JP3I (Jurnal Pengukuran Psikologi dan Pendidikan Indonesia), 12(2), 2023, 162-176
DOI: http://dx.doi.org/10.15408/jp3i.v12i2.31808
http://journal.uinjkt.ac.id/index.php/jp3i

Psychometric Properties of Creative Personality Scale among Secondary School Students

Rahmat Aziz[1], Ullrich Günther[2]

Department of Psychology, Faculty of Psychology, UIN Maulana Malik Ibrahim Malang, Indonesia[1]
Institut for Management and Organization, Leuphana University Lüneburg, Germany[2]

azira@uin-malang.ac.id

Abstract

Understanding the creative personality of students has significant implications for their future success and well-being. This study aimed to describe the development of the Creative Personality Scale in secondary school students. Data were collected from 275 students in junior and senior high schools. The research process was carried out in five stages to obtain a measure of creative personality that meets the requirements of validity and reliability. The data were analyzed through content validity and construct validity tests. The results of the validity test of the creative personality scale showed two important findings. First, the content validity test result found 24 valid items with an Alpha Cronbach of .898. Secondly, the construct validity test result showed that not all the modelling criteria could be met. The findings imply that developing the Creative Personality Scale can significantly contribute to creativity research and provide a valuable tool for researchers, educators, and practitioners to better understand and promote creativity in secondary school students.

Keywords: confirmatory factor analysis, creative personality scale, psychometric properties, secondary school students, validity and reliability

Abstrak

Pemahaman terhadap kepribadian kreatif pada siswa memiliki implikasi yang signifikan terhadap kesuksesan dan kesejahteraan mereka di masa depan. Tujuan dari penelitian ini adalah untuk mendeskripsikan pengembangan Skala Kepribadian Kreatif pada siswa sekolah menengah. Pengujian data dilakukan pada 275 siswa di sekolah menengah pertama dan menengah atas. Proses penelitian dilakukan melalui lima tahapan untuk mendapatkan alat ukur kepribadian kreatif yang memenuhi syarat validitas dan reliabilitas. Data dianalisis melalui pengujian validitas isi dan validitas konstruk. Hasil uji validitas skala kepribadian kreatif menunjukkan adanya dua temuan penting. Pertama, hasil pengujian validitas isi menemukan adanya 24 item valid, dengan nilai Alpha Cronbach .898. Kedua, hasil pengujian validitas konstruk menemukan tidak semua kriteria pemodelan dapat terpenuhi. Implikasi temuan menyatakan bahwa pengembangan skala kepribadian kreatif dapat memberikan kontribusi yang signifikan terhadap bidang penelitian kreativitas dan menyediakan alat yang berharga bagi para peneliti, pendidik, dan praktisi untuk lebih memahami dan menumbuhkan kreativitas pada siswa di sekolah menengah.

Kata kunci: *analisis faktor konfirmatori, properti psikometris, siswa sekolah menengah, skala kepribadian kreatif, validitas dan reliabilitas*

Introduction

Studying the creative personality scale in students is crucial in understanding their potential for innovation and contribution to society. The study found that creative individuals are more likely to find unconventional solutions to complex problems, making them invaluable assets to organizations and society (Chen, 2020; Garcia, 2019). Furthermore, creative individuals are often more adaptable to change and thrive in dynamic work environments (El-Said, 2019)). Thus, studying the creative personality scale in students can help identify and nurture individuals with the potential to become innovative leaders and entrepreneurs, as highlighted in a study by Zhou (2020). Studying the creative personality scale in students is essential because creativity has been linked to positive mental health outcomes, such as lower anxiety levels and depression (Benjamin, 2018). In conclusion, understanding the creative personality scale in students can have significant implications for their future success and well-being, making it a vital area of study for researchers, educators, and policymakers alike.

Several studies have demonstrated the importance of the creative personality scale in studying students' creativity. For instance, studies found that the creative personality scale predicted creative achievement in students (Akpur, 2020; Fatmawati, 2019). Another study demonstrated that students with higher scores on the creative personality scale were more likely to show divergent thinking and generate novel ideas (Li, 2020; Mastria, 2018). Furthermore, a study showed that students' creative personality was associated with their academic performance and learning (Akpur, 2020; Wang et al., 2022). Additionally, a study suggested that the creative personality scale could be used to identify students with high creative potential and select them for creative programs (Aziz et al., 2022; Jiang, 2021). It can be concluded that there have been several studies in which creativity has been the subject of research with different emphases and approaches.

So far, there are three trends in studying the creative personality scale. The first is adapting existing creative personality measures, which could involve translating and validating existing scales or modifying them to suit cultural context better (Meier et al., 2021; Tan, 2021). Second, exploring cultural factors that influence creative personality: The research examines the relationship between cultural values, beliefs, and practices and creative personality traits (Cheung, 2018; Skoglund, 2019). The last is developing new measures of creative personality: It could develop new creative personality measures specifically tailored to the Indonesian context. It could involve conducting focus groups or interviews with experts to identify culturally relevant traits and behaviours associated with creativity (Hidayat, 2018; Qian, 2019). This paper is a study using the third approach. It makes an academic contribution in finding a scale for measuring creative personality for Indonesian students in secondary school.

Creativity is a complex and multifaceted construct studied extensively from various perspectives. From the perspective of creativity research, creativity refers to the ability to produce novel and appropriate solutions to problems or challenges (Cheng, 2019; Sicotte, 2019). This definition highlights the importance of originality and usefulness in defining creativity. Another important aspect of creativity is the creative process, which involves generating, evaluating, and refining ideas into a final product (Bueno, 2018). Various factors can influence this process, including personality traits, cognitive processes, and environmental factors (Agnoli, 2018; Palanica, 2019). Furthermore, creativity can manifest in various domains, such as art, science, and business, and can be expressed through various mediums, such as writing, painting, or inventing (Sicotte, 2019; Wright, 2019)). In conclusion, creativity is a complex and multidimensional construct that involves producing original and useful solutions to problems, the creative process, and various factors influencing it.

Creative personality is a term used to describe individuals with certain personality traits associated with creativity. These traits include openness to experience, tolerance for ambiguity, curiosity, and a willingness to take risks (Sternberg, 2018). These traits are believed to contribute to developing creative

thinking and problem-solving skills and a willingness to explore new ideas and approaches. However, the relationship between personality traits and creativity is complex and multifaceted (Glaveanu et al., 2020). For example, some studies have found that certain personality traits, such as neuroticism, may be negatively related to creativity, while others have found that these traits may have a positive or neutral effect, depending on the context. Furthermore, environmental factors like education and cultural values may influence the relationship between personality and creativity (Shalley et al., 2015). In conclusion, the concept of creative personality refers to a set of personality traits that are believed to contribute to creativity, but the relationship between personality and creativity is complex and may be influenced by various factors.

There are three major trends regarding the study and evaluation of creative personalities. Firstly, there are measurements focused on cognitive aspects. This research model analyses creativity as a thought process consisting of fluency, flexibility, originality, and elaboration categories (Humble, 2018; Said-Metwaly, 2021). Secondly, there are measurements that concentrate on non-cognitive characteristics of creativity. In this model, creativity is considered as creative personality. Measurement tools generally assess various personality traits, such as openness to experience, ambiguity tolerance and risk-taking, perseverance (Mammadov et al., 2019; Qian, 2019; Zahra, 2021). In this model, creativity is viewed as a creative personality trait. The last, Some experts propose two criteria for creative products: novelty and usefulness. In this model, multiple product criteria are developed for further development. Furthermore, the measurement of creativity is product-oriented. (Cheng, 2019; Lerdal, 2019). This study elaborates on the second research model. The research's novelty lies in utilizing of six creative personality indicators in the scale of creativity. In addition, this research is also examining research subjects from two stages of secondary schooling in Indonesia.

Purpose of Study

The purpose of this article is to describe the development of the Creative Personality Scale in secondary school students. The selection of secondary school subjects is based on the premise that students are still in a developmental stage. Hence, creativity is recognized as one of the potential aspects to nurture in them. Developing the scale starts with determining the measurement domain, arranging the items, and testing the items. The five stages of scale development are expected to produce a valid and reliable creative personality scale for secondary school students. The measurement domain is determined by reviewing literature related to the concept of the creative personality. Item construction is done by creating statement items that reveal indicators of the creative personality. Item testing is performed to test internal consistency and provide evidence of construct validity through confirmatory factor analysis. The tests were conducted on students at the junior and senior high school levels of education.

Methods

This section describes four points related to the research procedure, research subject, data collection, and data analysis.

Research Procedure

The research process is performed through five stages. Determination of constructs and measurement areas, writing of items, reviewing of items, reliability testing, and construct validity testing. The explanation of each stage is as follows:

1. Determine the constructs and measurement areas of the creative personality. At this stage, the literature was reviewed to determine the indicators of the construct of the creative personality. The results of the review determined the existence of six creative personality characteristics. It means

http://journal.uinjkt.ac.id/index.php/jp3i

willingness to grow, openness to new experiences, perseverance in doing tasks, tolerance for ambiguity, courage to take risks, and constancy in opinion.

2. Item writing. At this stage, sixty items are created in the Likert scale that measures all six indicators of the creative personality. Each indicator is measured through 10 items (five favourable and five unfavourable).
3. Item review. At this stage, a *focus group discussion* was performed with the Faculty of Psychology of the State Islamic University of Malang lecturers. The review results determined that 36 items could be continued for the next testing stage. Six items represent each indicator.
4. Scale reliability estimate through the Alpha Cronbach technique. Testing is performed by discarding items with a *corrected item-total correlation* score marked negative.
5. Construct validity evidence. Testing is performed by using the *Confirmatory Factor Analysis* technique (CFA). The purpose of testing is to ensure that all six creative personality indicators tested through 24 items have met the construct validity requirements.

The five stages of research were performed to obtain a creative personality measuring tool that meets the high validity and reliability requirements for creativity research in students of junior high school and senior high school levels.

Research Subjects

The study subjects are two hundred and seventy-five students from junior high school (156 students) and senior high school level (119 students). The subjects' ages ranged from twelve to eighteen years (Mean =15.04 SD=1.68). The data collection procedure is performed after the student has consented to become the study's subject. More data is found in Table 1.

Table 1. Demographic Profile of Research Subject (N=275)

Demographic Profile	N	%
School		
1. Junior high school	156	56.7
2. Senior high school	119	43.3
Gender		
1. Male	154	56
2. Female	121	44
Age (Mean=15,04, SD=1,68)		
1. Twelve years old	31	11.3
2. Thirteen years old	60	21.8
3. Fourteen years old	67	24.4
4. Fifteen years old	49	17.8
5. Sixteen years old	26	9.5
6. Seventeen years old	26	9.5
7. Eighteen years old	16	5.8

Data Collections

The data was obtained through the measurement of the Creative Personality Scale. The scale reveals six indicators of creative personality: the willingness to grow, openness to new experiences, perseverance in doing tasks, tolerance for ambiguity, courage to take risks, and constancy in opinion. At the beginning of the test, the number of items was 36, but 15 valid items were obtained after reliability testing. This measuring instrument is in the form of a *Likert scale* with 5 (five) answer choices. The five answer choices are *Very Strongly Agree (VSA), Agree (A), Neutral (N), Disagree (D),* and *Strongly Disagree (SD)*. Scoring for favourable items moves from 5, 4, 3, 2, and 1. Scoring for unfavourable items moves from the numbers 1, 2, 3, 4, and 5.

Data Analysis

Data analysis was performed to test the reliability of creative personality measuring instruments. Reliability refers to the extent to which a measurement result is consistent if repeated. In this study, reliability testing was aimed to determine the consistency of the creative personality instrument. The reliability calculation is performed after the validity of each item is tested through empirical testing. An item is valid when it has *a corrected item-total correlation* score of more than .300. At the same time, the reliability of a measuring instrument is declared valid when it obtains a Cronbach Alpha value of more than .600. Construct validity testing using the *Confirmatory Factor Analysis* (CFA) techniques. The criteria used to assess a fit model are Che-square < .200, Probability > .200, RMSE (*Root Mean Square Error of Approximation*) < .800, AGFI (*Adjusted Goodness of Fit Index*) >.900, CFI (*Comparative Fit Index*) .>.900, and TLI (*Tucker-Lewis Index*) >.900.

Results and Discussion

This section presents the results of the reliability test, the results of the construct validity test and the compilation of valid items for the Creative Personality Scale. The discussion follows the presentation of the results of the study.

The Result of the Reliability Estimate

This section presents the results of the reliability test analysis of 36 (thirty-six) items of the Creative Personality Scale using the Alpha Cronbach technique. The analysis showed that 24 (twenty-four) items were valid and 12 (twelve) fell. The results of the first analysis on thirty-six items are presented in Table 2.

Table 2. The Result of the First Analysis

Factors	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Status
Willingness	W1	117.29	136.222	0.386	0.748	Valid
	W1	118.32	146.678	-0.023	0.768	Not valid
	W3	117.24	137.804	0.299	0.753	Valid
	W4	117.72	138.179	0.257	0.755	Valid
	W5	117.78	139.675	0.222	0.757	Valid
	W6	116.99	132.679	0.524	0.741	Valid
Openness	O1	117.30	134.261	0.493	0.743	Valid
	O2	117.69	139.683	0.280	0.754	Valid
	O3	118.41	151.520	-0.204	0.777	Not valid
	O4	118.01	145.102	0.039	0.765	Valid
	O5	117.35	136.212	0.464	0.746	Valid
	O6	117.48	140.689	0.211	0.757	Valid
Perseverance	P1	116.79	134.596	0.542	0.743	Valid
	P2	116.79	133.180	0.589	0.740	Valid
	P3	117.23	137.442	0.475	0.747	Valid
	P4	118.53	149.805	-0.144	0.774	Not valid
	P5	117.17	135.364	0.497	0.744	Valid
	P6	116.55	134.547	0.592	0.742	Valid
Tolerance	T1	117.47	138.512	0.285	0.753	Valid
	T2	118.24	149.563	-0.136	0.773	Not valid
	T3	116.95	135.694	0.490	0.745	Valid
	T4	117.08	135.493	0.470	0.745	Valid
	T5	117.17	136.658	0.411	0.748	Valid
	T6	118.84	158.334	-0.469	0.787	Not valid

http://journal.uinjkt.ac.id/index.php/jp3i

Take a risk	R1	117.03	135.003	0.477	0.745	Valid
	R2	117.47	135.564	0.496	0.745	Valid
	R3	117.32	135.233	0.502	0.744	Valid
	R4	118.40	151.650	-0.212	0.777	Not valid
	R5	118.28	150.407	-0.155	0.778	Not valid
	R6	116.84	133.291	0.528	0.742	Valid
Consistency	C1	118.28	150.456	-0.170	0.775	Not valid
	C2	118.46	154.125	-0.305	0.781	Not valid
	C3	117.36	136.449	0.418	0.747	Valid
	C4	117.09	134.401	0.517	0.743	Valid
	C5	117.37	134.432	0.493	0.744	Valid
	C6	116.79	133.614	0.559	0.741	Valid
Cronbach's Alpha = .760						

Table 2 shows the presence of nine items that have a negative corrected item-total correlation. These are items 3, 8, 16, 20, 24, 28, 29, 31, and 32. The Cronbach's alpha coefficient is 0.760. In the following analysis process, these nine items are removed. The results of the analysis are presented in Table 3.

Table 3. The Result of the Second Analysis

Factors	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Status
Willingness	W1	95.05	185.508	.464	.891	Valid
	W3	95.00	187.657	.363	.894	Valid
	W4	95.48	188.725	.298	.896	Valid
	W5	95.54	189.760	.287	.896	Valid
	W6	94.75	182.395	.564	.889	Valid
Openness	O1	95.06	183.566	.561	.889	Valid
	O2	95.45	191.044	.307	.894	Valid
	O4	95.77	202.004	-.091	.903	Not valid
	O5	95.11	185.701	.544	.890	Valid
	O6	95.24	190.433	.299	.895	Valid
Perseverance	P1	94.55	184.861	.579	.889	Valid
	P2	94.55	183.693	.605	.888	Valid
	P3	94.99	188.328	.509	.891	Valid
	P5	94.93	184.886	.569	.889	Valid
	P6	94.31	184.690	.636	.888	Valid
Tolerance	T1	95.23	187.197	.394	.893	Valid
	T3	94.71	186.471	.514	.890	Valid
	T4	94.84	186.329	.489	.891	Valid
	T5	94.93	186.126	.491	.891	Valid
Take a risk	R1	94.79	185.114	.520	.890	Valid
	R2	95.23	185.949	.535	.890	Valid
	R3	95.08	185.556	.540	.890	Valid
	R6	94.60	183.453	.558	.889	Valid
Consistency	C3	95.12	186.067	.490	.891	Valid
	C4	94.85	183.977	.578	.889	Valid
	C5	95.13	184.153	.547	.889	Valid
	C6	94.55	183.833	.589	.888	Valid
Cronbach's Alpha = .895						

Table 3 shows that the results of the second round of analysis identified one item (O4) with a negative corrected item-total correlation, while the other items have positive values. The Cronbach's Alpha reliability coefficient is 0.895. In the subsequent analysis process, this item is removed and tested again in the third

round. The result shows that all items (26 items) of the Creative Personality Scale have a corrected item-total correlation value of more than .300. All tested items are considered valid. However, the number of items on each indicator is unbalanced. The items with a small value on the corrected item-total correlation (W3 and P3) are discarded. The number of items on this scale is 24—further data is found in Table 4.

Table 4. The Result of the Last Analysis

Factors	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Status
Willingness	W1	84.87	163.224	.466	.895	Valid
	W4	85.30	165.686	.317	.900	Valid
	W5	85.36	166.472	.314	.899	Valid
	W6	84.56	161.079	.538	.893	Valid
Openness	O1	84.88	161.663	.553	.893	Valid
	O2	85.27	168.342	.313	.898	Valid
	O5	84.92	163.195	.556	.893	Valid
	O6	85.06	167.372	.319	.899	Valid
Perseverance	P1	84.37	163.008	.566	.893	Valid
	P2	84.37	161.906	.592	.892	Valid
	P5	84.75	162.953	.559	.893	Valid
	P6	84.13	162.778	.625	.892	Valid
Tolerance	T1	85.04	164.677	.401	.897	Valid
	T3	84.52	164.338	.508	.894	Valid
	T4	84.66	164.101	.488	.894	Valid
	T5	84.75	163.804	.494	.894	Valid
Take a risk	R1	84.61	163.297	.505	.894	Valid
	R2	85.04	163.838	.530	.894	Valid
	R3	84.90	163.282	.543	.893	Valid
	R6	84.41	161.477	.553	.893	Valid
Consistency	C3	84.93	163.580	.500	.894	Valid
	C4	84.67	161.961	.574	.893	Valid
	C5	84.95	161.607	.564	.893	Valid
	C6	84.36	162.123	.573	.893	Valid
Cronbach's Alpha = .898						

The test was performed in five rounds. In the first round, nine items were eliminated, namely items W1, O3, P4, T2, T6, R4, R5, C1, and C2. In this round, the alpha reliability of Cronbach is .760. The second round still found an item with a negative-marked Corrected-total item correlation score, namely item O4, and an alpha Cronbach reliability of .895. In the third round, all items scored above .300, but the item is not balanced among indicators. In the last round, it was found that the entire item had a positively marked *item corrected-total correlation* and had the reliability of Cronbach alpha .898.

The statistical test results indicate that all 24 items in the creative personality scale have a Corrected Item-Total Correlation value of more than .300, which suggests that all items are considered valid. The measuring instrument's reliability is also expressed as high, with a Cronbach's Alpha value of .898. Therefore, it can be concluded that the measuring instrument is highly reliable and suitable for use in research on students' creative personalities. This conclusion is supported by current research on the importance of measuring instruments' reliability and validity in psychological research (Berardi, 2019; Dugdale, 2019).

Reliability and validity are crucial aspects of any measuring instrument used in psychological research (Kim, 2011; Ramly, 2022). This study demonstrated that the Cronbach's Alpha value is .879. It indicates that the scale od creative personality has high internal consistency. Moreover, the Corrected Item-Total

Correlation values of more than .300 suggest that all items in the scale are valid and contribute to measuring the construct of the creative personality. Overall, the results suggest that the measuring instrument used in this research has a high level of reliability and validity, making it suitable for further research on students' creative personalities (Atesgoz, 2021; Moon et al., 2020; Vaezi & Rezaei, 2019). It is important to note that future research should continue to evaluate the reliability and validity of the measuring instrument to ensure the results are accurate and trustworthy.

In conclusion, the high reliability and validity of the measuring instrument used in this research provide a novelty in creativity research by enabling a more precise and comprehensive measurement of the creative personality. The measuring instrument contributes to psychology by enabling researchers to identify and study creative personality's unique traits and characteristics. By doing so, researchers and educators can better understand how to foster individual creativity, potentially leading to new insights and advances in the field.

The Result of Construct Validity Evidence

In this section, the results of construct validity evidence of twenty-four items that have been declared valid in the *internal reliability* test are presented. Construct validity evidence using confirmatory factor analysis techniques. The results of the tests are shown in Figure 1.

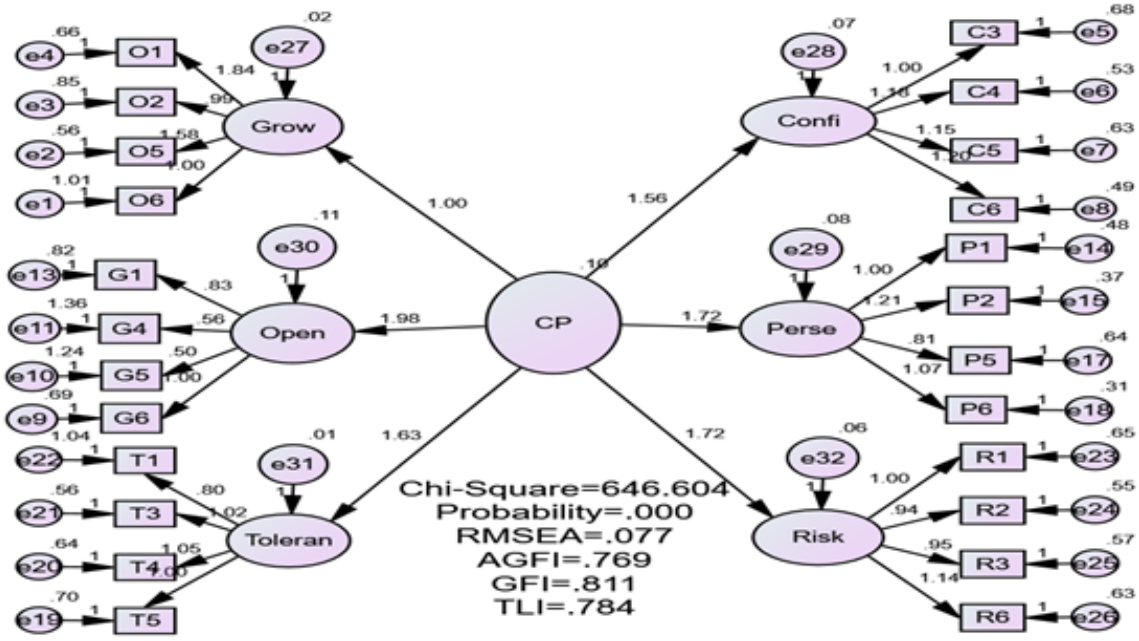

Figure 1. The Result of Construct Validity Testing

Based on Figure 1, Che-square = 646 >.200, Probability = .000 > .200, RMSEA (*Root Mean Square Error of Approximation*) = 077<.800., AGFI (*Adjusted Goodness of Fit Index*) = 769>.900., CFI (*Comparative Fit Index*) = 811>.900, and TLI (*Tucker-Lewis Index*) =784 >.900. The result shows that only RMSEA meets the fit criteria, while the other criteria are still not fit. In addition, four items had a loading factor below .500 (C6, P1, P2, P6). These results show that the construct validity of the Creative Personality Scale does not get satisfactory results.

There could be several reasons why only the RMSEA fit index met the criteria while other fit indices such as GFI, LTI, AGFI, and Chi-square did not. It could be that the model has a relatively poor fit overall, but the RMSEA detected some aspects of the model that fit well. Another possibility is that the

RMSEA is more sensitive to specific model misfits, while other indices may be sensitive to different types (Kelly & Konold, 2022; Shi et al., 2018). It is important to evaluate multiple indices of model fit to gain a more comprehensive understanding of the strengths and limitations of the model.

There are three recommendations to overcome this problem. First, the researcher must modify the model. It is a common strategy in confirmatory factor analysis. One approach is to use modification indices to identify areas of poor fit and then add or remove parameters to improve the model fit. Second, Cross-validation of the model: This is an important step in evaluating the replicability and generalizability of the factor structure and model fit indices. Third, Consideration of alternative models: This involves comparing the fit of different models and selecting the one that fits the data best(Boivin & Ng, 2006) (Lorenzo-Seva & Ferrando, 2006). The three recommendations are expected to produce a psychological measurement scale that meets the construct validity requirements.

The 24 Items of the Creative Personality Scale

Based on the literature review results (Sternberg, 2017, 2018; Sternberg & Lubart, 1999), six indicators were found to be the characteristics of a creative personality: the willingness to grow, openness to new experiences, perseverance in doing the task, constancy in opinions, tolerance for ambiguity, and courage to take a risk. The six indicators are measured through thirty-six items, but only 24 are declared valid based on the test results. The twenty-four items are found in Table 5.

Table 5. Indicator and Item of Creative Personality

Factors	Items in English	Items in Indonesia
Willingness	1. I feel passionate about doing tasks that have never been done before	*Saya merasa bergairah jika melakukan pekerjaan yang belum pernah dilakukan sebelumnya.*
	2. I feel enough of the achievements I have gained at the moment ®	*Saya merasa cukup dengan prestasi yang saya peroleh saat ini ®*
	3. Whenever I finish performing an activity, I desire another activity.	*Setiap saya selesai melaksanakan suatu kegiatan, muncul keinginan melakukan kegiatan lain.*
	4. People often describe me as curious because I ask lots of questions.	*Kebanyakan orang menggambarkan saya sebagai pribadi yang serius karena saya banyak bertanya.*
Openness	5. I'd rather learn a new lesson than the familiar one	*Saya lebih suka mempelajari sesuatu yang baru dibandingkan yang sudah biasa*
	6. I prefer to do ordinary activities rather than challenging new activities ®	*Saya lebih suka melakukan kegiatan yang biasa saja dibanding kegiatan baru yang menantang. ®*
	7. When visiting exhibitions, I often ask questions of the officers.	*Ketika mengunjungi pameran, saya sering mengajukan pertanyan pada petugas.*
	8. Although it is tiring, I feel satisfied if I get a new experience.	*Walaupun melelahkan, saya merasa puas jika mendapatkan pengalaman baru.*
Perseverance	9. I view every challenge as a patience test.	*Saya beranggapan bahwa setiap tantangan adalah ujian kesabaran.*
	10. In my opinion, patience can be characterized by perseverance in work	*Menurut saya, kesabaran itu bisa dicirikan dengan adanya ketekunan dalam bekerja.*
	11. I often work so hard that the time passes too quickly.	*Meskipun tugas itu sulit, saya biasanya menyelesaikan dengan sempurna.*
	12. I believe that with perseverance, the goal will be achieved.	*Saya percaya bahwa dengan ketekunan, tujuan akan tercapai.*

http://journal.uinjkt.ac.id/index.php/jp3i

Tolerance	13. I like working on problems that offer a wide range of potential solutions.	*Saya suka menyelesaikan masalah yang memungkinkan banyak alternatif penyelesaian*
	14. Every problem can be resolved in several different ways.	*Setiap masalah dapat diselesaikan dengan berbagai macam cara*
	15. I can understand the opinions of others that are different from mine.	*Saya bisa memahami pendapat orang lain yang berbeda dengan pendapat saya.*
	16. Confusion is one of life's challenges for me.	*Bagi saya, keraguan merupakan salah satu tantang dalam hidup*
Take a risk	17. Even if it hurts, I will take the fallout if I fail.	*Kalau saya gagal, saya siap menanggung segala akibatnya walaupun terasa menyakitkan.*
	18. Many of my friends think of me as someone who dares to be responsible.	*Banyak teman beranggapan bahwa saya adalah orang yang bertanggung jawab.*
	19. I feel brave because I am willing to accept the consequences of my deeds.	*Saya merasa sebagai orang pemberani karena mau menerima akibat atas perbuatan.*
	20. My guiding concept is to take responsibility no matter the risk.	*Prinsip saya, apapun resikonya saya harus berani bertanggung-jawab.*
Constancy	21. Though many disagree, I would like to defend my viewpoint.	*Meskipun kebanyakan orang tidak setuju dengan pendapat saya, tapi saya akan mempertahankannya.*
	22. Whatever the hazards, I'll stick by my convictions.	*Saya akan memegang teguh pada pendapat saya, apapun resikonya.*
	23. As more people criticize me, I become more eager to defend my position.	*Semakin banyak orang mengkritik saya, semakin kuat saya mempertahankan pendapat saya.*
	24. One of my pride is being able to maintain a stand.	*Salah satu kebanggaan saya adalah ketika mampu mempertahankan pendirian.*

Table 5 demonstrates that the Creative Personality Scale comprises six indicators measured through twenty-four. Although, in the beginning, the instrument consisted of favourable and unfavourable items, after going through empirical testing, it turned out that only two unfavourable items were declared valid, while the other items were favourable.

The development of the Creative Personality Scale has implications for educational practice, as it can inform the design of interventions and programs that promote creativity in students. The use of the creative personality scale can help educators identify students who have the potential to become creative leaders and innovators in various fields (Zhou, 2020). By assessing the different dimensions of creativity, such as originality, fluency, flexibility, and elaboration, educators can present their teaching methods to foster creativity and promote problem-solving skills (Aziz, 2023; Sunjin & Choe, 2019). Furthermore, using the creative personality scale can help educators provide appropriate support and guidance for students struggling with creativity or who may have unique creative strengths and weaknesses (Sunjin & Choe, 2019). By understanding the different dimensions of creative personality and the factors contributing to its development, educators can design more effective programs promoting creativity in students. In conclusion, using the creative personality scale in educational practice can help educators identify and nurture the creative potential in students and promote their personal and professional development.

The creative personality scale is a relatively new concept in psychology, and its development represents a departure from traditional measures of creativity that focus solely on the outcomes of creative behaviour, such as creating products or performances (Grabner, 2018; Jung, 2015; Tarn, 2016). The creative personality scale represents an innovative approach to measuring creativity that focuses on individual characteristics, traits, and dispositions contributing to creative behaviour (Mammadov et al., 2019). This

scale provides a more comprehensive and nuanced understanding of creativity by measuring multiple dimensions of creative personality (Freiberg-Hoffmann, 2019; Qian, 2019). In other words, the development of the creative personality scale represents a significant contribution to the field of creativity research. It provides a valuable tool for researchers, educators, and practitioners to better understand and foster creativity in individuals and society.

Conclusion

Validity testing results of the Creative Personality Scale revealed two important findings. First, the content validity test found 24 valid items with a Cronbach alpha of .898. Second, construct validity testing revealed that the model of the creative personality scale did not meet all the modelling criteria as a fit model. Of the six required modelling criteria, only the RMSEA was met. These two findings suggest that this creative personality scale can be used in research on student creativity. However, further improvement and testing are needed to find adequate construct validity.

The results provide academic contributions in finding a creative personality scale that can be used to examine creativity in students in secondary school. In conclusion, a creative personality scale is essential for studying students' creativity. The scale can help identify students with a high level of creativity and those who may need additional support to enhance their creative potential. Furthermore, the scale can assist in developing interventions and educational strategies to promote creativity in students. Therefore, educators and researchers should continue to use the creative personality scale to enhance creativity in educational settings. The finding that the construct validity of this creative personality scale does not meet good criteria leaves further researchers with the task of correcting these shortcomings to find a scale with high construct validity. Improvements can include modifying the model, re-testing the tested model, and considering or proposing alternative models of creative personality.

Acknowledgement

I am grateful for the funding from the Directorate General of Islamic Higher Education, Ministry of Religious Affairs of the Republic of Indonesia, through the Institute for Research and Community Service, Maulana Malik Ibrahim State Islamic University of Malang in 2023.

Conflict of Interest

The authors declare that there is no conflict of interest in the research.

Authors Contribution

RA is the author who conducted research and wrote the manuscript. UG is an author who recommends improvements in the method and substance of manuscripts.

References

Agnoli, S. (2018). The role of motivation in the prediction of creative achievement inside and outside of school environment. *Thinking Skills and Creativity*, *28*, 167–176. https://doi.org/10.1016/j.tsc.2018.05.005

Akpur, U. (2020). Critical, reflective, creative thinking and their reflections on academic achievement. *Thinking Skills and Creativity*, *37*. https://doi.org/10.1016/j.tsc.2020.100683

Atesgoz, N. N. (2021). Test of scientific creativity animations for children: Development and validity study. *Thinking Skills and Creativity*, *40*. https://doi.org/10.1016/j.tsc.2021.100818

Aziz, R. (2023). Creativity in higher education: The effect of personality on students' creative thinking skills. *Thinking Skills and Creativity Journal*, *6*(1), 44–51. https://doi.org/10.23887/tscj.v6i1.54916

Aziz, R., Surur, M., Lestari, S., Hotifah, Y., & Naim, N. (2022). Lecturer-student collaboration in higher education as a solution for fostering student's creative personality. *Jurnal Pendidikan Progresif*, *12*(1), 214–253. https://doi.org/10.23960/jpp.v12.i1.202219

Benjamin, E. (2018). The creative artists support group: a therapeutic environment to promote creativity and mental health through person-centered facilitation. *Person-Centered and Experiential Psychotherapies*, *17*(2), 111–131. https://doi.org/10.1080/14779757.2018.1440624

Berardi, A. (2019). Construct validity, test-retest reliability, and the ability to detect change of the Canadian occupational performance measure in a spinal cord injury population. *Spinal Cord Series and Cases*, *5*(1). https://doi.org/10.1038/s41394-019-0196-6

Boivin, J., & Ng, S. (2006). Are more data always better for factor analysis? *Journal of Econometrics*. https://www.sciencedirect.com/science/article/pii/S030440760500045X

Chen, B. (2020). Enhance creative performance via exposure to examples: The role of cognitive thinking style. *Personality and Individual Differences*, *154*. https://doi.org/10.1016/j.paid.2019.109663

Cheng, C. (2019). Creative process engagement and new product performance: The role of new product development speed and leadership encouragement of creativity. *Journal of Business Research*, *99*, 215–225. https://doi.org/10.1016/j.jbusres.2019.02.067

Cheung, R. H. P. (2018). Play-based creativity-fostering practices: the effects of different pedagogical approaches on the development of children's creative thinking behaviours in a Chinese preschool classroom. *Pedagogy, Culture and Society*, *26*(4), 511–527. https://doi.org/10.1080/14681366.2018.1424725

Dugdale, J. (2019). Reliability and validity of field-based fitness tests in youth soccer players. *European Journal of Sport Science*, *19*(6), 745–756. https://doi.org/10.1080/17461391.2018.1556739

El-Said, O. (2019). Creative thinking and entrepreneurial attitudes among tourism and hospitality students: The moderating role of the environment. *Journal of Hospitality and Tourism Education*, *31*(1), 23–33. https://doi.org/10.1080/10963758.2018.1480963

Fatmawati, A. (2019). Critical thinking, creative thinking, and learning achievement: how they are related. In *Journal of Physics: Conference Series* (Vol. 1417, Issue 1). https://doi.org/10.1088/1742-6596/1417/1/012070

Freiberg-Hoffmann, A. (2019). Creative personality scale. A new version for college students from Argentina. *Anales de Psicologia*, *35*(2), 290–299. https://doi.org/10.6018/analesps.35.2.346131

Garcia, D. (2019). Creative utterances about person-centered care among future health care professionals are related to reward dependence rather than to a creative personality profile. *Heliyon*, *5*(3). https://doi.org/10.1016/j.heliyon.2019.e01389

Glaveanu, V. P., Hanchett Hanson, M., Baer, J., Barbot, B., Clapp, E. P., Corazza, G. E., Hennessey, B., Kaufman, J. C., Lebuda, I., Lubart, T., Montuori, A., Ness, I. J., Plucker, J., Reiter-Palmon, R., Sierra, Z., Simonton, D. K., Neves-Pereira, M. S., & Sternberg, R. J. (2020). Advancing Creativity Theory and Research: A Socio-cultural Manifesto. In *Journal of Creative Behavior* (Vol. 54, Issue 3). https://doi.org/10.1002/jocb.395

Grabner, R. H. (2018). Effects of alpha and gamma transcranial alternating current stimulation (tACS) on verbal creativity and intelligence test performance. *Neuropsychologia*, *118*, 91–98.

https://doi.org/10.1016/j.neuropsychologia.2017.10.035

Hidayat, T. (2018). The effectiveness of enrichment test instruments design to measure students' creative thinking skills and problem-solving. *Thinking Skills and Creativity*, *29*, 161–169. https://doi.org/10.1016/j.tsc.2018.02.011

Humble, S. (2018). Factor structure of the Torrance tests of creative thinking figural form A in Kiswahili speaking children: Multidimensionality and influences on creative behavior. *Thinking Skills and Creativity*, *27*, 33–44. https://doi.org/10.1016/j.tsc.2017.11.005

Jiang, H. (2021). Measuring green creativity for employees in green enterprises: Scale development and validation. *Sustainability (Switzerland)*, *13*(1), 1–16. https://doi.org/10.3390/su13010275

Jung, R. E. (2015). Quantity yields quality when it comes to creativity: a brain and behavioral test of the equal-odds rule. *Frontiers in Psychology*, *6*. https://doi.org/10.3389/fpsyg.2015.00864

Kelly, D. E., & Konold, T. R. (2022). Impact of informative priors on model fit indices in Bayesian confirmatory factor analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, *30*(2), 272–283. https://doi.org/https://doi.org/10.1080/10705511.2022.2126359

Kim, K. (2011). Proven reliability and validity of the Torrance tests of creative thinking (TTCT). *Psychology of Aesthetics, Creativity, and the Arts*, *5*(4), 314–315. https://doi.org/10.1037/a0021916

Lerdal, K. (2019). WIP: Assessing the creative person, process, and product in engineering education. In *ASEE Annual Conference and Exposition, Conference Proceedings*. https://api.elsevier.com/content/abstract/scopus_id/85078783584

Li, C. R. (2020). The curvilinear relationship between within-person creative self-efficacy and individual creative performance: the moderating role of approach/avoidance motivations. *Personnel Review*, *49*(9), 2073–2091. https://doi.org/10.1108/PR-04-2019-0171

Lorenzo-Seva, U., & Ferrando, P. J. (2006). FACTOR: A computer program to fit the exploratory factor analysis model. *Behavior Research Methods*. https://doi.org/10.3758/BF03192753

Mammadov, S., Cross, T. L., & Cross, J. R. (2019). In search of temperament and personality predictors of creativity: A test of a mediation model. *Creativity Research Journal*, *31*(2). https://doi.org/10.1080/10400419.2019.1577085

Mastria, S. (2018). Creative brain, creative mind, creative person. In *Exploring Transdisciplinarity in Art and Sciences* (pp. 3–29). https://doi.org/10.1007/978-3-319-76054-4_1

Meier, M. A., Burgstaller, J. A., Benedek, M., Vogel, S. E., & Grabner, R. H. (2021). Mathematical creativity in adults: Its measurement and its relation to intelligence, mathematical competence and general creativity. *Journal of Intelligence*, *9*(1). https://doi.org/10.3390/jintelligence9010010

Moon, R. H., Chun, W., Kim, S., & Chang, J. Y. (2020). The incremental validity of implicit measures of creativity for creative achievement. *Personality and Individual Differences*, *164*. https://doi.org/10.1016/j.paid.2020.110088

Palanica, A. (2019). A comparison of nature and urban environments on creative thinking across different levels of reality. *Journal of Environmental Psychology*, *63*, 44–51. https://doi.org/10.1016/j.jenvp.2019.04.006

Qian, M. (2019). Evidence of the psychometric integrity of the creative personality scale using item response theory models. *Creativity Research Journal*, *31*(3), 349–355. https://doi.org/10.1080/10400419.2019.1647758

Ramly, S. N. F. (2022). Development, validity, and reliability of chemistry scientific creativity test for pre-university students. *International Journal of Science Education*, *44*(14), 1–16. https://doi.org/10.1080/09500693.2022.2116298

Said-Metwaly, S. (2021). Torrance test of creative thinking-verbal, Arabic version: Measurement invariance and latent mean differences across gender, year of study, and academic major. *Thinking Skills and Creativity*, *39*. https://doi.org/10.1016/j.tsc.2020.100768

Shalley, C., Hitt, M. A., Zhou, J., Leung, K., & Wang, J. (2015). A cross-cultural analysis of creativity. In *The Oxford Handbook of Creativity, Innovation, and Entrepreneurship*. https://doi.org/10.1093/oxfordhb/9780199927678.013.0017

Shi, D., Lee, T., & Maydeu-Olivares, A. (2018). Understanding the model size effect on SEM fit indices. *Educational and Psychological Measurement*, *79*(2), 310–334. https://doi.org/10.1177/0013164418783530

Sicotte, H. (2019). Open creative workspaces impacts for new product development team creativity and effectiveness. *Journal of Corporate Real Estate*, *21*(4), 290–306. https://doi.org/10.1108/JCRE-10-2017-0039

Skoglund, W. (2019). Utilizing culture and creativity for sustainable development: Reflections on the city of Östersund's membership in the UNESCO creative cities network. In *Smart Innovation, Systems and Technologies* (Vol. 101, pp. 398–405). https://doi.org/10.1007/978-3-319-92102-0_42

Sternberg, R. (2017). Creativity support policies as a means of development policy for the global south? A critical appraisal of the UNESCO creative economy report 2013. *Regional Studies*, *51*(2), 336–345. https://doi.org/10.1080/00343404.2016.1174844

Sternberg, R. (2018). The nature of human creativity. In *The Nature of Human Creativity*. https://doi.org/10.1017/9781108185936

Sternberg, R., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. In R.J. Sternberg (Ed.), Handbook of creativity. In *Cambridge University Press* (Vol. 1).

Sunjin, K., & Choe, I. (2019). The development and evaluation of the effect of creative problem-solving program on young children's creativity and character. *Thinking Skills and Creativity*, *33*(3). https://doi.org/10.1016/j.tsc.2019.100590

Tan, C. S. (2021). Development and preliminary validation of the 20-item Kaufman domains of creativity scale for use with Malaysian populations. *Current Psychology*, *40*(4), 1946–1957. https://doi.org/10.1007/s12144-019-0124-8

Tarn, C. S. Y. (2016). "Creativity" reform in Hong Kong: Validation of the creative inventions test. *Talent Development and Excellence*, *8*(2), 3–19. https://api.elsevier.com/content/abstract/scopus_id/85015621759

Vaezi, M., & Rezaei, S. (2019). Development of a rubric for evaluating creative writing: a multi-phase research. *New Writing*, *16*(3). https://doi.org/10.1080/14790726.2018.1520894

Wang, X., Zhuang, X., Li, Z., & Qiu, Z. (2022). The functional connectivity basis of creative achievement linked with openness to experience and divergent thinking. *Biological Psychology*, *168*. https://doi.org/10.1016/j.biopsycho.2021.108260

Wright, J. (2019). Breaking the silence and shame of sexual abuse: creative writing for therapeutic purposes (CWTP). *Journal of Poetry Therapy*, *32*(1), 11–21. https://doi.org/10.1080/08893675.2019.1548925

Zahra, M. H. A. (2021). Creativity and personality patterns and their impact on the attitude towards work

using the Vienna test system for the College of Physical Education and Sports Sciences - Al-Qadissiya University. *Review of International Geographical Education Online*, *11*(4), 599–614. https://doi.org/10.33403/rigeo.800675

Zhou, J. (2020). Creative enough to become an entrepreneur: A multi-wave study of creative personality, education, entrepreneurial identity, and innovation. *Sustainability (Switzerland)*, *12*(10). https://doi.org/10.3390/SU12104043