



## The development and validation of Indonesian Hope Scale (IHS): A Rasch model analysis

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### Abstract

Hope is one of the dimensions of character strength needed in individual personal development. Various instruments continue to be developed to measure a particular hope. The hope scale instrument must be adapted to each culture and country. However, in Indonesia, there has been no research on the development and validation of the hope scale. This study aimed to develop and validate the Indonesian Hope Scale (IHS) using Rasch's model analysis. Participants in this study are 323 students (99 male and 224 female) aged 13-25 years. This study consisted of junior high school students, senior high school students, college students, and postgraduate students. The results showed that Cronbach's Alpha was in the excellent category with a value is 0.82. The item reliability value is 0.99, and the person reliability value is 0.82. The results of Rasch's analysis show that the psychometric characteristics of the 20 items from the Indonesia Hope Scale can meet the requirements and can be used to measure expectations by professionals.

**Keywords:** Development and Validation, IHS, Rasch Model

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## Introduction

Hope is a psychological notion that first appeared in 1950 and has since grown in popularity. The study of hope has steadily increased during the previous three decades (Chamodraka, 2009). Researchers, academicians, and professionals from different fields of science pay special attention to the hope concept in various settings (Gallagher, Pedrotti, Lopes, & Snyder, 2019; Hartanto, 2020). Such as a hope study in children (Chawla, 2020), adolescents (Reichard, Avey, Lopez, & Dollwet, 2013), adults (Griggs, 2017), schools (De Bourdeaudhuij et al., 2011), universities (Fruiht, 2015), works (Reichard et al., 2013), etc.

Hope is not a single activity in the process of personal development. However, it is a complex condition with thoughts, feelings, and behaviors that can change over time (Esteves, Scoloveno, Mahat, Yarcheski, & Scoloveno, 2013). Hope also means an individual's motivational condition and belief that they can achieve their respective desires or goals. In hope theory, goals are everything that person wants to obtain, do, become, experience, or create. Either a massive goal (which takes a long time to achieve) or a small goal (which only takes a few minutes to complete) (Oettingen & Chromik, 2017).

Various hope measurements were developed to determine the condition of individual hope, producing different methods and ways. The researchers continue to look into the limitations and benefits of these measurements to enhance them. According to Stotland (1969) in (Gallagher et al., 2019), knowing hope through interviewing or asking direct questions does not create the desired responses from individuals. Another method based on the theory of Gottschalk (1974) (Gallagher, Marques, & Lopez, 2017) is measuring hope through observation. Meanwhile, another researcher, Staats (1989) (Gallagher et al., 2019), used more than one measurement to determine hope. The Staats concept looks at the measurement of hope from a cognitive and affective perspective. However, some theories that only recognize a single approach, such as purely cognitive or affective models, can limit progress in measurement (Gallagher et al., 2019).

The concept and development of the latest hope measurement have turned into a combination model of cognitive and affective dimensions. One of those models is the result of the product by Snyder (Snyder, 2000), which looks at the complexity of the basic concept of hope. Snyder states that hope is a cognitive-motivational

model. According to hope theory, when a person initiates a behavior, it should be directed towards achieving a specific outcome. Before starting that behavior, someone must be engaged in two types of cognition: *pathways thinking* and *agency thinking* (Gallagher et al., 2019). This concept can be interpreted as hope is a set of cognitions based on a mutual understanding of agency and pathways (Gallagher, Smith, Richardson, D'Souza, & Long, 2021)

First, pathways thinking refers to cognitions that show the plans or strategies used to achieve the goals. A person's perspective of the future can affect his current thinking. People who have high hope will be more assertive in determining plans to achieve future goals (Snyder, 2002). Second, agency thinking refers to cognitions that convey one's determination, motivation, and capacity to achieve goals (Bernardo, 2020). People who have high hope are more determined to achieve the goals they want to achieve. Based on these two aspects (agency thinking and pathways thinking) (Snyder, 2000), Snyder developed an instrument used to measure hope (*hope scale*) (Ward, Griswold, Johnson, & Grahe, 2017). The development of the hope instrument leads to the development of a self-report scale. Self-report measurement is used by various researchers in measuring and developing the hope scale (Gallagher et al., 2017; Lopez & Snyder, 2003).

The Snyder hope scale was initially developed to help uncover career choices in the United States. The studies (Hansen, Lees, Kapiga, Seeley, & Barnett, 2020) revealed that this hope scale could not be used as the primary reference for measuring hopes in populations in countries with different cultural backgrounds. So, the use of the instrument must be adapted to each culture and country. Several studies have developed and examined the validity of the hope scale. Among them are France (Dubé, Lapierre, Bouffard, & Alain, 2007), Dutch (Carifio & Rhodes, 2002), Slovakia, Spain, and Korean (Halama, 2001), Arabic (Alali, 2017), and the Philippines (Bernardo & Estrellado, 2014). However, no research in Indonesia indicates the outcomes of developing and testing the hope scale instrument. On the other hand, research that focuses on developing and validating the hope scale is needed. Therefore, this study aimed to develop and validate the Indonesian Hope Scale (IHS).

The results of this study are expected to provide some research contributions. First, the Indonesian Hope Scale (IHS) developed later can become a reference for researchers or educators to measure individual hope. Second, it can expand the discussion on the topic of the hope study in the scale development section. Third, the Rasch model analysis used in this study is the first analysis on the case of the hope scale.

## Method

### Participant

In this study, the participant selection technique uses a convenience sampling technique, using google form as a data collection, which is accessed on <http://bit.ly/HopeScale>. This study consisted of 323 Indonesian student respondents (aged 13-25). The participants were demographically from various gender, educational level, and ethnicity. Table 1 summarizes the demographic profile of the participants who responded to this study.

**Table 1.** Demographic Profile of Participants

Variables	Category	F	%
Gender	Male	99	31
	Female	224	69
Education Level	Junior High School	70	22
	Senior High School	103	32
	College Students	85	26
	Postgraduate Students	65	20
Ethnicity	Batak	19	6
	Jawa	69	21
	Melayu	22	7
	Minang	70	22
	Sunda	93	29
	Other	50	15

## Instrument

The study aims to develop a valid, reliable, practical, and effective instrument to measure students' hope in Indonesia. For this purpose, the instrument designed is an instrument that meets the minimum requirements for an appropriate measuring instrument. The scale developed in this research is the Indonesian Hope Scale (IHS), which has gone through development, revision, and refinement according to scientific methods and principles. The Indonesian Hope Scale (IHS) used in this study was developed based on the concept and construction of hope developed by Snyder with the following aspects: 1) Pathways thinking and 2) Agency thinking. This Indonesian Hope Scale consisted of 25 items. The scale used is a differential semantic scale based on choices from 1= definitely false to 8 = definitely true with a score range of 1-8 items, a minimum total score is 25, and a maximum total score is 200. Psychologists and counseling experts were requested for their input to add their insight into the material and content of the developed instrument. Expert validation was carried out to maintain the quality of the instrument and suitability of the scale with the developed construct.

## Data Analysis

The collected data in Microsoft Excel Spreadsheet were then analyzed to see the demographic profile of the participants involved in the study based on gender, education level, and cultural background using the statistical program Jeffreys' Amazing Statistics Program (JASP) version 0.16.10. Furthermore, to analyze the research results quantitatively and produce the coefficients of validity and reliability, the test was carried out using the Rasch model analysis with the Winstep program version 3.73.

## Results and Discussion

The analysis results from the development of the Indonesian Hope Scale (IHS) measuring instrument are presented following the results of the Rasch model analysis.

### Reliability

Reliability explains how far measurements made repeatedly will produce the same information (Sumintono, B., & Widhiarso, 2014). In calculating the reliability estimate, it is necessary to have several reliability assessment criteria on an instrument: item reliability index, person reliability index, person separation index, item separation index, and Cronbach's Alpha. At this stage, the data is first analyzed in the reliability analysis to determine the reliability of the instrument (person and item) where the reliability index is between 0 and 1, where 0.8 or more is acceptable. Furthermore, the evaluation was carried out on the person separation index and item separation index to determine the instrument's reliability. A separation index higher than two is considered a satisfactory separation. Finally, researchers use Cronbach's alpha to interpret internal consistency reliability where values range from 0 (low reliability) to 1 (high reliability), with a Cronbach's alpha reliability of more than 0.8 is a substantial value, which usually indicates a reliable score (Tan & Chellappan, 2018). Table 2 summarizes the consistency of the statistic of the instrument generated using the Rasch model.

**Table 2.** Reliability of the Indonesian Hope Scale

	M	SD	Separation Index	Reliability	Cronbach Alpha
<b>Person</b>	.35	.33	2.86	.82	.82
<b>Item</b>	.00	.42	10.65	.99	

In the Rasch model, reliability reports the consistency of responses between participants to items on the scale. People reliability refers to the surface of people's order that can be expected if the sample of people is given a set of other items that measure the same construct. Otherwise, item reliability implies consistency of item placement along the path if the identical item is given to different samples with the same ability level (Tan & Chellappan, 2018). Table 2 shows that the person's reliability value of 0.82 is in a suitable category ( $> 0.80$ ), and the item reliability value of 0.99 is in a special category ( $> 0.80$ ). It shows that respondents and items are stable and consistent when measured by different objects and respondents. Meanwhile, Table 2 shows that the dissociation index of people is 2.86 ( $> 2.0$ ), indicating that the instrument can detect three statistically other groups of participants in the sample. Furthermore, the item separation index is 10.65 ( $> 2.0$ ), it showing 11 levels of appropriate items in this study. A higher degree of separation implies a better measurement of these instruments, as they are separated by different degrees of difficulty. Therefore, the reliability index and the separation reliability were good and acceptable in this study. In addition, the reliability of Rasch items can be determined by Cronbach's Alpha, which is a measure of internal consistency. This analysis reveals a good Cronbach's Alpha of 0.82, where the reliability coefficient ( $> .80$ ) is acceptable in most social science studies. Therefore, the researcher can continue further analysis.

**Unidimensionality Test**

The unidimensionality test evaluates the developed instrument to measure what it is supposed to measure. Table 3 demonstrates the calculation of the unidimensionality test of the Indonesian Hope Scale (IHS). Table 3 shows that the raw data variance measurement result is 39.1%. This result indicates that the unidimensionality test requirements are met (Sumintono, B., & Widhiarso, 2014). Meanwhile, Table 3 also known that the variance value moves from 3.1% to 12.8%. It means that the condition for an instrument can be used if it has a variance value below 15% fulfilled. This hope scale instrument can measure the construct of hope and estimate what should be measured (so that there is no variance outside the construct).

**Table 3.** Unidimensionality of The Indonesian Hope Scale

	Empirical		Modeled
Total raw variance in observations	41.0	100.0%	100.0%
Raw variance explained by measures	16.0	<b>39.1%</b>	40.2%
Raw variance explained by persons	2.9	6.9%	7.1%
Raw Variance explained by items	13.2	32.1%	33.0%
Raw unexplained variance (total)	25.0	60.9%	59.8%
Unexplned variance in 1st contrast	5.2	<b>12.8%</b>	20.9%
Unexplned variance in 2nd contrast	2.1	<b>5.1%</b>	8.4%
Unexplned variance in 3rd contrast	1.7	<b>4.1%</b>	6.7%
Unexplned variance in 4th contrast	1.5	<b>3.5%</b>	5.8%
Unexplned variance in 5th contrast	1.3	<b>3.1%</b>	5.1%

**Rating Scale Functioning**

An assessment scale analysis was conducted to determine whether the rating scale could be understood well. If some items are less than the respondents or questionable items are answered, they must be corrected. The requirement that must be fulfilled is the Andrich Threshold index value between 1.4-5.0 logit. If the value index is less than 1.4 logit, the rating scales are combined, but the rating scales are separated if the value index is more than 5.0 (Sumintono, B., & Widhiarso, 2014). Table 4 summarizes the category structure on the gradation scale and the structure of the intersection size.

**Table 4.** Calibration Scaling Analysis of IHS

Category Label	Observed Count	Observed Average	Infit MNSQ	Outfit MNSQ	Andrich Threshold	Category measure
1	420	-.11	1.30	1.57	NONE	( -1.97)
2	524	-.13*	1.04	1.13	-.41	-.93
3	644	-.09	.88	.90	-.30	-.48
4	798	.00	.82	.80	-.21	-.18
5	1.072	.21	.93	.85	-.16	.09
6	1.421	.37	.88	.81	.01	.42
7	1608	.60	.90	.89	.36	.97
8	1588	.82	1.06	1.04	.71	(2.18)

Table 4 shows that the increment of the Threshold index between each score is less than 1.4 logit. From category 2 to category 3 is 0.11 logit, from category 3 to category 4 is 0.9 logit, from category 4 to category 5 is 0.5 logit, from category 5 to category 6 is 0,15 logit, from category 6 to category 7 is 0.35 logit, and category 7 to category 8 is 0.35 logit). It is known that the scale with eight choices cannot be understood well by respondents, and the answer scale options must be simplified. Figure 1 illustrates the probability curves for the Indonesian Hope Scale.

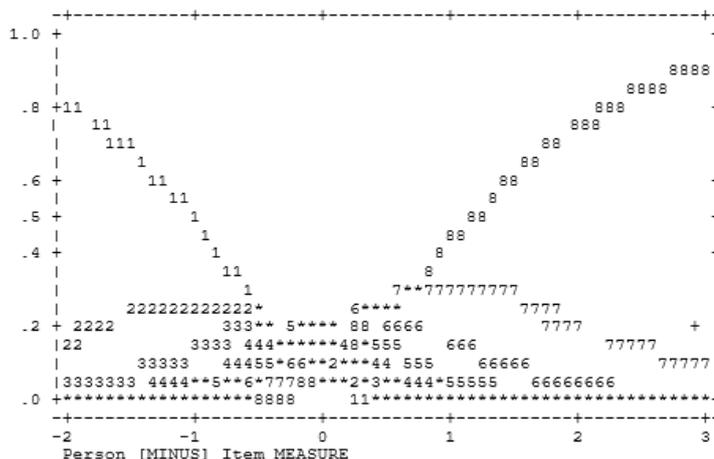


Figure 1. Probability curves for the Indonesian Hope Scale

Validity Item

Table 5. Summary Misfit Order and Item Difficulty

Item	Measure	PT. Measure Corr.	Outfit MNSQ	Outfit ZSTD	Perceived Difficulties
H13	0.73	.32	1.21	2.7	Most difficult item ↑ ↓ Most easy item
H7	.64	.34	1.14	2.1	
H14	.46	.45	1.16	2.4	
H16	.43	.43	1.08	1.3	
H3	.42	.32	1.02	.2	
H5	.32	.32	1.25	3.5	
H18	.29	.44	.97	-4	
H22	.27	.37	1.22	3.1	
H17	.27	.46	.89	-1.6	
H11	.26	.47	.78	-3.4	
H25	.14	.39	1.44	5.2	
H10	.12	.28	.91	-1.2	
H23	.09	.35	.80	-2.8	
H15	-.02	.40	.90	-1.2	
H1	-.09	.21	.84	-1.9	
H20	-.19	.37	.63	-4.7	
H8	-.21	.34	.99	-1	
H21	-.27	.43	.74	-3.0	
H12	-.30	.36	.99	-1	
H19	-.44	.29	1.00	.0	
H4	-.46	.27	1.19	1.8	
H24	-.49	.40	.97	-3	
H6	-.51	.30	1.05	-5	
H2	-.66	.29	1.10	-9	
H9	-.81	.25	1.31	-2.6	

The analysis begins by analyzing the item's difficulty by combining the mean score and standard deviation, then comparing the item measurement with the 2SD value (Boone, Yale, & Staver, 2014). Thus, the default logit should be between -0.82 and +0.82. After the analysis, there are no items outside the logit value range, which means that there are no outliers. Furthermore, the criteria used to check fit and misfit items (outliers) are to compare the Outfit MNSQ value (0.5-1.5), the Outfit ZSTD value (-2.0-+2.0), and PTMEA Corr. value (0.4-0.85). However, if the items found were the MNSQ and PTMEA Corr values, it does not meet the criteria, but if the

ZSTD value meets the requirements, the item can still maintain. (Boone et al., 2014). Table 5 shows that several items do not meet the criteria, namely items H13, H7, H14, H5, H22, H11, H25, H23, H20, H21, and H9. It indicates that the items are included in the outlier limit.

#### Analysis Bias/Difference Item Functioning

Difference Item Functioning (DIF) analysis based on gender was carried out because of the possibility of bias in responses between men and women in answering the statement items on the instrument. This analysis is known if the probability value of the items is less than 5% (0.05) (Boone et al., 2014). Table 6 and Figure 2 show that the two items (H14 and H22) detected were biased for the gender category.

**Table 6.** DIF Analysis based on Gender

Item	Summary DIF Chi-Squared	Probability
H1	.12	.72
H2	1.14	.28
H3	1.97	.15
H4	.00	1.00
H5	.00	1.00
H6	.00	1.00
H7	3.61	.05
H8	.81	.36
H9	.33	.56
H10	.85	.35
H11	1.48	.22
H12	2.26	.13
H13	2.88	.08
H14	5.82	<b>.01</b>
H15	2.93	.08
H16	.48	.48
H17	.42	.51
H18	.33	.56
H19	.00	1.00
H20	.33	.56
H21	.11	.73
H22	8.88	<b>.00</b>
H23	.83	.35
H24	.00	1.00
H25	.16	.68

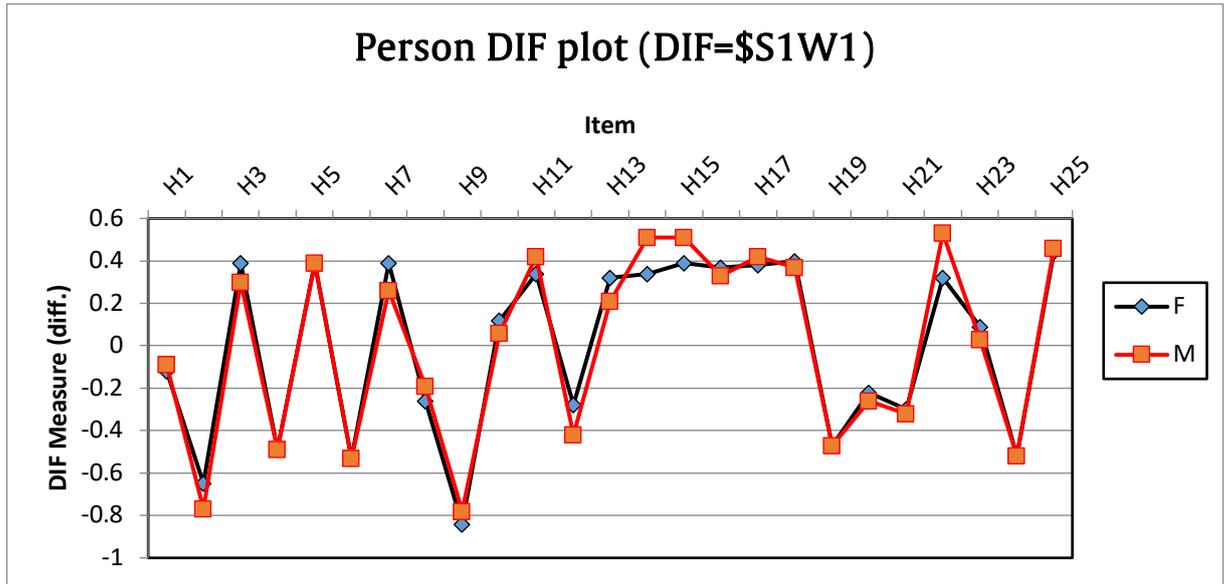


Figure 2. Analysis Differential Item Functioning (DIF) based on Gender Categories

**Test of Information Function**

Analysis using the information function test is used to see the level of information exposure and the ability of respondents to complete the items in the instrument (Sumintono, B., & Widhiarso, 2014). The information generated in this test depends on the relationship between the given scale and the individual's abilities. The X-axis shows students' ability to explain the amount of information obtained on the Y-axis.

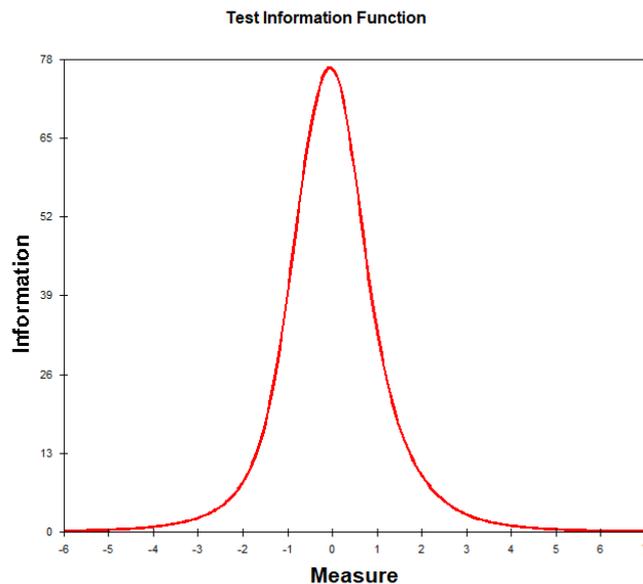


Figure 3. Test Information Function of IHS

Figure 3 shows that the information level of this instrument offers a high category that is 78 points. It can be concluded that respondents get the information representing their experiences through this instrument. The findings support the aim of this study in assessing the development and validation of the HIS among Indonesian students. With the validity instrument, the researchers conclude that several items that are: it stated that it does not meet the minimum limits of the valid and reliable scale. This condition requires that some items be removed and repaired to decrease the number of items. Based on the test results, there have been described previously. Of the 25 items designed after testing, 14 items meet the overall validity and reliability requirements. Furthermore, six items were corrected based on field trial analysis and expert suggestion results, and five items were removed. Thus the total number of items used is 20 items (ten items favorable and ten items unfavorable).

In the rating scale analysis on the Rasch Model, the respondents' eight answer choices could not be understood well by the respondents (Andrich Threshold index value of fewer than 1.4 logits). Therefore, after improvements have been made, the Indonesia Hope Scale (IHS) uses a Likert scale with four answer choices from 1=definitely false to 5=definitely true. In addition, based on the analysis of *Person Measure* in the RASCH model, which provides information about the logic of each person (participant), there are no participants who are "maximum measure or are considered outliers or misfits. All respondents filled out the Indonesia Hope Scale (IHS) instrument thoughtfully and carefully.

## Conclusion

This study shows that 20 items of the Indonesian Hope Scale are feasible to measure hopes in Indonesia. Using the Rasch model, the researcher has obtained a good reliability score, which indicates that the Indonesian Hope Scale produces a valid score when measuring hope. Therefore, IHS is recommended as an assessment tool for developing counseling services and other mental health programs. Further research is needed to examine the effectiveness of using this instrument and its integration with other mental health and counseling service programs. It also recommended specifically the intervention of researchers to increase students' hope.

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