

Analysis of the Rasch model on the development of quarter life crisis measurements

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Research Article

Analysis of the Rasch model on the development of quarter life crisis measurements

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Abstract

A quarter life crisis is a condition in which individuals experience an identity crisis due to their inability to face the transition from adolescence to adulthood. The quarter life crisis phase causes negative feelings in the form of anxiety, failure, helplessness, fear, and even depression. Quarter-life crises in individuals can be identified through psychological measurements. However, the currently available quarter life crisis measurement tool cannot provide maximum results. This is because most of the psychological measuring tools were developed with classical test theory. The Rasch model is here to overcome the shortcomings of classical theory tests. The main objective of this research is to develop a quarter life crisis measurement tool using the Rasch model. The sampling technique used in this research is accidental sampling. In this study, the subjects involved are 120 early adults aged 18-25 years, totaling 507 participants. Data analysis in this study used the Rasch model with the Winsteps program. Based on the results of the analysis, 29 items fit the model of 35 items. The resulting Cronbach alpha is 0.89 with an item reliability coefficient of 0.99 and a person coefficient of 0.87. Overall, it can be concluded that the measuring instrument for the quarter life crisis is valid and has good psychometric properties so that it can be used to measure the quarter life crisis in individuals.

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Introduction

Early adulthood is a developmental period that starts from the age of 20s to 30s. At this time, individuals are expected to achieve independence in personality, career development, choosing a partner, and getting married (Santrock, 2012). Based on Badan Pusat Statistik Indonesia (BPS) census in 2020, around 44 million Indonesian population are in their early adult development stage, ranging from the age of 20-29 years old (Badan Pusat Statistik, 2021). This condition generates a demographic bonus that is highly related to the productive age (Goma et al., 2021). One of the requirements to be productive is that young adult individuals must have the ability to carry out their developmental tasks, either in social relations, community or work.

In its practice, the developmental tasks of early adulthood are not easy for all individuals to undertake. This is because adulthood is a transition period faced by young people in terms of career choices, finances, relationships, and life paths.

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During the transition period, various instability occurs and is marked by the emergence of negative feelings, such as fear of failure, anxiety, isolation, and feelings of helplessness. Negative emotions that arise, if not handled properly, can cause an emotional crisis called the quarter life crisis (Atwood & Scholtz, 2008; Duara et al., 2021)

Robbins and Wilner (2001) define the quarter life crisis as an identity crisis experienced by individuals during the transition from adolescence to adulthood. Quarter life crisis is caused by career problems, relationships, happiness level, intolerance to uncertainty, financial responsibility, lack of purpose in life, feeling trapped, and lack of support (Duara et al., 2021; Yeler et al., 2021). There are seven aspects that individuals experience when they are in the quarter life crisis phase, namely: indecisive in making decisions; feeling hopeless; negative self-assessment; stuck in a difficult situation; feeling anxious; feeling depressed and worried about interpersonal relationships with others.

Robinson (2018) mentions that the most common features of a quarter life crisis are breakups, debts, and conflicts with parents. A quarter life crisis can also be caused by feelings of being trapped in an unsatisfactory job, unemployment, and job pressure. According to Somad (2021) around 16% of Indonesia's population has the potential to experience a quarter life crisis. This condition is reinforced by the findings of previous research conducted by Riyanto and Arini (2021) which found that around 81.7% of UNIKA MusiCharitas students experienced a quarter life crisis due to anxiety related to difficulties in finding suitable jobs and feelings of being stuck with work due to financial needs.

One of the ways to know the quarter life crisis is by taking psychological measurements on individuals aged 18-25 years. The measurement of the quarter life crisis, among others, was developed by Hassler (2009) under the name Quarter life crisis Diagnosis Quiz which consists of 25 items. Then Pinggolio (2015) developed the Quarterlife Crisis Scale (QLCS) in the Philippines which consists of 41 items with a reliability coefficient of 0.800. Furthermore, in 2019 Petrov developed the Crisis Screening Questioner-9 (CSQ-9) measuring instrument consisting of 9 items (Yeler et al., 2021). Based on the classical test theory, Agustin (2012) has developed a measuring instrument for the quarter life crisis in Indonesia, which consists of 25 items by adapting Hassler's (2009) items. The alpha reliability coefficient resulting from the adaptation of the quarter life crisis measurement tool is 0.924.

Measurements in the psychological field are mostly developed using classical test theory (Embretson & Reise, 2000; Smith, 2003). Even though the score appears in the classical test theory measurement, it still contains a pure score and a measurement error of $x = \tau + e$. This deficiency in classical test theory is seen in the estimation of item difficulty and a person's ability depending on the number of samples, in other words, the p-value depends on the number of samples (Debelak et al., 2022). The classical test theory does not explain items that do not fit so it causes problems in the estimated reliability produced (Smith, 2003). Not only that, the measurement with classical test theory ignores the standard error of measurement (SEM) on the raw score (Bond et al., 2022). The shortcomings contained in the classical theory test ultimately cause problems in the measurement results, especially in individual psychological measurements. To overcome these shortcomings, Georg Rasch, a Danish mathematician, developed a measurement using the Rasch model (Landfeldt et al., 2021; Smith, 2003)

The Rasch model provides a more flexible and effective way to check the psychometric quality of the measuring instruments used (Khine, 2020). The Rasch model can overcome problems that classical theory tests cannot, such as sample dependence and missing input data (Kreijns et al., 2020). Another advantage of the Rasch model is item analysis, score interpretation, and reliability estimation. This is because, in the Rasch model, calibration is carried out in three ways, the measurement scale, respondents, and items so that the resulting data is more accurate (Debelak et al., 2022; Landfeldt et al., 2021; Smith, 2003). The Rasch model analysis tests how well the items in the measuring instrument measure the assumed unidimensionality latent variables. Rasch model analysis also tests whether the items fit the model by assessing whether the response pattern observed in the data match the theoretical patterns expected by the model (Tian et al., 2020). Bond and Fox (2007) stated that the use of the Rasch model in instrument validation will produce more holistic information about the instrument and better meet the definition of measurement

In psychological measurement, the Rasch model sets two conditions. First, the measuring instrument must be close to unidimensionality, in this case, a large part of the item must be able to measure the measuring construct. Second, the

measuring instrument must show local independence, which means that a respondent's answer to an item should not be influenced by other items (Smith, 2003). The most important difference between the Rasch model and the classical test theory is that the assumptions of the Rasch model can be tested empirically and all items in the Rasch model have the same discrimination assumptions (Debelak et al., 2022). The Rasch measurement model meets the strict criteria of fundamental measurement (Landfeldt et al., 2021). To date, the Rasch model is the only measurement model that has the required scaling properties of linear interval measurements (Tian et al., 2020)

The main objective of this research is to develop a measuring tool for quarter life crisis using the Rasch model. After conducting review on literature previous research, researcher found that until now, no quarter life crisis measurement tools were developed using the Rasch model. The result of this research is a valid and quality measuring instrument to obtain objective, accurate and accurate measurement information regarding the quarter life crisis variable.

Problem of Study

The problem raised in this study is whether the development of a quarter life crisis measuring instrument using the Rasch model analysis can produce a valid and quality measuring instrument?

Method

Research Model

The research method used is a quantitative method with the type of research measuring instrument development.

Participants

In this study, the population determined were students of Universitas Islam Negeri Raden Intan Lampung, Indonesia. By using the accidental sampling technique, 507 participants were obtained and the criteria set were students who entered early adulthood with an age range of 18-25. The selection of the characteristics of the student sample is in line with the theory of quarter life crisis according to Arnett (2000) that at the age of 18-25 years, they experience a crisis in terms of education, career, identity, and romantic relationships.

Measurement Instrument Development Stage

The stages in the development of this measuring instrument are as follows:

- Conceptualization of the measuring construct, at this stage the measuring construct will be defined and translated into operational indicators. The measuring construct that will be revealed in this research is the quarter life crisis.
- Formulate behavioral aspects and indicators as outlined in the blueprint. The measuring instrument was developed based on aspects of the quarter life crisis from Robbins and Wilner (2001).
- Develop items. Items are developed based on the aspects and indicators contained in the blueprint. There are a total of 73 items.
- Item review (professional judgment). This process is carried out to ensure the suitability of the items written with the aspects measured and the suitability of the language used. The item reviewer on the quarter life crisis measuring instrument is a psychology lecturer at the Universitas Islam Negeri Raden Intan Lampung who is competent in his field.
- Pre-trial. This stage is carried out to see how far the respondents understand the language in the items that have been compiled.
- Trial of measuring instruments. This stage is carried out by distributing measuring instruments to research subjects that have been determined.
- Data analysis. The data in this study is analyzed using the Rasch model with the help of the Winstep 3.73 program. While the analysis of classical theory tests using the help of the JASP computer program
- Final Compilation. After the analysis stage, valid and quality measuring instruments will be obtained.

Instrument

The measuring instrument used in this study is the quarter life crisis scale that has been developed. Items developed amounted to 73 items. Then selected 35 items that match the aspects and indicators of the measuring construct. The scale used is a Likert scale with five response categories SA (Strong Agree) until SD (Strongly Disagree) (Debelak et al., 2022; Jr & Stefanie, 2018; Zile-tamsen, 2017).

Data Analysis

Data analysis in this study used the Rasch model approach with the help of Winstep 3.73 software and JASP software for classical theory test analysis.

Results

Table of STANDARDIZED RESIDUAL variance (in Eigenvalue units)

		-- Empirical --	Modeled
Total raw variance in observations	=	61.6 100.0%	100.0%
Raw variance explained by measures	=	26.6 43.2%	42.7%
Raw variance explained by persons	=	5.7 9.2%	9.1%
Raw Variance explained by items	=	21.0 34.1%	33.7%
Raw unexplained variance (total)	=	35.0 56.8%	100.0% 57.3%
Unexplned variance in 1st contrast	=	4.7 7.7%	13.5%
Unexplned variance in 2nd contrast	=	2.3 3.7%	6.5%
Unexplned variance in 3rd contrast	=	2.1 3.4%	6.0%
Unexplned variance in 4th contrast	=	1.8 3.0%	5.3%
Unexplned variance in 5th contrast	=	1.6 2.6%	4.5%

Figure 1. Unidimensionality

The result of the analysis of raw variance is 43.2%, which means that the requirements for 20% dimensionality have been met. Then the unexplained variance is 13.5%. This means that this measuring tool can be used and can measure one measuring construct, namely the quarter life crisis.

Table. 1 Summary Statistic of the Rasch Model

	Output	Result
Item	Item Reliability	0,99
	Separation	14,5
Person	Mean	0,16
	Person Reliability	0,87
	Separation	2,59
Instrument	Cronbach Alpha	0,89

The results of the analysis of the Rasch model obtained the item reliability coefficient value of 0.99. This means that these items are of very good quality. The person reliability coefficient obtained is 0.87, meaning that the respondents are quite consistent in providing answers. Judging from the resulting Cronbach alpha value of 0.89, it indicates that overall, this measuring tool can identify the quarter life crisis in participants well. The resulting item and person separation index is 24.5 and 2.59. This means that in this measurement there are 3 groups of respondents and 15 groups of items based on the level of difficulty to be approved by the respondents.

Table 2. Analysis Result with Classical Test Theory

Estimate	McDonald's ω	Cronbach's α	Average interitem correlation
Point estimate	0.893	0.888	0.179
95% CI lower bound	0.880	0.874	0.158
95% CI upper bound	0.907	0.901	0.201

The results of the classical test theory analysis obtained Cronbach's alpha of 0.87. That is, the measuring tool for the quarter life crisis is valid. Analysis using classical test theory was carried out to compare the measurement's result

Table 3. Item Misfits

Item	Outfit MNSQ	Outfit ZSTD	Pt Measure Core
A6 Whenever I have a problem, I always tell my closest friend	1.83	9.9	.22
A9 I feel comfortable for being with my friends	.91	-1.4	.32
A15 I am happy when I can meet the expectations of those closest to me	1.85	9.9	-.14
A16 I can make decision fast	.90	-1.7	.37
A17 I always take consideration for what I will do	1.38	5.2	-.13
A34 I am not worry if my peers are more successful than I do	1.37	5.9	.30

The results of the analysis of the Rasch model show that six items do not fit the model, namely, A6, A9, A15, A16, A17, and A34. The item is invalid because it does not meet the specified MNSQ, ZSTD, and Pt Measure core values. Based on the results of the analysis with the Rasch model, 29 items were found that fit the model from 35 items, but only 25 items were selected with consideration of the proportionality of the weights of each aspect contained in the blueprint. Referring to the results of the person measure, it is known that as many as 68 respondents indicated outliers.

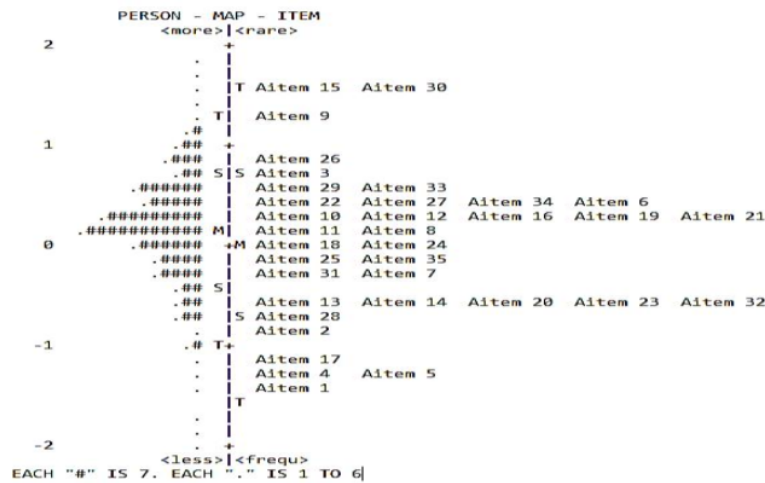


Figure 2. Wright Map of Quarter Life Crisis Measurements

The interaction between respondents' abilities and item difficulty can be seen in the right map above. The results of the analysis showed that the most difficult items to agree on were A15 (logit value +1.64) and A30 (logit value +1.55). However, if you look closely, some respondents have abilities above the item difficulty level. The item that is the easiest to agree on is A1 (logit value -1.37) and several respondents have abilities below the standard deviation.

The results of the model analysis showed that there was no bias in the measurement of gender, educational background, romantic relationship status, and employment status. This means that the measuring instrument developed is free from measurement bias.

Discussion and Conclusion

Based on the results of the analysis using the Rasch model, it is known that this quarter life crisis measuring instrument has good psychometric properties and provides consistent results, and is proven to reveal a psychological construct (unidimensional). In psychological measurement, most measuring instruments are multidimensional, so it is important to analyze the unidimensional assumptions in a measurement (Smith, 2003). The value of the resulting alpha reliability coefficient is 0.89. That is, this measuring tool produces a consistent and reliable measurement score. Item reliability coefficients and person reliability are also classified as very good, namely 0.99 and 0.87. The results of this study strengthen the research of Yasin et al., (2018) regarding reliability and validity testing with the Rasch model. Then the research of Tian et al., (2020) regarding the development of a self-efficacy measurement tool for nurses in China with an item reliability of 0.97. The results of this study are also evidence that the analysis using the Rasch model produces a valid measuring instrument.

The person separation index obtained is 2.59 and the item separation index is 24.52. This can be interpreted that the items used have been able to accurately assess respondents' answers, about the construction of the quarter life crisis. The value of the separation index, both on items and respondents is quite large. This shows that this scale has good quality because it can identify groups of respondents and items quite accurately.

The results of the instrument reliability analysis using the classical test theory approach also showed very satisfactory results, namely 0.87. These results make it clear that the quarter life crisis instrument is indeed a valid measuring tool because it can provide consistent and reliable measurement results. The value of the reliability coefficient generated by the Rasch model approach and the classical test theory is only slightly different, but the results of the calculation using the Rasch model are more accurate because it considers the level of conformity of the respondent with the model. The Rasch model is also able to calculate the score of each respondent in the form of interval data (Yamashita, 2022). The invalid aim in the analysis of the Rasch model can be seen from the value of MNSQ, ZSTD, and PT Measure Corr (Bond et al., 2022). An item is said to be valid at least it meets two of the three criteria that have been set (Bond et al., 2022; Smith, 2003). The Rasch model not only provides information about the validity of the aim but also the validity of the person (Christensen et al., 2022). Referring to the person measure, the person who does not fit the model is 68 participants.

The advantage of the Rasch model is that it can see the interaction between a person's abilities and item difficulty (Bond et al., 2022; Debelak et al., 2022). Item A15 is the most difficult item to agree with the largest logit value of +1.64. When viewed further from the editorial side, this item confused the respondent "I am happy if I can meet the expectations of the people closest to me". So many of the respondents answered "Neutral" on the item. However, when examined from the Wright Map, some respondents have abilities above item difficulty. That is, some respondents answered "Strongly Agree" and "Agree" on the item. When further reviewed on the blueprint, it turns out that the items that do not fit the model are unfavorable items, except for item A17 which is a favorable item. As in item A16 "I can make decisions quickly" this is not by the aspect of the quarter life crisis. Individuals who are in the quarter life crisis phase tend to find it difficult to make decisions (Robinson, 2018). The item that was easiest to agree on was item A1 "I feel worried when I think about my future". This item has the lowest logit value, which is -1.37 logit. This means that this measuring tool can measure the quarter-life of individuals well. This is because individuals who experience a quarter life crisis tend to feel confused and anxious about the future (Arnett et al., 2014; Robbins & Wilner, 2001).

Based on the results of the analysis using the Rasch Model, it is found that the quarter life crisis instrument that has been developed can reveal the construct of the quarter-life. 29 items fit the model; the resulting Cronbach alpha coefficient is 0.89. The item reliability coefficient is 0.99 and the person reliability is 0.87. That is, the developed scale

produced a consistent and reliable measurement score with very good and valid item quality. Overall, from the analysis results, it can be concluded that the quarter life crisis scale is proven to have good psychometric properties so that it can be used to measure the quarter life crisis in individuals.

Recommendations

Recommendations for Applicants

People who work in the field of psychology could make use of this measuring instruments to measure the quarter life crisis of individuals from all groups of background.

Recommendations for Further Research

Further researcher interested in this field could try to reach wider or more general subjects so that the measuring instrument can detect diversity of participants. Thus, the index of separation of respondents could increase.

Limitations of Study

The limitation of this study is in its subject, because the subject being observed are students. However, this measuring tool is still quite valid and reliable to be used to measure the quarter life crisis in the general population.

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- M. Nursalim Malay, contributed to the conceptualization of research methods; the study of analytical theory using the Rasch model; and data analysis.
- Mustamira Sofa Salsabila, contributed to the conceptualization of the theory of the quarter life crisis; studied the theory of the quarter life crisis and analysis of the items and indicators developed; and stabilized the measuring instrument.
- Citra Wahyuni, contributed to the concept of measuring instruments; studied items and indicators; and studied the analysis method of the Rasch model.

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