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Validation of the optimism scale in adolescents

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ABSTRACT

Background: Adolescence can bring emotional and behavioral disorders, leading some teenagers to involved in juvenile delinquency or exhibited suicidal behavior. One of the contributing factors was the lack of optimism among individual.

Purpose: This research aims to examine the validity of the optimism scale among adolescent

Method: A quantitative approach using Confirmatory Factor Analysis (CFA) was employed to evaluate the scale's validity and reliability. The instrument used was the Optimism Scale from Seligman (2006), which has three dimensions (permanence, pervasiveness, personalization) and 48 items. The study involved 352 female public high school students selected through purposive sampling.

Findings: The initial tests revealed that 10 items had standardized loading estimates below 0.5, rendering them invalid and prompting their removal. The remaining 38 items were retested, and all demonstrated standardized loading estimates exceeding 0.5, confirming their validity. The Composite Reliability (CR) value was above 0.7, and the Average Variance Extracted (AVE) exceeded 0.5, indicating reliability. Goodness-of-fit criteria showed strong results across five measures (Chi-square, Prob., RMSEA, CMIN/DF, and TLI), while one criterion indicated marginal fit (GFI). The conclusion is that the Optimism Scale has proven to be valid and reliable.

Implication: This valid and reliable optimism scale can support further studies on female public high school adolescents in Semarang.

KEYWORDS
Confirmatory factor analysis; optimism; reliability; teenagers; validation

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Introduction

Adolescence, defined by Hurlock (2017) as the age range from 13 to 18, is often linked to deviance and emotional or behavioral disorders due to developmental. During this period, adolescents face developmental tasks, including forming relationships with same-sex and opposite-sex peers, achieving emotional independence from parents, and taking responsibility for their actions. Successfully navigating these challenges leads to greater satisfaction, happiness, and acceptance from their environment, ultimately influencing their ability to tackle future developmental tasks.

Contemporary adolescents face rapid changes in their social environment and societal expectations that assume adult responsibilities before their psychological development has matured (Hurrelmann & Quenzel, 2015). The rapid technological advancements and media influences subject them to an overwhelming amount of information, straining their ability to process and understand it effectively. The inability of adolescents to cope with these pressures leads to various impacts, such as school failure, substance abuse, physical complaints, loss of self-esteem, feelings of alienation, sadness, shame, failure, hopelessness, depression, and even suicide (Vogels et al., 2022).

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The importance of adolescent mental health in Indonesia has become a topic of research by several psychology scientists, where adolescents' ability to regulate their emotions can stimulate positive forms of behavior and stimulate overall mental health (Pham et al., 2024). In addition, research was conducted related to emotional and behavioral problems (EBP-Emotional Behavioral Problem) in adolescents, which showed high results from EBP scores in Indonesian adolescents, and it can be concluded that research related to emotional problems in adolescents is important to continue to be developed (Sarfika et al., 2023). Another researcher who conducted in-depth interviews with 40 adolescents in Jakarta, related to the measurement of emotional problems in adolescents, namely the strength and weakness factors (SDQ-Strength and Difficulty Questionnaire), one of which showed that adolescents in Jakarta often have difficulty in controlling emotions (Valentia & Turnip, 2022). And this problem is also a problem experienced by other Indonesian adolescents, so research related to emotional problems still needs to be done.

Other research related to behavioral problems in adolescents found that smoking in adolescents can develop into abuse of other addictive substances among adolescents. In order to be accepted socially, adolescents tend to make risky decisions. Inadequate knowledge about drugs and poor family relationships can lead to substance abuse. The results of this study also stated that the plunge of adolescents into delinquent behavior, among others, is due to the low emotional competence of adolescents, who should be able to control the emotional conditions they are experiencing, so as not to escape from problems to drug use (Fahrizal et al., 2018; Rachmani et al., 2024). Another problem in Indonesian adolescents that has also been widely studied is related to body shaming, where adolescents with low emotional competence can have a low body image, then cannot cope with the stressful conditions they experience because of ridicule from others regarding their body shape and size, so it can be concluded that it is important for adolescents to have high emotional competence (Novitasari & Hamid, 2021).

Many studies observed that suicidal thoughts or behaviors are caused by a lack of optimism in individuals (Huffman et al., 2016; Rajkumar et al., 2015; Shaheen & Jahan, 2014). Optimism is a positive attitude towards one's experiences, believing that good events will occur. Individuals lacking optimism tend to perceive situations as sources of stress and are less skilled in problem-solving and self-regulation. They struggle to identify and pursue life goals and have difficulty accepting and enduring challenging situations. Therefore, they tend to avoid problems rather than face them directly (Chang et al., 2024).

Several studies have found that psychological problems such as depression and anxiety are more common among adolescents who attend public high schools than private high schools (Singh, Gupta, & Grover, 2019; Sushma et al., 2020). This is related to the lack of support provided by the school and the socioeconomic conditions of parents (Singh, Gupta, & Grover, 2019). In addition, Vadageri (2020) also found that adolescents who attended public high schools lacked adequate knowledge about the characteristics of the psychological problems. The problem can actually be solved with good optimism in teenagers. By having optimism, teenagers will easily find a way out of the problems they face because optimistic teenagers will always have alternative solutions to problems based on previous experiences (Scheier & Carver, 2018; Tejada-Gallardo et al., 2022).

Optimism is considered important for adolescents because it can influence self-regulation which encourages adolescents to increase their ability to achieve goals, especially when facing challenges or obstacles (Dursun, 2021). Based on research conducted by Rini & Siswati (2017), There is a positive and significant relationship between self-regulation and optimism. In addition to improving self-regulation, optimism is also useful for helping adolescents adjust to the problems they experience (coping). Students who have low coping abilities tend to give up easily when facing problems and only make a little effort to solve them, and vice versa (Wahyuni et al., 2020). Based on the description of the research results above, it can be concluded that optimism

is important for teenagers in particular, who are in a period of age full of challenges and adapting to change.

Seligman (Schulman, 2014) explained that optimism is an individual's attitude that destructive events will not last long and will not significantly impact ongoing activities. Similarly, when experiencing positive events, optimistic individuals believe these enjoyable moments will last long, affect overall activities, and are self-caused (Seligman, 2012). According to Seligman (Carver & Scheier, 2014), optimism is an individual's perspective on success and failure based on an explanatory style that attributes positive events to internal, permanent, and pervasive causes. They consider failures or bad events as external, temporary, and situation-specific factors.

Goleman (Barbey et al., 2014) stated that optimism is an attitude that prevents individuals from falling into indifference, despair, or depression when facing difficulties. According to Snyder & Lopez (Laranjeira & Querido, 2022), optimism is an individual's hope that everything will move toward the good, and feeling optimistic leads individuals toward their desired goals, believing in themselves and their abilities. Waskito (2013) proposed a similar opinion, describing optimism as a positive attitude toward one's experiences, being able to learn and strive better. The explained concept refers to the idea that an individual's optimistic attitude generates belief, leading to awareness and thus creating an effort to face their experiences.

According to Seligman (Colla et al., 2022), there are three dimensions of optimism: 1) Permanence (the stability of an event). Individuals perceive whether an event is stable or temporary. Less optimistic individuals see bad events as stable, while optimistic individuals see bad events as temporary and good events as lasting. Regarding pleasant events, less optimistic people perceive them as temporary, whereas optimistic individuals see them as lasting throughout their lives. 2) Pervasiveness (the scope of an event). The spatial dimension of an event, whether it applies specifically to one event or generally to all events. Less optimistic individuals see bad things happening in one area of their life spreading to other areas, and good things as only specific to certain aspects. Optimistic individuals tend to see bad events as caused by specific reasons that will not spread to other areas, while good events will permeate all aspects of their lives. 3) Personalization (the source of an event). The cause of an event, whether it is internal or external to the individual. When experiencing bad events, less optimistic people blame themselves, while for pleasant events, they attribute external factors. Conversely, optimistic individuals see external factors as the cause of bad events, and internal factors as the cause of pleasant events.

The development of optimism theory began with various studies in the fields of work and mental health (Scheier & Carver, 2018). Carver & Scheier (2014) explains that optimism is an individual difference variable that reflects the extent to which people have favorable general expectations for their future. Optimism is associated with taking proactive steps to protect one's health and well-being. Carver's approach emphasizes optimism in an attributional perspective, namely that someone will take on a certain task even though it is complicated, to achieve goals that will benefit themselves and their environment, also related to providing benefits in the socio-economic world. However, it was developed by Millstein et al. (2019), also in mental illness context, that optimism is associated with better health, and is generally considered a trait and disposition, which may influence the formation of other positive behavioral tendencies such as emotion regulation and coping strategies. Millstein later developed the optimism scale because this trait may vary across cultures and age.

In the concept of optimism according to Seligman (Priya, 2023), it is explained that optimism is attached to learning and positive psychology, meaning that optimism as an attributional understanding views that an optimistic person will want to continue to learn and adjust to changes and challenges, and believes that they will succeed, or receive positive learning from the process undertaken. The most appropriate keyword for the context of high school students is learned optimism according to Seligman's theory.

From the explanations, it can be concluded that the optimism scale suitable for high school subjects. Some studies that use Seligman's theory with validity and reliability test applied to high school adolescents in Iran (Baghkeirati et al., 2016) and the general population (Millstein et al.., 2019). In Indonesia, the use of the Seligman optimism measuring tool, especially in the high school population, has not been widely developed and implemented, especially among high school adolescents in Semarang. As discussed in the introduction, Semarang is one of Indonesia's major cities with high incidence of adolescent problems. The aim of this study was to test the validity and reliability of the optimism scale among high school adolescents in Semarang.

Method

Design and Stages of the Research

This study used a quantitative method to test the validity and reliability of the psychological scale. Data analysis used CFA (Confirmatory Factor Analysis) with the help of the Lisrel 8.9.

Participant Characteristics

This study employed purposive sampling to select participants based on specific inclusion criteria. Eligible participants were 11th-grade high school students aged 16–17 years who were actively enrolled in a public high school in Semarang. Based on these criteria, a total of 352 participants were included in the study. This research has ethical clearance with certificate number 511/UN7.F11/PP/IV/2023. This study includes informed consent given to guidance and counseling teachers, as those responsible for students.

Research Instruments

The data collection used an adapted and tested scale from Seligman's Optimism Scale (2006). The Optimism Scale was administered to the participants in Indonesian language. The operational definition of optimism in this study referred to Seligman (2012) concept, that is, an individual's attitude that assesses that all bad events occurring in their life will not last long, do not significantly impact ongoing activities, and are not entirely caused by their negligence but have the probability of being due to conditions, fate, or even other individuals. The aspects that constitute optimism include: (1) Permanence (Problems with Time); (2) Pervasiveness (Ease of Spreading); (3) Personalization. Scoring ranged from 1 for strongly disagree (SD) to 4 for strongly agree (SA) across 48 items. The higher the score, the higher the individual's optimism. The sample of original items were shown in Table 1.

Table 1.
Sample of Original Items

No.	Questions	Answer			
		SD	D	A	SA
1.	When I get a perfect score, I believe I can achieve it again next time.				
2.	I believe I can maintain my class rank in the future.				
3.	When I receive praise from the teacher, I believe my abilities will continue to improve.				
4.	I believe I can understand difficult material in the future.				
5.	I feel that the good grades I get are just a coincidence.				

Note.
SD : Strongly Disagree
D : Disagree
A : Agree
SA : Strongly Agree

The distribution of Optimism Scale items for trial test were shown in Table 2.

Table 2.
Distribution of Optimism Scale Items for Trial Test

No.	Aspect	Item	
		Favorable	Unfavorable
1.	*Permanence*	1, 2, 3, 4	5, 6, 7, 8
		9, 10, 11, 12	13, 14, 15, 16
2.	*Pervasiveness*	17, 18, 19, 20	21, 22, 23, 24
		25, 26, 27, 28	29, 30, 31, 32
3.	*Personalization*	33, 34, 35, 36	37, 38, 39, 40
		41, 42, 43, 44	45, 46, 47, 48
		24	24

Instrument Adaptation

Before conducting the CFA test, the researcher adapted the instrument using guidelines based on the International Test Commission (ITC) Guidelines for Translating and Adapting Tests Second Edition (Foster, 2016), which consisted of five stages: pre-condition, test development, confirmation, administration, and documentation. This adaptation began with forward and backward translation by two language experts. After that, the researcher analyzed the translation results involving two developmental psychology and psychometrics experts. As a result, 48 items were ready for CFA testing.

Result and Discussion

CFA of Optimism

Based on CFA test for optimism, there were 10 indicators with standardized loading estimate values lower than 0.5, leading to the conclusion that these 10 indicators were not valid. The results and model of the test could be seen in Table 3 and Figure 1.

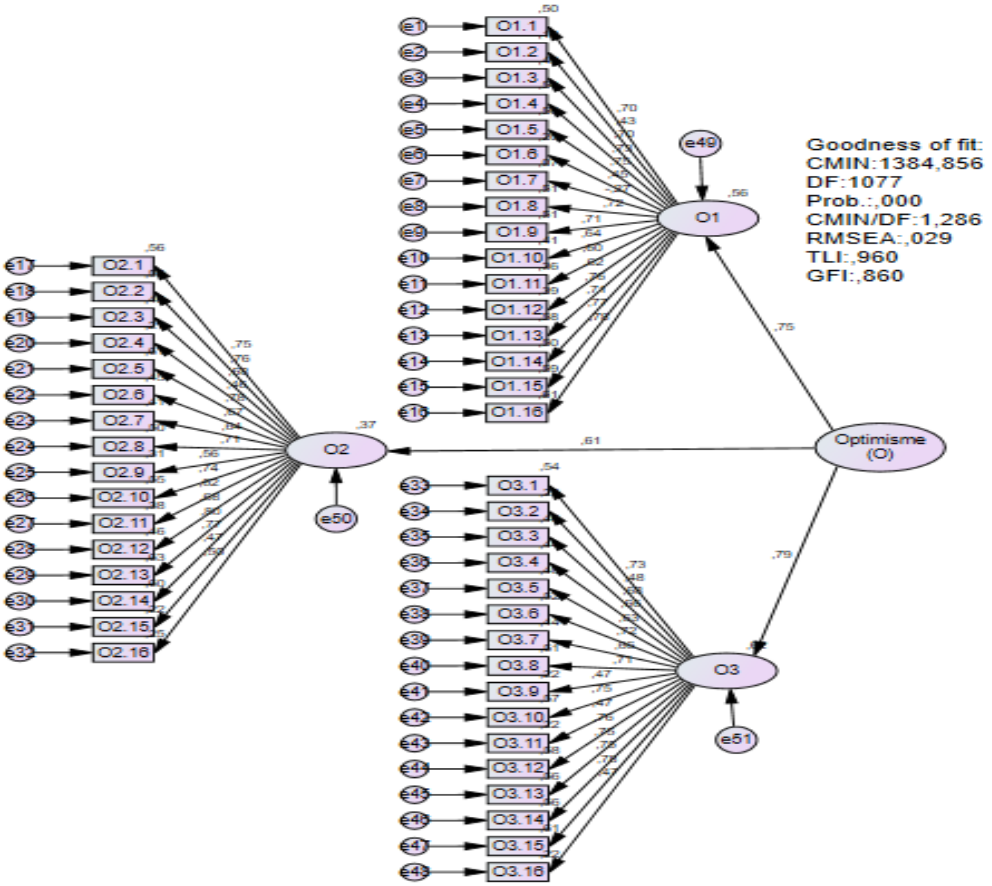
Table 3.
Results of the CFA Test for Optimism (O)

Level		Indicator	λ	Remark	λ^2	e	CR	AVE
Variable	Optimism (O)	O1	0.746	Valid	0.557	0.443	0.761	0.517
		O2	0.789	Valid	0.623	0.377		
		O3	0.611	Valid	0.373	0.627		
Dimension	Permanence (O1)	O1.1	0.704	Valid	0.496	0.504	0.914	0.437
		O1.2	0.426	Not Valid	0.181	0.819		
		O1.3	0.698	Valid	0.487	0.513		
		O1.4	0.735	Valid	0.540	0.460		
		O1.5	0.748	Valid	0.560	0.440		
		O1.6	0.445	Not Valid	0.198	0.802		
		O1.7	-0.270	Not Valid	0.073	0.927		
		O1.8	0.715	Valid	0.511	0.489		
		O1.9	0.712	Valid	0.507	0.493		
		O1.10	0.644	Valid	0.415	0.585		
		O1.11	0.599	Valid	0.359	0.641		
		O1.12	0.624	Valid	0.389	0.611		
		O1.13	0.762	Valid	0.581	0.419		
		O1.14	0.709	Valid	0.503	0.497		

Table 3.
Results of the CFA Test for Optimism (O)

Level		Indicator	λ	Remark	λ^2	e	CR	AVE
	Permanence (O1)	O1.15	0.768	Valid	0.590	0.410		
		O1.16	0.781	Valid	0.610	0.390		
	Pervasiveness (O2)	O2.1	0.750	Valid	0.563	0.438	0.927	0.449
		O2.2	0.764	Valid	0.584	0.416		
		O2.3	0.677	Valid	0.458	0.542		
		O2.4	0.459	Not Valid	0.211	0.789		
		O2.5	0.782	Valid	0.612	0.388		
		O2.6	0.672	Valid	0.452	0.548		
		O2.7	0.638	Valid	0.407	0.593		
		O2.8	0.706	Valid	0.498	0.502		
		O2.9	0.561	Valid	0.315	0.685		
		O2.10	0.740	Valid	0.548	0.452		
		O2.11	0.619	Valid	0.383	0.617		
		O2.12	0.677	Valid	0.458	0.542		
		O2.13	0.795	Valid	0.632	0.368		
		O2.14	0.774	Valid	0.599	0.401		
		O2.15	0.467	Not Valid	0.218	0.782		
		O2.16	0.498	Not Valid	0.248	0.752		
Dimension	Personalization (O3)	O3.1	0.733	Valid	0.537	0.463	0.925	0.442
		O3.2	0.478	Not Valid	0.228	0.772		
		O3.3	0.678	Valid	0.460	0.540		
		O3.4	0.662	Valid	0.438	0.562		
		O3.5	0.630	Valid	0.397	0.603		
		O3.6	0.721	Valid	0.520	0.480		
		O3.7	0.664	Valid	0.441	0.559		
		O3.8	0.713	Valid	0.508	0.492		
		O3.9	0.473	Not Valid	0.224	0.776		
		O3.10	0.752	Valid	0.566	0.434		
		O3.11	0.466	Not Valid	0.217	0.783		
		O3.12	0.762	Valid	0.581	0.419		
		O3.13	0.747	Valid	0.558	0.442		
		O3.14	0.750	Valid	0.563	0.438		
		O3.15	0.780	Valid	0.608	0.392		
		O3.16	0.472	Not Valid	0.223	0.777		

Figure 1. CFA Model of Optimism (O)



The 10 invalid indicators were dropped, and the remaining indicators were retested, yielding the following results in Table 4 and Figure 2.

Table 4.
Results of the CFA Test for Optimism (O) after Dropping Invalid Indicators

Level		Indicator	Remark	λ^2	e	CR	AVE
Variable	Optimism (O)	0.752	Valid	0.566	0.434	0.763	0.520
		0.788	Valid	0.621	0.379		
		0.612	Valid	0.375	0.625		
Dimension	Permanence (O1)	0.702	Valid	0.493	0.507	0.929	0.503
		0.699	Valid	0.489	0.511		
		0.731	Valid	0.534	0.466		
		0.755	Valid	0.570	0.430		
		0.720	Valid	0.518	0.482		
		0.708	Valid	0.501	0.499		
		0.639	Valid	0.408	0.592		
		0.600	Valid	0.360	0.640		
		0.626	Valid	0.392	0.608		
		0.762	Valid	0.581	0.419		
		0.713	Valid	0.508	0.492		
		0.764	Valid	0.584	0.416		
		0.779	Valid	0.607	0.393		

Table 4.
Results of the CFA Test for Optimism (O) after Dropping Invalid Indicators

Level		Indicator	Remark	λ^2	e	CR	AVE
	Pervasiveness (O2)	0.754	Valid	0.569	0.431	0.928	0.501
		0.771	Valid	0.594	0.406		
		0.676	Valid	0.457	0.543		
		0.779	Valid	0.607	0.393		
		0.676	Valid	0.457	0.543		
		0.641	Valid	0.411	0.589		
		0.707	Valid	0.500	0.500		
		0.554	Valid	0.307	0.693		
		0.747	Valid	0.558	0.442		
		0.617	Valid	0.381	0.619		
		0.681	Valid	0.464	0.536		
		0.788	Valid	0.621	0.379		
		0.768	Valid	0.590	0.410		
	Personalization (O3)	0.722	Valid	0.521	0.479	0.927	0.515
		0.674	Valid	0.454	0.546		
		0.671	Valid	0.450	0.550		
		0.634	Valid	0.402	0.598		
		0.725	Valid	0.526	0.474		
		0.668	Valid	0.446	0.554		
		0.715	Valid	0.511	0.489		
		0.746	Valid	0.557	0.443		
		0.770	Valid	0.593	0.407		
		0.747	Valid	0.558	0.442		
		0.754	Valid	0.569	0.431		
		0.769	Valid	0.591	0.409		

Based on Table 4, each indicator in the CFA for Optimism (O) had a standardized loading estimate value greater than 0.5, leading to the conclusion that each indicator in the CFA for Optimism (O) was valid. The obtained CR value was greater than 0.7, and the obtained AVE value was greater than 0.5, indicating that the CFA for Optimism (O) was reliable.

Goodness of Fit Model CFA

The goodness of fit results in Table 5 showed that there were five criteria indicating a good fit, which were Chi-square, Probability, RMSEA, CMIN/DF, and TLI, and one criterion indicating a marginal fit, which was GFI.

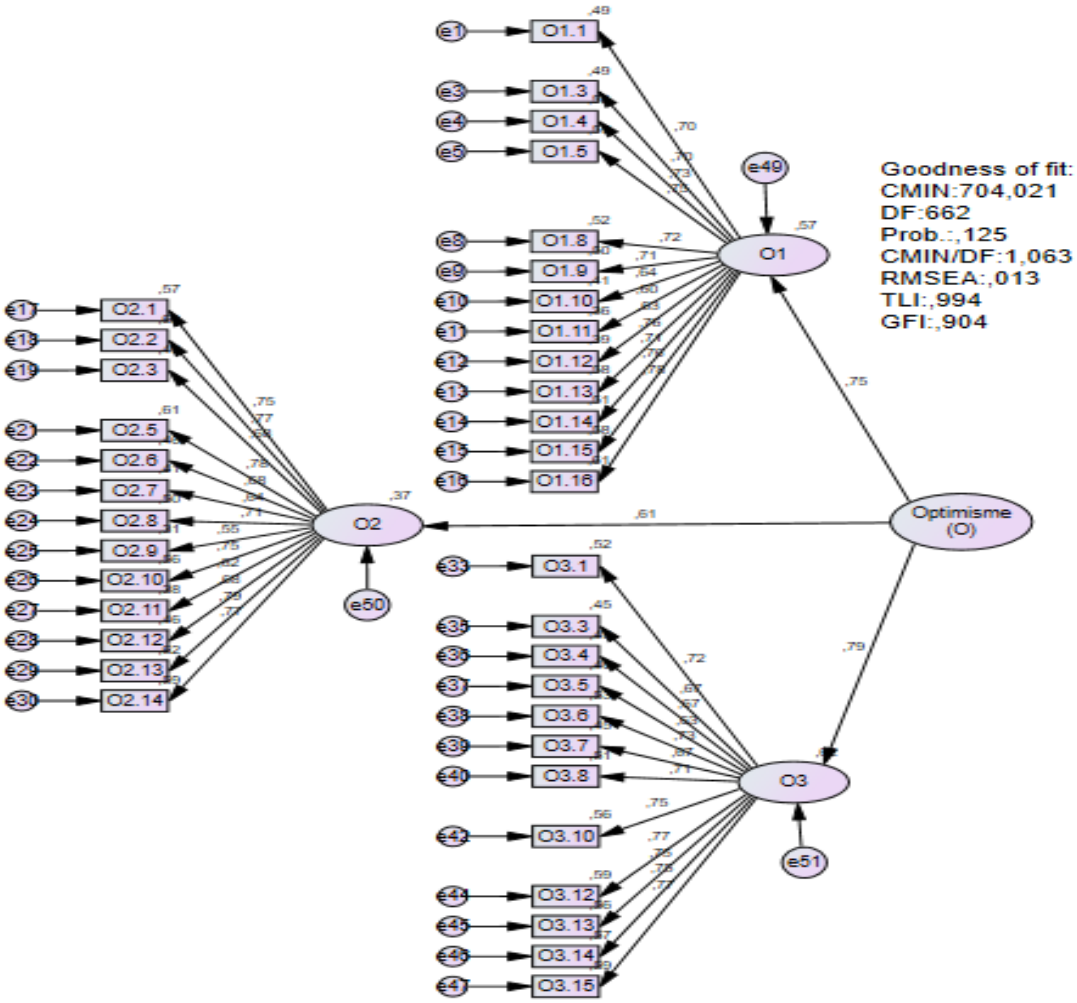


Figure 2. CFA Model of Optimism (O) after Dropped

Table 5.
Results of the Goodness of Fit Testing

Goodness of fit indices	Cut off value	Result	Conclusion
X^2	The smaller number the more agree	704,021	Good fit
Significance Probability (p)	≥0.05	0.125	Good fit
RMSEA	≤ 0.08	0.013	Good fit
GFI	≥ 0.90	0.904	Marginal fit
CMIN/DF	≤ 2.00	1.063	Good fit
TLI	≥ 0.95	0.994	Good fit

Reliability Test / Composite Reliability (CR)

The following formula was used to obtain the CR value:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum(1 - \lambda_i)}$$

Where λ is the factor loading value for each indicator. After calculating using the above formula, the CR values for each construct were obtained as follows in Table 6.

Table 6.
Composite Reliability (CR)

Construct	Indicators	Λ	λ^2	E	Reliability
Optimism (O)	O1	0.730	0.533	0.467	0.763
	O3	0.810	0.656	0.344	
	O2	0.611	0.373	0.627	
∑λ		**2.151**	**1.562**	**1.438**	
$\sum\lambda^2$		**4.627**			

Based on Table 6, the Optimism (O) construct had a CR value of 0.763, which means that the construct had a CR value greater than 0.7. The results lead to the conclusion that the Optimism construct was reliable.

Discussion

The aim of this study was to test the validity and reliability of the optimism scale among high school adolescents in Semarang, using CFA test. The result is 38 items on the optimism scale were valid and reliable. Prior to the CFA test, the researcher adapted the instrument using guidelines based on the International Test Commission (ITC) Guidelines for Translating and Adapting Tests Second Edition (Foster, 2016). Then, 48 items were ready for CFA testing.

The CFA test on the Optimism variable shows that 10 items were invalid because they had standardized loading estimate values lower than 0.5. A retest was conducted after removing the 10 invalid items. The results show standardized loading estimate values greater than 0.5, a CR value greater than 0.7, and an AVE value greater than 0.5, indicating that the remaining 38 items on the Optimism Scale were valid and reliable.

In the first CFA test, the discarded items included those related to class ranking, such as item 2 (I am confident I can maintain my class rank in the future) and item 6 (I believe my class rank will fluctuate). For this group of high school adolescents, class ranking was perceived homogeneously, with students unable to predict their performance. This was supported by research from Zulkifli et al. (2023), which found that student performance in school was often unstable, influenced by changing curricula and demands from the education department.

Next were items related to students' relationships with teachers, such as item 7 (I feel teachers only praise me when I am worried) and item 20 (When I struggle to understand the lesson, I immediately ask the teacher). Research by Mensah & Koomson (2020) observed that high school teacher-student relationships are formed uniquely, where closeness could be challenging to establish. The type of relationship was due to the characteristics of adolescence, marked by emotional independence and responsible behavior, but often featuring unconventional thoughts (Santrock, 2018).

Another influence on adolescents was the classroom social environment and peers (Liu, 2023). The research was consistent with the findings of the optimism scale validation test for adolescents, where invalid items included item 31 (I feel forced to be active in class) and item 43 (I failed the exam because my friends were too noisy), showing that adolescents were highly concerned with and influenced by their peer environment.

Other invalid items related to grades included item 32 (I am excited to study again after receiving a bad grade), item 34 (When I get a good grade, I believe it is due to my own efforts), item 41 (I got a bad grade due to lack of parental support), and item 48 (I feel I got a bad grade because I was lazy to read textbooks). This finding was consistent with research by Syafitri & Nirwana (2020), which found that high school students needed attention for exam preparation

and guidance from teachers regarding targeted grades. Students could only be partially independent in their studies, given their preparation for higher education.

After two rounds of testing, 38 items were found valid and reliable, making the scale suitable for further research on female public high school adolescents in Semarang. However, this study had limitations, such as data collection only from high school students, not including vocational high school students or those from other equivalent levels. Additionally, all participants were female due to limited data collection access, and no further gender analysis was conducted. Future researchers are recommended to validate the optimism scale for adolescents at other education levels and for both male and female subjects to ensure applicability to both genders.

Conclusion

The CFA test on the 48-item Optimism scale initially found 10 items to be invalid, leading to their removal. After retesting, the remaining 38 items on the Optimism Scale were valid and reliable. Therefore, this scale can be used in further research on female public high school adolescents in Semarang.

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