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Uncovering Competitive Behavior: How Critical Thinking, Self-Efficacy, and Social Comparison Shape College Students in Central Java, Indonesia

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Abstract:

Background: The diverse characteristics of university students in Central Java, Indonesia, present challenges for institutions. Understanding how social comparison mediates the relationship between critical thinking, self-efficacy, and competitive behavior is crucial for the advancement of higher education in the digital era.

Objective: This research investigates how critical thinking and self-efficacy impact competitive behavior among students in Central Java, Indonesia, with social comparison playing a mediating role.

Methods: The study utilized the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique to examine hypotheses within a quantitative descriptive research framework.

Results: Findings indicate that critical thinking positively influences competitive behavior and social comparison, and, in turn, social comparison affects competitive behavior. Social comparison plays a significant role in the interaction and competitiveness among students. Furthermore, social comparison moderates the relationship between critical thinking, self-efficacy, and competitive behavior.

Conclusion: Universities should focus on enhancing students' critical thinking and self-efficacy through workshops, mentoring, and fostering positive social comparison. This approach may offer valuable insights into how cultural and environmental factors can impact future study outcomes.

Keywords: Critical thinking, Self-efficacy, Competitive behavior, Social comparison.

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1. INTRODUCTION

The effects of globalization and industrialization are being felt globally, influencing all aspects of life. According to a report by the Organization for Economic Co-operation and Development (OECD), the global population is expected to reach around 8 billion in the year 2025. It is anticipated by the Indonesian Bureau of Statistics that this will also occur in Indonesia. There were 238.5 million people living in Indonesia in 2010, and by 2025, that number will have increased to 284 million. The earth seems to be shrinking in size as a result of the exponential growth of the human population and subsequent advances in technology. The ASEAN Economic Community (AEC) has received a lot of attention while discussing Southeast Asia. While some see it as a typical obstacle, others see it as a danger. We are compelled to innovate by the AEC, regardless of public opinion. Peace and unity among its citizens are highly valued and protected in Indonesia. This is in contrast to the more individualistic Western nations. The author notes that certain individuals may exhibit more aggressive behavior when temporarily residing in a collectivist environment but then revert to cautious competitiveness once they return to a more individualistic one [1]. Moreover, when compared to the Philippines, Singapore, Brunei, and Malaysia, Indonesia ranks worse on the competitiveness index. The ranking is influenced by students' levels of formal education, occupational training, and global standing. With a score of 0.622, Indonesia's Education Index ranks seventh in ASEAN (Association of Southeast Asian Nations) [2].

In this context, improving competitiveness is essential in Indonesia, particularly in the context of the current rapidly evolving technological landscape. The competitive behaviour of students in higher education is a critical factor in equipping the younger generation to meet the demands of the workforce. However, this behaviour is influenced by various factors, including internal ones, such as critical thinking skills and self-efficacy, and external such as social comparison. This phenomenon is becoming increasingly complex in the Central Java region, Indonesia, which has 250 universities in various cities with diverse student characteristics. However, empirical studies that explore how social comparison mediates the relationship between critical thinking, self-efficacy, and competitive behavior are still very limited, especially in the context of Indonesian culture and higher education.

Previous studies have focused on individual competitiveness in educational settings; however, little is known about the contaminating effects of focused competition on student performance. Behavioral science shows that competitiveness as a personality trait, fear of failure, and self-confidence predict perceived academic competitiveness across cultures [3]. In the context of higher education, competitiveness arises from both internal and external factors, all of which have implications for institutions, academics and students alike [4]. At the individual level, variables include parental expectations, school discipline and participation in extracurricular activities [5]. Despite the growing interest in competitiveness research, it remains a complex and fragmented field, with significant debate about the strengths and weaknesses of the field [6]. These studies demonstrate competition in the educational environment and its potential impact on student behaviour, student performance and institutional dynamics, with more research needed to understand the role of competition and its effects.

As demonstrated in the research by Haas *et al*. [7], students in specialised schools exhibit higher levels of competition and cooperativeness in comparison to those enrolled in traditional schools. Income inequality has been found to be associated with heightened competitiveness and diminished cooperativeness within academic institutions. Students from nations with unequal structures perceive their academic peers as more competitive and less cooperative [8]. These children exhibit a preference for instrumental rather than intrinsic cooperativeness, utilizing collaborative strategies primarily as a means to achieve academic success. The extant literature suggests that created income inequalities have been shown to increase perceived competitiveness and decrease perceived cooperativeness, and promote competitive as well as instrumental cooperative dispositions [8]. Students' anti-bullying attitudes benefit from a competitive learning environment, moderated by students' competitive dispositions [9]. Competitive learning environments lead students to develop more positive anti-bullying attitudes, and students' competitive dispositions somewhat moderate this association [9]. Prestigious institutions are settings for students with higher levels of competition and cooperativeness than their peers in standard schools [7]. Self-efficacy, adaptability, and social comparison are some of the factors that shape competitive behavior [1]. Instructors can affect the relationship between students' expectations and effort—the encouragement of critical thinking and stimulating teaching positively associated with their effort [10].

Critical thinking is an important competency in education, including clear reasoning, analysis, and independent thinking [11]. This includes the ability to identify the issue, understand the concept, and make a conclusion [12]. To successfully navigate social and physical environments, adapt to educational contexts and generate new ideas, students must strengthen their critical thinking skills [11]. The blended learning environment has been recognised as conducive to enhancing critical thinking, and students have also often expressed a positive opinion of blended learning [13]. Students also recognise specific pedagogies that can promote more critical thinking: discussions, project-based learning, real-world applications, research, collaborative learning, and case studies. Furthermore, socio-critical and problem-oriented methods have been identified as potentially beneficial in practical disciplines such as chemistry, with regard to the development of students' critical thinking skills, as well as their motivation and engagement. Individuals armed with their critical thinking skills will be able to maximise rationality in the pursuit of their goals, especially in competitive behaviour [12, 14].

In Bandura's social cognitive theory, self-efficacy is a critical concept that exerts a significant influence on the academic performance and behaviour of individuals. It refers to an individual's conviction that they possess the capacity to achieve success in specific circumstances [15].

The development of self-efficacy is influenced by four primary sources: mastery experiences, vicarious experiences, social persuasions, and physiological states [15, 16]. Verbal persuasion exerts a more significant influence on students with immigrant backgrounds, as students' cultural backgrounds can influence the relative importance of these sources [16]. In order to cultivate self-efficacy, educators can establish supportive social structures, address students' emotions, and develop objectives that demonstrate progress [17]. The predictive power of self-efficacy for future accomplishments is enhanced by its context-specificity and distinction from broader self-concepts [17]. Furthermore, the incorporation of outcome expectancies and personality dispositions into self-efficacy theory serves to elucidate the individual variations in problem-focused coping potential appraisals [18].

Since Festinger's original studies, social comparison theory has evolved, and more recent work has explored its complexities in a variety of contexts. Indeed, since whether results are perceived as similar to those of the comparison targets or not matters, individuals might demonstrate higher levels of self-efficacy when emphasizing similarities with more *versus* less active individuals [19]. A longitudinal investigation showed that compared to dimensions and temporal comparison effects, social comparison effects influenced ability evaluations to a greater extent [20]. At the organizational level, social comparisons are relevant to fundamental self-evaluations, team dynamics and corporate reputation, but some theoretical vagueness and uneven emphasis on a micro-level of analysis are causes for concern [21]. According to competitive situations and evaluation criteria, observational learning's influence on self-efficacy is variable, with the interpretation of winning or losing having an effect on this relationship [22].

The empirical model in this study was adapted from the research of Mildawani *et al*. (2022), which proposes that social comparison acts as a mediator in the relationship between critical thinking, self-efficacy, and competitive behaviour [1]. The study's issue statement is as follows: Is there evidence to back up the theory that suggests social comparison might mediate the relationship between competitive behavior, critical thinking capacity, and self-efficacy? Here is the empirical model used in the study: (Fig. **1**).

2. MATERIALS AND METHODS

2.1. Study Design

The relationship between the variables to be measured-critical thinking, self-efficacy, social comparison and students' competitive behaviour - is determined by the quantitative approach. As it emphasises the numerical measurement of these factors using tools such as rating scales and questionnaires, quantitative methods are appropriate. Furthermore, the purpose of the study, which is to test the effect of the independent variables (social comparison, self-efficacy and critical thinking) on the dependent variable (competitive behaviour), is explanatory, *i.e*., it attempts to explain under the conditions of the study, the relationship between the variables remains unchanged.

2.2. Hypothesis

Based on the theoretical framework and previous research, the hypothesis proposed in this study is:

H1: Critical Thinking has an effect on Competitive Behavior.

H2: Self-Efficacy has an effect on Competitive Behavior.

H3: Critical Thinking has an effect on Social Comparison.

H4: Self-Efficacy has an effect on Social Comparison.

H5: Social Comparison has an effect on Competitive Behavior.

H6: Social Comparison significantly mediates the relationship between Critical Thinking and Competitive Behavior.

H7: Social Comparison significantly mediates the relationship between Self-Efficacy and Competitive Behavior.

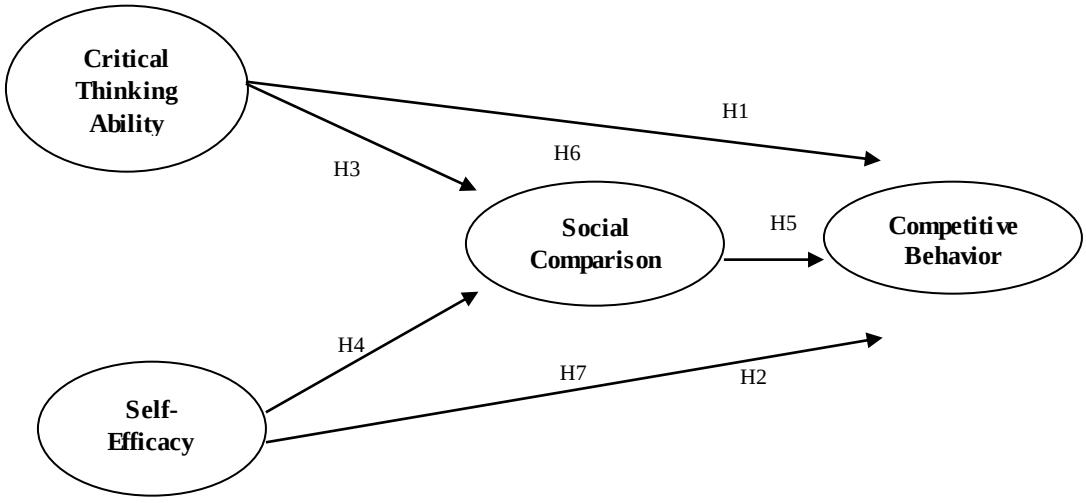

Fig. (1). Empirical model [1].

2.3. Procedure

Students were asked to fill out a Google form using a 5-point Likert scale in order to gather data. The data-gathering process was conducted online. The response rate was 91%, which is excellent, as 455 out of 500 questionnaires received were fully filled out. Magelang, Surakarta, Salatiga, Semarang, Pekalongan, Kajen, Batang, Klaten, Purbalingga, and Purwokerto are only a few of the towns in Central Java, Indonesia, where universities participated in the survey performed between August and October 2024.

Convenience sampling, a non-probability sampling method, is used due to the uncertainty around the precise population number. As part of the process of using a quantitative structural equation technique, we ensured that the data was normal. Individuals' perspectives, beliefs, and actions may be evaluated with the use of a quantitative research design and the measurement of study variables. Data was collected using a straightforward sampling strategy. The theoretical model was tested in a study of students in Central Java, Indonesia, utilizing structural analysis of the multivariate PLS-SEM approach to predict competitive behavior, self-efficacy, and critical thinking skills, with social comparison acting as a mediator.

This technique requires a sufficient sample size for the results of the analysis to be reliable and valid. Existing literature suggests that the minimum sample size for PLS-SEM is approximately 200-300 respondents, depending on the number of variables in the model. This study used multiple independent factors, mediators and dependent variables, which necessitated a larger sample size of 500 respondents to increase the power of the analysis and ensure model stability.

To reduce response bias, the survey was conducted anonymously, allowing respondents to give honest answers without social pressure. In addition, the measurement instruments used were assessed for validity and reliability to reduce measurement bias. Questions focused on current experiences or behaviours, minimising the likelihood of recall bias. To reduce confounding bias, demographic data were collected and analyzed. The data included age, gender, and highest education. To reduce non-response bias, a commendable response rate of 91% was achieved by facilitating access to the survey and providing explicit instructions.

2.4. Participants

The study involved students from several universities in Central Java, Indonesia. Participants were selected using convenience sampling, a form of non-probability sampling. Participants were only filtered based on their enrolment status in the participating universities; no other criteria were used. A publicly available Google form was used to conduct an online survey and collect data. The participating universities included 250 educational institutions from several major cities, including Magelang, Surakarta, Salatiga, Semarang, and others. Data for this study was collected between August and October 2024. The aim was to assess the relationship between the variables of competitive behaviour, social comparison, self-efficacy and critical thinking simultaneously, without follow-up or continuous observation of the participants. The data was collected once, without repeated observations or cause-and-effect analysis of long-term exposure and outcomes, so the cross-sectional study design was appropriate for this research.

2.5. Measure

The term “competitive behavior” is used in this context to refer to actions taken by individuals with the intention of attaining a higher position in relation to predetermined goals or criteria. Various components of competitive behavior, including the drive to compete, the pursuit of supremacy, and self-representation, are used to construct a behavioral scale that measures competitive behavior [23]. Twelve positive items and ten negative (reverse scored) items make up this scale's total of twenty-two items.

As used in this research, “social comparison” refers to people's propensity to judge their own abilities by contrasting them with those of other people. According to a study [24], there are three components of social comparison that the authors used to build a scale for measuring social comparison. These components include views on specific standards, views on opinion comparisons, and views on the competence of other people. Twelve positive items and ten negative (reverse-scored) items make up a total of 22 on this scale.

The capacity to think analytically, synthesize information, and find solutions to problems is the operational definition of Critical Thinking Ability in this research [25]. These three factors constitute a scale for evaluating critical thinking abilities. Twelve positive items and twelve negative (reverse scored) items make up the total of twenty-four items on this scale.

The capacity to self-regulate and display competencies that function as capital to attain predefined objectives is operationally defined as self-efficacy in this research. Attitudes toward self-evaluation, self-regulation, and one's own presentation make up a self-efficacy scale (Bandura, 2001). Out of a total of 23 elements, 12 are positive and 11 are negative (reverse rated) on this scale.

2.6. Data Analysis

The proposed model evaluated and tested in this research uses Smart-PLS version 3.1.0.0 for analysis. It uses PLS-SEM to simultaneously assess direct and indirect interactions within complex multi-variable models. This method is particularly suited to exploratory and predictive research designs, especially in cases where traditional covariance-based SEM may not be ideal due to sample size limitations or non-normal data distribution. PLS-SEM excels in the analysis of reflective and formative constructs, making it well-suited to the study of students' competitive behaviour. The analysis begins with the evaluation of the outer model by examining item similarities in the outer loadings, assessing convergent and divergent validity, and calculating the average variance extracted. Reliability is measured using composite reliability and Cronbach's alpha to ensure internal consistency. The internal model is then analysed using bootstrapping to determine path coefficients

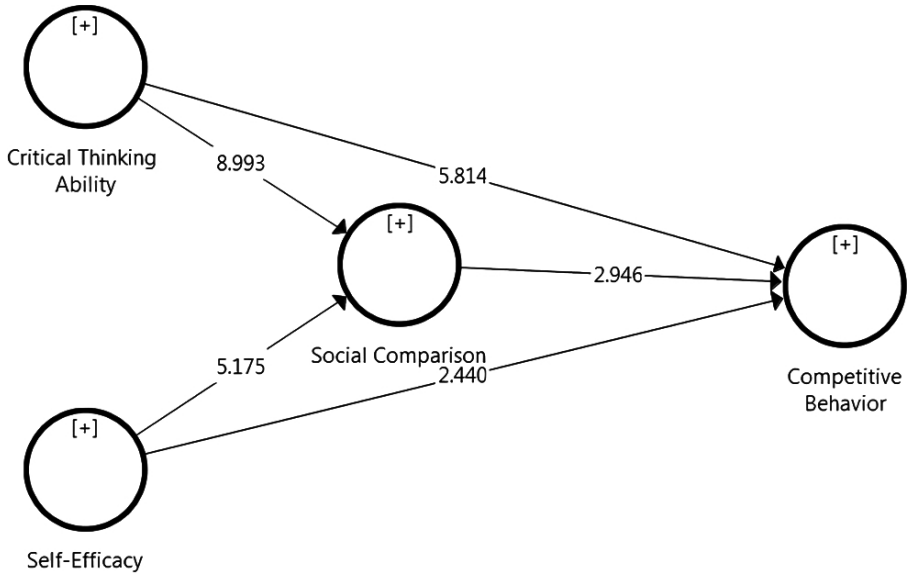

Fig. (2). Structural equation model.

and statistical significance to validate the hypothesised relationships. This methodological approach enhances the robustness and predictive power of the research findings [26].

3. RESULTS

Using a quantitative research approach, this study examined college students in Central Java, Indonesia, to see whether social comparison mediated the relationship between critical thinking skills, self-efficacy, and competitive behavior. The participant demographics are shown in Table **1**.

Table 1. Demographic details (N=455).

Criteria	Description	Frequency	Percentage
Gender	Male	236	51,87
	Female	219	48,13
Age	18 Years – 22 Years	187	41,10
	23 Years – 27 Years	158	34,73
	28 Years – 32 Years	76	16,70
	Over 32 Years	34	7,47
Students	D3	80	17,58
	D4	49	10,77
	S1	218	47,91
	S2	93	20,44
	S3	15	3,30

Fig. (**2**) presents a path diagram illustrating the positive effect of critical thinking on competitive behavior.

Also, competitive behavior is positively correlated with self-efficacy. Social comparison positively influences competitive behavior, while critical thinking has a direct beneficial effect. Self-efficacy is positively correlated with competitive behavior, and critical thinking also enhances social comparison. Critical thinking, self-efficacy, and competitive behavior are all positively correlated with social comparison, the mediating variable. The item loadings generated by the PLS method show the degree of similarity of the individual items in relation to the construct of interest.

3.1. Internal Consistency Measures for Measurement Models

The first analysis phase is model specification with confirmatory factor analysis. In this phase, the variables of critical thinking, and self-efficacy are included in the exogenous construct. The social comparison variable is included in the exogenous construct and is also an endogenous model, while the competitive behavior variable is included in the endogenous construct category. The model specification has five inner models and 91 outer models. The model is categorized as a reflective model.

To develop an external model, the PLS algorithm assesses external loadings, composite reliability, discriminant validity, and external loadings. Items with loadings above 0.70 signify that the model accounts for over 50% of the variance in the constructs, with composite reliability ideally reaching a minimum of 0.70. A composite reliability value exceeding 0.60 indicates the model's significance, with a typical benchmark of over 0.70. The outer model fit, particularly for mediation and moderation concepts, is evaluated through the average variance extracted (AVE) in the subsequent step, which should surpass 0.50 for each construct [26].

The primary goal of the first model evaluation was to determine the item loadings using a reflective model type using confirmatory factor analysis (CFA) [27]. In accordance with the minimal threshold for item loadings, all five constructions' item loadings (Fig. **2**) demonstrated values greater than 0.5. The loadings for the following constructs varied: Competitive Behavior (CB): 0.958 to 0.975; Social Comparison (SC): 0.724 to 0.985; Critical Thinking (CT):

0.725 to 0.911; and Self-Efficacy (SE): 0.778 to 0.985 [27]. Convergent validity had been attained, as shown by the implications of this figure. You can see the construct validity and reliability in Table 2.

Table 2. Measurement of outer model.

Variable	CR	AVE	Cronbach's Alpha
Competitive Behavior	0,997	0,934	0,997
Critical Thinking Ability	0,985	0,737	0,984
Social Comparison	0,993	0,862	0,992
Self-Efficacy	0,997	0,937	0,997

Note: Source: Data Processed.

The internal validity of the model is shown in Table 2 above, *i.e.*, Composite Reliability (CR), Average Variance Extracted (AVE) and Cronbach's Alpha. The CR is between 0.985 and 0.997, which confirms that the internal consistency of all constructs is at a high level. The AVE varies between 0.737 and 0.937, which means that all the variables vary in their ability to exemplify the variable, which is always above the minimum of 0.5. Furthermore, Cronbach's Alpha values of 0.984 to 0.997 show a high reliability of all the variables.

This means that the variables competitive behaviour (CR = 0.997, AVE = 0.934, Cronbach's Alpha = 0.997), critical thinking ability (CR = 0.985, AVE = 0.737, Cronbach's Alpha = 0. 984), social comparison (CR = 0.993, AVE = 0.862, Cronbach's Alpha = 0.992) and self-efficacy (CR = 0.997, AVE = 0.937, Cronbach's Alpha = 0.997) met the appropriate reliability and validity standards in this model. This is further supported by Table 3, which highlights the significant convergent validity of all constructs.

Table 3. Discriminant validity.

Constructs	CB	CTA	SE	SC
Competitive Behavior	0,966	-	-	-
Critical Thinking Ability	0,545	0,858	-	-
Self-Efficacy	0,440	0,613	0,968	-
Social Comparison	0,469	0,649	0,558	0,929

Note: Source: Data Processed.

The subsequent phase involves the evaluation of discriminant validity. Discriminant validity serves as an indicator that the construct is distinct from the associated term when evaluating the study model. The maximum squared correlation between any two latent variables must be equal to or greater than the value indicated above for each latent construct. This criterion, also known as the Fornell-Larcker criterion, ensures overall discriminant validity [28].

Table 3 shows that, according to the Fornell-Larcker criterion, the diagonal values of the constructs must exceed those of the related constructs, thus illustrating the distinctiveness of the study model.

3.2. Test of Hypothesis

The bootstrapping method was employed to evaluate the structural model within a partial least squares structural equation modeling (PLS-SEM) approach. The margin of error was 0.05%, and the significance level was evaluated at the 95% confidence level [29].

Table 4 shows the research variables' direct and indirect consequences. H1 is accepted because there is a significant association between critical thinking and competitive behavior (β = 0.362; t = 5.814, $p < 0.000$). A substantial association (β = 0.127; t = 2.440, $p < 0.015$) exists between self-efficacy and competitive behavior, which supports the adoption of H2. Moreover, H3 is accepted due to the significant link between critical thinking and social comparison (β = 0.491; t = 8.993, $p < 0.000$). Hence, H4 is accepted since there is a substantial link between self-efficacy and social comparison (β = 0.257; t = 5.175, $p < 0.000$). Finally, it is worth noting that there is a noticeable association between social comparison and competitive behavior (β = 0.163; t = 2.946, $p < 0.003$), which supports the adoption of H5 and suggests a beneficial influence. Moreover, H6 is validated since social comparison exerts a positive interaction (β = 0.080; t = 2.850, $p < 0.005$) mediating the link between critical thinking and competitive behavior. Just as critical thinking and competitive behavior are both mediated by social comparison, which confirms H7, the positive interaction between the two is also statistically significant (β = 0.042; t = 2.302, $p < 0.022$).

4. DISCUSSION

Critical thinking helps students analyze situations logically, make better decisions, and develop innovative solutions. In the context of academic or professional competition, this ability allows students to face challenges with more effective strategies. Critical thinking contributes directly to students' ability to behave competitively in Central

Table 4. Hypothesis testing.

Constructs	Independent Variable	Mediator	Dependent Variable	β	T statistics, >1.96	*p*-values, <0.05	Decision
H1	Critical Thinking Ability	-	Competitive Behavior	0.362	5.814	0.000	Accepted
H2	Self-Efficacy	-	Competitive Behavior	0.127	2.440	0.015	Accepted
H3	Critical Thinking Ability	Social Comparison	-	0.491	8.993	0.000	Accepted
H4	Self-Efficacy	Social Comparison	-	0.257	5.175	0.000	Accepted
H5	-	Social Comparison	Competitive Behavior	0.163	2.946	0.003	Accepted
H6	Critical Thinking Ability	Social Comparison	Competitive Behavior	0.080	2.850	0.005	Accepted
H7	Self-Efficacy	Social Comparison	Competitive Behavior	0.042	2.302	0.022	Accepted

Note: Source: Data Processed.

Java. By developing these skills, students are only able to face academic challenges but also become individuals who are ready to compete in the professional realm. Chance, a specialist in cognitive psychology, defines critical thinking as the capacity to assess information, organize and articulate ideas, support viewpoints, analyze similarities, reach conclusions, critique arguments, and solve problems [30]. He further asserts that critical thinking empowers individuals to generate inventions that directly enhance personal accomplish-ments. Students with high self-efficacy tend to feel more confident in competing, both in academic and non-academic areas. Discussion of self-efficacy encourages students to see competition as an opportunity to learn and grow, not just to win. This creates healthy competitive behavior. Self-efficacy theory posits that self-efficacy affects people's actions and attitudes, especially their competitiveness. Studies indicate that persons with elevated self-efficacy have greater inclinations toward competition [1]. In this case, two potential motivating factors can be at play: Those who rate themselves highly in terms of self-efficacy are more likely to exhibit good mental traits like optimism, confidence, and a feeling of mastery over one's own life. With these optimistic views, one's competitive spirit may soar [31].

Critical Thinking has an effect on social comparison. Critical thinking skills influence how students conduct social comparisons, which ultimately impact competitive behavior. Students who think critically tend to be more objective in comparing themselves to others, using upward comparisons to motivate self-improvement and downward comparisons to evaluate their achievements. This healthy social comparison encourages more strategic, productive, and purposeful competitive behavior among students.

Culturally, economically, and academically varied social settings are commonplace for university students in Central Java. Confidence in one's own abilities is a key factor in how this influences social comparison. Learn more about how kids in Central Java handle peer pressure by reading up on self-efficacy. A student's personal growth, mental stability, and competitive behavior may all benefit from a healthy dose of self-efficacy, which allows them to constructively handle social comparison. The emergence of negative emotions, such as jealousy and depression, as a consequence of social comparisons is a concern in this era of extensive social media usage [32, 33]. Here, self-efficacy serves as psychological capital, instigating constructive coping mechanisms (both mental and physical) like being consistent and persistent in pursuit of goals [33].

Social comparison has a significant influence on competitive behavior of students in Central Java universities. Students who compare themselves with peers are more likely to be driven to enhance their performance, especially in academic contexts or extracurricular activities. Upward comparison can encourage them to set higher standards and try harder, while downward comparison can increase self-confidence. Recent research by Boecker *et al*. demonstrates that comparing one's own situation to that of other people serves an adaptive purpose, bringing harmony to relationships and decreasing inequality through shaping one's own emotional and behavioral responses to the success or failure of other groups or individuals, whether those reactions are congruent (such as joy or sympathy) or incongruent (such as schadenfreude or envy) [30].

Research shows that social comparison significantly mediates the connection between critical thinking and competitive behavior. Critical thinking skills help students evaluate themselves and their environment logically, which influences how they compare themselves to others. Social comparison then shapes their competitive behavior, both by motivating self-improvement through upward comparison and by strengthening self-confidence through downward comparison. In the context of students in Central Java, social comparison serves as an important bridge connecting critical thinking with healthy and productive competition patterns. According to research, competitive behavior in kids is greatly affected by their critical thinking abilities and social comparison. According to research demonstrating that critical thinking skills are an important aspect of character development and self-assessment [34, 35], such skills contribute positively to the character of students. This paper examines social comparison and competitive behavior, which influences the association of several psychological constructs and competitive behavior, in confirmatory motivation and allocation of effort [36].

Social comparison significantly mediates the connection between self-efficacy and competitive behavior, showing that students with higher levels of self-efficacy are more inclined to make constructive social comparisons, either through upward comparison to increase motivation or downward comparison to strengthen self-confidence. This means that social media content can be used for several purposes, but it will also be useful to use this product. There are many different types of content in Central Java, so social comparison can be used directly. Studies indicate that social comparison significantly mediates the association between self-efficacy and competitive behavior in students [1]. Self-efficacy is favorably associated with beneficial social comparisons, which may improve motivation or self-confidence [36]. Media attention and reliance correlate with heightened self-efficacy, which subsequently affects prosocial actions [37].

A number of shortcomings of the study should be considered. The use of self-reported measures may introduce bias, as participants may provide socially acceptable responses rather than truthful reflections. The findings may not be as applicable to students in other areas or demographics due to the focus on Central Javan University students. The study's cross-sectional design prevents the ability to demonstrate a relationship between competitive behaviour, social comparison, self-efficacy and critical thinking. These limitations may affect the strength and direction of the associations, suggesting that caution should be used in interpreting the findings. Recent research has examined critical thinking within educational settings. Mildawani *et al*. [1] discovered that competitive behaviour is affected by self-efficacy and adaptability, with social comparison serving as a mediator. Darwin *et al*. elucidated the intricate perspectives of students on the advantages and

constraints in the development of critical thinking [38]. Purnamaningwulan demonstrated that listening journals significantly enhance students' critical thinking abilities in an integrated course [39].

The study shows that self-efficacy and critical thinking are crucial for promoting competitive behaviour, with social comparison acting as a mediating factor. However, these results should be treated with caution due to possible biases, the specificity of the sample and the complexity of the relationships analysed. Regional and cultural circumstances may introduce unique dynamics that are not represented here, although the findings are in agreement with those of similar studies. Further research, particularly in the areas of experimental and longitudinal designs, would be needed to clarify these relationships and improve understanding. Mildawani *et al*. [1] reported self-efficacy and adaptation ability as positive predictors of competitive behavior through social comparison. Relatedly Vázquez-Parra *et al*. [40] showed the correlation between complex thinking, entrepreneurial self-efficacy and social entrepreneurship competencies. Wu *et al*. [41] did show that entrepreneurship education has a positive influence on entrepreneurial intentions, which is fully mediated by entrepreneurial self-efficacy. Gong *et al*. [37] generalized these findings to prosocial behaviors by showing the impact of media attention and media dependency upon self-efficacy that leads to prosocial attitudes.

The results are particularly relevant to university students in Central Javan and those in comparable educational and cultural settings. Results should be extrapolated with caution to other populations or regions. Studies with a variety of samples from different geographical locations, socio-economic backgrounds and educational settings may improve the generalisability of the findings.

CONCLUSION

This study highlights the significant role of critical thinking skills in shaping students' competitive behavior, both directly and through their influence on social comparison. Additionally, self-efficacy is found to be a key factor in fostering both social comparison and competitive behavior. These findings demonstrated social comparison with other individuals is a significant mediator, strengthening the relationship of critical thinking as well as self-efficacy in an individual's competitive behaviour. This implies that students' perceptions of their peers not only affect their self-assessment, but also foster healthy competition.

In light of this, universities across Central Java need programs that not only foster innovative perspectives but also cultivate critical thinking and self-efficacy among students. This allows educational institutions to foster an academic environment capable of instilling healthy competition, as well as positively impacting students' personal and career growth. The implications for education policy are significant and address the need for curricula and pedagogic approaches that include critical thinking, as well as self-efficacy training, in order to develop students who will be able to compete in increasingly competitive academic and professional environments.

AUTHORS' CONTRIBUTIONS

The authors confirm their contributions to this paper as follows. R.A.P.: The study conception and design were carried out; B.G.: Data collection was conducted; I.N.S. was responsible for the analysis and interpretation of the results. P.P. and F.K.N.: The initial draft of the manuscript was prepared. All authors reviewed the findings and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

CB	=	Competitive Behavior
SC	=	Social Comparison
CTA	=	Critical Thinking Ability
SE	=	Self-Efficacy
CFA	=	Confirmatory Factor Analysis
CR	=	Composite Reliability
AVE	=	Average Variance Extracted
PLS-SEM	=	Partial Least Squares Structural Equation Modeling
SCT	=	Social Cognitive Theory
ASEAN	=	Association Of Southeast Asian Nations
AEC	=	Asean Economic Community
OECD	=	Organisation for Economic Co-Operation and Development

ETHICAL STATEMENT

This research project is considered low-risk and is exempted from ethics approval by the IRB at Universitas Sebelas Maret, Indonesia, as it only involved an anonymous online survey, posing no foreseeable harm or discomfort to participants.

CONSENT FOR PUBLICATION

Written informed consent was obtained from all participants included in this study for the publication of their data.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article will be available from the corresponding author [P.P] upon reasonable request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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