

Psychometric Properties of Psychological Well-being for Students in Boarding Schools: A Rasch Analysis

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Abstract

This study aimed to develop a psychological well-being scale for students using Rasch analysis. The research involved 789 eligible participants aged 13-17 from East Java. The study found that gender, culture, individual maturity development, and assistance provided significantly impact students' psychological well-being. The study concluded that these factors are critical to ensuring the effectiveness of any intervention. The use of Rasch analysis enabled the researchers to identify the essential psychometric properties of the scale, making it a reliable tool for assessing students' psychological well-being. Overall, the study provides valuable insights into the factors that affect students' psychological well-being and can help develop effective interventions. The findings of this study have significant implications for educators and mental health professionals who work with young people. By addressing the critical factors identified in this research, they can provide better support to students and help improve their psychological well-being.

Keywords: *Psychological Well Being, Student, Boarding School, Rasch.*

1. INTRODUCTION

The study of psychological well-being has become increasingly relevant in understanding the challenges that students in Islamic boarding schools face. This is due to the unique characteristics of these schools, such as their Islamic values that govern social interactions between kiai, ustadz, and santri, their learning models, curriculum, teaching materials, learning processes, and residential activities [1], [2]

Students in Islamic boarding schools encounter various difficulties during their learning process, including personal issues, learning challenges, social interactions, and more [1], [3]. However, students who live in dormitories and study in a dormitory environment have unique characteristics that differentiate them from learners in other educational institutions. This is due to the strong bonds that students in dormitories tend to form with their dormmates, who are also their schoolmates. Therefore, student problems can affect their daily activities and the entire dormitory community [4], [5].

The most common problems experienced by students in Islamic boarding schools include discomfort and unhappiness while staying in the boarding school, confusion about their

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career path after graduating from the boarding school, difficulty developing interests and talents, adapting to new activities, difficulty understanding the situations and culture in Islamic boarding schools, poor time management, disputes with friends, and more [5]–[7]. These challenges can lead to discomfort, unhappiness, depression, and disempowerment, which aligns with Huppert's (2009) statement that "psychological well-being is about lives going well. It is the combination of feeling good and functioning effectively." Therefore, individuals with high psychological well-being report feeling happy, capable, well-supported, and satisfied with their lives, among other things.

Psychological well-being refers to how an individual experiences their daily life and the challenges they encounter. Research has indicated that an individual's psychological well-being is closely linked to their overall quality of life, including their physical health, emotional intelligence, and ability to cope with positive and negative influences. To achieve optimal psychological well-being, focusing on factors such as self-acceptance, achieving life goals, self-awareness, and dealing with stress is essential to enable individuals to lead productive lives and positively contribute to society. Several factors can influence an individual's psychological well-being, such as age, gender, socioeconomic status, social support, religiosity, optimism, emotional control, attachment, warm relationships, and the attainment of personal goals. Other factors influencing psychological well-being include psychosocial, sociodemographic, resilience, and social support factors [9]. Academic stress can also affect an individual's psychological well-being [10].

This study has identified several factors that influence psychological well-being across six aspects of well-being: self-acceptance, personal growth, purpose in life, positive relationships with others, environmental mastery, and autonomy. These aspects reflect the individual's personal growth and self-realization [10].

2. METHOD

Various psychological well-being instruments are available, including Ryff's psychological well-being scale [11], the multidimensional psychological well-being scale [12], and The 14-item Warwick-Edinburgh Mental Well-being Scale [13]. However, these scales may not be adequate for measuring the psychological well-being of santri due to the different characteristics of the respondents who will be measured. Studies on psychological well-being measurement with a well-being scale typically focus on psychological and multidimensional psychological well-being in the context of workers [14]. The 14-item Warwick-Edinburgh Mental Well-being Scale is commonly used for adults [15].

Researchers developed a psychological well-being scale for students based on the multidimensional model theory, the integrated model of personal development (IMPD), which includes six dimensions. This suggests that a prosperous individual's mentality is not only free from pressure or mental problems [16]. The researchers examined six aspects of psychological well-being, including self-acceptance, personal growth, purpose in life, positive relationships with others, environmental mastery, and adjusted autonomy, considering the conditions and characteristics of students in Islamic boarding schools.

The initial psychological well-being scale consisted of 36 items, which were reduced to 34 after validity testing (the test data will be explained in stages later). Each statement item was given a choice of answer that included "Very suitable/very in harmony/very appropriate," "Appropriate/in harmony/appropriate," "Not appropriate/not in harmony/not appropriate," and "Very inappropriate/very incongruent/very inappropriate," with gradations of values used being 4, 3, 2, and 1. The researchers developed the answer choices on a modified Likert scale, considering the characteristics of teenage respondents to reduce bias in developing the scale. The results indicated that the respondents did not

have difficulty with the answer choices and that the choice was appropriate. The answer choice data will be explained in the next stage of the study.

The data collection method employed in this study was the Cross-Sectional method [17], which is appropriate for issues with sufficient data collection at a single point in time to test students' internal validity of the psychological well-being scale. The data was collected directly at Islamic boarding schools in a random manner. The study involved 1016 respondents, spread across five East Java districts. According to data from the Directorate of Early Education and Islamic Boarding Schools Boarding School, Ministry of Religion in 2020/2021, there were 4.37 million Islamic boarding school students spread throughout Indonesia. These students were distributed across 30,494 cottages of Islamic boarding schools. East Java was the province with the highest number of santri, with 970,541 students or 22.19% of the total santri in the country.

The Rasch analysis results were obtained from 789 eligible respondents, consisting of 318 male and 471 female students. The selected students were between the ages of 13 and 17.

The present study employs the Rasch Model as a robust construction instrument for measuring individual characteristics [18]. The Rasch Model is a widely used psychometric approach for constructing instruments that measure an individual's abilities. In order to evaluate the model's assumptions, researchers may utilize software such as Winstep to carry out Rasch analysis. The Rasch Model was employed in this research to develop instruments that measure the psychological well-being in students.

3. RESULTS AND DISCUSSION

3.1 Overall fit to the Rasch Measurement Model

Results from Rasch's analysis for scale well-being of psychological Students can be seen in the following table:

Table 1. Reliability Result

	Reliability	Separation index	Mean measure*)	Cronbach's alpha	Raw variance explained by measures**)
Person	0.57	1.16	0.14	0.54	47 %
Items	1.00	22.77	0.00		

*) measure in Logit

***) computed via principal component analysis

Based on the data presented in the table, it is clear that respondents were consistent in their answers on the psychological well-being scale. The person reliability index of 0.57 indicates this, while the item reliability index of 1.00 demonstrates maximum reliability, which is an excellent result. The Chronbach's alpha coefficient of 0.54 further suggests good internal consistency among respondents.

Furthermore, the person separation index of 1.16 and item separation index of 22.77 reveal that respondents can be divided into two groups based on their psychological well-being levels: high and low. The scale can also group psychological well-being levels into 22 or 23 categories.

Although the interaction between respondents and items is only satisfactory, the psychological well-being scale is reliable due to the good enough person reliability index. Therefore, the measurement instrument can accurately assess students' psychological well-being when used appropriately on the right respondents. To achieve this, it is essential to introduce the scale to respondents, explain how the measurement works, and encourage honesty in their responses.

Additionally, the table above demonstrates that the psychological well-being scale can measure psychological well-being in students with various levels of respondents and components of the item. The mean measure for respondents in the table above is 0.14 Logit, indicating that the average psychological well-being of respondents is high.

3.2 Unidimensionality and local dependency

Based on the Rasch analysis of the Students' Psychological Well-being Scale, it has been found that 47% of students have scored well above the minimum criteria of 40%. Additionally, the variance in the first contrast was determined to be 9.9%, which is still below the benchmark of 15%. These findings strongly suggest that the scale has achieved its intended construct validity.

3.3 Rating Scale Diagnostics

How the logit value for each choice answers own score sequential values from low to tall or from minimum value to mark maximum so that variation answer respondents based on capacity response answer from scale well-being psychological can be seen from the table below:

Item threshold and fit. Indies of response format (I= 34, N= 789)

Table 2. Rating Scale Result

Categories	Andrich Threshold	Observed Average	Observed Count (%)	Infit	Outfits
Very Incongruent, Very Incongruent, Very Inappropriate	NONE	-1.02	15	1	1.04
Inappropriate, Incongruent, Inappropriate	-1.26	-0.38	27	0.91	0.94
Appropriate, Aligned, Exact	-0.29	0.54	39	0.81	0.81
Very Appropriate, Very Aligned, Very Precise	1.54	0.96	18	1.16	1.14

According to the findings, the observation score variant increased accordingly as the Andrich Threshold shifted from negative to positive logit (1.54) for each answer choice. This suggests there may have been inaccuracies in the respondents' answer selection, further supported by the figure displaying the choice answer curve and its predicted changes in the model's characteristics.

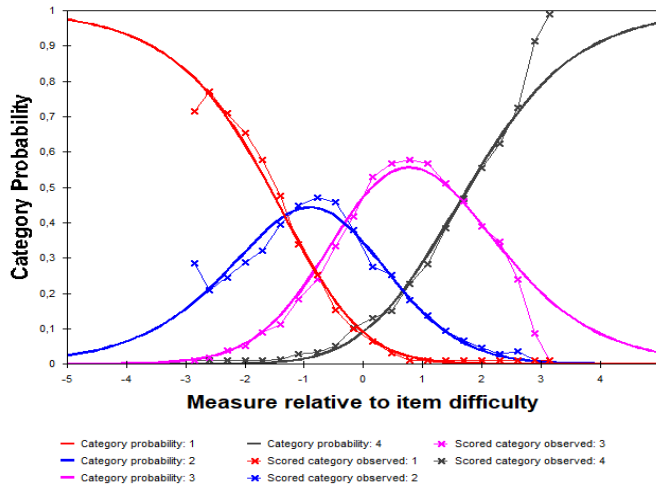


Figure 1. Measure Relative to Item Difficulty

According to the Rasch analysis, which portrays Figure 1 as an ideal straight-line pattern, respondents should ideally select their answers. The respondents' answers, represented as dots, often follow the existing pattern, indicating that respondents can discern the beneficial answer pattern presented on a psychological well-being scale for students.

3.4 Item Measure, Fit Indices, and Precision Measurement

The analysis of the psychological well-being scale for students involves examining item size, item suitability for producing accurate measurements (infit and outfit MNSQ), accuracy of resulting measurements (SE model), and item discrimination (measurement correlation). Based on the table, item number 20 appears to be the most challenging for respondents, as it asks them to plan their goals and evaluate whether such planning is valuable in an Islamic boarding school (2.00 logit). Meanwhile, item number 19, which asks about the importance of experiencing new things, is the easiest (-1.18 logit). All 34 items on the psychological well-being measurement scale have an MNSQ outfit between 0.5-1.5, demonstrating that all items fit the model well.

Table 3. Difficult Items Answered by Respondents.

Items	Total Score	Measure	SE models	Infit		Outfits		Pt. Measure Corr.
				MNSQ	ZSTD	MNSQ	ZSTD	
Item 20	1190	2.00	0.06	1.09	1.79	1.09	1.66	0.22
Item 34	1205	1.96	0.05	1.10	1.97	1.08	1.43	0.22
Item 33	1253	1.82	0.05	1.25	4.88	1.24	4.49	0.24
Item 31	1342	1.58	0.05	1.16	3.45	1.15	3.16	0.33
Item 25	1363	1.53	0.05	0.96	-0.88	0.96	-0.87	0.26

Table 4. Easiest Items Answered by Respondents

Items	Total Score	Measure	SE models	Infit		Outfits		Pt. Measure Corr.
				MNS Q	ZST D	MNS Q	ZST D	
Item 14	2640	-1.41	0.06	0.95	-0.98	0.96	-0.83	0.18
Item 10	2650	-1.44	0.06	0.92	-1.74	0.92	-1.58	0.17
Item 6	2687	-1.56	0.06	1.12	2.39	1.12	2.40	0.19
Item 11	2731	-1.71	0.06	1.03	0.55	1.04	0.76	0.18
Item 19	2754	-1.81	0.06	1.07	1.42	1.07	1.44	0.23

Based on the analysis of the psychological well-being scale for students, the SE model explains each item's standard error of measurement. Each item has a reliable fit, with a standard error range of 0.06 to 0.05, indicating a strong and precise ability to measure accurately. Furthermore, the table reveals that one item has a negative value for Pt. measure Corr.

3.5 Person Measure and the Wright-Map

In Rasch Model analysis not only measures item accuracy but also measures the precision of respondents in fill in scale well-being psychological students shown in the table below this:

Table 5. Lowest Score in Student's Psychological Well-Being Scale

Person Entry Number	Total Score	Measure	SE models	Infit		Outfits		Pt. Measure Corr.
				MNS Q	ZST D	MNS Q	ZST D	
909	73	-0.75	0.24	0.58	-2.07	0.53	-2.21	0.84
900	72	-0.81	0.24	1.00	0.08	0.99	0.03	0.69
620	71	-0.87	0.24	0.65	-1.63	0.65	-1.51	0.75
704	71	-0.87	0.24	1.67	2.46	1.52	1.88	0.48
80	70	-0.93	0.24	0.86	-0.56	1.03	0.22	0.25

Table 6. Highest Score in Student’s Psychological Well-Being Scale

Person Entry Number	Total Score	Measure	SE model	Infit		Outfit		Pt. Measure Corr.
				MNS Q	ZST D	MNS Q	ZST D	
559	108	1.34	0.26	1.45	1.70	1.28	1.14	0.65
223	106	1.20	0.26	0.82	-0.71	0.82	-0.73	0.70
712	206	1.20	0.26	1.34	1.36	1.27	1.10	0.46
809	106	1.20	0.26	1.42	1.63	1.21	0.90	0.52
311	105	1.14	0.26	1.46	1.80	1.41	1.62	0.54

The data provided above presents information regarding the psychological well-being scale for students, including the highest and lowest scores obtained by five respondents. Among 789 respondents, respondent number 559 achieved the highest score, measuring at 1.34 logit and SE 0.26. This 17-year-old female student from an Islamic boarding school in Jombang exhibits high psychological well-being. In contrast, respondent 80 scored the lowest, measuring -0.93 logit and SE 0.24. This 12-year-old female student from Probolinggo exhibits a low level of psychological well-being.

Our Rasch analysis allows for comparing the psychological well-being scores between the highest and lowest-scoring respondents and enables us to compare the most complex and most accessible items. Furthermore, we can compare respondents who faced the highest difficulty level on the most challenging items or vice versa. This comprehensive analysis considers the items, the respondents, and their interaction, resulting in a thorough understanding of the data.

3.6 The DIF Analysis

The analysis of the DIF results is quite interesting. It groups respondents into subgroups with a DIF probability greater than 0.05 based on location, gender, age, reason for attending the Islamic boarding school, counselor availability, and grade. The analysis results reveal that the psychological well-being scale items do not have any detrimental effect on any of the subgroups. The items on the scale are unbiased and do not harm respondents. The DIF analysis shows that some items may only be equally beneficial for some respondent subgroups, with a DIF probability value of less than 0.05. However, only a few items have a DIF contrast greater than 0.64 logit, which are removed accordingly.

Table 7. DIF Analysis REsult

Respondent subgroups	Items with DIF Analysis <0.05	Items with DIF Contrast > 0.64
City	1, 3, 5, 8, 11, 12, 16, 17, 18, 20, 21, 22, 23, 28, 29, 30, 32, 34, 36	1, 28, 34
Gender	1, 3, 6, 7, 11, 12, 17, 20, 21, 22, 27, 30, 34, 36	-
Reason for entry boarding school	3, 5, 11, 14, 16, 18, 19, 20, 21, 22, 25, 30, 31, 32, 34	3, 5, 11, 18, 21, 23, 30, 32, 34
Availability	1, 8, 12, 16, 17, 18, 25, 28, 29, 31,	1

counselor at Islamic boarding school	34, 35, 36
Grades	1, 4, 6, 7, 10, 12, 13, 17, 18, 19, 20, 21, 24, 27, 28, 29

It is crucial to consider the impact of respondent subgroups when evaluating bias in the statement items scale for psychological well-being. This emphasizes the importance of profoundly understanding respondent characteristics when creating the scale's statement items. The more comprehensive the data on respondents, the fewer items will exhibit a DIF probability < 0.05 and more than these scales may be required to strengthening the scale's validity. Our analysis has identified 22 unbiased and reliable items that can be safely used by students of diverse backgrounds, including those from different cities, genders, reasons for entering Islamic boarding schools, and academic levels.

3.7 Analysis Students' Psychological Well-being

Analyzing the psychological well-being scores of students based on different criteria can provide valuable insights for researchers. Apart from assessing DIF and DIF contrast, researchers can also compare the psychological well-being scores of students belonging to distinct subgroups of respondents, such as gender, city, academic grade, availability of a counselor, and reason for entering an Islamic boarding school. Gaining a deeper understanding of factors that impact psychological well-being can empower researchers to design more nuanced interventions to support students.

Table 8. Psychological Well-Being Based on Respondents' Subgroups

Respondent Subgroups	N (Respondent)	Mean Outfit	
City	Jombang	327	0.97
	Ponorogo	159	0.97
	Probolinggo	74	1.17
	Sumenep	229	0.99
	Total Respondents	789	
Gender	Boy	318	0.97
	Woman	471	1.02
	Total Respondents	789	
Reason for entry boarding school	Invitation Friend	18	1.35
	Encouragement Family	20	0.97
	Parental Encouragement	259	1.00
	Desire Alone	492	0.98
	Total Respondents	789	
Availability counselor at Islamic boarding school	There is	74	1.17
	Nothing	715	0.98
	Total Respondents	789	
Grades	7	201	1.10

8	250	0.98
9	182	0.94
10	76	0.90
11	80	1.01
Total Respondents	789	

The tabulated data above indicates notable differences in the psychological well-being scores across various subgroups of respondents. Specifically, the psychological well-being level of students in Probolinggo was higher than that of students from other cities, as evidenced by a Mean Outfit of 1.17 logit. In addition, female students displayed a higher psychological well-being level than their male counterparts, with a Mean Outfit of 1.02 logits. The reason for entering an individual boarding school was also found to significantly impact students' psychological well-being scores, with those who entered based on an invitation from a friend displaying a higher Mean Outfit of 1.35 logit compared to those who entered for other reasons. Such findings highlight the need for boarding schools to provide adequate psychological support for their students, especially those who are new and may struggle to adjust to the new environment.

Moreover, the data presented above underscores the importance of having a counselor who can offer special assistance to students and accompany them in all activities in Islamic boarding schools to improve their psychological well-being. This is evident in the Mean Outfit value of 1.17 logit, despite the smaller number of respondents (N=74) compared to other Islamic boarding schools with more counselors (N=715). Such findings suggest that the presence of a counselor in Islamic boarding schools may be instrumental in enhancing students' psychological well-being.

Notably, different results were observed in the psychological well-being scores based on the students' intermediate school level. Specifically, the data demonstrated notable differences in the psychological well-being scores at each level. Students in grade 7, who are new to the boarding school environment and are still trying to find their identity displayed lower psychological well-being scores. This is likely due to the significant change teenagers experience during this stage, which can negatively impact their psychological well-being. Providing adequate psychological support to these students is crucial to ensure that they adjust well and maintain good psychological well-being.

Finally, the data demonstrated that the development of knowledge and maturity in each aspect of psychological well-being encourages changes in the psychological well-being scores. The score increases in grade 11, indicating that students have matured psychologically and can successfully complete their development tasks. Overall, the data presented above provides valuable insights into the factors that impact students' psychological well-being in Islamic boarding schools, highlighting the need for appropriate psychological support to be available for students at all levels. Differences in the level of psychological well-being individuals are influenced by many factors such as gender, culture, work, education, social support, and age [19]. Difference score well-being psychological Can in a way varies different in each aspect of psychological well-being a cross-sectional study with a sample of 1990 emerging adults (50% male) from the Spanish general population was conducted. Participants were assessed through five questionnaires. Results showed that women scored higher than men in purpose in life and personal growth [19] while Men scored higher than women in self-acceptance and autonomy, and women scored higher than men in personal growth and positive relationships with others. They examined the relevance of gender to the psychological well-being of adult individuals aged 21 to 64 years, and they were assessed with Ryff's Psychological Well-Being Scales [11].

Understanding psychological well-being in students will be different with group public other such as workers, society general, adults, or even students at school general. That thing is different because characteristics are different.

Table 9. The Difference Between Psychological Well-Being Subgroups

Respondent subgroups	Sum-of-Squares	df	Mean-Squares	F-test	Prob>F
City	3.33	3.00	1.11	6.73	0.0002
Gender	3.63	1.00	3.63	22.09	0.0000
Reason for entering boarding school	1.14	3.00	0.38	2.26	.0795
Availability counselor at Islamic boarding school	1.08	1.00	1.08	6.42	.0111
Grades	5.58	4.00	1.39	8.59	0.0000

The well-being scores in psychology groups display a noticeable degree of variability. However, not all differences observed are statistically significant, as some fail to reach the required significance level.

In this section, we will reveal the result of the variations in the development of psychological well-being instruments, and several instruments have been designed based on different theories. One such example is the multiple scales of PWB formulated by Riff (1989), which measure the well-being of adults and workers (Ryff & Singer, 1996), or psychological well-being in college students, such as the 14-item Warwick-Edinburgh Mental Well-being Scale [20].

Psychological well-being scales tailored for students possess unique characteristics as they are learners in schools and Islamic boarding schools. They have different responsibilities, activities, and cultures. The Rasch analysis results manifest that psychological well-being is significantly influenced by the culture of each Islamic boarding school, gender, grade, and the presence of a companion (counselor) at the Islamic boarding school. The analysis also shows that the highest psychological well-being score is found in incoming students invited by their friends to join the boarding school. This is pertinent to teenage development, where peer relationships play a significant role, and engaging in activities with friends can elevate psychological well-being scores.

The Rasch analysis for the psychological well-being scale for students shows that the scale has excellent reliability on the item level, sufficient reliability on the person level, and enough reliability on the interaction between both. The scale is also accessible from bias (local dependencies), unidimensional, and has a measurable misfit of the item with the ideal model.

The answer choices given in the scale have gradations of 1, 2, 3, 4 for unfavorable items and 1, 2, 3, 4 for favorable items. The analysis indicates that these answer choices were clear to respondents and are appropriate.

The psychological well-being scale scores for students are categorized into three levels: high, medium, and low, based on calculating the mean and standard deviation. The high level is when the psychological well-being scale logit score is above the Mean+1 SD, which is 0.53, while the low level is when the psychological well-being scale logit score is below the Mean-1 SD, which is -0.29. The moderate level is when the logit score is between >-0.29 and <0.53 .

The Wright person-item Rasch map for the psychological well-being scale of Islamic boarding school students with N=789 shows that the items on the right side are the most challenging to answer. In contrast, the left side depicts the distribution of respondents' abilities in answering statement items from the highest to the lowest. The Wright map compares person and item logits starting from the Mean logit (M), one standard deviation (S), and two standard deviations (T).

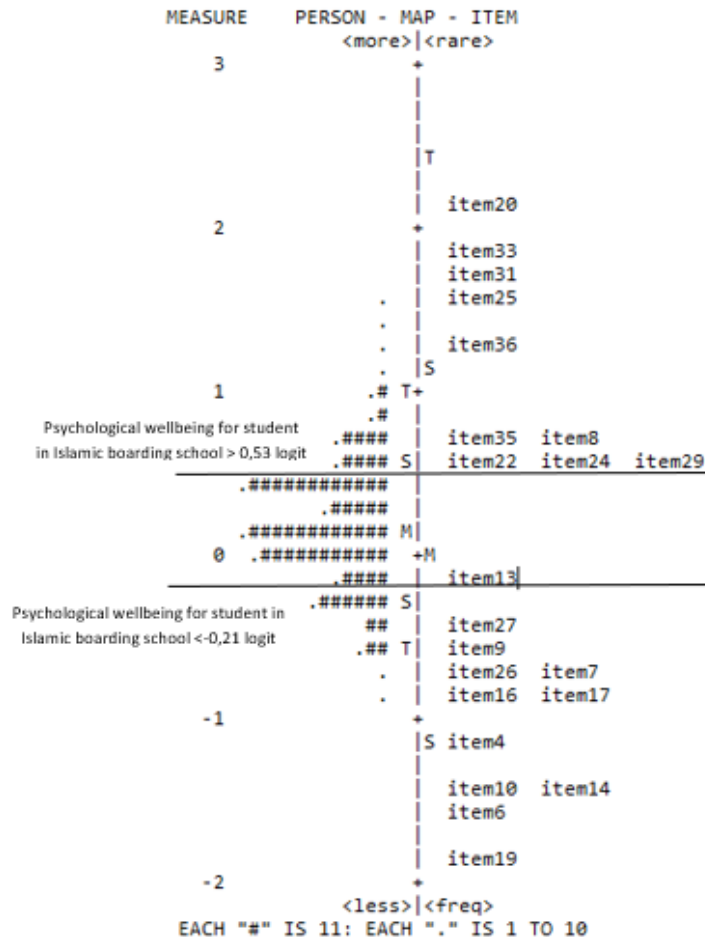


Figure 2. The Wright Person-Item Rasch Map

4. CONCLUSION

The present study aims to develop a psychological well-being scale designed to evaluate the well-being of students. This scale helps assess various well-being aspects, including emotional and social well-being, general life satisfaction, and positive psychological functioning. By creating a reliable and valid scale, the study provides a valuable tool for researchers, educators, and mental health professionals to assess students' psychological well-being and design effective interventions.

Additionally, the study provides significant psychometric information about the factors that influence students' psychological well-being. The study's results indicate that internal factors do not solely determine psychological well-being but are also impacted by external factors such as culture, gender, individual maturity development, and expert support. This information can help educators and mental health professionals design more effective interventions considering these external factors.

The study highlights the importance of considering these factors when assisting students experiencing psychological well-being issues. It is crucial to provide support tailored to the individual's unique needs. By taking into account the various factors that influence a student's psychological well-being, we can design more effective interventions that positively impact their overall well-being.

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