

Psychometric Evaluation of The *Walsh Family Resilience Questionnaire* (WFRQ) Using The *Rasch* Model

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ABSTRACT

The *Walsh Family Resilience Questionnaire* (WFRQ) is a widely used instrument for measuring family resilience in various cultural contexts. However, research on its psychometric quality using the *Rasch* model approach is still limited, especially in Indonesia. This study aims to examine the *item fit*, unidimensionality, difficulty level, and reliability of the WFRQ by involving 355 adult respondents living with their nuclear or extended families. Data analysis was performed using WINSTEP software. The results show that most WFRQ items meet the fit criteria with *Mean Square* (MNSQ) values ranging from 0.5 to 1.5. Two items (8 and 20) were eliminated because they did not meet the fit criteria. The reliability value was excellent, with a *person reliability* of 0.94 and an *item reliability* of 0.96. The *Wright Map* showed that the majority of respondents were at a moderate to high level of resilience, while the item difficulty level was relatively low, making the instrument easy for respondents with high resilience.

Keywords: *Rasch model, WFRQ, Psychometrics*

Evaluasi Psikometrik terhadap *Walsh Family Resilience Questionnaire* (WFRQ) Menggunakan Model *Rasch*

ABSTRACT

Walsh Family Resilience Questionnaire (WFRQ) merupakan instrumen yang banyak digunakan untuk mengukur ketahanan keluarga dalam berbagai konteks budaya. Namun, penelitian mengenai kualitas psikometriknya dengan pendekatan model *Rasch* masih terbatas, khususnya di Indonesia. Penelitian ini bertujuan untuk menguji *item fit*, unidimensionalitas, tingkat kesulitan, dan reliabilitas dari WFRQ dengan melibatkan 355 responden dewasa yang tinggal bersama keluarga inti atau keluarga besar. Analisis data dilakukan menggunakan perangkat lunak WINSTEP. Hasil penelitian menunjukkan bahwa sebagian besar butir WFRQ memenuhi kriteria fit dengan nilai *Mean Square* (MNSQ) berkisar antara 0,5 hingga 1,5. Dua butir (nomor 8 dan 20) dieliminasi karena tidak memenuhi kriteria fit. Nilai reliabilitasnya sangat baik, dengan reliabilitas responden sebesar 0,94 dan reliabilitas butir sebesar 0,96. *Wright Map* menunjukkan bahwa mayoritas responden berada pada tingkat ketahanan sedang hingga tinggi, sementara tingkat kesulitan butir relatif rendah, sehingga instrumen ini tergolong mudah bagi responden dengan tingkat ketahanan tinggi.

Kata Kunci: *Model Rasch, WFRQ, Psikometrik*

Introduction

The family is the smallest unit that plays a central role in shaping the character, values, and psychosocial resilience of each member (Yen, 1984). Amidst the pressures of modern social dynamics, *family resilience* has become an important factor in maintaining family function and stability (Patterson, 2002). In recent decades, complex social dynamics such as rising divorce rates, economic pressures, gender role conflicts, and parenting challenges have placed Indonesian families in a stressful situation (Amalia et al., 2017). This condition emphasizes the importance of efforts to understand and measure family resilience in the local context.

The WFRQ is one of the instruments widely used globally to assess the level of family resilience based on Froma Walsh's theoretical framework (Walsh, 2003). This instrument has been adapted in various languages and cultures, but to date, there has been no research in Indonesia that specifically tests the psychometric quality of the WFRQ using the *Rasch Model* approach. The *rasch model* approach is known to provide objective item analysis, free from sample characteristics, and provides information on *item fit*, unidimensionality, and reliability (Bond & Fox, 2015).

Several cross-cultural studies have tested the validity and reliability of the WFRQ. In Iran, Karaminia et al., (2018) adapted and validated the WFRQ in 350 adult respondents from a military center in Tehran, with *Cronbach's alpha* results between 0.70 and 0.94 and CFA showing a sufficiently adequate three-dimensional structure. In Italy, Rocchi et al. (2017) tested the WFRQ on 421 participants (chronic patients and their families), with very high reliability results ($\alpha = 0.946$; ICC = 0.98-0.99). Zhang et al. (2023) adapted the Chinese version of the WFRQ to 566 elderly people with disabilities and their caregivers, showing high validity and reliability ($\alpha = 0.93$; CFI = 0.916; RMSEA = 0.060).

This study aims to fill this gap by testing the psychometric characteristics of the WFRQ using the *Rasch Model* approach in the Indonesian population. This article not only contributes to the literature on family psychological measurement but also supports the development of fair, contextual, and high-quality measurement tools in the field of family psychology.

Methodology

This study used a quantitative approach with a psychometric design to test the items of the *Walsh Family Resilience Questionnaire (WFRQ)* instrument. This instrument consists of 32 statement items. The participants in this study were adults aged 18 years and above, as they were considered mature and understood family dynamics and were able to give consent and understand the questions. They had lived with their families for at least 6 months and lived in a household

recognized as *a nuclear family* or *extended family*. The population in this study consisted of 355 respondents. Data collection was carried out by distributing questionnaires to respondents according to the predetermined inclusion criteria, and respondents were asked to fill out the instrument independently with a guarantee of data confidentiality. After the respondent data was collected, the next stage was to analyze the data using *Rasch measurement* with the Winstpes application. In Rasch analysis, two assumptions must be met, namely:

1. Unidimensionality

In testing the assumption of unidimensionality, researchers examine whether all construct-valid items satisfy unidimensionality by analyzing the *Principal Component Analysis of Residuals* (PCAR) (Chou & Wang, 2010). PCAR analysis is used to assess the extent to which the variation in the instrument truly reflects the construct being measured. Referring to Hoster and Lake (in Rezky, 2022), a model is considered to satisfy the assumption of unidimensionality as a productive measurement if the *raw variance explained by the measure* is $\geq 40\%$. This can be seen in the following table:

Table 1. Unidimensionality Test

DIMENSION	Eigenvalues	Observed (%)	Expected
<i>Total raw variance</i>	56.1	100	100
<i>Raw variance explained by measures</i>	25.1	44.7	45
<i>Raw variance explained by persons</i>	22.8	40.6	40.9
<i>Raw variance explained by items</i>	2.3	4.1	4.1
<i>Raw unexplained variance (total)</i>	31.0	55.3	55
<i>Raw unexplained variance in the first contrast</i>	3.3	6.0	10.8

Based on the test results in Table 1, it can be seen that the *Eigenvalues* value is 25.1 and the PCAR value is 44.7%. From the PCAR criteria results above, it can be concluded that *the Walsh Family Resilience Questionnaire* scale is unidimensional because the *raw variance explained by measured or observed values* is above 40%.

2. Local Independence

Local independence is one of the prerequisites in measurement, which states that each item in a series should not have a significant relationship with other items (Edwards & Houts, 2017). To identify violations of this assumption, *residual correlation* analysis is used. If the residual correlation value exceeds 0.50, then the item pair is considered to have *local dependence* (Klooster et al., 2008).

Table 2. Local Independence Test

<i>Residual Correlation</i>	<i>Entry Number Item</i>	<i>Entry Number Item</i>
0.50	Item 20	Item 22
0.48	Item 21	Item 31
0.47	Item 12	Item 31
0.44	Item 2	Item 5
0.43	Item 25	Item 26

Table 2 shows several items that exceed the standard residual correlation value for each pair of items with a value exceeding 0.50 in the positive direction. There is one pair of items that has a correlation of 0.50, namely items 20 and 22 with a residual correlation value of 0.50. These two items measure the same dimension, namely the *organization pattern* dimension. Because these items contain local dependencies, the researcher chose one of the two items. Item 20 was dropped, and item 21 was retained because the MNSQ value was close to 1 (Cantó-Cerdán et al., 2021). The remaining items represent each dimension of the WFRQ.

Results

To test the suitability of items on the *Walsh Family Resilience Questionnaire* (WFRQ), a *Rasch model* analysis was used with *infit* and *outfit mean square* (MNSQ) indicators in the range of 0.1-1.5 (Bond & Fox, 2015). A value of 1 indicates perfect suitability, while a value above 1.5 indicates that the item is inconsistent, and a value below 0.5 indicates that the item is too predictable. MNSQ values above 2 are considered to threaten the quality of measurement (Linacre, 2002). The model is declared fit if the MNSQ is in the range of 0.5-1.5, which also fulfills the assumption of unidimensionality (Mair, 2018).

To facilitate the interpretation of calibration results, the logit units are then converted to a new scale through linear scaling. In this study, the settings $uscale = 110$ and $umean = 30$ were used in the Winsteps application, resulting in a scale that is more informative and easier for users to understand.

Figure 1. Item *Fit* Test Results

ENTRY NUMBER	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PIMEA CORR.	EXACT OBS%	MATCH EXP%	ITEM
20	983	339	151.93	3.37	1.85	8.5	1.98	8.8	.39	53.5	69.5	Item 20
8	1022	339	136.62	3.50	1.51	5.4	1.72	6.4	.52	63.1	71.6	Item 08
5	1089	339	107.33	3.74	1.45	4.5	1.34	2.9	.62	69.8	75.2	Item 05
22	970	339	156.79	3.33	1.42	4.7	1.44	4.5	.40	57.7	68.9	Item 22
2	1089	339	107.33	3.74	1.32	3.3	1.44	3.6	.61	73.4	75.2	Item 02
12	1081	339	111.03	3.71	1.26	2.8	1.16	1.5	.70	72.2	74.8	Item 12
16	1091	339	106.40	3.74	1.20	2.1	1.14	1.3	.64	71.6	75.3	Item 16
32	1112	339	96.44	3.80	1.16	1.7	1.04	.4	.68	73.1	76.1	Item 32
19	1105	339	99.79	3.78	1.13	1.4	1.07	.6	.60	72.8	75.9	Item 19
3	1123	339	91.10	3.83	1.11	1.3	1.03	.3	.65	71.6	76.4	Item 03
21	1029	339	133.74	3.53	1.09	1.1	1.07	.8	.67	69.2	72.1	Item 21
29	1103	339	100.75	3.78	1.00	.0	.94	-.5	.63	77.6	75.8	Item 29
31	1065	339	118.27	3.66	.99	-.1	.94	-.6	.72	75.8	74.1	Item 31
23	1074	339	114.22	3.69	.89	-1.2	.98	-.1	.65	81.9	74.5	Item 23
7	1090	339	106.87	3.74	.91	-1.0	.83	-1.6	.66	80.1	75.2	Item 07
17	1074	339	114.22	3.69	.90	-1.1	.90	-1.0	.72	71.9	74.5	Item 17
27	1079	339	111.95	3.71	.88	-1.4	.79	-2.2	.71	75.8	74.7	Item 27
26	1071	339	115.58	3.68	.87	-1.6	.82	-1.8	.67	74.6	74.4	Item 26
4	1106	339	99.32	3.79	.86	-1.6	.82	-1.6	.69	80.1	75.9	Item 04
15	1134	339	85.71	3.85	.86	-1.7	.77	-1.9	.72	77.9	76.5	Item 15
11	1034	339	131.66	3.54	.85	-1.8	.85	-1.6	.69	71.9	72.3	Item 11
14	1079	339	111.95	3.71	.82	-2.2	.77	-2.3	.62	79.5	74.7	Item 14
10	1175	339	65.19	3.90	.80	-2.5	.69	-2.1	.65	80.4	76.1	Item 10
24	1039	339	129.56	3.56	.79	-2.6	.74	-2.9	.64	76.4	72.7	Item 24
6	1152	339	76.77	3.87	.75	-3.1	.66	-2.8	.72	84.6	76.5	Item 06
28	1061	339	120.04	3.64	.74	-3.3	.71	-3.2	.71	83.1	73.8	Item 28
30	1085	339	109.19	3.73	.72	-3.4	.67	-3.4	.69	83.1	75.0	Item 30
13	1124	339	90.62	3.83	.70	-3.8	.59	-3.9	.72	85.2	76.4	Item 13
18	1100	339	102.17	3.77	.68	-4.1	.61	-4.0	.73	83.4	75.7	Item 18
25	1056	339	122.24	3.62	.65	-4.7	.59	-4.8	.73	82.5	73.6	Item 25
9	1135	339	85.22	3.85	.62	-4.9	.57	-4.0	.72	87.9	76.5	Item 09

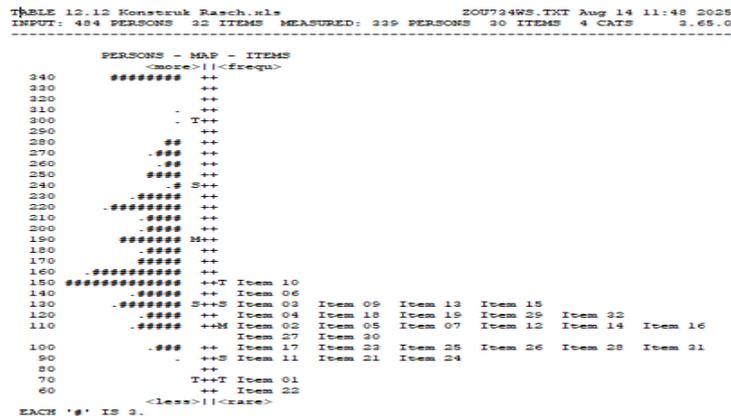
From the analysis of the five dimensions, two items were found to exceed the specified values. These items are item 20 *infit mnsq* (1.85) *outfit mnsq* (1.98) and item eight *infit mnsq* (1.51) *outfit mnsq* (1.72). These items will be excluded because they do not meet the specified criteria.

Figure 2. Item and Separation Reliability

SUMMARY OF 339 MEASURED (EXTREME AND NON-EXTREME) PERSONS									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	
MEAN	95.9	30.0	191.04	14.21					
S.D.	11.8	.0	65.14	8.12					
MAX.	120.0	30.0	372.81	55.04					
MIN.	75.0	30.0	93.64	9.81					
REAL RMSE	17.15	ADJ.SD	62.84	SEPARATION	3.66	PERSON RELIABILITY	.93		
MODEL RMSE	16.37	ADJ.SD	63.05	SEPARATION	3.85	PERSON RELIABILITY	.94		
S.E. OF PERSON MEAN	= 3.54								
PERSON RAW SCORE-TO-MEASURE CORRELATION = .98									
CRONBACH ALPHA (KR-20) PERSON RAW SCORE RELIABILITY = .96									
SUMMARY OF 30 MEASURED (NON-EXTREME) ITEMS									
	RAW SCORE	COUNT	MEASURE	MODEL ERROR	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	
MEAN	1084.1	339.0	110.00	3.70	.99	-.5	.96	-.5	
S.D.	42.4	.0	19.04	.14	.34	3.2	.39	2.9	
MAX.	1175.0	339.0	157.53	3.92	2.38	9.9	2.59	9.9	
MIN.	970.0	339.0	66.17	3.31	.62	-4.9	.58	-4.5	
REAL RMSE	3.90	ADJ.SD	18.64	SEPARATION	4.78	ITEM RELIABILITY	.96		
MODEL RMSE	3.71	ADJ.SD	18.68	SEPARATION	5.04	ITEM RELIABILITY	.96		
S.E. OF ITEM MEAN	= 3.54								
DELETED: 2 ITEMS									
UMEAN=110.000 USCALE=30.000									
ITEM RAW SCORE-TO-MEASURE CORRELATION = -1.00									
9870 DATA POINTS. LOG-LIKELIHOOD CHI-SQUARE: 11945.99 with 9511 d.f. p=.0000									

Figure 2 above shows the *person reliability and item reliability* values on the WFRQ. *The person reliability* of the WFRQ has a value of 0.94, which is above the minimum limit of >0.80 (Bond & Fox, 2015), and *the item reliability* of the WFRQ has a value of 0.96, which means that the number of respondents is sufficient to confirm the order of item difficulty consistently.

Figure 3. Wright Map



The Wright map was created by Wilson and Draney (2002) and is used to display the respondents' ability and item calibration on the same scale. Figure 3 *Wright map* shows the measurement of family resilience levels, indicating that respondents' abilities are generally higher than the difficulty level of the items. The majority of respondents are in the medium to high ability range, with a concentration of 110 to 280. This condition indicates that most respondents are able to answer the items relatively easily. Although the instrument targeting is quite good, the difference between the respondents' abilities and the difficulty level of the items shows that this instrument is not challenging enough for respondents with high family resilience. However, the gap between the respondents' abilities and the difficulty of the items indicates the need to add more difficult items so that the measurement of family resilience can cover the entire range of abilities, especially in groups with high family resilience abilities.

Conclusion

The results of this study indicate that *the Walsh Family Resilience Questionnaire (WFRQ)* has good psychometric quality. The instrument meets the assumptions of unidimensionality, high reliability (*person reliability* = 0.94; *item reliability* = 0.96), and most items are in the MNSQ range of 0.5–1.5. Two items (8 and 20) were eliminated because they did not *fit*. *The Wright Map* shows

that the majority of respondents are at a moderate to high level of resilience, although more challenging items are needed. Overall, the WFRQ has been proven to be valid and reliable in the Indonesian cultural context.

Suggestion

Based on the results of this study, *the Walsh Family Resilience Questionnaire* (WFRQ) has been proven to be valid and reliable for measuring family resilience in the Indonesian context. However, there are still several things that need to be considered for further research. First, the addition of items with a higher level of difficulty needs to be considered so that the instrument can cover a wider range of family resilience abilities, especially for families with high levels of resilience. Second, further research is recommended to involve participants with more diverse backgrounds, in terms of age, marital status, and socioeconomic conditions, so that the measurement results are more representative. In addition, cross-cultural validity testing is also necessary to ensure that the WFRQ can be used consistently across various community groups in Indonesia. With further development, this instrument is expected to become a more comprehensive and adaptive measurement tool in supporting studies and interventions related to family resilience.

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