

## Development of subjective well-being inventory in schools using the RASCH model

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**Abstract:** *This study aims to develop an inventory for measuring subjective well-being among high school (SMA) and vocational high school (SMK) students in Indonesia. Utilizing Item Response Theory (IRT) with the Rasch model and Winstep software, this study adopts a mixed methods design, specifically an exploratory sequential approach. Purposive sampling is used to select 350 participants from 16 schools in West Java, Sulawesi, and Sumatra. The inventory comprises 60 statement items categorized into three components: pleasant affect, unpleasant affect, and life satisfaction, totaling 16 indicators. Modified Likert scales are used to assess each item. Validation involves a guidance and counseling expert, and Rasch modeling analysis covering item fit, dimensionality, and reliability. The research findings indicate that the development of the Indonesian version of the subjective well-being inventory for SMA/SMK students using the Rasch modeling approach has successfully produced a valid and reliable measurement tool. The analysis results show that this inventory meets the criteria for item fit, inventory dimensionality, and person and item reliability. Specifically, it contributes to guidance and counseling practices in schools, aiding in understanding and interventions related to students' subjective well-being.*

**Keywords:** *inventory development; subjective well-being; RASCH model.*

**Abstrak:** Studi ini bertujuan untuk mengembangkan sebuah instrumen untuk mengukur kesejahteraan subjektif di antara siswa SMA dan SMK di Indonesia. Menggunakan Teori Respons Item (IRT) dengan model Rasch dan perangkat lunak Winstep, studi ini mengadopsi desain metode campuran, khususnya pendekatan eksploratori sekuensial. Sampling purposif memilih 350 peserta dari 16 sekolah di Jawa Barat, Sulawesi, dan Sumatera. Instrumen terdiri dari 60 pernyataan meliputi tiga komponen: pengaruh menyenangkan, pengaruh tidak menyenangkan, dan kepuasan hidup, dengan total 16 indikator. Skala Likert yang dimodifikasi menilai setiap item. Validasi melibatkan validator ahli bimbingan konseling, dan analisis pemodelan Rasch yang mencakup kesesuaian item, dimensionalitas, dan reliabilitas. Temuan penelitian menunjukkan bahwa pengembangan versi Indonesia dari inventaris kesejahteraan subjektif untuk siswa SMA/SMK menggunakan pendekatan pemodelan Rasch telah berhasil menghasilkan alat pengukuran yang valid dan reliabel. Hasil analisis menunjukkan bahwa inventaris ini memenuhi kriteria kecocokan item, dimensionalitas inventaris, serta reliabilitas orang dan item. Secara khusus berkontribusi dalam praktik bimbingan dan konseling di sekolah untuk mendukung pemahaman dan intervensi terkait subjective well-being siswa.

**Kata kunci:** pengembangan instrumen; kesejahteraan subjektif; model RASCH.

## INTRODUCTION

The conceptualization of subjective well-being lies within the framework of positive psychology, as proposed by Seligman (Novikova, 2024), emphasizing the identification of individual strengths and positive aspects. This approach holds significant potential for enhancing students' mental well-being and its positive impact on the quality of life within educational settings (Lou, Ng, & Siu, 2024). The urgency and relevance of the Sustainable Development Goals (SDGs) agenda in improving mental health and well-being worldwide are particularly evident among adolescents (De Neve & Sachs, 2020; Nations, 2015). According to Hurlock (Sari, 2021), the adolescent phase presents challenges in emotional and cognitive development. Consistent with the views of (Diener, Lucas, & Oishi, 2018; Oishi, Diener, & Lucas, 2016), subjective well-being encompasses positive evaluations and experiences of life. Subjective well-being not only relates to life satisfaction, but also involves psychological components, such as positive feelings towards life, emotional experiences, and positive self-perceptions.

Amid global challenges, 39 out of 46 countries have reported low levels of life satisfaction among adolescents (Marquez & Long, 2021). Research across four regions—Middle East, Anglo, Nordic Europe, and German Europe—found that anxiety significantly impacts subjective well-being (Y.-J. Wu & Lee, 2022). In Indonesia, the rates of depression, anxiety, and stress reached 25.0%, 51.1%, and 38.9%, respectively, affecting their quality of life (Astutik, Sebayang, Puspikawati, Tama, & Dewi, 2020). Therefore, negative emotions such as stress, anxiety, and depression can decrease adolescents' levels of subjective well-being, a natural aspect of their developmental journey (Wang et al., 2023).

In the Indonesian education system, particularly at the high school/vocational school level, the development of measurement tools to assess subjective well-being is becoming increasingly crucial. This stems from the understanding that the adolescent period during high school/vocational school is characterized by unique challenges and pressures. Adolescents at this stage are undergoing a transition to adulthood, facing greater responsibilities, especially in academics and social interactions (Fraser, Bryce, Alexander, & Fabes, 2021; McKie, 2022). Their primary focus is preparing for higher education or

the workforce. Emotionally, they experience significant mood fluctuations and increased intensity of feelings, such as anxiety and sadness. They also encounter challenges in managing interpersonal conflicts and regulating emotions effectively (Kiuru et al., 2020). These concepts align with the Competency Standards for Student Independence, especially in the development of emotional resilience aspects, which are integral in helping students overcome emotional challenges during their transition to adulthood. Therefore, it is important to develop subjective well-being measurement tools that can provide a more holistic view of students' well-being beyond academic parameters. Although subjective well-being measurement tools have been widely applied in various countries, their adaptation in the Indonesian context is still limited. A comparison between global conditions and the situation in Indonesia indicates the need for measurement tools that are suitable for the cultural context, social realities, and the environment of high school/vocational school students.

According to (Diener 1984), various scales have been used to measure subjective well-being, both in single-item and multi-item forms, each with its own strengths and weaknesses. In their scale development efforts, (Pontin et al. 2013) successfully developed and validated the Modified BBC Subjective Well-being Scale (BBC-SWB) to measure the dual concepts of subjective well-being—individual-oriented and social-oriented views—demonstrating adequate validity and reliability. Another study by (Calleja, Mason, and Pérez 2022) provided perspective by focusing on the development and validation of the Subjective Well-being Scale (EBS-20) along with its short version (EBS-8) for Spanish-speaking populations. Additionally, some studies have focused on specific populations, such as adolescents in school environments and students in the state of Ceara, Brazil. (Tian, Wang, and Huebner 2015) showed that the Brief Adolescent's Subjective Well-being in School Scale (BASWBSS) and (DIAS-VIANA and NORONHA 2022) demonstrated that the School Subjective Well-being Scale (EBESE) can effectively distinguish groups based on individual variables and educational processes, affirming their validity as reliable measurement tools. Moreover, with the Indonesian version measurement tool by (Prasetyawati et al. 2021), the Adaptation of Brief Adolescent Subjective Well-being in School Scale (BASWBSS), the

Student Subjective Well-being Scale in the Indonesian Context showed validity and reliability for students in Indonesia.

Despite numerous studies on subjective well-being measurement tools, developing an inventory specifically for high school and vocational students in Indonesia is essential. This inventory can address the country's cultural diversity and unique student population, offering a better understanding of students' subjective well-being by considering social, cultural, and contextual factors (Borsa, Damásio, & Bandeira, 2012). Therefore, this study utilizes the item response theory (IRT), a statistical framework that models individual responses to items in tests. IRT assesses the performance of each item independently, facilitating the identification of inconsistent items and measuring the relative difficulty level of each item (Embretson and Reise 2013; Zanon et al. 2016).

One of the methods in IRT is the Rasch model, known for its objectivity, accuracy, and consistency in testing subjective well-being measurement tools. By evaluating the performance of each item independently, this model can identify items inconsistent with the measured concept, thereby enhancing the quality of the measurement tool by removing or modifying irrelevant items (Andrich, 1988).

Therefore, the novelty of this research lies in the use of the IRT approach, which represents an advancement from the traditional classical test theory (CTT) approach commonly used for testing the validity and reliability of measurement tools. This study also focuses on the cultural diversity and the varied nature of students in Indonesia. The research question is: What is the process of developing a subjective well-being inventory for Indonesian high school/vocational school students using the Rasch modeling approach?

## METHOD

This study applies a mixed methods research design with an exploratory sequential design, which combines the collection, analysis, and synthesis of qualitative and quantitative data sequentially (Creswell, 2021). The approach begins with a qualitative approach to explore the complex concept of subjective well-being, followed by a quantitative approach (Houser, 2019). The initial stage involves literature review and discussions with experts to establish relevant domains and components. Subsequently, an inventory grid is developed based on these findings and evaluated by a panel of expert validators. Following revisions, the inventory is deemed valid and used for data collection from a representative sample.

Table 1. Demography of the Participants

Profile Demography	Category	Frequency	%
Gender	Male	235	67.14
	Female	115	32.86
Age	Over 17 years old	56	16
	Under 17 years old	294	84
Grade	XII	255	72.86
	XI	83	23.71
	X	255	72.86
Type of School Institution	High School (SMA)	149	42.57
	Vocational School (SMK)	201	57.43
Ethnic Group	Sundanese	158	45.14
	Buginese	34	9.71
	Javanese	23	6.58
	Makassarese	91	26
	Mandarese	7	2
	Batak	2	0.57
	The Torajans	5	1.42
	Malays	2	0.57
	Minang	6	1.71
	Other	22	6.29
Religion	Islam	343	98
	Christian	7	2

The data research is then quantitatively analyzed using Rasch modeling to test the quality of the inventory, including item appropriateness, inventory dimensions, and reliability. The analysis results offer insight into the quality of the newly developed subjective well-being inventory. Thus, this research provides a significant contribution to the understanding and measurement of subjective well-being.

This study involved 350 participants from 16 high schools and vocational institutions, selected through purposive sampling (Gay, Mills, & Airasian, 2012). This approach was chosen because it allowed researchers to select participants who aligned with the research objectives and represented the targeted geographical areas, namely West Java, Sulawesi, and Sumatra. The use of purposive sampling method is consistent with (Diener 1984) theoretical framework, emphasizing that subjective well-being is also associated with other demographic variables, such as gender, age, ethnicity, religion, and so on. These regions were chosen due to their geographical and cultural diversity, the availability of significant high school institutions, relevance to the target population, and the goal of obtaining findings applicable nationwide.

The subjective well-being inventory is developed based on the grand theory by (Diener 1984) and involves exploring the conceptual definitions from multiple experts. This process includes forming operational definitions that subjective well-being is the assessment of students' overall life quality, encompassing cognitive evaluations of life satisfaction in the school environment, as well as affective experiences in their associations with pleasant and unpleasant influences in adolescent life. By incorporating measures of positive affect, life satisfaction, and fulfillment, the SWBI provides researchers and practitioners with a comprehensive understanding of an individual's subjective well-being. Through its nuanced approach, it not only quantifies happiness but also sheds light on the intricacies of what contributes to a fulfilling life, guiding interventions and policies aimed at enhancing overall well-being.

Moreover, the Subjective Well-Being Inventory doesn't just quantify happiness; it delves into the underlying factors that contribute to an individual's sense of fulfillment and satisfaction with life. Through its array of questions spanning emotional experiences, social interactions, and personal evaluations, the SWBI

offers a holistic glimpse into one's subjective well-being landscape. Its adaptability across diverse cultural contexts and age groups underscores its significance as a universal metric for understanding happiness. Whether utilized in clinical settings to gauge treatment efficacy or in policy research to inform societal well-being initiatives, the SWBI serves as a compass guiding efforts toward fostering happier, more fulfilling lives for individuals and group alike.

The inventory utilizes a four-point Likert scale modified response format, namely 1) very inappropriate; 2) appropriate; 3) inappropriate; 4) very inappropriate. It consists of 60 statement items representing three construct components of subjective well-being: 1) life satisfaction; 2) pleasant influences; 3) and unpleasant influences, with 60 statement items representing three construct components of subjective well-being: life satisfaction, pleasant influences, and unpleasant influences (Diener, Suh, Lucas, & Smith, 1999).

Construct validation was conducted by experts in guidance and counseling. Subsequently, Rasch model analysis was performed using the WinSteps statistical application to evaluate specific aspects to assess the instrument's quality. The aspects are: 1) examining item fit adequacy with the predefined criteria. This was done by looking at outfit mean square (MNSQ) values where accepted ( $0.5 < \text{MNSQ} < 1.5$ ); outfit Z-Standard value (ZSTD) accepted ( $-2.0 < \text{ZSTD} < 2.0$ ); Point Measure correlation value (Pt Mean Corr) accepted ( $0.4 < \text{Pt Measure Corr} < 0.85$ ) (Boone, Staver, and Yale 2013; Cantó-Cerdán et al. 2021); 2) dimensionality (the minimum requirement for raw variance explained by measures should be 20%; if the value is above 40%, it is better; and above 60% means outstanding), as well as other aspects in measuring dimensions, such as unexplained variance in 1<sup>st</sup>, which ideally should not exceed 15% (Sumintono & Widhiarso, 2015); and 3) person and item reliability, Cronbach's alpha values (measuring the overall interaction reliability between persons and items) with criteria ( $< 0.67$ : poor); ( $0.5 - 0.6$ : bad); ( $0.6 - 0.7$ : fair); ( $0.7 - 0.8$ : good); ( $> 0.8$ : excellent), as well as person and item reliability values ( $< 0.67$ : weak); ( $0.67 - 0.80$ : fair); ( $0.8 - 0.90$ : good); ( $0.91 - 0.94$ : excellent); and ( $> 0.94$ : outstanding) (Guilford 1950; Sumintono and Widhiarso 2015). Table 2 provides detailed information on the 16 indicators of these constructs.

Table 2. Indicators for Components SBW Inventory

Component	Indicators	Items
1. Pleasant influence	1.1 Joy Students experience a deep sense of joy or profound positive feelings that fulfill satisfaction and great delight.	1,2 (favorable) 3,4 (unfavorable)
	1.2 Elation Students feel elation or extremely pleased, joyful, and very happy.	5,6 (favorable) 7,8 (unfavorable)
	1.3 Contentment pride Students feel satisfied and proud of themselves or the achievements they have made.	9,10 (favorable) 11,12 (unfavorable)
	1.4 Affection Students show feelings of affection or deep positive feelings towards others, expressing warmth, care, and concern.	13,14 (favorable) 15,16 (unfavorable)
	1.5 Happiness Students exhibit a general positive pleasant feeling, characterized by satisfaction in their lives.	17,18 (favorable) 19,20 (unfavorable)
	1.6 Ecstasy Students show a profound sense of ecstasy, marked by feelings of euphoria, extraordinary joy, and deep satisfaction.	21,22 (favorable) 23,24 (unfavorable)
2. Unpleasant influence	2.1 Guilt and shame Students feel guilt when they acknowledge wrongdoing and shame when they perceive their actions as inappropriate.	25,26 (favorable) 27,28 (unfavorable)
	2.2 Sadness Students experience sadness when they feel sorrowful, disappointed, or empty in life.	29,30 (favorable) 31,32 (unfavorable)
	2.3 Worry anger Students experience feelings of anxiety and anger, termed as worry anger, occurring when students feel worried and anxious about something happening	33,34 (favorable) 35,36 (unfavorable)
	2.4 Envy Students experience feelings of envy when they feel unhappy or dissatisfied with the success, achievements, or luck of others.	37,38 (favorable) 39,40 (unfavorable)
3. Life satisfaction	3.1 Desire to change life Students show a strong urge or desire to make significant changes in their lives.	41,42 (favorable) 43,44 (unfavorable)
	3.2 Satisfaction with current life Students show feelings of satisfaction with the situation and conditions of life they are currently experiencing.	45,46 (favorable) 47,48 (unfavorable)
	3.3 Satisfaction with past Students show feelings of satisfaction with what has happened or been achieved in their past lives.	49,50 (favorable) 51,52 (unfavorable)
	3.4 Satisfaction with future Students show feelings of satisfaction and optimism about what they anticipate will happen in their future lives.	53,54 (favorable) 55,56 (unfavorable)
	3.5 Significant others' views of one's life Students demonstrate comprehension of the perspectives and judgments of important individuals in their lives. This includes understanding the desires, goals, and opinions of individuals they care about.	57,58 (favorable) 59,60 (unfavorable)

**RESULTS AND DISCUSSION**

**1. Results of Construct Validation of the Subjective Well-being Inventory**

The construct validation of the subjective well-being inventory involved two experts with expertise in mental health and guidance and counselling for adolescents. Both experts gave favorable ratings to the subjective well-being inventory. These results are consistent with previous findings by (Lambert and Newman 2023), highlighting the importance of construct validation in producing reliable and valid measurement tools. However, some items were still too general, indicating that the use of overly general items could diminish the validity of the subjective well-being measurement tool. Therefore, contextualization is needed to make it

more specific to adolescents at the high school and vocational school levels. Previous research by (Clark and Watson 2019) showed that clarity in item construction could enhance the validity and reliability of measurement tools. Statement items with similar meanings need revision to better align with the formulated components of subjective well-being, as per the findings of (Ihsan 2015), emphasizing the importance of conceptual clarity in developing subjective well-being measurement tools. Additionally, the use of words such as "or," "and," and "often" in items should be avoided as they can influence the measurement of subjective well-being. (Saifuddin 2020) stressed the importance of using clear and unambiguous language in composing items for measurement tools.

Figure 1. Summary of Category Structure

SUMMARY OF CATEGORY STRUCTURE. Model="R"

CATEGORY	OBSERVED	OBSVD	SAMPLE	INFIT	OUTFIT	ANDRICH	CATEGORY		
LABEL	SCORE	COUNT	%	AVRGE	EXPECT	MNSQ	MNSQ	THRESHOLD	MEASURE
1	1	1621	8	-.77	-.93	1.16	1.20	NONE	( -2.93)
2	2	4751	23	-.37	-.22	.82	.83	-1.67	-1.05
3	3	9095	43	.97	.90	.89	.91	-.34	.91
4	4	5533	26	2.07	2.10	1.07	1.06	2.01	( 3.18)

**2. Test of Accuracy of SWB Inventory Scale**

The analysis in the Andrich Threshold column is used to assess the accuracy of the scale in the subjective well-being inventory, with the criterion that the movement values should be sequential from "none" to negative, then positive, to meet the established scoring standards (Sumintono & Widhiarso, 2015). The research results indicate that there is an increase in the average observation values from "none" to -1.67, then to -0.34, and finally reaching 2.01. These results indicate that the alternative choices provided in the subjective well-being inventory have been proven valid and do not cause confusion among the respondents.

**3. Results of Analysis of Item Fit in the SWB Inventory**

The criteria used to examine the level of item fit that does not comply (outliers or misfits) with three criteria are: Outfit Mean Square Value ( $0.5 < MNSQ < 1.5$ ), meaning that items within the range of 0.5 – 1.5 are accepted; Outfit Z-

Standard Value ( $-2.0 < ZSTD < +2.0$ ), meaning that items accepted are within the range of -2.0 - +2.0 and if it exceeds +2.0 the item cannot be predicted, and if it is less than -2.0 the item is too easily predictable; Point Measure Correlation Value ( $0.4 < Pt Measure Corr < 0.85$ ) (Boone et al. 2013; Cantó-Cerdán et al. 2021). According to (Sumintono and Widhiarso 2015), the items that fail to meet the three established criteria are of low quality and inadequate. Based on the analysis of item fit level (*item fit*) in Figure 2, it is found that item 30 "when sad, I try to cope with it by talking to someone I trust to help relieve emotional burden" with values (Outfit MNSQ=1.60), value (Outfit ZSTD=6.8), and value (Pt Measure Corr=.31) does not meet the three established criteria and is not fit. Furthermore, item 36 unpleasant affect tends to be unfit, looking at the three criteria only Outfit MNSQ and Outfit ZTSD do not meet the requirements, but Pt Measure Corr (value .43) is still within the fit limit, and items 8 pleasant affect, 43 life satisfaction, 50 life satisfaction, 57 life satisfaction, 35 unpleasant affect, 52 life satisfaction, 10 pleasant affect, 13 pleasant affect,

58 life satisfaction, 34 unpleasant affect, and 33 unpleasant affect do not meet the Outfit ZTSD and Pt Measure Corr criteria, but Outfit MNSQ (value 1.32) is still within the fit range. Furthermore, (Sumintono and Widhiarso 2015), items that fail to meet only one of the three

established criteria can still be maintained if they meet the other criteria. Therefore, there is only one item, namely unpleasant affect 30, that is not fit or valid for use, so that item must be eliminated. A summary of the results of the item fit level is presented in Table 3.

Figure 2. Item Fit Level

ITEM STATISTICS: MISFIT ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PT-MEASURE CORR.	EXP.	EXACT OBS%	MATCH EXP%	ITEM
30	1017	350	.08	.08	1.56	6.4	1.60	6.8	A .31	.42	41.4	55.6	U_30
36	1066	350	-.24	.08	1.60	6.7	1.55	6.4	B .43	.41	41.4	57.0	U_36
27	743	350	1.65	.07	1.30	4.2	1.32	4.5	C .40	.46	43.7	48.0	U_27
8	760	350	1.56	.07	1.21	3.0	1.23	3.3	D .32	.46	46.0	48.2	P_8
43	853	350	1.05	.07	1.20	2.8	1.22	3.1	E .27	.45	48.6	50.1	L_43
50	1070	350	-.27	.08	1.21	2.7	1.20	2.6	F .36	.41	51.4	57.0	L_50
57	1090	350	-.41	.08	1.16	2.0	1.20	2.5	G .12	.40	61.7	57.4	L_57
35	734	350	1.70	.07	1.18	2.6	1.18	2.6	H .39	.46	45.4	47.7	U_35
60	829	350	1.18	.07	1.16	2.2	1.16	2.2	I .57	.45	47.7	49.7	L_60
52	689	350	1.96	.08	1.14	2.0	1.15	2.2	J .26	.46	53.4	46.9	L_52
26	1140	350	-.77	.09	1.04	.6	1.14	1.9	K .17	.39	57.1	57.6	U_26
40	966	350	.40	.08	1.12	1.7	1.14	1.8	L .49	.43	54.0	53.1	U_40
22	1269	350	-1.94	.11	1.08	1.0	1.11	1.3	M .30	.32	66.6	65.6	P_22
32	751	350	1.61	.07	1.11	1.6	1.10	1.6	N .43	.46	45.7	48.1	U_32
21	1248	350	-1.72	.10	1.09	1.2	1.10	1.2	O .31	.33	64.3	62.5	P_21
11	827	350	1.19	.07	1.09	1.3	1.09	1.3	P .44	.45	50.6	49.6	P_11
12	827	350	1.19	.07	1.06	.9	1.08	1.2	Q .46	.45	50.9	49.6	P_12
31	857	350	1.03	.07	1.07	1.0	1.07	1.1	R .53	.45	50.3	50.2	U_31
5	1281	350	-2.08	.11	.99	-.1	1.07	.8	S .26	.31	69.7	68.1	P_5
46	1082	350	-.35	.08	1.05	.7	1.07	.9	T .43	.41	57.7	57.3	L_46
45	1081	350	-.34	.08	1.05	.7	1.06	.9	U .40	.41	60.3	57.3	L_45
4	682	350	2.00	.08	1.03	.5	1.03	.5	V .37	.46	53.7	47.0	P_4
55	845	350	1.09	.07	1.01	.2	1.03	.5	W .49	.45	52.6	49.9	L_55
25	1224	350	-1.48	.10	.97	-.3	1.03	.4	X .31	.35	63.7	60.2	U_25
38	1135	350	-.73	.09	.97	-.4	1.00	.0	Y .30	.39	63.4	57.6	U_38
39	984	350	.29	.08	.98	-.2	.99	-.1	Z .53	.43	59.1	54.0	U_39
44	770	350	1.51	.07	.92	-1.2	.95	-.7	z .31	.46	59.1	48.3	L_44
29	1131	350	-.70	.09	.94	-.8	.93	-.9	y .38	.39	59.1	57.7	U_29
3	821	350	1.23	.07	.92	-1.2	.93	-1.0	x .35	.45	53.1	49.5	P_3
14	1217	350	-1.42	.10	.91	-1.3	.92	-1.1	w .43	.35	64.9	59.9	P_14
37	1181	350	-1.10	.09	.91	-1.3	.91	-1.3	v .45	.37	64.0	58.3	U_37
15	913	350	.71	.08	.87	-1.9	.90	-1.5	u .34	.44	62.9	51.4	P_15
53	1157	350	-.91	.09	.90	-1.4	.87	-1.8	t .49	.38	61.1	57.8	L_53
20	815	350	1.26	.07	.89	-1.7	.89	-1.7	s .59	.45	56.6	49.3	P_20
1	1230	350	-1.54	.10	.87	-1.8	.87	-1.7	r .35	.35	59.1	60.8	P_1
18	1081	350	-.34	.08	.87	-1.7	.86	-2.0	q .50	.41	60.0	57.3	P_18
54	1135	350	-.73	.09	.86	-1.9	.87	-1.8	p .42	.39	62.9	57.6	L_54
59	895	350	.81	.08	.86	-2.0	.87	-1.9	o .53	.44	60.9	50.8	L_59
23	907	350	.74	.08	.85	-2.2	.87	-1.9	n .57	.44	60.6	51.2	P_23
42	1240	350	-1.64	.10	.86	-1.9	.82	-2.4	m .45	.34	67.1	61.8	L_42
10	1235	350	-1.59	.10	.86	-2.0	.85	-2.0	l .39	.34	64.3	61.2	P_10
48	943	350	.54	.08	.85	-2.2	.84	-2.3	k .68	.44	57.4	52.2	L_48
28	859	350	1.02	.07	.82	-2.8	.83	-2.6	j .51	.45	59.7	50.2	U_28
24	837	350	1.14	.07	.82	-2.8	.82	-2.8	i .58	.45	57.4	49.8	P_24
41	1221	350	-1.45	.10	.82	-2.6	.81	-2.7	h .43	.35	67.1	60.1	L_41
17	1240	350	-1.64	.10	.82	-2.6	.80	-2.8	g .50	.34	69.7	61.8	P_17
13	1224	350	-1.48	.10	.79	-3.1	.81	-2.7	f .36	.35	62.9	60.2	P_13
49	1179	350	-1.08	.09	.79	-3.1	.78	-3.2	e .43	.37	67.7	58.2	L_49
58	1139	350	-.77	.09	.75	-3.7	.76	-3.5	d .34	.39	69.7	57.7	L_58
34	1125	350	-.66	.09	.73	-3.9	.74	-3.8	c .38	.39	66.0	57.6	U_34
47	932	350	.60	.08	.73	-4.1	.74	-4.0	b .59	.44	67.1	51.7	L_47
33	1110	350	-.55	.09	.71	-4.2	.73	-4.0	a .34	.40	67.7	57.6	U_33
MEAN	1009.0	350.0	.00	.08	.98	-.3	.99	-.2			58.4	55.0	
S.D.	182.9	.0	1.22	.01	.17	2.3	.18	2.3			7.5	5.7	

Table 3. Summary of Item Fit Results

Item Number	Criteria	Total
1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60	Fit/Valid	59
30	Unfit/Invalid	1

Figure 3. Dimensionality

TABLE 23.0 Data untuk Rasch Model.xlsx ZOU913WS.TXT May 17 19:06 2024  
 INPUT: 350 PERSON 60 ITEM REPORTED: 350 PERSON 60 ITEM 4 CATS  
 WINSTEPS 3.73

```

-----
-----
Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)
-- Empirical -- Modeled
Total raw variance in observations = 112.5 100.0% 100.0%
Raw variance explained by measures = 52.5 46.7% 46.4%
Raw variance explained by persons = 11.7 10.4% 10.3%
Raw Variance explained by items = 40.8 36.3% 36.1%
Raw unexplained variance (total) = 60.0 53.3% 100.0% 53.6%
Unexplnd variance in 1st contrast = 9.4 8.3% 15.7%
Unexplnd variance in 2nd contrast = 3.0 2.6% 5.0%
Unexplnd variance in 3rd contrast = 2.5 2.2% 4.1%
Unexplnd variance in 4th contrast = 2.3 2.0% 3.8%
Unexplnd variance in 5th contrast = 1.8 1.6% 3.1%
    
```

**4. Dimensionality of the SWB Inventory**

Based on the Rasch Model, the minimum requirement for dimensionality is 20%, which is considered adequate, while values exceeding 40% indicate better quality, and values exceeding 60% are considered exceptional, as seen from the Raw variance explained by measures. Another aspect of dimensional measurement is Unexplained variance in 1<sup>st</sup>, which ideally should not exceed

15% (Andrich and Marais 2019; Boone 2020; Sumintono and Widhiarso 2015). Based on the analysis results obtained from the Raw variance explained by measures at 46.7%, it indicates better quality, and the Unexplained variance in 1st yielded a result of 8.3%. Thus, the developed subjective well-being inventory meets the criteria for measuring the subjective well-being of high school students.

Figure 4. Person and Item Reliability

TABLE 3.1 Data untuk Rasch Model.xlsx ZOU913WS.TXT May 17 19:06 2024  
 INPUT: 350 PERSON 60 ITEM REPORTED: 350 PERSON 60 ITEM 4 CATS WINSTEPS 3.73

```

-----
SUMMARY OF 350 MEASURED PERSON
-----
|          TOTAL          |          MODEL          |          INFIT          |          OUTFIT          |
|          SCORE          |          ERROR          |          MNSQ          |          ZSTD          |
|          COUNT          |          MEASURE          |          MNSQ          |          ZSTD          | | | | | |
|---|---|---|---|---|---|---|---|---|
| MEAN          | 173.0          | 60.0          | .82          | .20          | 1.01          | -.4          | .99          | -.5          |
| S.D.          | 17.8          | .0          | .71          | .01          | .53          | 2.9          | .51          | 2.8          |
| MAX.          | 215.0          | 60.0          | 2.81         | .26          | 3.36         | 8.9          | 3.70         | 9.8          |
| MIN.          | 117.0         | 60.0          | -1.26        | .19          | .16          | -8.2         | .17          | -8.0         |
|-----|-----|-----|-----|
| REAL RMSE     | .22          | TRUE SD      | .68          | SEPARATION   | 3.07         | PERSON RELIABILITY | .90          |
| MODEL RMSE    | .20          | TRUE SD      | .69          | SEPARATION   | 3.42         | PERSON RELIABILITY | .92          |
| S.E. OF PERSON MEAN = .04
-----
PERSON RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .92
-----
SUMMARY OF 60 MEASURED ITEM
-----
|          TOTAL          |          MODEL          |          INFIT          |          OUTFIT          |
|          SCORE          |          ERROR          |          MNSQ          |          ZSTD          |
|          COUNT          |          MEASURE          |          MNSQ          |          ZSTD          | | | | | |
|---|---|---|---|---|---|---|---|---|
| MEAN          | 1009.0         | 350.0         | .00          | .08          | .98          | -.3          | .99          | -.2          |
| S.D.          | 182.9         | .0          | 1.22         | .01          | .17          | 2.3          | .18          | 2.3          |
| MAX.          | 1301.0        | 350.0         | 2.00         | .12          | 1.60         | 6.7          | 1.60         | 6.8          |
| MIN.          | 682.0         | 350.0         | -2.34        | .07          | .71          | -4.2         | .73          | -4.0         |
|-----|-----|-----|-----|
| REAL RMSE     | .09          | TRUE SD      | 1.22         | SEPARATION   | 13.98        | ITEM RELIABILITY   | .99          |
| MODEL RMSE    | .08          | TRUE SD      | 1.22         | SEPARATION   | 14.34        | ITEM RELIABILITY   | 1.00         |
| S.E. OF ITEM MEAN = .16
-----
    
```

### 5. Measurement of Person and Item Reliability of the SWB Inventory

The obtained result was  $.92 > 0.8$ , indicating that the interaction between person and item overall is excellent. With the person reliability value of 0.92 obtained, it can be assumed that the consistency of student responses is excellent. Additionally, the item reliability value obtained was  $1.00 > 0.94$ , indicating that the quality of items in the inventory has exceptional reliability aspects. In this context, the research findings indicate that the developed inventory has excellent reliability, both in terms of the overall inventory and the individual reliability of high school and vocational school students' responses based on item quality.

This study produced an inventory of subjective well-being focusing on cognitive and affective evaluations of individual life. The construct includes emotional responses to various events and cognitive assessments of life satisfaction levels. This understanding encapsulates pleasant emotional experiences, low levels of negative emotions, and high levels of satisfaction in one's life. This concept is a primary focus in the field of positive psychology as it emphasizes positive experiences that provide value and satisfaction in life (Snyder & Lopez, 2014). Consistent with (Diener 1984) tripartite model, these components are (1) high life satisfaction levels, which are individuals' assessments of their lives overall; (2) high levels of positive affect, including positive emotional experiences, such as happiness, joy, and peace; and (3) low levels of negative affect, encompassing negative emotional experiences, such as anxiety, sadness, and tension (Diener et al., 1999).

Subjective well-being correlates significantly with academic achievement and their quality of life. According to research by (Bortes et al. 2021; Wu, Gai, and Wang 2020), factors such as life satisfaction, positive influence, and optimism about the future are positively related to academic performance. (Maechel et al. 2023) emphasize that cognitive components of subjective well-being, such as positive perception, also influence academic achievement. Furthermore, the harmonious relationship between teachers and students, as described by (Diener and Ryan 2009; Zhou et al. 2023), contributes to the enhancement of students' subjective well-being and academic performance. (Steinmayr et al. 2018) found that adolescents

with strong social support have better subjective well-being and lower risk of depression. Additionally, depression symptoms, such as lack of interest in activities and social interaction, are associated with low subjective well-being.

### CONCLUSION AND SUGGESTIONS

The research findings indicate that this inventory meets the criteria for item fit, inventory dimensionality, and person and item reliability. The components of subjective well-being measured include pleasant affect (joy, elation, contentment, pride, affection, happiness, and ecstasy), unpleasant affect (guilt and shame, sadness, worry, anger, and envy), and life satisfaction (desire to change life, satisfaction with current life, satisfaction with past, satisfaction with future, and significant others' views of one's life). Item fit analysis identified one item that did not meet the criteria, which was subsequently eliminated from the Subjective Well-being inventory. Furthermore, the reliability test results indicate that the overall person-and-item interaction, as well as the consistency of student responses, and the quality of items in the inventory, are excellent. Thus, the Indonesian version of the Subjective Well-being inventory developed has undergone empirical testing and can be utilized as a valid and reliable measurement tool for assessing students' subjective well-being. This makes a significant contribution to the development of guidance and counseling services in schools, which require measurement tools that consider the cultural diversity and contexts of Indonesian students. Additionally, this inventory can serve as a foundation for further research in the field of students' subjective well-being and interventions aimed at improving their quality of life.

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