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The Optimism Scale Based on Explanatory Style: Evidence of Psychometric Validity in Indonesian High School Students

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ABSTRACT

Purpose of the study: The purpose of this study was to provide psychometric evidence of the Optimism Scale based on Explanatory Style in high school students in Indonesia.

Methodology: The type of research is quantitative research with a survey type. This study was conducted with EFA factor analysis, which was used for initial exploration in scale development and CFA, which was used to confirm a predetermined factor model based on the results of EFA., the optimism scale consisted of 32 items, and the number of subjects in this study was 186 students. The data were analysed using the Jamovi program version 2.4.11.

Main Findings: The results of this study indicate that there are 3 factors after EFA, and after CFA there are 7 items that are dropped, leaving 25 items with CFA values of CFI = 0.911, TLI = 0.902, SRMR = 0.0553, RMSEA = 0.0508 and McDonald's Omega reliability of 0.872 and Cronbach's alpha of 0.872.

Novelty/Originality of this study: This study offers an explanatory style-based optimism scale with comprehensive psychometric validity evidence in Indonesian high school students. This study makes a novel contribution in the development of instruments that are appropriate to the Indonesian cultural context, as well as supporting the measurement of optimism in educational settings to understand students' positive thinking patterns in order to improve their psychological well-being and academic achievement.

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1. INTRODUCTION

Optimism has a crucial role in various aspects of our lives, including education, the work environment and welfare. For example, in the context of leadership, optimism is vital because it allows leaders to inspire others, see positive potential even in difficult situations, and guide people towards a better future [1], [2]. Optimism is the belief that everything will go well. It guides a person to believe in their potential with positive goals. Optimism allows a person to easily find solutions to problems because they have a positive mindset [3], [4]. An optimistic attitude inspires someone to be enthusiastic in finding solutions to the problems they face, because they realize the potential they have. Optimistic people tend to have a positive perspective on life, believing that basically, life and all events have a positive side [5]. Optimism symbolizes hope, enthusiasm,

encouragement and a positive attitude towards the future. On the other hand, optimism is different from pessimism. Optimism can be interpreted as a tendency to believe that good things will happen in the future. Optimistic individuals tend to see the unfavorable things that happen to them as something that only affects certain aspects of their lives [6].

The concept of positive outcome expectations, as elucidated by Carver and Scheier, is widely recognized as a crucial aspect in comprehending optimism [2]. The Life Orientation Test-Revised (LOT-R), a prominent instrument for gauging optimism, was developed by Scheier et al grounded in this theory [7]. Numerous recent studies have underscored the LOT-R commendable internal consistency and provided supporting evidence for its construct validity across diverse contexts, as noted by various researchers such as Hinz et al [4], Carver and Scheier [8], Steca et al [10]. In Germany Schweizer and Koch [11] devised another optimism measurement scale called Personal Optimism and Social Optimism Extended (POSO-E), drawing on the same positive outcome expectations concept. So Colligan [12] crafted an optimism assessment tool, the Optimism - Pessimism Scale (OPS) and the Optimism Scale, based on Seligman's explanatory style. In Mexico Garcia-Cadena, et al [13] introduced the Interactive Optimism Scale-Garcia (IOS-G), a scale rooted in interbehavioral theory by Fryling [14] and emphasizing psychological concepts developed by Ribes-Inesta [15] regarding interactive personality styles.

In the forthcoming section, we will briefly elucidate the theories that underpin the mentioned instruments. Optimism, as a primary construct rooted in the theory of positive outcome expectancies, is predominantly characterized by a cognitive dimension, albeit also interconnected with certain affective and motivational components [2], [16], [17]. The awareness of a desired goal serves as a motivating factor propelling individuals toward actions aimed at its attainment, driven by the perceived value attached to that goal. Optimistic individuals, envisioning a brighter future, exhibit motivation to exert effort, self-management, prioritize tasks, and ultimately achieve or approach their goals [18]–[20]. Consequently, optimism, viewed through this theoretical lens, is conceived as a relatively stable personality trait persisting throughout an individual's life. Alternatively, within the framework of the interactive personality style proposed by Ribes-Inesta, emphasis is placed on a series of historical exchanges between individuals and their environment, other people, and self (reactive biography) [21]. This interaction entails a reciprocal relationship between specific stimuli and responses, culminating in the formation of a style of association identified as personality traits. In this context, optimism is regarded as an integral component of an interactive personality style. Optimistic individuals exhibit attitudes and behaviors reflecting a belief in the inherent goodness and beneficial qualities of other people, the physical and biological environment, and themselves in various situations [22], [23]. Drawing from past and present experiences, optimistic individuals posit that their life journey thus far holds value because, in general, the world provides the desired well-being through interactions with it [24].

In other words, the fundamental difference between these two theories lies in the dimension of activeness in the first theory and the dimension of passivity in the second theory. In the first theory, individuals act actively to achieve the value of goals by believing in themselves, whereas in the second theory, optimism involves the belief that the world and the people in it are good, not because they should be, but because of the experiences they have had [23], [25]. Regarding the transaction mechanism approach between individuals and their environment which is used to explain the continuity of personality throughout the life span, it can be said that in general, positive expectancy theory supports more proactive optimism, while interactive personality style theory supports reactive optimism [19], [26]. However, optimism interpreted by the interactive personality style theory includes not only what the individual feels, thinks and does (response function), but also how the environment acts directly and actively, which is conveyed through language to the individual (stimulus function) [18], [27], [28].

The optimism scale has demonstrated robust internal consistency, as evidenced by favorable measurement outcomes in both England and Brazil. In England, the results included $\chi 2$ (25) = 136.66, $P < 0.001$, CFI = 0.935, TLI = 0.907, and SRMR = 0.040, while in Brazil, the findings were $\chi 2$ (26) = 87.66, $P < 0.000$, CFI = 0.944, TLI = 0.922, and SRMR = 0.042 [1]. Both the LOT-R and POSO-E questionnaires focus on an individual's aspirations for the future, steering clear of inquiries about past experiences and present circumstances. Consequently, the North American questionnaire incorporates items like “I am always optimistic about my future” and “overall, I expect more good things to happen to me than bad things,” while the German questionnaire includes statements like “I have positive expectations” and “I have negative expectations” [21]. Conversely, the Optimism Scale places emphasis on expressions linked to the past, present, and future, grounded in personal explanatory style, such as confidence in future success.

Investigating instruments that can validly and reliably measure optimism holds significant importance due to optimism being a psychological trait with substantial positive impacts across various facets of human life. These positive influences encompass both physical and mental well-being [29]–[32], family dynamics [33]–[35], professional careers [36]–[38], and overall social welfare [39], [40]. Specifically, from a medical standpoint, there is compelling evidence indicating that optimism can mitigate anxiety and depression levels in cancer patients [41]–[43], enhance sleep quality [44], [45], alleviate post-operative pain intensity [24], [46], lower the

risk of coronary heart disease [47], [48], and reduce the likelihood of death from heart disease and overall mortality [47], [49], [50].

Due to the substantial impact of optimism on predicting various crucial psychological outcomes such as education, health, emotional well-being, social interaction, and career achievement, our objective is to contribute to the existing literature by validating the Optimism Scale in the context of Indonesian high school students. In a similar vein Coelho et al, employed students as participants in their study [1]. Our overarching aim is to demonstrate that the Optimism Scale serves as a reliable and cross-culturally validated alternative for assessing optimism. Given the relatively recent publication of the Optimism Scale in 2018, it is imperative to assess its psychometric properties in diverse cultures before its widespread application in research. Consequently, this study primarily seeks to determine whether utilizing subjects with the characteristics of Indonesian teenagers can render the optimism scale more contemporary, with increased validity and reliability through a substantial sample size. The secondary objective is to gather evidence regarding the construct validity and reliability level of the optimism scale measurement instrument. Consequently, a thorough investigation into the psychometric characteristics of the Optimism Scale and an examination of its measurement construct are necessary. The findings of this analysis can serve as valuable insights for practitioners and academics considering the use of the Optimism Scale as a dependable psychological assessment tool.

2. RESEARCH METHOD

The type of research is quantitative research with a survey type. The sample consisted of 186 Indonesian teenagers with an age range of 15 - 17 years where the number of males = 69 with a percentage of 37.1% and females = 117 with a percentage of 62.9%. The research subjects came from high school. Each participant in the research responded to a brief questionnaire encompassing socio-demographic inquiries, a series of Likert-type scales, and provided informed consent. In this consent, participants granted permission for the utilization of the gathered information exclusively for scientific and academic purposes associated with the research.This research was conducted in October 2023. Research data was obtained with an online instrument through Google Form. Data collection was carried out by offering participants to become subjects according to the research criteria. The criteria for respondents in this study were high school students. Participation in this study was voluntary. This research was conducted voluntarily, depending on the subject's willingness to participate. All participants have agreed to participate in this study and have expressed their consent in the consent.

The assessment tool used in this study is the Optimism Scale, which was developed based on Seligman's theory with aspects of permanence, pervasiveness, and personalisation. which features statements such as 'the success I achieved became the basis for future success [18]. Using a Likert scale, this instrument provides respondents with five answer options, ranging from 1 = Strongly Disagree to 5 = Strongly Agree for positive items and 1 = Strongly Agree to 5 = Strongly Disagree for negative items. Construct validity was then conducted with 10 professional colleagues in the field of psychology. The results of the peer review determined that 32 items could be continued to the next stage of testing, namely Aiken V, all items> 0.78, meaning that all items can be said to be valid. Instrument grids can be seen in Table 1.

Table 1. Optimism Instrument Grid

Aspect	Indicator
Permanence	Believing that the good is permanent
	Believing that the bad is temporary
Pervasiveness	Giving universal explanations when getting good news
	Giving specific explanations when getting bad news
Personalization	Believing bad events happen because of external factors
	Believing that good things are due to internal factors

All data underwent analysis using the Jamovi program version 2.4.11, as outlined by Sahin and Aybek [51]. Initially, exploratory factor analysis (EFA) measurements were conducted, with the determination of the number of factors guided by the KMO Measure of Sampling Adequacy and Kaiser-Guttman Criterion, specifically requiring a minimum eigenvalue of 1 [52]. Subsequently, Confirmatory Factor Analysis (CFA) was employed to validate the unidimensional model of the optimism scale structure. The assessment of model fit was based on several indices and predefined criteria: Chi-square ($\chi 2$), where significance or a p-value > 0.05 was deemed acceptable; Root Mean Square Error Of Approximation (RMSEA), which should be less than 0.08 (i.e., RMSEA < 0.08); Comparative Fit Index (CFI) or Tucker-Lewis Index (TLI), both recommended to exceed 0.90 (i.e., CFI/TLI > 0.90); and Standardized Root Mean Square Residual (SRMR), which should be below 0.08 (i.e., SRMR < 0.08) [53], [54]. Finally, the optimism scale's consistency was assessed using McDonald's omega (ω) and Cronbach's alpha (α) to evaluate reliability, with both ω and α required to surpass 0.70 [55].

3. RESULTS AND DICUSSION

3.1 Results Exploratory factor analysis (EFA)

The researcher first conducted an exploratory factor analysis to test whether it replicated the dimensional structure of the Optimism Scale [18]. Using the Kaiser-Guttman Criterion, where the minimum eigenvalue is 1, the Bartlett Sphericity test values were obtained, namely $\chi 2 = 2440$, df = 496, and $P < 0.000$, which indicates that the matrix is in a suitable state, which can be seen in table 2.

Table 2. Bartlett's Test of Sphericity

χ^2	df	p
2440	496	< .001

Then the overall KMO Measure of Sampling Adequacy value is 0.858, which is > 0.05 so it can be said to be considered good, which can be seen in table 3.

Table 3.KMO Measure of Sampling Adequacy

	MSA	Ket
Overall	0.858	Good

Then look at the number of factors or components formed from this optimism scale with a total of 32 items. Based on the Exploratory Factor Analysis (EFA) test, there are 3 components and the component loadings of all items are entered because the overall value is > 0.3, which can be seen in table 4.

Table 4. Component Loading Exploratory Factor Analysis

	Components			Uniqueness
	1	2	3	
OP_25	0.718			0.464
OP_28	0.700			0.465
OP_26	0.657			0.499
OP_20	0.655			0.499
OP_23	0.650			0.482
OP_30	0.629			0.598
OP_22	0.617			0.541
OP_21	0.610			0.624
OP_24	0.608			0.556
OP_29	0.586			0.579
OP_31	0.552			0.609
OP_19	0.551			0.616
OP_27	0.520			0.670
OP_10		0.728		0.468
OP_2		0.716		0.483
OP_1		0.693		0.510
OP_8		0.663		0.558
OP_5		0.629		0.604
OP_7		0.622		0.607
OP_6		0.619		0.589
OP_11		0.606		0.579
OP_4		0.598		0.639
OP_3		0.463		0.748
OP_9		0.431		0.747
OP_16	0.318		0.726	0.372
OP_15	0.354		0.714	0.364
OP_13			0.706	0.458
OP_12			0.665	0.489
OP_14			0.651	0.516
OP_17			0.641	0.529
OP_18	0.436		0.502	0.550
OP_32			0.388	0.777

Then in the Component Statistics as a whole, this optimism scale accounts for 44.4% with details of factor 1 with a value of 18.1%, factor 2 with a value of 13.6%, and factor 3 with a value of 12.7%. In detail, it can be seen in table 5.

Table 5. Component Statistics

Components	SS Loading	% of Variance	Cumulative %
1	5.78	18.1%	18.1%
2	4.36	13.6%	31.7%
3	4.07	12.7%	44.4%

Next on the scree plot shows the existence of several components or factors. In this scale, there are 3 components or factors. It can be seen in figure 1.

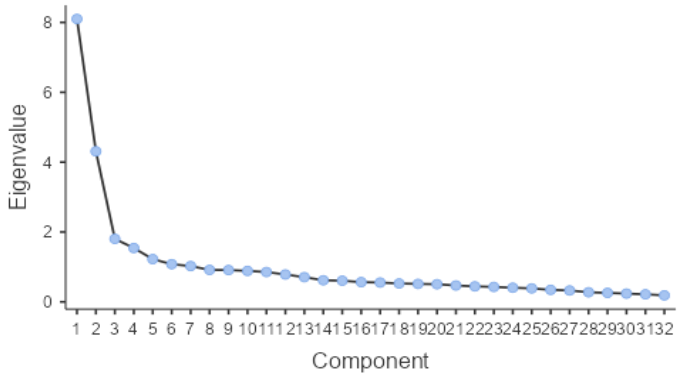

Figure 1. Scree Plot

3.2 Results Confirmatory Factor Analysis (CFA)

To confirm the factors or components of the optimism scale, CFA needs to be carried outeach factor was adjusted to the results of Component Loading Exploratory Factor Analysis so that CFA results were obtained, namely $\chi 2 = 746$, df = 461, $p < .001$, CFI = 0.865, TLI = 0.855, SRMR = 0.0622. and RMSEA = 0.0577 from the results obtained, the measurement components are not suitable, modifications will be carried out by removing several indicator variables (items) in the Factor Loadings table, namely items no. 3, 4, 9, 15, 16, 23, 30. These items are dropped based on low estimate value on the CFA loading factor. After modification, the CFA results obtained were $\chi 2 = 402$, df = 272, $p < .001$, CFI = 0.911, TLI = 0.902, SRMR = 0.0553. and RMSEA = 0.0508. These results can be seen in table 6.

Table 6. Confirmatory Factor Analysis (CFA)

	Model Fit Index						
	$\chi 2$	df	P	CFI	TLI	SRMR	RMSEA
Preliminary CFA	746	461	< 0.001	0.865	0.855	0.0622	0.0577
Modified CFA	402	272	< 0.001	0.911	0.902	0.0553	0.0508

Next, the blueprint display of the optimism scale consists of 3 factors and has been modified to obtain the god fit value so that the number of items from initially 33 becomes 25 items. Can be seen in table 7.

Table 7. Optimism Scale Blueprint based on CFA

Factor	Definition	Number of Items	Example Items
Permanence	The way a person explains a problem is related to the time dimension, whether in a short or longer time span.	8	I believe that the learning success I have achieved is the starting point for future success
Pervasiveness	The way a person explains events is divided into specific and universal.	6	I passed the exam because I spent a lot of time and energy trying
Personalization	The way someone explains a problem is related to the origins of the cause, whether internal or external.	11	I believe my success in studying is due to the hard work I put in.
Total		25	

Reliability was assessed with McDonald's Omega and Cronbach's alpha. These two parameters show good internal consistency with a value of > 0.7 or close to 1 [56]. On the optimism scale in this study, the McDonald's Omega value is 0.872 > 0.7 and Cronbach's alpha is 0.872 > 0.7, so it can be concluded from the McDonald's Omega and Cronbach's alpha values that the optimism scale is reliable.

This study aims to develop an optimism scale based on explanatory styles, namely Permanence, Pervasiveness, and Personalisation [18]. As well as providing psychometric evidence of the use of the optimism scale in Indonesian, using a sample of Indonesian adolescents. This scale is used to map and explain optimism attitudes from an educational psychology approach, especially in students. EFA is carried out to determine the number of factors that cause the correlation of a set of items. In this analysis, information is condensed to explain variation with a smaller number of items, as well as defining substantive matters of the content or meaning of the latent variable [57]. EFA provides evidence about the internal structure of a test's content and construct validity [58], [59]. Furthermore, this study uses Varimax rotation to determine the factor structure formed, where the rotation is to clarify the relationship between factors. From the varimax rotation, three factors are considered according to the theoretical concept. These factors consist of Permanence, Pervasiveness, and Personalization factors.

Varimax rotation is considered appropriate and in line with advances in measuring instruments in determining several dimensions. The possible correlation between the factors Permanence, Pervasiveness, and Personalization is considered the main explanation for the distribution of these factors. In determining factors using exploratory factor analysis (EFA), the assumption of normality was met based on the Bartlett test and the Kaiser-Meyer-Olkin index. The value obtained from the Bartlett test shows that the normality assumption is met with a value <0.001. Furthermore, the Kaiser-Meyer-Olkin index was obtained with a value of 0.858, which is close to the maximum value of 1. This index is used to measure the adequacy of an adequate sample by comparing the sum of the squares of the partial correlation with the total correlation. Low partial correlations form the basis of factor analysis and indicate the presence of minimal confounding variables. Therefore, Kaiser-Meyer-Olkin is also interpreted as an indicator of adequate sample adequacy for factor analysis [60].

After identifying several factors through Exploratory Factor Analysis (EFA), it is important to conduct Confirmatory Factor Analysis (CFA) to obtain statistical evidence regarding the suitability of the model to the data. Re-evaluation of the three-factor model needs to be carried out to test the correlation between factors. In this context, this research should involve testing other factor structures to ensure that the resulting model fits the existing data. Based on the results of Confirmatory Factor Analysis (CFA), a three-factor model was found with factors that were correlated with each other. In the initial CFA, the data was found to be unfit, so modifications were made to the CFA by dropping several items that had low estimated values so that there were seven items that were dropped, making the CFA model fit and meet the criteria [53]. Then in the McDonald's Omega and Cronbach's alpha reliability tests, good values were obtained so it can be said that this optimism scale is reliable [1], [21]. This scale was developed for Indonesian teenagers to see different levels of optimism. Some teenagers in Indonesia have different views, especially regarding the future. Therefore, this scale obtains items with the same themes in all Indonesian high school students and various responses, such as the future of education and confidence in one's own abilities [61]–[63].

The results of this study have significant implications in the field of educational psychology, especially in the development of valid and reliable psychological instruments. With evidence of the validity and reliability of the Explanatory Style-based Optimism Scale in the Indonesian cultural context, this instrument can be used in further research to explore optimism and other psychological factors in high school students. In addition, these findings can also be utilised by school counsellors and educators in designing intervention programmes aimed at increasing students' optimism. By understanding students' explanatory style patterns, schools can develop strategies to build a more positive and resilient mindset in facing academic and social life challenges. Furthermore, healthy optimism is closely related to increased academic motivation, psychological well-being, and better achievement. Therefore, this scale can help in identifying students who tend to have a pessimistic explanatory style so that more appropriate support can be provided. In addition, this research opens up opportunities for further studies in the realm of positive psychology, particularly regarding how explanatory style can be developed through educational interventions and learning experiences at school.

Additional research is needed to investigate disparities in age, gender, and educational attainment, as this study, like any scientific inquiry, has inherent limitations that must be considered when interpreting its results. The study was conducted on a single sample, yielding questionable outcomes, highlighting the necessity for further investigation on larger and more diverse samples across different educational backgrounds. To evaluate the temporal stability of the optimism scale, a test-retest procedure is imperative. Another limitation is the potential skewing of responses due to social desirability, a well-documented issue with self-report assessments. Utilizing online data collection anonymously can help mitigate the impact of social desirability. Future research should focus on assessing the optimism scale's temporal stability through test-retest methods and addressing social desirability concerns. Additionally, it is crucial to establish the differential validity of optimism compared to related constructs in positive psychology, such as positivity, resilience, and flourishing, by applying

these concepts to various populations, including employees, organizational leaders, or hospital patients. Comparing the Optimism Scale with existing measures like the LOT and LOT-R would also enable the testing of incremental validity.

4. CONCLUSION

In conclusion, this research reveals the existence of three factors of optimism, namely Permanence, Pervasiveness, and Personalization, after going through the Exploratory Factor Analysis (EFA) process. The scale development process begins with creating scale items and assessing construct validity in the first stage. Next, the second stage involved improving the performance of the scale, starting with 32 items which were then reduced to 25 items after going through Confirmatory Factor Analysis (CFA) to ensure conformity with the theoretical construct. The results of the modified CFA showed good values and met the criteria, indicating conformity with the three-factor correlation model. The reliability of the optimism scale was also tested using McDonald's Omega and Cronbach's alpha, and the results showed high values. This research highlights the importance of optimism in the educational context, especially for teenagers who face various challenges in the school environment. The optimism scale developed in this research can be a useful tool for assessing optimistic attitudes in high school students. However, further research is needed to explore predictors of optimism and its impact on high school students psychological well-being.

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