability, and construct validity of each of its dimension subscales. The subscales for environmental mastery, personal growth, purpose in life, and self-acceptance performed well on all criteria and can be used independently. Autonomy and positive relations with others, however, performed well in terms of test-retest reliability and construct validity but lagged behind in internal consistency. Therefore, we recommend scholars who wish to focus on one of these two dimensions to complement the existing subscales with new items. Ideally, the reliability and validity of the adjusted scales would be determined with an identical procedure to this study, in order to compare results and to determine the scales' reliability and validity increase. Below, we provide several suggestions for generating new items.

As explained in the theoretical framework, autonomy relates to children's individual and deliberately shared decision making. We attempted to provide several examples of decision making and opinion sharing. However, similar to the approach of Huebner [30], these examples can be made more concrete by relating them to the different social domains that are dominant in children's life, such as family and school. Examples of new items are "How often do you give your opinion at school?" and "How often do you give your opinion at home?" Positive relations with others relates to the nature and strength of children's bonds with their parents and peers. The current items provide concrete examples of concern and caring for others. Yet, the number of items can be expanded by providing additional examples of such behavior, such as "How often do you comfort your friends [parents]?" and "How often do you share with your friends [parents]?" [38].

Next to deriving items based on theory, we would like to recommend conducting qualitative research using the current operationalizations as examples and asking children in what other ways they experience environmental mastery, positive relationships etc. That being said, the current PWB-c can readily advance the field because it allows researchers to study all facets of children's psychological well-being, and to study these facets in relation to children's subjective well-being. Similar to studies conducted among adolescents and adults [39–41], children's subjective and psychological well-being were found to be strongly related. A joint approach to studying children's well-being, therefore, seems viable. Still, because subjective and psychological well-being are shown to be distinct constructs in factor analyses [39,41], they cannot be combined into a single construct. Theoretically, psychological well-being precedes subjective well-being (see Self-Determination Theory) [2,42,43]. Methodologically, psychological and subjective well-being need to be separated in order to scrutinize their synergies and differences in predictors and outcomes [3–5].

With this study, we validated the PWB-c and several of its subscales among samples of children aged 8 to 12 years. Due to the simple nature of the items, the PWB-c may also be used among adolescents (13–18). Included in a longitudinal study, the PWB-c would enable researchers to test the dominant assumption that overall psychological well-being decreases as children enter adolescence [7]. By studying whether and how dimension scores change, future research can also unravel fluctuations in psychological well-being throughout childhood. Adolescents, for instance, may experience an increase in personal growth due to their strong urgency for sensation seeking and novelty behaviors [44], but a decrease in self-acceptance because they often feel insecure and misunderstood by others [25]. Knowing exactly which aspects of children's psychological well-being are dwindling will benefit

efforts of creating interventions to encourage positive development. Previous research investigating the effectiveness of so-called well-being therapy shows promising results. Well-being therapy, aimed at stimulating reflection on each of the PWB dimensions, can be used to promote resilience in non-clinical samples [45] and to reduce relapse in depressed individuals [46]. Admittedly, the PWB-c was validated among non-clinical samples and can, therefore, only be used to test the effectiveness of well-being interventions among a generic child audience. Future research should investigate its usefulness to capture the psychological well-being of children with suspected or diagnosed conditions such as autism, anxiety, and depression. Still, up until now, the effectiveness of well-being therapy has been predominantly studied in adult samples (with the exception of four studies conducted among adolescents aged 11 and up) [47]. Research into the effectiveness of well-being therapy is expanding rapidly [47], and it seems only fitted that the effectiveness of positive interventions can now be investigated among younger children too. After all, what is learned in the cradle is carried to the tomb.

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Appendix A

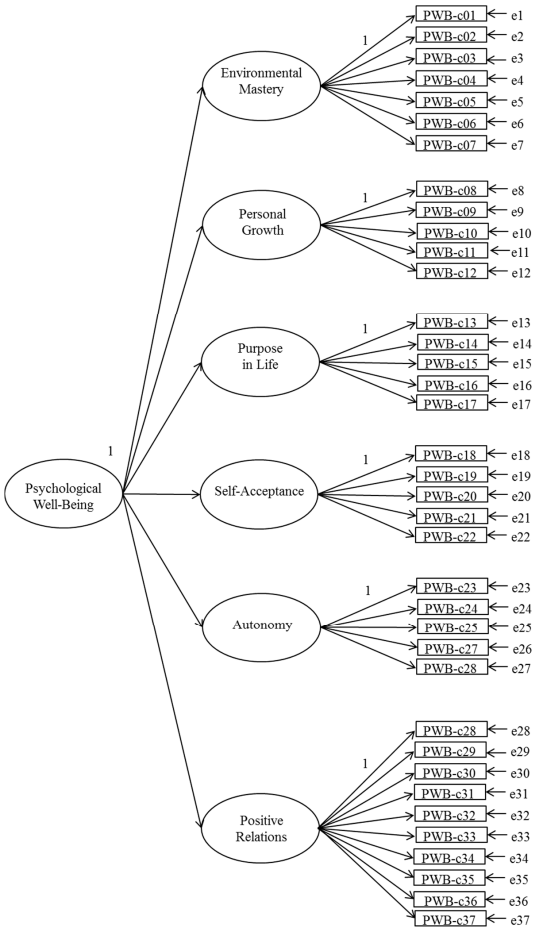

Figure A1. Theoretical second-order factor model of the Psychological Well-Being scale for children. Ovals represent latent variables and rectangles manifest variables.

Appendix B

Table A1. List of items included the psychological well-being scale for children ('how often … '), and their accompanying standardized factor loading (Pilot study, $N = 157$).

		24 Items	12 Items	6 Items
	Environmental mastery	0.52	0.57	-
PWB-c01	… do you yourself choose what you do after school? [a,b,c]	**0.69**	**0.69**	0.43
PWB-c02	… do you yourself choose what you do during the weekend? [a,b]	**0.66**	0.66	-
PWB-c03	… do you yourself choose what you want to eat for dinner?	-	-	-
PWB-c04	… do you yourself choose what clothes you buy?	-	-	-
PWB-c05	… do you yourself choose when you watch television? [a]	0.41	-	-
PWB-c06	… do you yourself choose when you use the computer? [a]	0.42	-	-
PWB-c07	… do you yourself choose when you do your homework?	-	-	-
	Personal growth	0.52	0.64	-
PWB-c08	… do you like to engage in new activities? [a,b,c]	**0.63**	**0.56**	0.33
PWB-c09	… do you like learning new things at school? [a]	0.48	-	-
PWB-c10	… do you like owning new things?	-	-	-
PWB-c11	… do you like meeting new people? [a,b]	**0.50**	0.53	-
PWB-c12	… do you like visiting new places? [a]	0.39	-	-
	Purpose in life	0.52	0.45	-
PWB-c13	… do you think about what you want to be when you grow up? [a,b,c]	**0.77**	**0.84**	0.38
PWB-c14	… do you think about where you want to live in the future? [a,b]	**0.71**	0.71	-
PWB-c15	… do you think about high school? [a]	0.64	-	-
PWB-c16	… do you put in your best effort at school?	-	-	-
PWB-c17	… do you save your allowance?	-	-	-
	Self-acceptance	0.58	0.50	-
PWB-c18	… are you proud of yourself? [a]	0.73	-	-
PWB-c19	… do you feel high in self-confidence? [a]	0.61	-	-
PWB-c20	… do you like yourself? [a]	0.69	-	-
PWB-c21	… are you happy with yourself? [a,b]	**0.79**	0.68	-
PWB-c22	… are you satisfied with who you are? [a,b,c]	**0.80**	**0.92**	0.46
	Autonomy	1.00	1.00	-
PWB-c23	… do you make choices by yourself? [a]	0.38	-	-
PWB-c24	… do you ask your parents for their opinion? [a,b]	**0.47**	0.39	-
PWB-c25	… do you ask your parents for help? [a,b,c]	**0.41**	**0.48**	0.44
PWB-c26	… do you do things without you parents?	-	-	-
PWB-c27	… do you give your opinion on something?	-	-	-
	Positive relations	1.00	1.00	-
PWB-c28	… do you do fun things with your friends? [a, b]	**0.44**	**0.50**	-
PWB-c29	… are you jealous of your friends?	-	-	-
PWB-c30	… do you argue with your friends?	-	-	-
PWB-c31	… can you trust your friends?	-	-	-
PWB-c32	… do you help your friends? [a]	0.42	-	-
PWB-c33	… do you do fun things with your parents? [a,b,c]	**0.53**	0.48	0.53
PWB-c34	… are you jealous of your parents?	-	-	-
PWB-c35	… do you argue with your parents? [a]	0.39	-	-
PWB-c36	… can you trust your parents?	-	-	-
PWB-c37	… do you help your parents? [a]	0.41	-	-

Note. Answer categories varied from (1) *almost never* to (4) *very frequently*. Items PWB-c29, PWB-c30, PWB-c34, and PWBc-35 are reversed coded. [a] Included in 24-item PWB-c; [b] Included in 12-item PWB-c; [c] Included in 6-item PWB-c; Standardized factor loadings emphasized in bold subsequently indicate the two highest (i.e., for the 24-item PWB-c) and highest (i.e., for the 12-item PWB-c) standardized factor loadings.

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