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Academic Hardiness Scale of College Students : Validity and Reliability Analysis Using Rasch Model

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Abstract: This study aims to analyze the validity and reliability of the academic hardiness scale that has been developed in the context of Indonesian culture. This research method used a survey with a quantitative approach to 50 students at the University of West Sulawesi. The data analysis technique was carried out using the Rasch Model. The results of the study showed that this academic hardiness scale was quite good at describing the profile of students' academic hardiness with a raw variance explained value of 38.8%. This scale was also reliable, with a person reliability value of 0.94 and an item reliability of 0.95, which reflects the consistency of the measurement. These findings have significant implications for further research in developing a guidance and counseling service program model that is more responsive to the needs of students in higher education, which is based on empirical evidence. This can be achieved by producing a consistent measurement scale to provide accurate information regarding the profile of students' academic hardiness in higher education.

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Introduction

The individual transition from high school (SMA) to college (PT) is an important stage in a student's life journey. This transition process includes changes that are not only academic, but also involve significant differences in learning methods, academic load demands, and existing social dynamics (Wardani, 2020). Based on Article 13 Paragraph (2) of the Republic of Indonesia Law Number 12 of 2012 concerning Higher Education, students have the responsibility to develop themselves through the learning process and are expected to apply the knowledge gained for the benefit of the wider community. Kumaraswamy (2013) stated that students often face difficulties in adjusting to increased academic loads and changes in more complex mindsets and learning approaches. These obstacles have the potential to affect students' psychological well-being, which in turn can impact their academic outcomes.

Theoretically, psychological well-being can differ between individuals, depending on life experiences and how individuals interpret them (Ryff, 1995). In the context of higher education, students' psychological well-being is closely related to academic hardiness, namely the individual's ability to survive and adapt in the face of academic challenges. Hardiness itself is defined as a pattern of attitudes and strategies that allow individuals to view stressful situations as opportunities for growth (Maddi, 2013). Students with high levels

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of academic hardiness tend to have stronger motivation in achieving academic achievement and are better prepared to face difficulties as part of self-development (Benishek et al., 2005). In addition, academic hardiness functions as a protector against academic stress and can contribute to improving students' psychological well-being (Nayyeri & Aubi, 2011). Academic stress is one of the main challenges that students often face, which arises due to their inability to meet academic demands (Yendi et al., 2021). Each individual has a different way of managing academic stress, and one of the factors that influences an individual's coping mechanism is personality (Barseli et al., 2020). Hardiness is a personality characteristic that has been widely studied for its ability to reduce the impact of stress, both physically and psychologically.

The concept of hardiness was first introduced by Kobasa in 1979 and further developed by Benishek & Lopez (2001) in the context of education. Academic hardiness refers to an individual's resilience in facing tough academic challenges, as well as their ability to remain actively involved in academic activities (Benishek et al., 2005). According to Arsyad (2021), academic hardiness provides strength for students to remain involved in various academic activities and challenges, even in different fields simultaneously. This shows that hardiness plays a role in reducing academic stress and helping students cope with academic pressure more effectively. Individuals with high levels of hardiness tend to have the motivation and perseverance to deal with academic stress efficiently. Most research on academic hardiness is still limited to literature review-based studies. On the other hand, research that focuses on the validation and development of the academic hardiness scale in the context of Indonesian culture is still very limited. This finding is in line with the opinion of Creed, Conlon, & Dhaliwal (2013), who stated that studies on the validation and development of the academic hardiness scale are still very limited. This suggests a gap in the literature that needs to be further explored, particularly in the development of an academic hardiness scale for college students.

With strong academic hardiness skills, students will be better prepared to face various academic challenges and be able to achieve more optimal psychological well-being. This study aims to test the validity and reliability of the student academic hardiness scale developed by Benishek & Lopez (2001) using the Rasch Model. The Rasch Model allows for the strengthening of instruments to measure human behavior more accurately (Boone et al., 2014). Therefore, the main objective of this study is to test the validity and reliability of the item fit of the academic hardiness scale consistently, and to ensure that the scale can measure the construct of student academic hardiness appropriately, in accordance with the established theoretical dimensions.

Research Method

This study adopted a quantitative approach with a survey method, which focused on collecting data from research samples. This method aims to obtain a comprehensive picture of various aspects related to the population group studied (Maidiana, 2021). In this study, data were analyzed using Item Response Theory (IRT). IRT is a probabilistic model used to explain the relationship between individual responses to an item (question item) and latent variables, such as skills or characteristics measured by a research instrument (Fajrianthi et al., 2016). By applying this model, the analysis can provide deeper insight into the level of difficulty of each item and the extent to which the item can measure the intended variable accurately and consistently. This study involved 50 respondents in the validity and reliability test of the academic hardiness scale. The participants in this study were students at the

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University of West Sulawesi, spread across several faculties. The sampling technique used in this study was convenience sampling, which is a sampling method based on convenience for researchers, namely samples that were accidentally encountered, considered appropriate, willing to be data sources, and met the criteria determined by the researcher (Siregar, 2017). The distribution of participants in this study can be seen in Table 1.

Table 1. Distribution of Participants

Faculty	Level	Number
Faculty of Teacher Training and Education	Bachelor	10
Faculty of Social and Political Sciences	Bachelor	10
Faculty of Economics and Business	Bachelor	10
Faculty of Health Sciences	Bachelor	10
Faculty of Animal Husbandry and Fisheries	Bachelor	10

The data collection process in this study was carried out online by utilizing the Google Forms platform as the main media for distributing the questionnaire. The use of this technology aims to facilitate access for respondents and increase efficiency in data collection. Before being asked to fill in and provide answers on the academic hardiness scale, respondents were given a detailed explanation of the purpose of the study and the importance of their participation in this study. In addition, the researcher also emphasized the importance of maintaining the confidentiality and protection of respondents' personal data (Ilfiandra et al., 2022).

The research instrument used was the academic hardiness scale, which has been adapted in the context of Indonesian culture and developed based on the synthesis of the theories of Benishek & Lopez (2001) and Kobasa. S. C, Maddi, S., & Puccetti. M. C. (1982). This instrument was designed with reference to various main factors in forming the theory of academic hardiness. Although the theory used has been synthesized by the researcher, the process was carried out while maintaining the original meaning and substance of the theory that is the basis of the research. This instrument consists of various aspects and indicators. The aspects and indicators of academic hardiness can be seen in Table 2.

Table 2. Aspects and Indicators of Academic Hardiness

Aspects	Indicator
Commitment	Consistency
	Self-motivation
	Active participation
	Time management
	Independence
Control	Ability to delay gratification
	Emotional regulation
	Focus and concentration
	Discipline
	Self-reflection
Challenge	Environmental changes
	Limited resources
	Social support
	Task load
	Pressure to perform

The scoring guidelines applied in the academic hardiness scale refer to the Likert scale, which is a measurement method that uses several statement items to describe individual

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characteristics (Muhajirin & Panoraman, 2017). This scale is often applied in social and psychological research because it can capture various levels of intensity of an individual's attitude or perception towards a statement. In this study, the academic hardiness scale uses a Likert scale with five alternative answers. Each answer is given a different score, namely a score of 1 for Very Unsuitable (STS), a score of 2 for Unsuitable (TS), a score of 3 for Undecided (RR), a score of 4 for Suitable (S), and a score of 5 for Very Suitable (SS) (Amalia, 2022).

Data analysis on the academic hardiness scale was carried out using the Rasch Model, which was processed with Winstep 3.73 software. By applying the Rasch Model, the analysis does not only rely on raw values, but more on logit values, which describe the probability of an item being selected by a group of respondents. This approach produces more objective results because the logit value reflects the level of difficulty of the item relative to the respondent's ability, not just the distribution of scores obtained (Wibisono, 2016). Furthermore, the data obtained from the academic hardines scale were analyzed based on several main aspects, namely: unidimensionality, analysis of the level of difficulty of the item, analysis of the suitability of the item, diagnosis of the rating scale, and evaluation of the reliability of the instrument.

Results and Discussion

Unidimensional Analysis of Academic Hardiness Scale

In the analysis of scale validity using the Rasch Model, one of the main concepts applied is item unidimensionality (Sumintono & Widhiarso, 2015). Item unidimensionality ensures that the instrument used truly measures the aspects to be analyzed without being influenced by other irrelevant factors. An instrument is considered to meet the unidimensionality criteria if it meets two main requirements. First, the value of raw variance explained by measure must not be less than or equal to 20%. If the value is in the range of 20% to 40%, the instrument is categorized as sufficient; in the range of 40% to 60%, the instrument is considered good; and if more than 60%, the instrument is considered very good. Second, the value of unexplained variance in the 1st contrast must be less than or equal to 15% (Sumintono & Widhiarso, 2015). The results of the unidimensionality analysis on the academic hardiness scale can be seen in Table 3.

Table 3. Unidimensional Test

Information	Empirical			Modeled
Total raw variance in observations	245.2	100.0%		100.0%
Raw variance explained by measures	95.2	38.8%		38.1%
Raw variance explained by persons	12.5	5.1%		5.0%
Raw Variance explained by items	82.6	33.7%		33.1%
Raw unexplained variance (total)	150.0	61.2%	100.0%	61.9%
Unexplned variance in 1st contrast	30.5	12.4%	20.3%	
Unexplned variance in 2nd contrast	9.5	3.9%	6.3%	
Unexplned variance in 3rd contrast	8.8	3.6%	5.9%	
Unexplned variance in 4th contrast	6.9	2.8%	4.6%	
Unexplned variance in 5th contrast	1.75	2.3%	3.3%	

The results of the unidimensionality analysis showed that the raw variance explained by measure value was 38.8%, which indicates that this instrument has sufficient quality, because its value is in the range of 20% to 40%. In addition, the unexplained variance value on the 1st to 5th contrast is below 15%, with the following details: 12.4% for unexplained variance on

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the 1st contrast, 3.9% on the 2nd contrast, 3.6% on the 3rd contrast, 2.8% on the 4th contrast, and 2.3% on the 5th contrast. Based on the results of this analysis, this scale meets the unidimensionality criteria, which indicates that this instrument has good ability to measure the academic hardiness construct accurately. This shows that each item on the scale contributes consistently to the measurement of the intended variable, without being influenced by other irrelevant factors.

Analysis of the Level of Difficulty of Academic Hardiness Scale Items

To analyze the level of difficulty of items in an instrument, the items can be grouped into four levels based on the combination of the standard deviation (SD) and mean values contained in the measure column. The first category is the very difficult level, namely items with values exceeding +1 SD. The second category is the difficult level, which includes items with values ranging from the mean to +1 SD (0.00 logit + 1 SD). The third category is the easy level, which includes items with values ranging from the mean to -1 SD (0.00 logit - 1 SD). Finally, the fourth category is the very easy level, which consists of items with values less than -1 SD. With this grouping, the analysis of the level of item difficulty can help in evaluating the extent to which the items in the instrument can reflect the variation in respondents' abilities in answering each question (Sumintono & Widhiarso, 2015). The results of the difficulty of the academic hardiness scale items can be seen in Table 4.

Table 4. Item Difficulty Level Test

ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.
1	216	50	-1.20	.19
133	192	50	-.51	.15
143	180	50	-.25	.14
75	182	50	-.29	.14
76	172	50	-.09	.14
131	180	50	-.25	.14
6	166	50	.02	.14
10	101	50	1.21	.15
13	211	50	-1.03	.18
77	146	50	.37	.13
141	169	50	-.03	.14
145	162	50	.09	.13
74	207	50	-.91	.17
51	184	50	-.33	.15
57	181	50	-.27	.14
147	117	50	.88	.14
55	204	50	-.82	.17
4	189	50	-.44	.15
19	121	50	.81	.13
41	134	50	.58	.13
122	192	50	-.51	.15
26	114	50	.94	.14
137	130	50	.65	.13
8	129	50	.66	.13
11	210	50	-1.00	.18
103	200	50	-.71	.16
34	181	50	-.27	.14
140	129	50	.66	.13
52	187	50	-.40	.15
121	194	50	-.56	.16
20	83	50	1.70	.18
144	178	50	-.21	.14
24	209	50	-.97	.18

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9	107	50	1.08	.14
100	140	50	.48	.13
64	177	50	-.19	.14
22	220	50	-1.35	.20
79	170	50	-.05	.14
50	119	50	.84	.14
49	110	50	1.02	.14
96	137	50	.53	.13
99	125	50	.74	.13
95	186	50	-.37	.15
101	175	50	-.15	.14
89	138	50	.51	.13
98	140	50	.48	.13
116	135	50	.56	.13
32	215	50	-1.17	.19
7	152	50	.27	.13
94	197	50	-.63	.16
15	202	50	-.76	.17
2	175	50	-.15	.14
43	198	50	-.66	.16
27	214	50	-1.13	.19
87	119	50	.84	.14
31	203	50	-.79	.17
119	175	50	-.15	.14
67	109	50	1.04	.14
84	180	50	-.25	.14
21	187	50	-.40	.15
35	178	50	-.21	.14
91	184	50	-.33	.15
36	143	50	.42	.13
12	204	50	-.82	.17
68	123	50	.77	.13
72	148	50	.34	.13
102	190	50	-.46	.15
16	121	50	.81	.13
MEAN	163.9	50.0	.00	.15
S.D.	33.3	.0	.67	.02

Based on the data presented in Table 4, it is known that the standard deviation (SD) value is 0.67. Using this value as a reference, it can be determined that the level of difficulty of the items in the instrument can be categorized into four groups. The very difficult category includes items that have a score greater than or equal to 0.67 (≥ 0.67), which indicates that these items are more challenging for respondents. Meanwhile, the difficult category includes items with scores in the range of 0.00 to less than 0.67 (0.00–0.67), which means that these items are still quite challenging but more accessible than the previous category. Furthermore, the easy category includes items with scores in the range of -0.67 to less than 0.00 (-0.67–0.00). Items in this category are easier for respondents to understand and answer. The very easy category includes items that have a score of less than -0.67 (< -0.67), which indicates that these items are the easiest for students to respond to.

Analysis of the Level of Suitability of Academic Hardiness Scale Items

The analysis of item suitability aims to ensure that each item in the instrument functions optimally according to the measurement objectives, and does not cause confusion or misunderstanding for respondents (Ilfiandra et al., 2022; Sumintono & Widhiarso, 2015). Details regarding each of these criteria can be seen in Table 5.

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Table 5. Item Fit Criteria

Item Fit Criteria	Range
Outfit MNSQ	0.5 < Outfit MNSQ < 1.5

Evaluation of the level of item suitability can be seen through the OUTFIT MNSQ value with the provisions of the Outfit MNSQ value. An item can be declared fit if it meets the standard value of 0.5 < Outfit MNSQ < 1.5 which is used in identifying the suitability (fit) or misfit of an item (Boone et al., 2014). Details regarding the level of item suitability test can be seen in Table 6.

Table 6. Item Suitability Level Test

ENTRY NUMBER	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PT-MEASURE CORR.	PT-MEASURE EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	ITEM
1	2.24	4.0	5.69	9.8	A -.01	.20	38.8	44.6	SR 1
133	1.60	2.5	3.25	6.8	B .09	.27	40.8	42.1	SR 133
143	1.88	3.6	3.23	7.2	C .03	.29	32.7	37.3	SR 143
75	1.36	1.7	2.66	5.8	D .15	.29	28.6	37.7	SR 75
76	1.49	2.4	2.55	5.8	E .17	.31	20.4	36.1	SR 76
131	1.12	.7	2.36	5.1	F .16	.29	44.9	37.3	SR 131
6	1.15	.8	2.14	4.8	G .14	.32	28.6	35.8	SR 6
10	1.85	3.6	1.97	3.9	H .32	.51	20.4	27.4	SR 10
13	1.80	2.9	1.81	2.9	I .15	.22	38.8	44.9	SR 13
77	1.18	1.1	1.80	4.0	J .27	.37	30.6	34.2	SR 77
141	1.68	3.2	1.79	3.5	K .19	.32	28.6	35.9	SR 141
145	1.56	2.8	1.61	3.0	L .26	.33	30.6	36.0	SR 145
74	1.22	1.0	1.55	2.1	M .15	.23	36.7	44.7	SR 74
51	1.53	2.4	1.52	2.3	N .23	.28	36.7	39.1	SR 51
57	1.49	2.2	1.43	2.0	O .30	.29	26.5	37.5	SR 57
147	1.21	1.3	1.49	2.6	P .34	.45	28.6	28.1	SR 147
55	1.40	1.7	1.49	1.9	Q .17	.24	46.9	44.2	SR 55
4	1.23	1.1	1.46	2.0	R .18	.27	49.0	40.8	SR 4
19	1.46	2.5	1.46	2.5	S .37	.44	30.6	28.2	SR 19
41	1.46	2.6	1.45	2.5	T .34	.40	28.6	30.6	SR 41
122	1.39	1.7	1.40	1.7	U .21	.27	40.8	42.1	SR 122
26	1.34	1.9	1.30	1.7	V .44	.46	34.7	28.2	SR 26
137	1.32	1.9	1.34	2.0	W .36	.41	26.5	29.9	SR 137
8	.91	-.5	1.32	1.9	X .35	.41	32.7	29.9	SR 8
11	1.25	1.1	1.29	1.2	Y .17	.22	46.9	45.0	SR 11
103	.95	-.2	1.28	1.2	Z .17	.25	49.0	44.0	SR 103
34	1.28	1.4	1.22	1.1	.28	.29	32.7	37.5	SR 34
140	1.23	1.4	1.26	1.5	.37	.41	30.6	29.9	SR 140
52	1.24	1.2	1.25	1.2	.26	.28	40.8	39.8	SR 52
121	1.22	1.0	1.25	1.1	.21	.26	40.8	42.5	SR 121
20	1.21	.9	1.13	.5	.62	.61	53.1	52.9	SR 20
144	1.19	1.0	1.21	1.1	.21	.30	34.7	37.0	SR 144
24	.83	-.7	.80	-.9	.25	.22	46.9	45.1	SR 24
9	.79	-1.2	.80	-1.1	.55	.49	32.7	28.0	SR 9
100	.80	-1.3	.79	-1.3	.46	.39	32.7	32.2	SR 100
64	.79	-1.1	.76	-1.3	.32	.30	38.8	36.8	SR 64
22	.71	-1.3	.79	-.8	.19	.19	53.1	44.0	SR 22
79	.79	-1.2	.79	-1.1	.38	.32	44.9	36.2	SR 79
50	.78	-1.4	.79	-1.3	.53	.45	34.7	28.2	SR 50
49	.78	-1.3	.76	-1.4	.54	.48	28.6	28.1	SR 49
96	.78	-1.4	.78	-1.4	.47	.39	38.8	31.4	SR 96
99	.78	-1.4	.78	-1.4	.51	.43	32.7	29.2	SR 99
95	.78	-1.1	.75	-1.2	z .29	.28	44.9	39.6	SR 95
101	.77	-1.3	.74	-1.4	y .35	.30	38.8	36.6	SR 101
89	.76	-1.6	.76	-1.5	x .48	.39	36.7	31.9	SR 89
98	.75	-1.6	.76	-1.5	w .48	.39	38.8	32.2	SR 98
116	.76	-1.6	.76	-1.6	v .45	.40	28.6	30.8	SR 116
32	.75	-1.1	.71	-1.2	u .26	.21	53.1	44.8	SR 32

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7	.75	-1.6	.75	-1.6	t	.42	.36	36.7	35.4	SR	7
94	.74	-1.2	.74	-1.2	s	.29	.25	44.9	43.1	SR	94
15	.72	-1.3	.73	-1.2	r	.23	.24	51.0	44.1	SR	15
2	.67	-1.9	.73	-1.5	q	.29	.30	38.8	36.6	SR	2
43	.72	-1.4	.72	-1.3	p	.27	.25	53.1	43.7	SR	43
27	.66	-1.6	.71	-1.3	o	.23	.21	63.3	44.9	SR	27
87	.70	-2.0	.69	-2.1	n	.54	.45	30.6	28.2	SR	87
31	.69	-1.5	.68	-1.5	m	.26	.24	55.1	44.2	SR	31
119	.69	-1.8	.66	-1.9	l	.38	.30	51.0	36.6	SR	119
67	.69	-1.9	.68	-1.9	k	.57	.48	34.7	28.1	SR	67
84	.68	-1.8	.66	-1.9	j	.34	.29	46.9	37.3	SR	84
21	.68	-1.7	.66	-1.8	i	.30	.28	44.9	39.8	SR	21
35	.68	-1.8	.65	-2.0	h	.35	.30	49.0	37.0	SR	35
91	.68	-1.8	.66	-1.8	g	.32	.28	44.9	39.1	SR	91
36	.66	-2.4	.66	-2.3	f	.45	.38	40.8	33.1	SR	36
12	.64	-1.8	.65	-1.7	e	.24	.24	75.5	44.2	SR	12
68	.61	-2.7	.62	-2.7	d	.55	.43	42.9	29.0	SR	68
72	.58	-3.0	.59	-2.9	c	.49	.37	44.9	34.9	SR	72
102	.51	-2.8	.51	-2.8	b	.35	.27	40.8	41.2	SR	102
16	.49	-3.8	.49	-3.8	a	.57	.44	44.9	28.2	SR	16

Based on Table 6, the analysis results show that the OUTFIT MNSQ value is in the range of 0.5 < OUTFIT MNSQ < 1.5, which is the tolerance limit in assessing the suitability of items to the model used. The invalid statement items include items number 1, 133, 143, 75, 76, 131, 6, 10, 13, 77, 141, 145, 74, 51, and 16. Thus, from a total of 150 statement items analyzed, 135 items were declared valid, so they can be used as a feasible and appropriate instrument for further measurement purposes.

Diagnostic Rating Scale Analysis of Academic Hardiness Scale

The quality of the rating scale or response options in an instrument can be evaluated using the Rating Scale Diagnostic (RSD) in Rasch Modeling. This evaluation aims to determine the extent to which the rating scale used is able to differentiate respondents based on different levels of ability, has a high level of reliability in consistently differentiating respondents, and is well defined so that each respondent can understand the differences between the available answer options (Boone et al., 2014). In the instrument used to measure academic hardiness in students, the scale applied is a Likert scale with five categories. Details regarding the analysis of the academic hardiness scale diagnostic rating scale can be seen in Table 7.

Table 7. Diagnostic Instrument Rating Scale Test

Label	Category Label	Observed Average	Andrich Threshold
Very Inappropriate	1	-.50	NONE
It Is Not In Accordance With	2	-.43	-.54
Wednesday-Doubt	3	.03	-.76
In Accordance	4	.48	.13
Very Suitable	5	.94	1.18

An alternative answer can be said to be understood by respondents when the observed average and Andrich threshold values increase according to the level of alternative answers (Sumintono & Widhiarso, 2015). If seen in Table 7. the average value of respondents' answers or observed averages has increased consistently, where the observed average value for answer choice 1 is -.50; answer choice 2 is -.43; answer choice 3 is 0.3; answer choice 4 is 0.48; and answer choice 5 is 0.94. This shows that the academic hardiness scale in students has been in accordance with the conditions of the respondents in a real way and is not confusing for respondents. However, in addition to the observed average value, it is also

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important to consider the Andrich threshold. The instrument uses a Likert scale with five answer choices ranging from 1 (very inappropriate) to 5 (very appropriate), which is polytomous data or a type of data that uses a Likert scale with five or seven answer choices (Linacre, 2006; Sumintono, 2014). The Andrich threshold value monotonically moves from None to the negative logit direction and continues to move towards the positive logit, indicating that the five options given are valid for the respondents (Wibisono, 2016). However, in addition to the direction of the logit movement from negative to positive, the consistency of the Andrich threshold value range also needs to be considered, where the standard range of the Andrich threshold logit value is greater than 1.4 and less than 5.0 (Linacre, 2006).

Based on Table 7. There is a variation in the range of Andrich threshold logit values, where answer choices 1 (very inappropriate) and 2 (inappropriate) (-0.54) show a fairly clear difference for respondents so that they do not have difficulty in distinguishing the answer choices. Then answer choice 5 (very appropriate) also has a larger logit range, namely (1.18) which shows that it is very clear to respondents what the answer choices mean so that they are no longer confused in choosing them. While answer choice 3 (uncertain) shows a lack of clarity in its explanation (-0.76) so that respondents have difficulty in distinguishing the answer choices. Likewise with answer choice 4 (appropriate) which has a logit value (0.13) which shows that the difference between the categories "appropriate" and "uncertain" is quite clear, but respondents tend to choose answer 4 rather than 3.

Reliability Analysis of Academic Hardiness Scale

Instrument reliability testing is carried out to ensure that an instrument has a high level of consistency in producing stable data or information over time (Nurlatifah et al., 2023). In Rasch Modeling, one of the main indicators in the reliability test is referring to the correlation coefficient criteria based on the guidelines put forward by Arikunto (2010). This reliability coefficient functions as a standard in determining the extent to which an instrument can produce reliable data and is free from measurement errors. Details regarding the reliability criteria for the academic hardiness scale can be seen in Table 8.

Table 8. Reliability Criteria for the Academic Hardiness Scale

Interval	Category
0,00-0,19	Very Inappropriate
0,20-0,39	It Is Not In Accordance With
0,40-0,59	Wednesday-Doubt
0,60-0,79	In Accordance
0,80-1,00	Very Suitable

Data obtained from summary statistics provide important information regarding the level of reliability of the instruments used in a study. This information covers three main aspects, namely reliability from the respondent's side (person reliability), reliability from the review of question items (item reliability), and the interaction between respondents and the statement items given in the measurement instrument (Muntazhimah et al., 2020). Person reliability describes the extent to which respondents' answers are consistent in answering the questions asked, which reflects the stability of individuals in responding to the instruments used. Meanwhile, item reliability refers to the extent to which each question item in the instrument can measure the intended construct consistently and accurately. In addition, the interaction between respondents and statement items also shows the extent to which respondents understand each item in the instrument and the suitability between respondent characteristics and the statements given. Details regarding the person instrument reliability

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test (person reliability) and item instrument reliability test (item reliability) can be seen in Table 9.

Table 9. Person Instrument Reliability Test (Person Reliability) and Item Instrument Reliability Test (Item Reliability)

	50 INPUT		50 MEASURED		INFIT		OUTFIT	
	Total	**Count**	**Measure**	**Realse**	**Imnsq**	**Zstd**	**Omnsq**	**Zstd**
Mean	491.6	150.0	.34	.13	1.05	-.8	1.08	-.7
S. D.	65.7	.0	1.14	.25	.69	5.1	.81	4.8
Real Rmse	.28	True SD	1.10	Separation 3.97	Person Reliability			.94

	150 INPUT		150 MEASURED		INFIT		OUTFIT	
	Total	**Count**	**Measure**	**Realse**	**Imnsq**	**Zstd**	**Omnsq**	**Zstd**
Mean	163.9	50.0	.00	.15	1.00	-.1	1.08	.2
S. D.	33.3	.0	.67	.02	.28	1.4	.57	1.9
Real Rmse	.16	True SD	.65	Separation 4.21	Item Reliability			.95

Based on the analysis results presented in Table 9, the person reliability value was recorded at 0.94. This value reflects the level of consistency of respondents' answers to the statement items in the instrument used. In other words, the interaction between respondents and statement items in the instrument as a whole is in the very good category. Therefore, the academic hardiness scale can be categorized as having a very high level of reliability, so that it can be stated as a reliable instrument in measuring the intended construct. In addition, the analysis results also show that the item reliability value reaches 0.95. With this high reliability value, the academic hardiness scale can be used as a valid and reliable measuring instrument in assessing students' academic resilience. The high level of reliability on this instrument confirms that both in terms of respondents and in terms of statement items, the instrument has met the criteria required in Rasch Modeling. This finding has implications for guidance and counseling services. This finding has significant implications for further research in designing and developing a guidance and counseling service program model that is more adaptive and responsive to the needs of students in higher education, which is based on empirical evidence. This can be achieved by producing a consistent measurement scale to provide accurate information regarding the profile of academic hardiness of students in higher education.

Conclusion

Based on the result, the academic hardiness scale is proven to meet the principle of unidimensionality, which means that this scale can consistently measure one construct that is in accordance with the purpose of measurement. In addition, each item in the instrument can be categorized as fit with the model used and can be well understood by respondents.

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Furthermore, the reliability test shows that this instrument has a high level of consistency, so it can be used repeatedly in various research contexts.

Recommendation

This study provides an important foundation for further research in designing and developing empirical evidence-based guidance and counseling models, by considering the description of academic hardiness through the use of a valid and reliable academic hardiness scale. In addition, the results of this study can be a guideline for education practitioners and guidance and counseling personnel in designing more adaptive services, according to the needs of students and the context of higher education in Indonesia.

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