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Psychometric properties of emotional intelligent scale: the application for university students in Indonesia

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ABSTRACT

The current research aims to assess the psychometric properties of the emotional intelligence scale among university students in Indonesia. This research used a survey design. The current research participants were 288 university students in Palembang, West Nusa Tenggara, Kupang, Yogyakarta, and Jakarta, Indonesia. Two procedures were used to analyze the data: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The results showed that EFA with comprehensive techniques that compromise parallel analysis yielded a 5-factor solution: empathy with five items, handling relationships with five items, motivation for oneself with six items, self-awareness with seven items, and managing emotion with eight items. The five factors solution was confirmed through CFA with the value: Chi square=2.631, Tucker-Lewis's index (TLI)=.804, comparative fit index (CFI)=.823, root mean square error of approximation (RMSEA)=.075, and standardized root mean residual (SRMR)=.743. The scale validation and reliability were tested through average variance extracted (AVE) with the value ranged from 0.271 to 0.594, construct reliability (CR) with the value ranged from 0.706 to 0.879, and Cronbach's alpha with the value ranged from 0.706 to 0.879. Therefore, based on psychometric analysis, the scale is valid and reliable to be used in measuring emotional intelligence among university students in Indonesia.

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1. INTRODUCTION

The ability to comprehend one's own feelings and emotions, which influence one's actions, is referred to as emotional intelligence [1]. Emotional intelligence is a very important psychological concept since it is associated with stress coping strategies [2]. As stated by Drigas and Papoutsi [3], emotional intelligence is a prerequisite for the preservation of mental health and stress conditions. People with a high level of emotional intelligence could be able to control their stress and burnout through controlling feelings,

recognizing and expressing emotion, supporting their own emotional thinking, understanding and analyzing emotion, and directing emotion [4], [5]. A low level of perceived stress has been associated with a higher score of emotional intelligence. It means a higher level of emotional intelligence leads to a lower stress condition. Furthermore, a study [6] stated that the importance of emotional intelligence is that it makes people able to reveal their internal emotions in an effective manner and also motivates their behavior.

In regard to the importance of emotional intelligence in learning, it is very important to do research on university students emotional intelligence. It is because emotional intelligence is very significant for university students. For instance, self-perceived employability and professional decisions are influenced indirectly by emotional intelligence [7]. It is emphasized by Shagini *et al.* [8], who stated that career adaptability may account for the effect of emotional intelligence on career-related outcomes. This is crucial because college students are currently searching for a job or setting up a solid workplace. Emotional intelligence is associated with various aspects of emotional well-being, such as a greater level of subjective well-being, better life satisfaction, and better mental health conditions [9]. Other than that, many researchers have associated emotional intelligence with university student`s success in dealing with emotional stress. Emotional intelligence is the primary predictor of students learning and cognitive health and also the primary psychological support when depression comes [10], [11]. This is because emotional intelligence refers to the individual's capability to manage their emotions, manage other individual's emotions, and utilize information to facilitate activities, reasoning, and thinking [12]. Furthermore, with the help of emotions, one can show his or her internal feelings in the most effective way [13].

University students need emotional intelligence because they face increased exploration in the context of declining social support. University students need emotional intelligence because it will enable them to lower their academic pressure and improve their ability to make decisions [6]. Emotional intelligence is also stated to enable students to tackle their emotional upset and avoid emotional exhaustion such as stress, burnout in learning, and handling egoism [14]. Students with a high level of emotional intelligence are known to have good social engagement. Abera [15] claimed that students with higher emotional intelligence scores have a higher propensity to be highly perceptive in social situations, to interact well with others, and to be highly socially capable than students with lower emotional intelligence ratings. This is important since university students are known to be in the transition phase to college, which is associated with the developmental challenge of changes to existing relationships. Previous studies [16], [17] stated that university studies are frequently perceived by students as a period of great personal change due to heavy workloads and a stage of life in which the student must deal with many changes that cause academic stress. In this case, as university students, individuals experience acute and chronically risky situations. Students at universities also go through the process of being cut off from their families, entering the workforce, getting used to new professors and classmates, learning continuously changing material, reorganizing curriculum, and taking difficult exams [17].

Currently, university students in Indonesia are said to be at high risk of mental health issues. Research has found a severe condition of mental health problems among university students in Indonesia. Previous research [18] found that 76.7% of university students in Indonesia were at a severe stress level and 23.3% were at a mild stress level. Kaligis *et al.* [19] conducted research involving 393 young people in Indonesia aged between 16 and 24 years old. The research found that the most common mental health problem in Indonesia was anxiety, with a percentage of 95.4%, followed by depression, with a percentage of 88%. This research is emphasized by other study [20], who explore the mental health issue among university students in Indonesia. In a study involving 253 university students in Indonesia, the researchers found that the students disagreed that they have no anxiety problem and disagreed with their ability to cope with their mental health problem [21]. In their research, it also found that among 250 university students in Indonesia, 76% had a high level of psychological distress, while 24% had a low level of psychological distress. Furthermore, in a study that looked at 1,792 medical students in their first year at 29 universities in Indonesia, 93% of the students reported disengagement, 95% reported exhaustion, and 74% reported signs of mental health problems [22].

The mental health issues among university students in Indonesia need to be emphasized because 50% of university students in Indonesia who had mental health issues reported self-harming and suicidal thoughts [19]. Other than that, Pramukti *et al.* [23] found that less perceived satisfactory support was associated with more suicidal thoughts among 938 university students in Indonesia. It means that there is a tendency among Indonesian university students who have mental health problems to think about suicide. Other than that, the students with mental health problems in Indonesia have negative thoughts about themselves [24], analyzing patients with mental health problems in Indonesia, found that the patients described themselves as feeling shame, inadequate, suffering, and isolated from society. It indicates the need for the empowerment of emotional intelligence among university students in Indonesia because emotional intelligence was found to be correlated with stress coping strategies.

In regard to the importance of emotional intelligence, it is very important to do research on university students emotional intelligence. Previous study [25] declared that as academics and practitioners begin to consider potential therapies, it is critical to comprehend the significance of emotional intelligence in university students given the rise in mental health problems and the impact of psychosocial factors on them. Emotional intelligence is the parameter of a student's knowledge, skill, and overall success. Other than that, emotional intelligence is the trait of understanding and recognizing emotion in order to motivate oneself [26]. However, the research tool used to measure emotional intelligence among university students in Indonesia has yet to be verified. Research regarding emotional intelligence research tools was only conducted by Wasidi [27], who developed a valid and reliable scale for teacher students in Bengkulu, Indonesia. This research has limitations in that the result can only be used by teacher students, which does not account for measuring university students levels of emotional intelligence. Other than that, the research only used confirmatory factor analysis (CFA) to confirm the structure of the scale, and the analysis did not perform exploratory factor analysis (EFA) to investigate the correlation among the observed variables [28].

The psychometric properties of the emotional intelligence scale have been tested in several countries. Pacheco *et al.* [29] used factorial analysis to examine the psychometric properties of the Spanish version of the Wing and Law Emotional Intelligence Scale. Perazzo *et al.* [30] used bifactorial exploratory structural equation modelling (ESEM) to evaluate the psychometric properties of the Brazilian adaptation of the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF). Chirumbolo *et al.* [31] used exploratory structural equation modelling to examine the psychometric features of the trait emotional questionnaire in the Italian context. Al-Dassean [32] used factorial analysis to evaluate the psychometric properties of an Arabic-adapted version of the trait emotional intelligence questionnaire among university students. It indicates that there is a need to test the psychometric analysis of emotional intelligence among university students in Indonesia since it has been validated in several countries. Therefore, this research aims to test the psychometric trait of emotional intelligence among university students in Indonesia.

In Indonesia, only a few studies about the psychometric properties of emotional intelligence were conducted. For example, Febriana [33] tested the psychometric properties of an adapted Emotional Intelligence Questionnaire-Short Form into Indonesian language and culture, involving 200 participants as workers in Indonesia. The psychometric test used in this research was a CFA with one model factor. Fajrianthi and Zein [34] created a psychological exam utilizing item response theory with 752 job seekers as subjects to gauge ability-based emotional intelligence in the Indonesian workplace. To the best of our knowledge, no research on the examination of psychometric properties in the context of university students has been conducted in Indonesia. Therefore, this research aims to validate the psychometric test of emotional intelligence as an application for university students.

In practice, emotional intelligence is tested through various kinds of psychometric properties tests. One of the familiar psychometrics used for the emotional intelligence scale was factorial analysis, namely EFA and CFA. For example, Gong and Paulson [35] used CFA to confirm the structure of the emotional intelligence scale, utilizing a one-factor model with model fit indices. Shi and Wang [36] also used CFA to confirm the structure of the emotional intelligence scale in Chinese university students. The analysis was completed with concurrent validity, convergent validity, and discriminant validity. Factor analysis is the significant analysis used in the development, refinement, and evaluation of the scale [37]. EFA is often used in the early stages of research to check the dimensionality and gather information about the interrelationships among a set of variables. On the other hand, CFA is a more sophisticated and complex set of methods used in the research process to test particular theories or hypotheses regarding the structure of a scale [38]. Both factorial analysis test models are essential as psychometric properties because EFA is able to elucidate how different constructs relate to one another, and CFA is able to confirm the structure that was built in EFA, confirm the relationship between the constructs, and confirm the relationship between the constructs and the items [39]. Therefore, this research aims to examine the psychometric properties of the emotional intelligence scale among university students in Indonesia.

Based on the discussion, the significance of this research is to provide valid psychometric properties of the emotional intelligence scale to be used in research among university students in Indonesia. Pacheco *et al.* [29] indicated that a valid and reliable instrument of emotional intelligence can be used to examine the potential peculiarities and implications of assessing specific aspects of emotional intelligence in specific settings. It is because a valid instrument confirms the accuracy of the instrument to measure the data or result, and reliability confirms the consistency of the instrument to measure the data or result [40]. In this case, Appelbaum *et al.* [41] suggested the researcher ensure the instrument has a good reliability and validity score before using a multi-item psychological instrument. It is because the validity of the instrument through psychometric properties indicates the instrument is "well-grounded or justifiable, being at once relevant and meaningful" [42]. Therefore, the instrument developed as a result of this research would be able to be used by researchers to examine university student`s emotional intelligence.

2. METHOD

2.1. Participants

This research is a cross-sectional survey with the aim of examining the psychometric properties of emotional intelligence among university students in Indonesia. The population of the current research was the university students in Indonesia. The convenience sampling technique was used to determine the sample. Therefore, the data collected through Google Forms is spreading to university students in Indonesia, such as in Palembang, Nusa Tenggara Barat, Kupang, Yogyakarta, and Jakarta. A total of 288 university students participated in this research. The total of 288 participants in the current research is appropriate because many items have factor loading greater than 0.60. According to Schreiber [43], when there are four or more items have factor loading greater than 0.6, the factor is stable regardless of the sample size. Other than that, the result of Kaiser-Meyer-Olkin in the current research proved the appropriateness of the sample size in the current research (>0.80) [42]. Within the 288 participants 12.8% (37 university students) of the participants came from Palembang, 31.3% (90 university students) of the participants came from Nusa Tenggara Barat, 49.7% (143 university students) of the participants came from Kupang, 2.8% (8 university students) of the participants came from Yogyakarta, and 3.5% (10 university students) of the participants came from Jakarta. In terms of age, the age of participants ranged from 17 to 26 years old, with most of the participants being female with a percentage of 60.4% (174 university students) and 39.6% (46 university students) being male.

2.2. Instrument

The data was collected through an online survey. The survey consists of demographic information and five Likert's-scale emotional intelligence questionnaires [44], consisting of a 5-point scale (1=strongly agree, 5=strongly disagree). In this research, the favorable item was used and the unfavorable item was excluded. It is because studies found poor-quality psychometric properties on unfavorable items. For example, previous study [45] found that 77% of the items dropped out of the research were unfavorable. Furthermore, unfavorable items on the psychological scale tend to interrupt the factorial validity of the scale [44]. A favorable item means that the item is objectively structured and can be positively classified under the thematic category [46]. Unfavorable items are the reverse version of favorable items; a study [47] reveals the dilemma of combining both kinds of items. The combination of the favorable and unfavorable items resulted in the following: the response pattern for favorable items is different from its unfavorable counterpart; there is a lower level of internal consistency on the scale when favorable and unfavorable items are combined; and the scales of combined items had lower levels of reliability and greater frequencies of inconsistent responses. Other than that, Chyung *et al.* [48] stated in their research that it is better not to use a mix of favorable and unfavorable items, as doing so can create threats to the validity and reliability of the survey instrument. Therefore, 30 favorable items were used in this research. All items were listed in Table 1.

2.3. Procedure

The current research obtains data through an online survey. The researcher separated questionnaires from respondents through Google Forms. Before the respondent fills out the questionnaires, the researcher explains the purpose of the data collection and how it will be used. In addition to that, we explain that all data used in this research will be kept confidential and will only be used for research. The next, researcher requests their confirmation to voluntarily fill out the existing questionnaires by asking their willingness to fill out the Google Form and answering with yes or no. This is to state that we do not pressure or require respondents to participate in this research.

2.4. Data analysis

In this research, two factorial analyses were performed: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA was conducted in SPSS 27.0, and CFA was conducted in AMOS. The dataset was tested for its adequacy for factorial analysis through Kaiser-Meyer-Olkin (KMO) and Barlett's test of sphericity [49]. KMO assessed the adequacy of the data to be used in factorial analysis; the value ranged from 0 to 1, with the value above 0.5 indicating that the data is adequate for factorial analysis [49]. Therefore, the threshold of the KMO for the current research exceeded 0.5. Other than that, the value of Barlett's test of Sphericity should be significant (<0.05).

The main function of EFA in this research was to determine the number of factors to retain and to test the intercorrelation between the variables [50]. In terms of the number of factors to retain, eigenvalue greater than 1, and Scree plot considered, the result will be emphasized with parallel analysis. The parallel analysis will be the main consideration in this research because it is stated to be more efficient in determining the number of factors to retain. Handrianto *et al.* [50] stated that parallel analysis is 92% correct, 92% of the time and exhibits minor variability and sensitivity to different factors.

Table 1. Emotional intelligence questionnaires

No	Items
1	I recognize the emotions that happen to me.
2	I laughed if there was something funny.
3	I know why I am sad.
4	I always try to get up again and not dissolve in sorrow if I fail to do something
5	I realized when I was sad.
6	I can control myself when I am angry.
7	I know I am angry.
8	I sometimes cry when I feel sad.
9	I try to find a solution when I feel tired of doing something.
10	I am sad if I have trouble.
11	I feel confident in being able to do what I desire.
12	I know why I am angry.
13	I feel very confident that I can realize my aspirations
14	I will smile or laugh when I am happy
15	I am passionate about activities related to education
16	I'm not afraid of failing in my activities
17	I quickly get angry when someone annoys me.
18	I know things that make me happy.
19	I can feel the sadness that others experience even though they don't tell me.
20	I can know the feelings of my friend just by looking at his face expression
21	I can feel the sorrow of my friend.
22	I can feel the sorrow of my friend.
23	I don't dare to bother my angry friend
24	I can usually know how others feel about me
25	I always thank the people who have helped me.
26	I am happy to entertain my friend who is sad.
27	I never escaped the duties and responsibilities I was given.
28	When my friend is happy, I am happy too.
29	I often denounce my friend if he violates the order.
30	I sometimes give advice to my friends if they are having a problem

After determining the number of factors, varimax rotation was performed to make the factors more interpretable [51]. The difference between the squared pattern structure coefficients of a factor is increased by this extraction method. Furthermore, communalities and factor loading are considered to frame the structure of the scale. Therefore, principal component analysis with a fixed number based on the factor retained was performed. Since it represents the overall amount of the original variable that was shared with all other variables, communality is crucial [52]. The scale for communality was 0 to 1. If the values are closer, the extracted factor adequately explains the item variation. Communality between .20 and.80 is seen as low; .20 to.80 is exhaustive; and .60 to.80 is regarded as high [53]. Other than that, since factor loading is the correlation between the item and the factor, it needs to be taken into account [54].

The structure of the scale framed in the EFA was confirmed through the CFA. CFA tests the hypothesized number of variables and the correlation between the construct and the item. A model of fit indices was created in CFA to help researchers confirm the structure of the scale. It is advised to use at least two separate indices because the values of these indices were not intended to serve as the benchmark for binary decisions. Comparative fit indices (CFI) (>.90) are among the goodness of fit metrics taken into account. The root mean square error of approximation (RMSEA) and the Tucker-Lewis Index (TLI) values should exceed 0.90 (>.0.90). Other than that, Dash and Paul [55] limit the criteria for the absolute fit indices as: CMIN (<5) and SRMR (<.05).

Through the use of average variance extracted (AVE) and composite reliability (CR), the accuracy of the scale measurement is evaluated. CR evaluates the degree of correlation between the many indicators of the same construct that are in agreement, whereas AVE reflects the amount of variation taken by the construct due to measurement error. The composite dependability value is anticipated to be greater than 0.7 in a good model, while AVE is anticipated to be greater than 0.5 [55].

3. RESULTS

3.1. Exploratory factor analysis

Before conducting factorial analysis, the appropriateness of the data to be used in factorial analysis needs to be examined; therefore, Kaiser-Meyer-Olkin and Barlett's test of Sphericity were conducted. The results show that the value of Kaiser-Meyer-Olkin was.867 and the value of Barlett's test of Sphericity was significant (.000) as shown in Table 2. It indicates that the dataset was appropriate to be used in factorial analysis.

After considering the appropriateness of the dataset, researcher conduct further analysis relate to factor retention. To determine how many factors to retain in this research, several methods were employed, namely Eigenvalue greater than 1, Scree plot, and parallel analysis. Table 3 shows the result of an eigenvalue greater than 1 and the parallel analysis, and Figure 1 show the result of the Scree plot.

The initial factor analysis reveals eight factors explaining 66.270% of the variances as shown in Table 4. The scatterplot also reveals eight items with eigenvalues greater than 1 (Figure 1). However, the parallel analysis suggested five factors to retain (Table 3). When we compare the mean value of parallel analysis with the initial eigenvalue, the sixth column in the parallel analysis mean is greater than the six factors in the initial eigenvalue (parallel eigenvalue: 1.331085, initial eigenvalue: 1.257). Furthermore, the sixth column in the parallel analysis percentile is greater than the sixth column in the initial eigenvalue (parallel eigenvalue: 1.377844, initial eigenvalue: 1.257). It means that the parallel analysis suggested five factors to retain in the analysis. In this research, the result of parallel analysis was adopted with five factors to retain.

After determining the number of factors, the researcher examined the factor loading and the communalities of each item. In this case, the extraction of principle component analysis with a fixed number of five factors, rotated with varimax rotation, and the coefficient suppressed with an absolute value of.30 were conducted to reveal the factor loading and communalities of each item. The result shows that all items value satisfaction, factor loading, and communalities. No items were deleted because the factor loading and communalities of each item were greater than.30. The factor loading ranged from .373 to.860, and the communalities ranged from.336 to.752. The first factor has 5 items, the second factor has 5 items, the third factor has 6 items, the fourth factor has 7 items, and the fifth factor has 7 items.

Table 2. The result of KMO and Barlett's test

Kaiser-Meyer-Olkin Measure of sampling adequacy	Bartlett's Test of Sphericity		
	Approx. Chi-square	Df	Sig.
.867	3895.434	435	.000

Table 3. Initial eigenvalue and parallel analysis-generated eigenvalue at the 95th percentile

Components	Initial Eigenvalue		Simulated Eigenvalue at 95th percentile	
	Total	% of the variance	Means	percentile
1	8.682	28.941	1.655426	1.747727
2	2.628	8.760	1.554640	1.621303
3	1.907	6.358	1.494253	1.549054
4	1.695	5.650	1.436478	1.489146
5	1.471	4.904	1.385082	1.427971
6	1.257	4.191	1.331085	1.377844
7	1.190	3.967	1.283875	1.326777
8	1.050	3.499	1.242802	1.275826
9	.873	2.909	1.203227	1.237257
10	.773	2.577	1.163262	1.195014

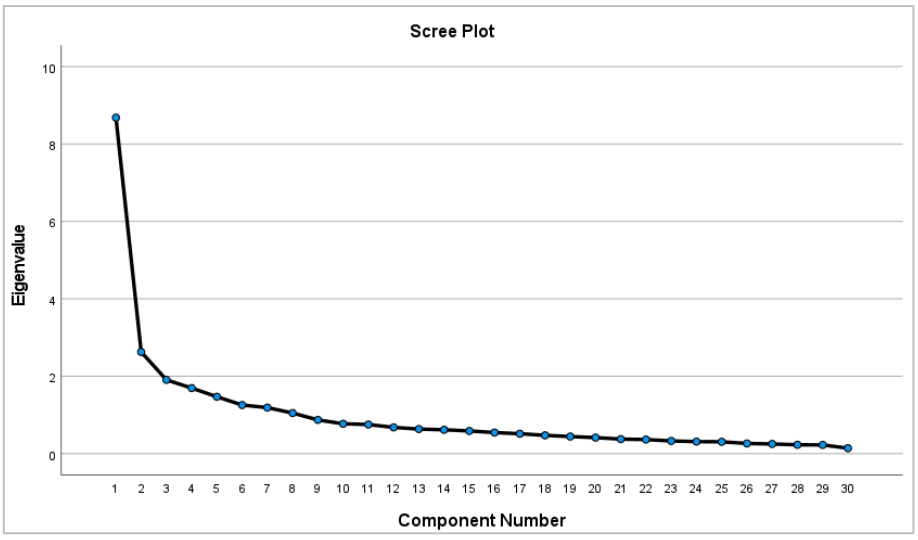

Figure 1. Scree plot

Table 4. Exploratory factor analysis

Dimension	Items	Communalities	Components				
			1	2	3	4	5
Empathy	N19	.752	.860				
	N20	.734	.823				
	N21	.710	.786				
	N22	.733	.810				
	N24	.460	.630				
Handling relationship	N26	.527		.607			
	N27	.465		.601			
	N28	.547		.643			
	N29	.631		.761			
	N30	.646		.728			
Motivation oneself	N4	.647			.739		
	N11	.523			.634		
	N13	.603			.762		
	N15	.531			.548		
	N16	.568			.498		
	N25	.482			.465		
Self-awareness	N1	.479				.648	
	N3	.627				.724	
	N5	.577				.642	
	N6	.349				.378	
	N7	.636				.639	
	N9	.348				.380	
	N12	.589				.603	
Managing emotion	N2	.402					.414
	N8	.461					.623
	N10	.404					.593
	N14	.647					.662
	N17	.336					.373
	N18	.450					.466
	N23	.460					.626

3.2. Confirmatory factor analysis

The analysis of EFA suggests the primary structure of the scale with a five-factor structure. The first factor is named empathy with five items; the second factor is named handling relationships with five items; the third factor is named motivation oneself with six items; the fourth factor is named self-awareness with seven items; and the fifth factor is named managing emotion with eight items. CFA was then executed to confirm the structure of the scale. CFA analysis with two models was conducted. The first model as shown in Figure 2 consists of five factors of emotional intelligence: empathy, handling relationships, motivation for oneself, self-awareness, and managing emotion. In this analysis, several model fit indices were executed. The result of the first-order model reveals that CMIN=2.616, TLI=.806, CFI=.826, RMSEA=.075, and SRMR=.0727. Other than that, the factor loading ranged from.304 to.857.

The second-order model of CFA was named Emotionally Intelligent with five factors: empathy, handling relationships, motivation oneself, self-awareness, and managing emotion. Figure 3 displays the result of second order model of CFA. The result indicates that CMIN=2.631, TLI=.804, CFI=.823, RMSEA=.075, and SRMR=.0743. Other than that, the factor loading ranged from.318 to.859. Furthermore, the correlation coefficient ranged from.53 to.84. The comparation of the first and the second order model result are displayed in Table 5.

Table 5 compares the first and second-order models with the standard given. The values of CMIN and RMSEA fulfilled the threshold given, but the values of TLI and CFI did not fulfil the standard given. However, the above 80 for CFI and TLI is still considered acceptable [9]. Other than that, the value of SRMR did not meet the threshold given. However, the value of RMSEA fulfilled the threshold given, which is enough to state that the model has acceptable and tolerable model fit indices for CFA.

3.3. Validity and reliability test

After confirming the structure of the scale, researchers test the validity and reliability of the scale through convergent validity, composite reliability, and internal consistency. The convergent validity was tested with AVE, and the results were as: the first factor was 0.594, the second factor was 0.499, the third factor was 0.436, the fourth factor was 0.355, and the fifth factor was 0.271. The composite reliability was tested through CR, and the results were as: the first factor was 0.879, the second factor was 0.832, the third factor was 0.823, the fourth factor was 0.786, and the fifth factor was 0.706. The internal consistency of the scale was assessed through Cronbach's alpha, and the results were as: the first factor was 0,879, the second factor was 0.818, the third factor was 0.819, the fourth factor was 0.781, and the fifth factor was 0.706. The

result of convergent validity showed that several factors, such as handling relationships, motivating oneself, self-awareness, and managing stress, had an AVE below 0.5, which is below standard. However, all factors have acceptable values for composite reliability (>0.7) and internal consistency (>0.7). The result of AVE, CR and Cronbach alpha is displayed in Table 6.

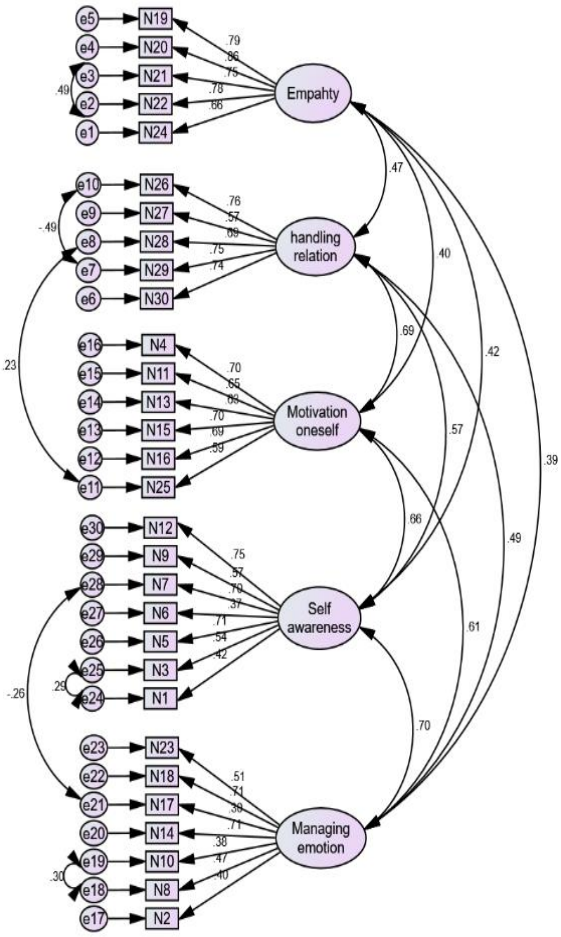

Figure 2. CFA first order model

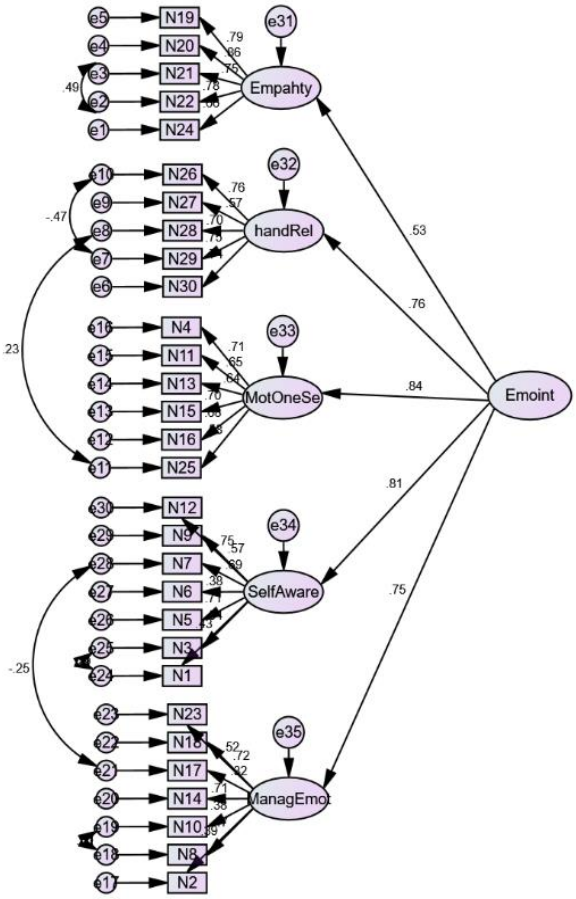

Figure 3. CFA second order model

Table 5. CFA first order and second order comparation

Goodness of fit	Criterion	Model	
		First order	Second order
CMIN	<5	2.616	2.631
TLI	≥.90	.806	.804
CFI	≥.90	.826	.823
RMSEA	<.06 to .08	.075	.075
SRMR	<.05	.0727	.743

Table 6. The result of convergent validity, composite reliability and Cronbach alpha

Components	Convergent validity AVE	Composite reliability CR	Reliability analysis Cronbach alpha
Empathy	0.594	0.879	0.879
Handling relationship	0.499	0.832	0.818
Motivation oneself	0.436	0.823	0.819
Self-awareness	0.355	0.786	0.781
Managing emotion	0.271	0.706	0.706

4. DISCUSSION

The purpose of this research was to test the psychometric properties of emotional intelligence among university students in Indonesia, utilizing both factorial analyses, namely EFA and CFA. Using EFA and CFA in evaluation research was sufficient; EFA can identify several common factors, while CFA validates the model framed in EFA [56]. Patil *et al.* [57] stated that CFA without EFA does not produce superfluous factors; as a result, the psychometric properties of the emotional intelligence scale in this research were tested through robust psychometric testing, namely EFA and CFA.

Based on the psychometric analysis, this study reveals that the scale has similar characteristics to the original version. In this research, EFA was used to determine the underlying factor of the observed variable, and five factors were retained in the analysis. The theoretical structure of the scale was confirmed through CFA. Other than that, the scale also confirmed its psychometric properties through convergent validity, composite reliability, and Cronbach alpha. As a result, the 30 items on the scale in this research were separated into five factors according to communalities and factor loading. The first factor is named empathy with five items; the second factor is named handling relationships with five items; the third factor is named motivation oneself with six items; the fourth factor is named self-awareness with seven items; and the fifth factor is named managing emotion with eight items.

This research is similar to another research. For example, Shwu [58] created and implemented a quick emotional intelligence test for high school vocational instructors. The research had similar results to the current research on five constructs of emotional intelligence: self-awareness, managing emotions, self-motivation, empathy, and handling relationships. However, the research only explores the internal consistency of the instrument, followed by descriptive statistics and multivariate analysis. Patil *et al.* [57] also developed a measure of emotional intelligence. The research concludes that there are five constructs of emotional intelligence: self-awareness, self-regulation, motivation, empathy, and social. However, the research only utilized basic analysis such as mean, standard deviation, standardized alpha reliability, and correlation coefficient. Based on the previous research, the current research contributes to the validation of emotional intelligence instruments with robust psychometric analysis.

The result of this study is supported by the literature review. Many researchers and academicians associated emotional intelligence with the five constructs found in this research. Based on literature, each construct of emotional intelligence in this research is associated with emotional intelligence. Firstly, emotional intelligence was associated with empathy. Segura *et al.* [59] stated that empathy is the construct that has a very strong relationship with emotional intelligence because empathy is the concept that is related to the ability of someone to understand and use their emotions. Empathy is very important because it is correlated with the affective (emotional), cognitive, or combination of both of the students [60]. It makes the student able to understand someone's situation. Based on the literature, empathy will benefit students personally and socially. Personally, it was revealed that students who perceive themselves as empathic experience empathy as a professional satisfaction and meaningfulness protection against burnout [61]. Socially, empathy is stated to enhance students social interaction, enhance prosocial behavior, and inhibit anti-social acts such as cyberbullying [62]. Tran [63] integrates empathy as one of the six interrelated dimensions of teaching and learning, namely, connecting, accommodating, reciprocating, integrating, renationalizing, and empathy. According to Theobald [64], through empathy, university students have a sense of belonging to the classroom and university activities and build connections with the teachers. Empathy is the process of understanding or responding to other emotions; therefore, it develops the social connection between individuals [65]. It means that university students with empathic emotions would be able to build good social connections with their peers, university staff, and lecturers.

Secondly, emotional intelligence is associated with handling relationships. According to Aparicio-Flores *et al.* [66], emotional intelligence is associated with interpersonal and intrapersonal skills, which are then associated with social and personal experiences. For university students, handling relationships is significant for their academic lives. Handling relationships refers to the ability of the students to build positive relationships with their peers, lecturers, and academic staff; failure to do so leads to stress and health problems [67]. Fitzgerald and Konrad [68] found in their research that students who have problems handling relationships have greater anxiety and stress, questioning their ability to handle difficult aspects of their lives and having difficulties attaining their goals. On the contrary, students with greater ability to handle relationships would have less stress and anxiety. It is important since university students have more pressure and more serious mental health problems compared to school students.

Thirdly, emotional intelligence is associated with motivation within oneself. Emotional intelligence can be defined as the ability to motivate ourselves to have the best for ourselves and for our relationships with others. For university students, self-motivation could boost their academic achievement and performance. It is because self-motivation increases the effort and persistence of the students [69]. Other than that, self-motivation drives students towards independent learning [70]. It means students will not only depend on the teacher's material and lectures but also strive to learn personally and gauge information as

much as they can, which is known as self-regulated learning. University students with self-regulated learning or self-motivation showed better academic performance, were more satisfied with their studies, and were able to cope easily with the transition from school to university life. Al-Abyadh and Azeem [71] stated that self-motivation is one of the fundamental elements for structuring and integrating essential skills to achieve academic expectations for university students. It was strengthened by Brambila-Tapia [72], who stated that self-motivation has a small but significant contribution to university student achievement.

Fourthly, emotional intelligence is associated with self-awareness. Research by Mustafa *et al.* [73] found that one of the factors in emotional intelligence is self-awareness. Self-awareness helps university students manage themselves and improve performance. Self-awareness enables university students to determine in which areas they are weak and strong, so they can focus on which areas of themselves should be improved [74]. In previous research, there is a positive, moderate, and significant relationship between self-awareness, reading attitude, reading habit, and reading attitude [75]. Other than that, self-awareness helps university students shape their specific skills. In this case, Blakemore and Agllias [76] stated that self-awareness is an integral, holistic, and effective development of the professional self. It means that self-awareness helps university students become professional workers. It is important since, at their age, university students are preparing themselves to become professional workers.

Fifthly, emotional intelligence is associated with managing emotion. Based on the cognitive model, emotional intelligence can be defined as the ability to regulate emotion [25]. It is the concept that can manage motion in both cognitive and metacognitive processes. For university students, it is important to have good emotional management. For example, when they were given criticism and feedback, university life is different from school life, where in this stage, the discussion of knowledge is much wider and more free, so argument debate as the process of acknowledging knowledge will be faced by university students [77]. In this case, managing emotion will teach students how to become adult humans who respect each other's opinions. Thus, it is important to have good emotional management in order to promote emotional and intellectual growth. Other than that, Yan *et al.* [78] stated that university students should manage their emotions in order to respond to any issues and problems that arise during their academic lives so they can treat any issues calmly.

4.1. Implication

This study's findings should have theoretical and practical ramifications. The research theoretically adds to the psychometric discourse on the emotional notion, wherein university students' emotional intelligence is comprised of five components: empathy, handling relationships, motivation for oneself, self-awareness, and managing emotion. Furthermore, practically, the result of this research can be used as a tool to measure university students' emotional intelligence in Indonesia.

5. CONCLUSION

This study aimed to test the psychometric properties of the emotional intelligence scale in the context of university students in Indonesia. Specifically, this research aims to test the underlying factor of emotional intelligence among university students in Indonesia, test the structure of the instrument of emotional intelligence hypothesized in exploratory factor analysis, and test the validity and reliability of emotional intelligence. To attain the aim of this research, several analysis methods were conducted, namely EFA, confirmatory factor analysis, convergent validity, composite reliability, and Cronbach alpha analysis. The study comprised 288 university students across five regions in Indonesia, namely Palembang, West Nusa Tenggara, Kupang, Yogyakarta, and Jakarta. EFA and CFA tested the psychometric properties of the scale by exploring the initial structure of the instrument and confirming the structure. In this research, five factors were retained and confirmed, namely empathy with five items, handling relationships with five items, motivation for oneself with six items, self-awareness with seven items, and managing emotion with eight items. Furthermore, convergence validity, composite reliability, and Cronbach's alpha analysis confirm the validity and reliability of the instrument.

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