Evaluation of the High School Students' Perceived Social Support Scale (KraS-DS) Using the Rasch Model

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doi: 10.17977/um065.v6.i5.2026.1

Article history
Submitted: 3 March2026
Revised: 11 April 2026
Accepted: 12 April 2026
Published: 13 April 2026

Keywords
Instrument
Scale
Rasch model

Abstract
Perceived social support is needed by adolescents to prevent mental health problems and achieve the expected well-being. The absence of social support, whether from parents, teachers, and friends, has an impact on individual feelings and emotions. The urgency of perceived social support for adolescent life requires a valid and reliable instrument to measure the condition of adolescent social support. The purpose of this study was to produce a valid and reliable social support scale for high school students (KraS-DS) using the Rasch model. The quantitative research method used the Rasch Model to evaluate the KraS-DS instrument to ensure its validity and reliability. Participants were 212 adolescents attending high schools in Karanganyar District. Data were collected through a survey using a paper and pencil test. The results of the analysis showed that (1) the person reliability and item reliability of the social support scale can be said to be good, meaning that the items and responses from respondents were quite consistent; (2) item number X4 is the item that has the highest level of difficulty or is difficult to agree with; (3) the function of the rating scale on the social support scale has worked well; and (4) the item discrimination power on the social support scale can be said to be good, even though items 7 and 8 do not fit the Rasch model.

1. Introduction

Mental health issues in Indonesia are a common problem encountered in daily life, as one in four adolescents aged 16–18 is reported to have experienced symptoms of psychological distress, such as depression (Pham et al., 2024). The WHO (2025) reports that the increasing prevalence of mental health disorders among adolescents may lead to physical and mental health problems that persist into adulthood. Consequently, the increasing prevalence of mental health-related issues has made perceived social support among adolescents an important aspect of prevention efforts.

Yahya et al. (2022) argue that individuals' perceived social support deserves serious attention from stakeholders, as it affects well-being and helps reduce negative feelings. Adolescents who feel supported tend to be better at recognizing their emotions (Wilcox et al., 2022; Madson et al., 2025). Perceived social support is also significantly linked to how individuals cope with problems and their adaptive capabilities (Nazari et al., 2024). Moreover, perceived social support has been shown to reduce self-stigma, depression, and stress (Karaçar & Bademli, 2022; Ju et al., 2023; Hou et al., 2024; Kulari, 2025).

It refers to an individual's belief in their ability to access help when needed (Tras et al., 2021). This support typically from parents, teachers, and peers plays a key role in mitigating the negative effects of stress, enhancing academic success, and building self-confidence (Yıldız & Uzundağ, 2024; Yildiz & Eldeleklioglu, 2024; Liu et al., 2024). On the other hand, adolescents with neglectful parents may struggle to achieve life satisfaction due to the absence of expected support (Yang et al., 2024). Even more concerning, Fang et al. (2022) suggest that low levels of perceived social support can lead individuals to become emotionally numb or detached. In short, perceived social support serves as a protective factor and has a positive impact on adolescents' lives and mental health. However, when individuals doubt whether they have adequate support, they may become emotionally disconnected and indifferent.

This highlights the importance of developing a valid and reliable instrument to assess adolescents' perceived social support levels and to anticipate the risks associated with low support. The development of such an instrument is an effort to provide an accurate and field-relevant assessment tool (Patria et al., 2024). Furthermore, a well-constructed social support scale can serve as a valuable reference for future research

ISSN: 2797-3174

(Marar et al., 2023). Field data indicate that there is currently no valid and reliable instrument available to measure the social support resources accessed by secondary school students in local areas, such as Karanganyar. Existing scales developed in Indonesia have primarily focused on text-based online counselling using content validity (Yuniswara & Ardi, 2024) and on social support among university students in early adulthood using Confirmatory Factor Analysis (Saragih et al., 2026). Therefore, these instruments do not adequately capture the nature of social support among adolescents at the local level, particularly in Karanganyar, Indonesia. To ensure that a measurement tool truly captures what it aims to measure (Connell et al., 2018), the development process must include validity testing, such as the Rasch Model. This study aims to produce a valid and reliable perceived social support scale for high school students (KraS-DS) using the Rasch model.

2. Method

2.1. Research Design

The evaluation of the Perceived Social Support Scale for Senior High School Students (KraS-DS) was conducted as a quantitative study using the Rasch model for instrument validity testing. According to Davis and Boone (2021) and Handaka et al. (2024), the Rasch model provides a strong framework for evaluating rating scale instruments across various contexts, as it assesses both instrument function and person measurement in ways that support parametric statistical testing. Ariakpomu et al. (2025) further noted that Rasch-based instrument evaluation can assess latent variables through item-level measurement. The Rasch model was considered an effective tool for establishing the relationship between an individual's ability and item difficulty (Sarifah et al., 2025). Based on this, the Rasch model was used to examine the validity of the KraS-DS scale by analyzing the relationship between students' ability levels and item difficulty. The KraS-DS scale was evaluated using the Rasch model through the Winsteps application. The analysis results generated by Winsteps were then cross-checked against the Rating Scale Instrument Quality Criteria (see Table 1).

Table 1. Rating Scale Instrument Quality Criteria Fisher (2007)

Criterion	Poor	Fair	Good	Very Good	Excellent
Targeting	>2 errors	1-2 errors	<1 error	<0.5 error	<0.25 error
Item Model Fit Mean-Square Range Extremes	<0.33->3.0	0.34 – 2.9	0.5 – 2.0	0.71 – 1.4	0.77 – 1.3
Person and Item Measurement Reliability	<0.67	0.67 – 0.80	0.81 – 0.90	0.91 – 0.94	>0.94
Person and Item Strata Separated	2 or less	2 – 3	3 – 4	4 – 5	>5
Ceiling effect: % maximum extreme scores	>5%	2 – 5%	1 – 2%	0.5 – 1%	<0.5
Floor effect: % minimum extreme scores	>5%	2 – 5%	1 – 2%	0.5 – 1%	<0.5
Variance in data explained by measures	<50%	50 – 60%	60 – 70%	70 – 80%	>80%
Unexplained variance in contrasts 1-5 of PCA of residuals	>15%	10-15%	5-10%	3-5%	<3%

2.2. Participants

The study involved 212 high school students from the Karanganyar sub-district. Data were collected through a paper-and-pencil survey, which was selected as the data collection method to better capture sensitive information from participants (Braekman et al., 2018) namely, the social support received from parents, teachers, and peers. Based on demographic results (see Table 2), 35% of the participants were male (N = 74), and 65% were female (N = 138), representing the total sample.

Table 2. Participants' Demographics

No	Demography	N	Percentage (%)
1	Gender		
	Male	74	35
	Female	138	65
2	Age		
	13 years	1	0.5
	14 years	13	6.1
	15 years	139	65.6
	16 years	59	27.8

2.3. Instrument

The instrument evaluated in this study was the KraS-DS scale, which had been developed based on the analysis and synthesis of several expert perspectives, namely Letiecq et al. (1996), Lakey and Cohen (2000), and Goldsmith (2004). The analysis included definitions and indicators, which were then elaborated into descriptors and item questions for the KraS-DS scale. This instrument evaluation study defined perceived social support as the help received and felt by individuals from teachers, parents, and peers. These three sources teachers,

ISSN: 2797-3174

parents, and peers also served as indicators in the social support scale. Each indicator identified for the KraS-DS scale was described in detail before being developed into questionnaire items.

Support from teachers was described as including providing attention, sharing relevant information, and teaching skills to students. Parental support was described as creating closeness, showing concern, building trust, and sharing personal experiences. Meanwhile, peer support was described as forming friendships, fostering solidarity, having a wide circle of friends, and experiencing diversity in friendships. Once all the indicators had been described, 22 items were developed and presented to participants, who were asked to respond using a four-point Likert scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

3. Results and Discussion

3.1. Results

The results of the KraS-DS scale analysis using the Rasch model are presented in two parts: the scale-level results and the item-level results.

3.1.1. KraS-DS Scale Analysis Results

The overall results of the social support scale analysis can be seen in Figure 1 (person measures) and Figure 2 (item measures).

SUMMARY OF 212 MEASURED PERSON

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	69.7	22.0	1.77	.40	1.00	-.14	.99	-.19
SEM	.4	.0	.07	.00	.04	.12	.04	.12
P.SD	6.3	.0	.98	.03	.58	1.75	.57	1.73
S.SD	6.4	.0	.98	.03	.58	1.75	.57	1.73
MAX.	84.0	22.0	4.49	.58	4.06	6.65	4.20	6.65
MIN.	44.0	22.0	-1.44	.32	.10	-4.52	.09	-4.54

REAL RMSE	.44	TRUE SD	.87	SEPARATION 2.01	PERSON RELIABILITY	.80
MODEL RMSE	.40	TRUE SD	.89	SEPARATION 2.24	PERSON RELIABILITY	.83

S.E. OF PERSON MEAN = .07

PERSON RAW SCORE-TO-MEASURE CORRELATION = 1.00
CRONBACH ALPHA (KR-20) PERSON RAW SCORE "TEST" RELIABILITY = .83 SEM = 2.60
STANDARDIZED (50 ITEM) RELIABILITY = .92

Figure 1. Summary of Measured Person

SUMMARY OF 22 MEASURED ITEM

	TOTAL SCORE	COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD
MEAN	671.9	212.0	.00	.13	.99	-.38	.99	-.41
SEM	11.8	.0	.18	.00	.07	.64	.07	.64
P.SD	54.1	.0	.81	.01	.30	2.94	.30	2.94
S.SD	55.4	.0	.83	.01	.31	3.00	.31	3.01
MAX.	769.0	212.0	2.45	.15	1.70	5.63	1.71	5.75
MIN.	492.0	212.0	-1.72	.11	.55	-5.30	.56	-5.11

REAL RMSE	.14	TRUE SD	.80	SEPARATION 5.93	ITEM RELIABILITY	.97
MODEL RMSE	.13	TRUE SD	.80	SEPARATION 6.26	ITEM RELIABILITY	.98

S.E. OF ITEM MEAN = .18

ITEM RAW SCORE-TO-MEASURE CORRELATION = -.99
Global statistics: please see Table 44.
UMEAN=.0000 USCALE=1.0000

Figure 2. Summary of Measured Item

ISSN: 2797-3174

3.1.2. Person and Item Measurement Reability

The person reliability score was 0.83, which falls into the good category (Figure 1), indicating that respondents were reasonably consistent in their answers. The item reliability score was 0.98, which is considered excellent (Figure 2). Thus, both the person reliability and item reliability scores for the KraS-DS scale indicated good results. This suggests that the items and the respondents' answers were adequately consistent.

3.1.3. Person and Item Strata Separation

The person separation value was 2.01, which is classified as fair (Table 2). This suggests that the items in the KraS-DS scale did not span a wide enough continuum of difficulty levels. In other words, the scale lacked sufficient variation to differentiate between respondents with very high versus very low levels of perceived social support. As a result, there were respondents whose levels of perceived support could not be accurately captured by the existing items in the KraS-DS scale. In contrast, the item separation value was 5.93, which is considered excellent (Figure 2). This indicates that the respondents in the dataset were highly diverse in terms of their perceived social support. Such diversity ranged from very low to very high levels of perceived support.

3.1.4. Model Unidimensionality

Figure 3 shows that the raw variance explained by measures was 33.7%, which falls into the poor category, while the unexplained variance in the first contrast was 9.8%, categorized as good. These results suggest that the KraS-DS scale was still influenced by other factors unrelated to social support. In other words, the social support scale appeared to measure constructs beyond its intended focus, indicating potential contamination. This is supported by the unidimensionality result of 33.7%, which is below the 50% threshold generally expected for confirming unidimensionality.

	Eigenvalue	Observed		Expected
Total raw variance in observations =	33.1798	100.0%		100.0%
Raw variance explained by measures =	11.1798	33.7%		33.9%
Raw variance explained by persons =	4.1951	12.6%		12.7%
Raw Variance explained by items =	6.9847	21.1%		21.2%
Raw unexplained variance (total) =	22.0000	66.3%	100.0%	66.1%
Unexplned variance in 1st contrast =	3.2484	9.8%	14.8%	
Unexplned variance in 2nd contrast =	2.6251	7.9%	11.9%	
Unexplned variance in 3rd contrast =	1.6024	4.8%	7.3%	
Unexplned variance in 4th contrast =	1.4107	4.3%	6.4%	
Unexplned variance in 5th contrast =	1.3921	4.2%	6.3%	

Figure 3. Model Unidimensionality Analysis Result

3.1.5. Item Analysis Result

An examination of the KraS-DS items using the item map (Figure 4) displayed both the item distribution and respondent distribution. Based on the results shown in Figure 4, item X4 emerged as the most difficult item on the scale, meaning it was the hardest for respondents to agree with. However, despite this, item X4 was still unable to effectively measure respondents with higher levels of perceived support even though the item separation fell into the excellent category and the person separation was rated as fair. This indicates that while the respondents in the sample ranged widely in terms of perceived social support from very low to very high the item questions themselves lacked sufficient variation to match that range.

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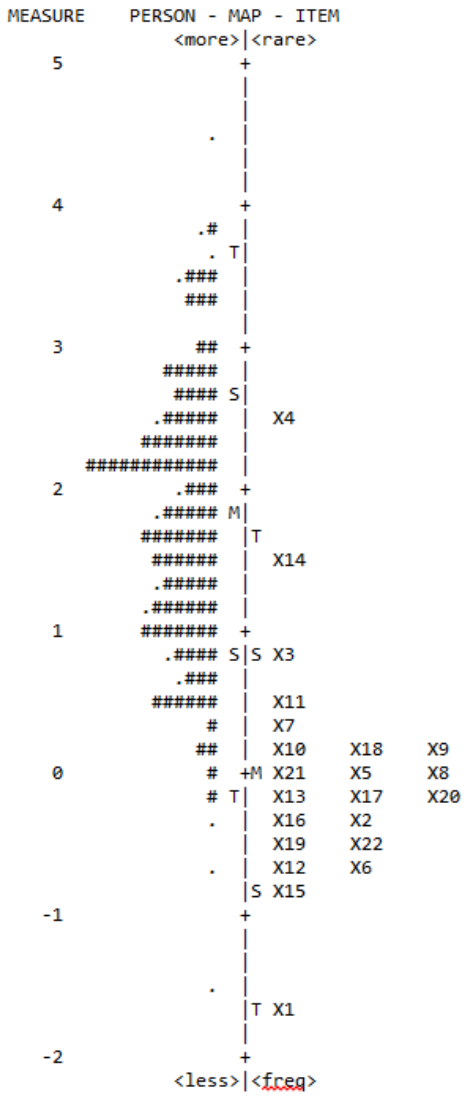

Figure 4. Wright Map of Perceived Social Support Scale

Based on the item map results, it can be known that the items in the KraS-DS scale are most suitable for measuring respondents with moderate levels of perceived social support. However, when administered to respondents with very high or very low levels of social support, the scale was unable to differentiate optimally. As a result, the information gathered about respondents' social support becomes very limited when measuring those at the upper end (very high support) or lower end (very low support) of the spectrum.

The KraS-DS scale used a four-point rating scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). Therefore, it was necessary to examine whether these response categories functioned properly by analyzing the results of the Andrich Threshold.

CATEGORY LABEL	SCORE	OBSERVED COUNT	%	OBSVD AVRGE	SAMPLE EXPECT	INFIT MNSQ	OUTFIT MNSQ	ANDRICH THRESHOLD	CATEGORY MEASURE	
1	1	71	2	-.50	-.88	1.23	1.30	NONE	(-3.37)	1
2	2	488	10	.36	.46	.96	.97	-2.13	-1.40	2
3	3	2685	58	1.62	1.62	.91	.91	-.64	1.10	3
4	4	1420	30	2.66	2.65	1.03	1.00	2.78	(3.90)	4

Figure 5. Andrich Threshold Analysis Results

A rating scale is considered to function well when all response options are selected by participants, and the category measures increase consistently in the Andrich Threshold. The category measure scores in the Andrich Threshold column namely -3.37, -1.40, 1.10, and 3.90 showed a consistent upward trend, with no reversed categories detected. This indicates that the items on the KraS-DS scale did not confuse respondents in

ISSN: 2797-3174

selecting their answers. The category measure of -3.37 suggests that respondents with an ability level of -3.37 tended to select the lowest response option. Those with an ability of -1.40 tended to select the next lowest, those at 1.10 leaned toward higher responses, and those at 3.90 most likely selected the highest response category. This can be seen in Figure 6.

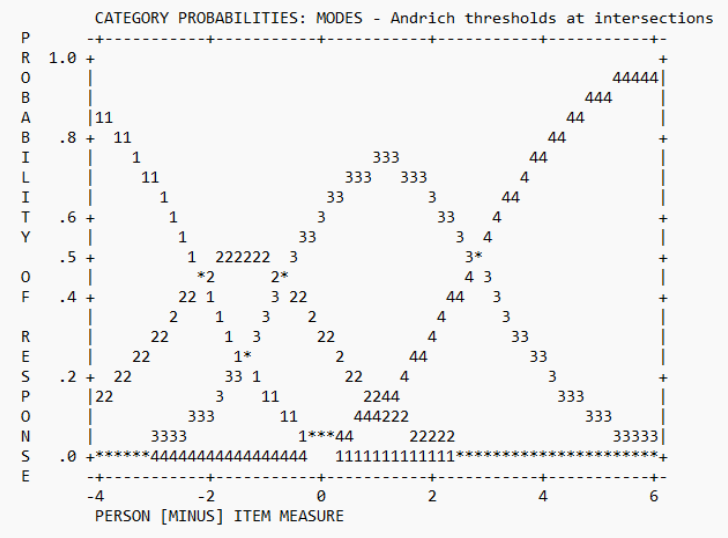

Figure 6. Category Probability Curve: Modes

Figure 6 shows that for persons with lower item measures, the most probable response tends to be score 1. In other words, the higher the level of perceived social support, the lower the probability of selecting score 1. Conversely, the lower the level of perceived support, the less likely respondents were to select score 4. However, as respondents' level of perceived social support increased, the probability of selecting score 4 also increased. Based on the visual results shown in Figure 2, it can be concluded that the rating scale in the KraS-DS functioned appropriately.

3.1.6. Item Fit Order

Table 6 presents the results of the item fit analysis, which were compared against the accepted range of Outfit Mean Square (OUTFIT MNSQ) values for research instruments, namely between 0.5 and 1.5. The results in Table 6 show that items number 7 and 8 exceeded this acceptable range. This indicates that those particular items did not fit the Rasch model (see Figure 3), possibly because they were measuring a different construct. Meanwhile, the Point-Measure Correlation (PTMEASUR) values were used to assess item discrimination by comparing latent scores generated through Rasch analysis with classical test theory, using 0.30 as the benchmark. The analysis showed that all items in the KraS-DS scale had point-measure correlations above 0.30, indicating good item discrimination.

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	JMLE MEASURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PTMEASUR-AL CORR.	PTMEASUR-AL EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	ITEM
4	492	212	2.45	.11	1.14	1.53	1.18	1.86	.43	.53	56.1	54.5	X4
14	577	212	1.44	.11	1.11	1.05	1.15	1.43	.39	.50	55.7	61.2	X14
3	617	212	.89	.12	1.34	2.95	1.39	3.29	.46	.48	53.3	64.7	X3
11	647	212	.44	.12	.66	-3.62	.65	-3.80	.51	.47	77.4	65.6	X11
7	658	212	.27	.13	1.70	5.63	1.71	5.75	.44	.47	48.6	65.7	X7
9	661	212	.22	.13	1.10	.95	1.05	.56	.45	.47	64.6	65.5	X9
10	664	212	.18	.13	1.02	.21	.99	-.05	.58	.47	64.6	65.5	X10
18	668	212	.11	.13	.55	-5.30	.56	-5.11	.53	.47	80.7	65.4	X18
21	676	212	-.02	.13	.81	-2.03	.81	-2.00	.51	.47	69.3	65.2	X21
5	678	212	-.05	.13	1.23	2.14	1.19	1.81	.37	.47	59.4	65.1	X5
8	678	212	-.05	.13	1.59	5.02	1.60	5.18	.45	.47	52.8	65.1	X8
20	681	212	-.10	.13	.72	-3.13	.73	-2.97	.43	.47	76.4	65.0	X20
17	684	212	-.15	.13	.73	-2.97	.72	-3.10	.54	.46	73.6	65.0	X17
13	685	212	-.17	.13	1.19	1.81	1.17	1.69	.47	.46	62.7	65.0	X13
2	691	212	-.27	.13	1.15	1.49	1.13	1.31	.48	.46	63.2	64.6	X2
16	697	212	-.37	.13	.93	-.72	.94	-.58	.39	.46	68.4	64.5	X16
22	704	212	-.49	.13	.60	-4.89	.61	-4.87	.60	.46	76.4	64.6	X22
19	707	212	-.54	.13	.68	-3.80	.72	-3.28	.50	.46	75.0	64.5	X19
6	713	212	-.64	.13	.85	-1.66	.83	-1.94	.51	.46	72.6	64.7	X6
12	714	212	-.66	.13	.81	-2.21	.79	-2.42	.53	.46	72.2	64.7	X12
15	721	212	-.79	.13	.88	-1.39	.88	-1.35	.45	.45	64.2	64.9	X15
1	769	212	-1.72	.15	1.05	.55	.95	-.45	.50	.41	75.5	69.3	X1
MEAN	671.9	212.0	.00	.13	.99	-.38	.99	-.41			66.5	64.6	
P.SD	54.1	.0	.81	.01	.30	2.94	.30	2.94			9.0	2.5	

Figure 7. Item Fit Order Analysis – Rasch Model

ISSN: 2797-3174

3.1.7. Rasch Model

The red line in Figure 8 represents the ideal Rasch model, which illustrates the expected structure of item and person interaction: as a respondent's level of perceived social support increases, so should the likelihood of endorsing the item positively. The blue line reflects the actual social support data. If this line deviates too far from the ideal Rasch model, the item is considered misfitting that is, it does not function as expected under the model. However, if the deviation is minor, then the social support scale can still be considered to conform to the Rasch model. In summary, the likelihood of selecting "Strongly Disagree" increases for respondents with very low perceived social support, whereas the likelihood of selecting "Strongly Agree" increases for respondents with very high perceived support.

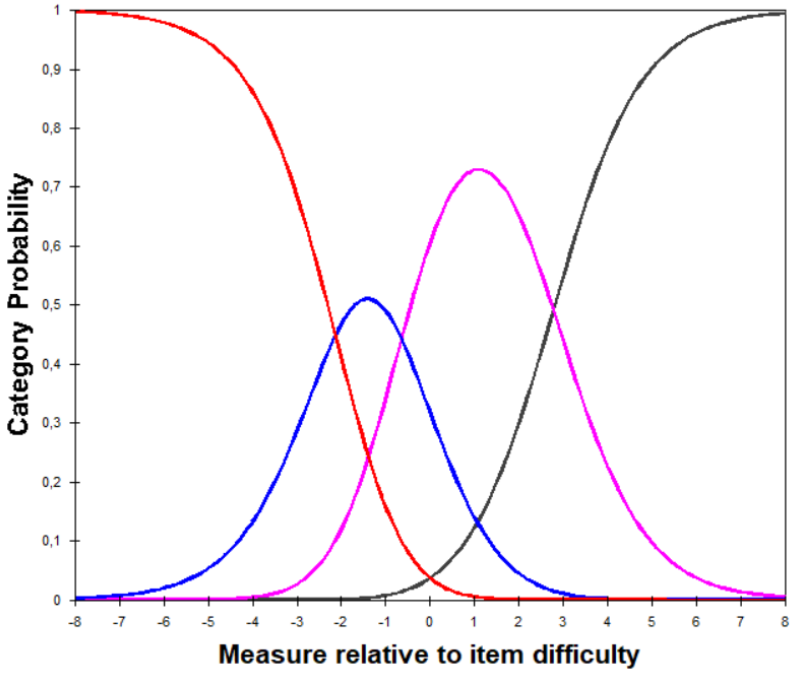

Figure 8. Rasch Model

3.2. Discussion

This study aimed to produce a valid and reliable social support scale for high school students (KraS-DS) using the Rasch model. The analysis was divided into two parts: the analysis of the KraS-DS scale and the analysis of individual item responses within the scale. The results of the scale-level analysis showed consistency between the item responses and the respondents. However, some respondents could not be accurately measured by the items in the KraS-DS. This was likely due to the presence of construct-irrelevant variance or other factors unrelated to social support. Meanwhile, the item-level analysis revealed that item X4 had the highest level of difficulty, and items X7 and X8 did not fit the Rasch model. This suggests that the items in the scale lacked sufficient variability. Although the items did not confuse respondents, the KraS-DS scale appeared most suitable for measuring perceived social support at moderate levels. This was reflected in the survey data, which showed that respondents tended to choose middle-range responses: 59% selected "Agree," 25% "Disagree," compared to only 15% who selected "Strongly Agree" and 1% "Strongly Disagree".

Item X4, as the most difficult item, indicated according to Rasch theory that students tended to score low on that item (Stemler & Naples, 2021), possibly due to limited perceived support in the form of "My parents accompany me while studying." Conceptually, perceived social support is understood as an individual's belief and evaluation of their relationship with others, which plays an important role in well-being (Villatte et al., 2022). Such relationships may include supportive feedback, emotional support, instrumental support, value reinforcement, and informational support (Mekonnen et al., 2024). The statement "My parents accompany me while studying" reflects a form of instrumental support that parents may provide. It seems that this form of support was reported as low by students possibly due to their developmental stage. High school students are generally capable of thinking systematically, exploring values, considering alternative problem-solving strategies, and developing independence and responsibility (Addzaky, 2024). As such, at the high school level, students may no longer need their parents to accompany them while studying, although they may still require parental motivation to support their academic progress.

ISSN: 2797-3174

Items that did not fit the Rasch model because their MNSQ scores fell outside the acceptable range of 0.5–1.5 (Tesio et al., 2024) were item X7 ("My parents tell me about their academic experiences with their friends in the past") and item X8 ("My parents talk about their weaknesses in certain school subjects to motivate me to do better"). This misfit may have been due to the relatively large sample size, or, as noted by Mousavi & Cuit (2020), could be attributed to unexpected or atypical responses from some students that deviated from what the items intended to capture. For these items, the expected response was agreement; however, it appears that some students responded otherwise. Both items are related to the parents' ability to share academic experiences with their children. In the context of social support, parents who share their own academic experiences can help increase their child's sense of security and self-confidence. This is because such narratives can foster the child's internal belief that academic challenges are normal, which in turn supports a more positive self-image (Ohlauson & Nilsson, 2020). Therefore, it can be concluded that items X7 and X8, which did not fit the Rasch model, should be excluded from future data collection using the KraS-DS social support scale.

3.3. Implications

The implications of this study suggest that school counsellors can utilise the findings specifically, the KraS-DS scale to analyse students' social support resources, thereby enabling them to provide appropriate guidance and counselling services.

3.4. Limitations

However, this study has several limitations. As indicated in the results, the limited variation in questionnaire items led to some items being overly difficult, while others showed poor fit. Furthermore, the KraS-DS scale appears to be more suitable for measuring respondents with moderate levels of social support resources rather than high levels. Future researchers may replicate this study with a different sample, but at the same developmental level, whilst varying the questionnaire items to avoid those that were not suitable.

4. Conclusion

The KraS-DS scale can be used to measure the social support perceived by individuals in their daily lives. Although item 4 was found to be difficult to endorse, and items 7 and 8 did not fit the model, future data collection can proceed without including the two misfitting items. Overall, the consistency between the item responses and the respondents' answers was considered adequate.

Author Contributions

All authors have equal contributions to the paper. All the authors have read and approved the final manuscript.

Funding

This research is funded by Directorate of Research and Community Service through the Assignment Research Grant Scheme for Professors and Structural Academic Staff.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/ or publication of this article.

Data Availability

The datasets generated during and/ or analyzed during the current study are available from the corresponding author on reasonable request.

Declaration on AI Use

The authors declare that no artificial intelligence (AI) or AI-assisted tools were used in the preparation of this manuscript.

Acknowledgement

The authors express their gratitude to the Directorate of Research and Community Service for its support through the Assignment Research Grant Scheme for Professors and Structural Academic Staff.

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