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## Development and validation of Indonesian Peace of Mind Scale (IPoMS): The Rasch analysis

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### ABSTRACT

Every society dreams of true peace. To achieve true peace, humans need to start with inner peace. The importance of peace becomes one of the bases for developing a measure of peace for designing peace-building programs. This research answers the need for these measuring tools by developing and validating a peace measuring instrument called the Indonesian Peace of Mind Scale (IPoMS). This instrument consists of seven items in two aspects: the internal state of peacefulness and harmony. This study used Rasch analysis to test the construct validity of IPoMS. The construct validity test involved 202 vocational high school students in Yogyakarta, Indonesia. Data analysis using Winstep software provides information about the quality of respondents and instruments, items that are easy and difficult for respondents to agree on, fit order items, and unidimensionality. The results of the application of Rasch analysis show that IPoMS is good, precise, and have item conformity with the model. IPoMS is a reliable and valid measuring tool to measure students' level of peace accurately. This paper discusses the implications and recommendations for further research for the implementation of guidance and counseling containing the value of peace as a follow-up to the performance of IPoMS.

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## 1. INTRODUCTION

Peace is a new vision in the 21st century. In Indonesia, a love of peace is also one of the pillars of character in education [1]. The conditions behind the emergence of this vision are the needs of the people of a country that not only requires material prosperity but also requires lasting peace and tranquility [2], [3]. People's need for peace indirectly challenges them to realize peace by living together and side by side in a calm, comfortable, and minimally violent manner [4], [5]. Peace can also be achieved with competitive conditions without contradiction and diversity without conflict [6]. It is also possible to apply it in a school environment where students face various competitions that can nurture and train them to create peace.

People's expectations about living peacefully with the surrounding environment did not work as they should. Several studies have shown that the lack of peace in individuals correlates with violence [7], [8] and contributes to high levels of aggressive behavior [9]. Research in Indonesia shows that the level of aggressiveness of students in the very high category is 5.82%, and in the high category is 17.82% [10]. Another study also in Indonesia stated that the aggressive level of students in the very high category was 5%, and the very high category was 26% [11]. The results of other studies in Indonesia show that the profile of

aggressive behavior in Indonesia consists of four aspects namely physical by 29%, verbal by 18%, anger by 24%, and hostility by 29% [12]. The violence that appears as a form of unrest has a negative impact, like a cultural violence [13], students' poor perceptions of the school climate [14] and contribute to academic performance [15]–[17].

Peace in students has benefits for developing non-violent attitudes. The values of non-violence themselves include love and living in harmony [18]. Non-violence as an effective way to deal with conflict requires thought, resources, vision, planning, patience, and commitment [19]. Environmental conditions without violence and peace are not just an idea or idea but are the norm throughout human history and prehistory [20]. The environment as described has become a condition desired by many parties, including schools. It becomes a challenge for humans to realize this non-violent attitude; humans must face the five great enemies of peace: greed, ambition, envy, anger, and arrogance [19].

The urgency of peace in humans triggers the need for a measuring instrument that can measure the level of peace of students. Efforts to measure peace will result in a description of the student's level of peace. Thus, various related parties can follow up in guidance and counseling interventions to develop peace in students [10], [11], [21]. What strengthens this measurement effort is that peace indirectly affects academic achievement through the mediating effect of academic motivation [22]. Based on the explanation of the importance of measuring peace, the Indonesian Peace of Mind Scale (IPoMS) is one of the measuring tools that can measure the level of peace.

There has not been much research to develop and test the usefulness of measuring student peace. Previous research has produced the Peace Attitudes Scale [23] and Peace of Mind scale [24]. However, both of these studies used factor analysis techniques, whereas this study used Rasch analysis. Rasch analysis in testing a data collection instrument has the accuracy and accuracy of data analysis [25]–[27]. Thus, as a product of this research, the Indonesian Peace of Mind Scale (IPoMS) is more precise and accurate in photographing the level of peace of students, especially students in Indonesia. The IPoMS uses two aspects: the internal state of peacefulness and harmony [24], [28].

## 3 METHOD

### 2.1. Research design

This study uses a quantitative approach by focusing on the analysis of the instrument for measuring the level of peace (IPoMS). IPoMS validation using the Rasch model. Compared to other methods, the advantage of Rasch analysis is the ability to predict missing data based on individual response patterns [29]. Using the Rasch analysis in instrument validation will have more holistic information about the instrument better meet the definition of measurement [25].

### 2.2. Participants

The participants of this study were 202 vocational high school students. The selection of research participants using stratified random sampling technique in four Vocational High Schools in Yogyakarta City. We disguise all participants involved in this study so confidentiality is maintained. So that the security and good name of the participants can be maintained. The distribution of participants in the study is in table 1.

Table 1. Distribution of participants

No	School name	Number of participants
1	Muhammadiyah Vocational high school 1 Yogyakarta	86
2	Muhammadiyah Vocational high school 2 Yogyakarta	29
3	Muhammadiyah Vocational high school 3 Yogyakarta	59
4	Muhammadiyah Vocational high school 4 Yogyakarta	28

### 2.3. Data collection tools

IPoMS measuring the level of peace in students consists of two aspects: the internal state of peacefulness and harmony [24]. The internal state of peacefulness includes the ability of students to accept themselves and non-violence. In contrast, the internal state of harmony consists of the compatibility between the soul and human behavior [30]–[32]. Table 2 describes the draft of the tool for measuring the level of peace in the form of IPoMS.

Table 2. IPoMS instrument grid

Indicator	Statement	No item
The internal state of peacefulness	- When I face a stressful situation, I think of ways that can help me stay calm (+)	3
	- When I want to feel more positive emotions, I change the way I think about the situation I'm in (+)	4
	- When I want to reduce negative feelings, I change the way I think about the situation at hand (+)	6
	- I keep emotions in my heart (-)	7
The internal state of harmony	- When I want to feel more positive (like happy or happy), I change what I think about (+)	1
	- I want to reduce negative feelings (such as sadness or anger), I change what I think about (+)	2
	- I control my emotions by changing the way I think about the situation I'm in (+)	5

### 2.4. Data collection

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This research has several procedures for collecting the data. The first stage is research preparation. At this stage, researchers make research plans and prepare research materials. This effort can support the implementation of research step by step. The second stage is the formulation of the research instrument draft. In this second stage, the researcher began to draft the IPoMS instrument grid. The draft instrument underwent an expert assessment process to see the appropriateness of the language on each item of the IPoMS instrument. The third stage is the implementation of the research. At the implementation stage of the study, the researcher made the IPoMS instrument format on google forms. This effort can make it easier for students to fill out the instrument. The fourth stage is conducting data analysis and preparing reports. At this stage, the researcher conducted data analysis using the Rasch analysis.

### 2.5. Data analysis <sup>24</sup>

Research data analysis using Rasch analysis with the <sup>19</sup>p of Winstep software [33]. Two fundamental theorems that form the basis of Rasch's analysis are the level of individual ability/agreement and the level of difficulty of the item to be approved [33]. The psychometric tools that are the basis for analyzing the research data include summary statistics (quality of respondents, quality of instruments, and interactions between person and item). This study also provides item measure (items that are most difficult to agree on and easiest to agree with by respondents), item fit order (items fit and misfit), and unidimensionality (ability to measure what should be measured).

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### 3. RESULTS AND DISCUSSION

<sup>12</sup> The results of validating the IPoMS instrument are one of the studies and research results. The results of the study <sup>28</sup> describe a description of (a) the quality of the respondents, the quality of the instrument, and the interaction between the person and the item <sup>2</sup> (b) the items that are the most difficult to agree on, and the easiest to agree <sup>7</sup> by the respondents, (c) the items that are fit and misfit, and (d) the ability of the instrument to measure what it is supposed to measure. The four data analysis descriptions result from identifying construct validity using Rasch analysis.

Figure 1 describes the description of summary statistics. The first part of the picture provides comprehensive information about the respondents' quality of the instrument and the interaction between person and item.

SUMMARY OF 202 MEASURED PERSON								
	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ ZSTD	
MEAN	19.1	7.0	.37	.56	1.01	-.31	1.00	-.32
SEM	.2	.0	.07	.01	.07	.12	.07	.12
P.SD	2.9	.0	.96	.09	.93	1.71	.95	1.72
S.SD	2.9	.0	.96	.09	.93	1.72	.95	1.73
MAX.	27.0	7.0	3.85	1.07	4.07	4.30	4.76	4.79
MIN.	10.0	7.0	-2.26	.50	.07	-3.92	.06	-3.68
-----								
REAL RMSE	.66	TRUE SD	.69	SEPARATION	1.05	PERSON RELIABILITY	.53	
MODEL RMSE	.57	TRUE SD	.77	SEPARATION	1.36	PERSON RELIABILITY	.65	
S.E. OF PERSON MEAN = .07								
-----								
PERSON RAW SCORE-TO-MEASURE CORRELATION = .98								
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .65 SEM = 1.97								
SUMMARY OF 7 MEASURED ITEM								
	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ ZSTD	
MEAN	550.7	202.0	.00	.10	.99	-.31	1.00	-.25
SEM	16.0	.0	.16	.00	.14	1.38	.15	1.50
P.SD	39.2	.0	.39	.00	.33	3.38	.37	3.67
S.SD	42.4	.0	.42	.00	.36	3.65	.40	3.96
MAX.	580.0	202.0	.88	.10	1.55	4.04	1.59	5.03
MIN.	461.0	202.0	-.30	.10	.65	-4.01	.63	-4.22
-----								
REAL RMSE	.11	TRUE SD	.37	SEPARATION	3.41	ITEM RELIABILITY	.92	
MODEL RMSE	.10	TRUE SD	.37	SEPARATION	3.66	ITEM RELIABILITY	.93	
S.E. OF ITEM MEAN = .16								
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ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00								
Global statistics: please see Table 44.								
UNEAN=.0000 USCALE=1.0000								

**Figure 1. Summary Statistics**

Based on Figure 1 shows the person measure has a value of 0.37. This value means that respondents tend to agree on statements in various items. The Cronbach's Alpha value which measures the instrument reliability, is 0.65, which means it is pretty good. Figure <sup>2</sup> also shows the coefficient of person reliability is 0.53, and item reliability is 0.92. This value indicates that the consistency of the respondents' answers is weak, but the quality of the items in the instrument is good. Other data in Figure 1 are INFIT MNSQ and OUTFIT MNSQ. In the person table, the average values are 1.01 and 1.00 (the closer to 1.00, the better). In INFIT ZSTD and OUTFIT ZSTD, the average values in the person table are 0.31 and 0.32 (the closer to 0.0, the better the quality). While in the item table, the INFIT MNSQ and OUTFIT MNSQ values are 0.99 and

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1.00 (the closer to 1.00, the better). The INFIT ZSTD and OUTFIT ZSTD values in the item table, are 0.31 and 0.25 (the closer to 0.0, the better the quality).

Figure 2 describes the item measure. The second figure represents the items that are the most difficult to agree with and easy to agree with by the respondents.

ITEM STATISTICS: MEASURE ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEASUR-AL CORR.	EXP.	OBS%	MATCH EXP%	ITEM
7	461	202	.88	.10	1.39	4.85	1.51	5.03	.25	.54	54.0	48.2	7
1	533	202	-.19	.10	1.07	.80	1.06	.68	.61	.52	52.5	51.1	1
5	567	202	-.16	.10	1.55	4.84	1.59	5.01	.32	.50	46.0	55.2	5
2	571	202	-.20	.10	.89	-1.15	.87	-1.34	.58	.50	60.4	55.8	2
6	571	202	-.20	.10	.79	-3.02	.72	-3.00	.59	.50	68.8	55.8	6
4	572	202	-.21	.10	.67	-3.69	.65	-3.89	.62	.50	69.3	55.9	4
3	580	202	-.30	.10	.65	-4.01	.63	-4.22	.66	.50	72.8	56.2	3
MEAN	550.7	202.0	.00	.10	.99	-.3	1.00	-.2			60.5	54.0	
P.SD	39.2	.0	.39	.00	.33	3.4	.37	3.7			9.4	2.9	

Figure 2. Item Measure

The way to interpret Figure 2 above is by looking at the logit items numbered 1 to 7. Based on Figure 2, item 7 shows the logit item 0.82 which means that the respondent has the most difficulty agreeing with item number 7. This conclusion is based on the logit value of item 7, which is greater than the other items. While item 2 shows the logit item -0.30, the respondent is the easiest to agree with item number 3. This conclusion is based on the logit value of item 3, which is smaller than the other items.

Figure 3 describes fit order items. The third part of the picture illustrates the fit and misfit items.

ITEM STATISTICS: MISFIT ORDER

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEASUR-AL CORR.	EXP.	OBS%	MATCH EXP%	ITEM
5	567	202	-.16	.10	1.55	4.84	1.59	5.01	.32	.50	46.0	55.2	5
7	461	202	.88	.10	1.39	4.85	1.51	5.03	.25	.54	54.0	48.2	7
1	533	202	-.19	.10	1.07	.80	1.06	.68	.61	.52	52.5	51.1	1
2	571	202	-.20	.10	.89	-1.15	.87	-1.34	.58	.50	60.4	55.8	2
6	571	202	-.20	.10	.79	-3.02	.72	-3.00	.59	.50	68.8	55.8	6
4	572	202	-.21	.10	.67	-3.69	.65	-3.89	.62	.50	69.3	55.9	4
3	580	202	-.30	.10	.65	-4.01	.63	-4.22	.66	.50	72.8	56.2	3
MEAN	550.7	202.0	.00	.10	.99	-.3	1.00	-.2			60.5	54.0	
P.SD	39.2	.0	.39	.00	.33	3.4	.37	3.7			9.4	2.9	

Figure 3. Item Fit Order

The way to identify fit and misfit items are to compare the INFIT MNSQ value with the sum of the mean and standard deviation values. Based on Figure 3, the mean and standard deviation values sum is  $0.99 + 0.33 = 1.32$ . A larger logit value indicates a misfit item. Based on Figure 3, the items that are a misfit and need to be revised are items 5 and 7. Item number 5 initially reads, "I control my emotions by changing how I think about the situation I'm in." After reviewing, we revised it to "I control my emotions by changing the way I think positively about the situation I'm in." While item number 7 initially reads, "I keep emotions in my heart." After reviewing, we revised it to "I prefer to vent my emotions on myself instead of trying to talk to other people."

Figure 4 describes the unidimensionality of the instrument. The description in this fourth part is to evaluate whether the tool can measure what it should count, in this case, the Indonesian Peace of Mind Scale (IPoMS) construct.

Table of STANDARDIZED RESIDUAL variance in Eigenvalue units - ITEM information units			
	Eigenvalue	Observed	Expected
Total raw variance in observations	= 10.8825	100.0%	100.0%
Raw variance explained by measures	= 3.0825	30.6%	30.9%
Raw variance explained by persons	= 1.2657	12.6%	12.7%
Raw Variance explained by Items	= 1.8167	18.0%	18.2%
Raw unexplained variance (total)	= 7.8000	69.4%	69.1%
Unexplained variance in 1st contrast	= 2.4254	24.1%	34.6%
Unexplained variance in 2nd contrast	= 1.2908	12.8%	18.4%
Unexplained variance in 3rd contrast	= 1.1379	11.3%	16.3%
Unexplained variance in 4th contrast	= .8127	8.1%	11.6%
Unexplained variance in 5th contrast	= .7859	7.8%	11.2%

Figure 4. Unidimensionalitas

Unidimensionality interpretation compares the results of raw variance measurements with the minimum requirement of unidimensionality. The condition that an instrument can measure what it wants to measure is the unidimensionality value of at least 20%. Figure 4 shows the results of the raw data variance measurement of 30.6%. The measurement results indicate that the minimum unidimensionality requirement is 20%. This analysis means the instrument is included in the excellent category in measuring what is intended to be measured.

The study results found that the IPoMS is a reliable and valid measuring tool to measure students' level of peace accurately. However, IPoMS data needs to be supported and strengthened by other



instruments. Thus, the IPoMS data shows the actual condition of student peace. This measurement of peace becomes a systematic schedule to raise valid data. Data on student peace is the basis for stakeholders to design a program for developing a culture of peace in schools, especially in Indonesia. A culture of peace is one of the needs of students in schools that can spur self-actualization in both academic and non-academic fields. Individuals who have true peace seek not only to create a culture of peace but also to develop development, positive relationships, character, and protection for human rights [34]. In Indonesia, the risk of creating uneasy conditions for students is substantial, considering that Indonesia is an archipelagic country with various customs and cultures [35].

Several studies have developed and validated peace measuring tools. The first study describes a peace of mind scale consisting of 7 statement items. However, the instrument validation analysis in this study used factor analysis [24]. The second study yielded a Peace Attitudes Scale consisting of 7 statement items [23]. The validation analysis of the measuring instrument also uses factor analysis. Subsequent research developed a peace scale involving 71 statement items using the SOS-10 analysis [36]. The weakness of the instrument is the number of items too many, which causes the possibility of data bias.

Weaknesses that emerged in previous studies become one of the backgrounds for developing and validating IPoMS. Therefore, the validation of IPoMS in this study used Rasch analysis. Rasch analysis provides a more accurate description of the results of measuring instrument validation, produces more holistic information about the instrument, and better meets the measurement definition [25], [37], [38]. Rasch analysis to develop and validate a measuring tool can provide the weaknesses and strengths of the statement items of an instrument [39]. This condition increases the accuracy of the data from the measurement results of an instrument. Because of the importance of measurement in the field of Education, Rasch analysis is the answer to various problems of instrument validity and reliability [40].

School counselors are parties who have the potential and opportunities to take advantage of IPoMS. The Rasch analysis provides holistic data of instrument validation results. Furthermore, Rasch became one of the analyzes that developed in the psychometric field of counseling [41]. Several examples of the implementation of Rasch analysis in psychometry in counseling include the Psychological Well-Being measuring tool for adolescent victims of violence [42] and the career decision self-efficacy scale [43]. However, to improve the accuracy of data collection, this study focuses on developing and validating IPoMS using Rasch analysis to strengthen peace education in Indonesia.

As a measure of the level of peace among students in Indonesia, IPoMS involves two core aspects, namely the internal state of peacefulness and harmony [24]. The internal state of peacefulness refers to psychological calm despite being under a stressor that becomes a burden in his life [44]. In contrast, the internal state of harmony refers to a positive condition in a person who has harmony and balance between expectations and the reality of the world [45]. The results of previous studies prove that the conditions of peacefulness and harmony are essential aspects of forming true peace in humans [46].

The findings of this study, which can describe a measuring instrument for peace in the form of IPoMS, have implications for efforts to develop a culture of peace in the school environment. Measuring student peace using IPoMS can be one of the basics for planning a peace culture development program in schools [47]. With more straightforward language, IPoMS accommodates an assessment of the portrait of students' peaceful condition. A culture of peace is vital for students to feel safe and psychologically comfortable learning at school. Thus, students can have a good perception of the school climate and spur themselves in academic performance [17].

The parties involved in the school setting are also responsible for creating a peace culture development program based on the measurements' results using IPoMS. One party who can create a culture of peace is a counselor. Moreover, various works of literature state that counselors are agents of peace [48] [50]. Peace-oriented counselors strive to carry out counseling services to suppress child abuse early on. To create a culture of peace in the school environment, counselors must collaborate with various parties to obtain data other than those documented through IPoMS. Guidance and Counseling services that have an orientation to the peaceful aspect are one of the recommendations for counselors to follow up on the results of the IPoMS measurement.

Several studies show that guidance programs promoting the value of peace are a strategy to minimize violence. Violence is a form of the absence of peace in the individual [9]. The first study showed that guidance programs that raised the topic of peace could suppress students' aggressive impulses [51]. Other research shows that the guidance program can also raise the value of peace in Markesot [49]. It can also suppress students' aggressive drives [10]. Based on the results of these studies, a guidance program with the theme of peace can be one of the recommendations for counselors to build a culture of peace in schools.

In addition to the guidance program, the counseling program with the theme of peace can also suppress students' aggressive behavior. Some studies have shown that peace counseling can be a counselor strategy to stop student aggressive behavior [11], [21]. The value of local wisdom is a critical aspect of supporting the success of peace counseling, for example, the teachings of KH. Ahmad Dahlan [52], [53] and

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Markesot [54] on peace. The results of the research above show that counseling that raises the value of peace can also be one of the recommendations for counselors to build a culture of peace in schools.

This study has limitations in developing and validating IPoMS. Research that develops and verifies IPoMS needs to involve experts to assess instrument statement items. This expert judgment is to increase the validity of the content of the IPoMS instrument. In addition, the pilot of the instrument needs to involve respondents on a wider scale so that this instrument can indeed have high acceptance in Indonesia to measure the level of peace.

#### 4. CONCLUSION

Indonesia is a country that participates and participates in maintaining world order and peace. This research is developing and validating a peace measuring instrument, and we named it IPoMS. This measuring instrument consists of two aspects: the internal state of peacefulness and harmony. The first aspect has 4 statement items, while the second aspect has 3 statement items. The validation results using Rasch analysis show that IPoMS is a measuring tool that accurately measures the level of peace. The results of this study should be one of the tools that can reveal the level of peace among students, and the data will be the basis for implementing peace education in guidance and counseling settings. This study also recommends conducting a content validity analysis using expert judgment to validate the statement items of the peace measuring instrument. Thus, the instrument has more real content clarity and does not cause meaning bias.

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