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COGNITIVE BIAS EFFECTS ON POLYTECHNIC STUDENTS' INVESTMENT DECISIONS IN SEMARANG

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ABSTRACT

The rapid growth of young investors in Financial reflects increasing engagement with the capital market, yet novice investors remain vulnerable to cognitive biases in decision-making. This study investigates the influence of self-attribution bias (internal and external), confirmation bias, and overconfidence bias on investment decision-making among undergraduate Polytechnic students in Semarang. A quantitative research design was employed using a structured questionnaire, and the data collected from 117 respondents were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Findings reveal that internal self-attribution bias significantly affects investment decisions, both directly and through its mediating role in overconfidence bias. In contrast, confirmation bias showed a financially significant effect on investment behavior. The study concludes that internal psychological attributions, particularly beliefs in personal competence, are key drivers of student investor behavior. These results underscore the importance of integrating behavioral finance and awareness of cognitive biases into financial education to support more rational, informed investment decisions.

Keywords: Self-Attribution Bias, Overconfidence Bias, Confirmation Bias, Investment Decision-Making, Cognitive Psychology.

INTRODUCTION

The capital market is a key foundation for driving economic growth and improving public welfare, serving as a link between investors and business actors (Gunawan & Wiyanto, 2022). In Financial, the number of individual investors has grown rapidly, especially among young people under 30 years old, who accounted for over 54% of more than 15.7 million active investors as of March 2025 (Huaxia, 2025). This financial behavior is driven by easy access to technology, popular app-based investment platforms, and continuous financial education through social media, with most young investors being male and university graduates (Pradikasari & Isbanah, 2018).

Investment decisions involve not only rational factors such as analysis and planning but are also strongly influenced by psychological factors, particularly financial behavior driven by attitudes and emotions (Pradnyani & Sujana, 2023). Cognitive biases such as self-attribution, confirmation, and overconfidence often impair objectivity, leading investors to uet personal beliefs or emotions rather than rational analysis. Self-attribution bias includes attributing success to personal ability while blaming external factors for failures, which may lead to overconfidence. Confirmation bias causes investors to focus on information that supports their existing beliefs and ignore contradictory data (Angraini et al., 2022).

Most studies on these biases focus on experienced investors (Said, 2020), while research on students, especially Polytechnic students in Semarang with diverse academic backgrounds, remains limited (Hastuti et al., 2020). As novice investors, students are more susceptible to biases due to limited experience and information (Kulintang & Putri, 2024). Understanding these biases and their interactions is essential to designing effective financial education that enhances the quality of investment decisions.

Globally, young investors' behavior varies across different cultural and technological contexts. US and Canadian youth favor high-risk investments like cryptocurrency (Shah, 2025), Chinese youth focus on internet-based products with social values, and European millennials tend to be more cautious (Tomlinson, 2019). These differences highlight the need for localized studies in Finansial, with its unique digital financial inclusion and youthful demographics. This study aims to fill the gap by examining the relationships among cognitive biases affecting young Indonesian investors, particularly polytechnic students in Semarang, to support more rational and informed investment decisions through improved financial education.

Based on this background, the assumptions/hypotheses formed include:

H_1: Self-attribution on Internal Bias to Investment Decisions

This hypothesis states that internal self-attribution positively and significantly influences investment decisions. Individuals who attribute investment success to internal factors, such as personal ability or effort, are more likely to make confident, well-directed investment decisions than those who do not. Previous research supports that internal attribution influences investor decision-making behavior (Islam et al., 2024). This study found that risk propensity mediates the relationship between behavioral bias and investment decisions, such that investors who attribute investment success to internal factors tend to make riskier investment decisions but are more psychologically stable.

H_2: Self-attribution on External Bias to Investment Decisions

This hypothesis posits that external self-attribution has a positive, significant effect on investment decisions. External self-attribution refers to attributing investment outcomes to factors outside personal control, such as luck, economic conditions, or assistance from others, which can affect investor confidence and decision-making. Studies by Acharya et al. (2025) indicate that investors who attribute success to external factors exhibit distinct patterns in their investment decisions. Moreover, Saraskanrood & Ghafouri (2022) confirm the significant role of external self-attribution in shaping investor behavior. Hence, greater external self-attribution is expected to increase its impact on investment decisions.

H_3: Confirmation Bias in Investment Decisions

Confirmation bias, the tendency of investors to focus only on information that reinforces their initial beliefs while ignoring contradictory evidence, has been shown to influence investment decisions in recent international studies significantly. For example, research by Shunmugasundaram & Sinha (2025) found that confirmation bias had a statistically significant negative effect on financial decision-making, particularly in academic and professional settings. Similarly, Mohanty et al. (2024) emphasized that confirmation bias, together with conservatism bias, is mediated by factors such as overconfidence and clearly affects investment decisions in the insurance context in India.

H_4: Overconfidence Bias in Investment Decisions

This hypothesis posits that overconfidence bias has a positive, significant effect on investment decisions. Investors exhibiting overconfidence tend to overestimate the accuracy of their judgments and predictions, influencing their investment choices and risk-taking behavior. Overconfident investors often feel optimistic that their investments will outperform the average, which may lead to more frequent or riskier investments. Prior research has demonstrated that overconfidence bias significantly affects investor behavior and can lead to suboptimal investment decisions (Abdin et al., 2022). Therefore, higher levels of overconfidence bias are expected to increase its impact on investment decision-making.

H_5: Self-attribution on Internal Bias to Overconfidence

The hypothesis in this study is that there is a positive, significant relationship between internal self-attribution and overconfidence. Individuals who tend to attribute success to internal factors, such as personal ability or effort, will show higher levels of overconfidence than those who do not. It is supported by research conducted by Asri & Santi (2025), which found that self-attribution bias and past success indirectly influence trading frequency through overconfidence as a mediating variable. In addition, research Saraskanrood & Ghafouri (2022) on investors in the Tehran Stock Exchange also confirms a positive and significant relationship between internal self-attribution and overconfidence, which, in turn, directly affects investor behavior. Thus, the stronger an individual's internal self-attribution, the greater their tendency to experience overconfidence.

H_6: Self-attribution on External Bias to Overconfidence

The hypothesis in this study is that external self-attribution has a positive, significant effect on overconfidence. External self-attribution is the tendency of individuals to attribute investment success to factors beyond personal control, such as luck, economic conditions, or the help of others. Research Acharya et al. (2025) shows that investors who view success as the result of external factors tend to have overconfidence in investment decision-making. Furthermore, Saraskanrood & Ghafouri (2022) in their study of the Iranian capital market also confirmed that self-attribution bias, including external bias, significantly increases investor overconfidence. Thus, the greater an individual's tendency toward external self-attribution, the higher the overconfidence in investment decision-making.

H_7: Confirmation Bias on Overconfidence

In investment decision-making, investor confidence plays a crucial role in determining the results achieved. However, overconfidence often poses a risk, as it can cause investors to underestimate uncertainty and ignore important information that contradicts their beliefs. Research by Cheng (2019) shows that confirmation bias causes investors to be more selective in accepting information that supports their initial beliefs

and to ignore information that contradicts them. Overconfidence itself is still recognized as a significant bias in decision-making, with various studies emphasizing that it is a "meta-bias" that affects many aspects of individual decisions (Binnendyk & Pennycook, 2024). Furthermore, experimental research involving financial management students shows a positive relationship between confirmation bias and overconfidence, in which investors affected by this bias tend to ignore information that could correct their excessive beliefs (Supramono & Wandita, 2017). Therefore, the stronger a person's confirmation bias, the greater the overconfidence in investment decisions.

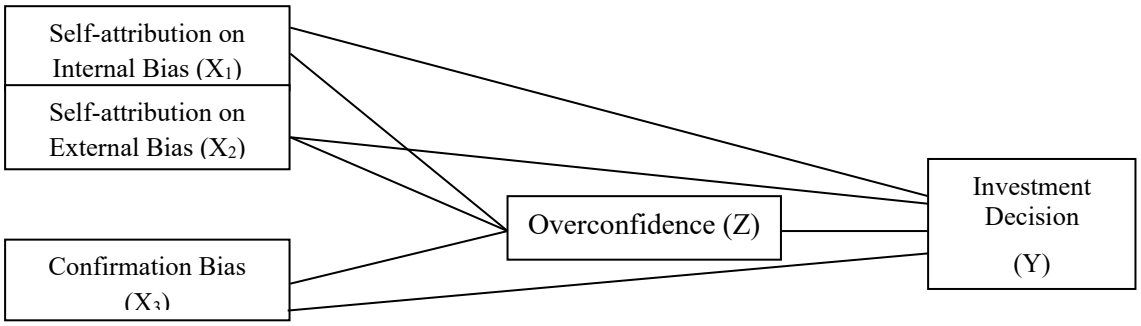

Figure 1. Framework of Thought

RESEARCH METHODS

This study aims to explore the influence of self-attribution bias (internal & external), overconfidence bias, and confirmation bias on investment decision-making among students, with reference to prospect theory related to investment behavior. The research design is descriptive-analytical with a quantitative approach. The population focused on in this study was active polytechnic students in Semarang. Polytechnic students in Semarang were selected based on their representative population, adequate investment knowledge and experience, and ease of data collection. The sample size was determined using the Judgmental Sampling technique. Primary data collection was conducted using a questionnaire that applied a 5-point Likert scale, where 1 indicated strongly disagree, and 5 indicated strongly agree. This study also emphasized research ethics by maintaining data confidentiality and providing respondents with clear information about the study's purpose. The entire research process was carried out after obtaining approval from relevant parties, including institutions and participating respondents.

Data analysis used descriptive statistics to identify sample characteristics and regression analysis to evaluate relationships among self-attribution bias, overconfidence bias, and confirmation bias in investment decisions. This study also considered control factors such as educational background and previous investment experience. After collecting primary data using the Likert scale, the analysis continued using the Partial Least Squares (PLS) approach, with SmartPLS 4 software used for the calculations. Thus, it is hoped that a feasible model can be produced. Within the PLS-SEM analysis framework, two submodels are required: the measurement model (outer model) and the structural model (inner model). Both contribute significantly to understanding the relationships among variables in this study.

RESULTS AND DISCUSSION

An overview of the respondents in the study, including their level of education, major, religion, investment experience, source of income, and monthly income, is presented comprehensively in Table 1. The respondent profile provides an overview of the demographic composition of the study participants.

Table 1. Respondent Profile

Respondent Profile	Category	N	Percentage
Level	1	15	12.8%
	2	20	17.1%
	3	77	65.8%
	4	5	4.3%
Dapartement	Business Administration	17	14.7%
	Accounting	63	54.3%
	Electrical Engineering	14	12.1%
	Mechanical Engineering	12	10.3%
	Civil Engineering	10	8.6%
Religion	Buddhism	1	0.9%
	Hinduism		
	Islam	113	96.6%
	Catholic		
	Confucian		
	Protestant Christian	3	2.6%
Investment Experience	< 6 Months	64	54.7%
	6 Months - 1 Year	20	17.1%
	> 1 Year	33	28.2%
Source of Income	Salary / Income	28	23.9%
	Pockets money from parents	92	78.6%
	Loans from other parties	2	1.7%
	Savings	40	34.2%
	Scholarship	17	14.5%
	Other	8	6.8%
Income Per Month	< Rp 500,000	38	32,5%
	Rp 500,000- Rp 1,000,000	42	35.9%
	Rp 100,000- Rp 3,000,000	31	26.5%
	> Rp 3,000,000	6	5.1%

Source: Data Processed, 2025

Of the 117 confirmed respondents, all met the established criteria. All respondents were from the polytechnic students in Semarang. The majority of respondents were third-year students, most of whom were from the Accounting department and were Muslim, with less than 6 months of investment experience. The majority of investment funds came from their parents' pocket money, with monthly incomes of Rp500,000-Rp1,000,000. Based on Hair et al. (2021), measurement models can be used to test validity, reliability, and collinearity. The first test of the measurement model is convergent validity, which assesses the extent to which the indicators are highly correlated in measuring the construct. The main points to note in the research are the factor loadings and AVE (Average Variance Extracted), which is the average variance extracted (Hair et al., 2021).

An indicator is considered valid when the factor loading value is sufficiently large above the 0.700 threshold, and the AVE value is sufficiently large above 0.500.

Table 2. Validity Test

Item	X_1 (Self-Attribution Internal Bias)	X_2 (Self-Attribution Eksternal Bias)	X_3 (Confirmation Bias)	Z (Overconfidence Bias)	Y (Investment Decision)	Results
SAI2	0.908					
SAI3	0.905					
SAI4	0.896					
SAI5	0.910					
SAE1		0.843				
SAE3		0.884				
SAE4		0.817				
CB1			0.718			All
CB2			0.879			Data
CB3			0.815			(Item)
CB4			0.867			Valid
CB5			0.712			
OB1				0.772		
OB2				0.744		
OB3				0.887		
OB4				0.899		
OB5				0.904		
KI5					0.920	
KI7					0.850	

Source: Data Processed, 2025

The data in Table 2 show that all items are valid, as they meet the criteria for convergent validity. The second test conducted on the measurement model is the discriminant validity test. Discriminant validity is related to the principle that various measures of a construct must have and show high correlations. One of the two available methods for evaluating discriminant validity is the cross-loading approach. This approach is considered valid when the factor loadings of the factors within the relevant construct exceed the correlations of the variables with other constructs (Budhi, 2018). When the correlation of a construct is highest with another construct, can that construct be considered valid? This can be achieved by comparing the square root of the AVE values (Hair et al., 2021).

Table 3. Fornell-Larcker Criteria

Variable	X_1	X_2	X_3	Z	Y	Results
X_1 (Self-Attribution Internal Bias)	0.905					
X_2 (Self-Attribution Eksternal Bias)	0.474	0.848				Whole Variable
X_3 (Confirmation Bias)	0.556	0.460	0.801			
Z (Overconfidence Bias)	0.361	0.317	0.177	0.844		Valid
Y (Investment Decision)	0.443	0.359	0.336	0.470	0.885	

Source: Data Processed, 2025

Based on the results of the discriminant validity test using the Fornell-Larcker criteria, all variables in this research model were declared valid. It is indicated by the square root of the Average Variance Extracted (AVE) value of each construct being greater than the correlation between other constructs. Thus, it can be concluded that all variables in this study have good discriminant validity. It means that each construct in the model truly represents a distinct concept, with no overlap in meaning among the variables. These results reinforce the belief that the measurement model used is appropriate and can be continued to the structural analysis stage.

Table 4. Reliability Test

Variable	Cronbach's Alpha	Reliabilitas Komposit	Results
X_1 (Self-Attribution Internal Bias)	0.926	0.947	
X_2 (Self-Attribution Eksternal Bias)	0.808	0.885	Whole
X_3 (Confirmation Bias)	0.859	0.899	Variable
Z (Overconfidence Bias)	0.898	0.925	Reliabel
Y (Investment Decision)	0.730	0.879	

Source: Data Processed, 2025

Based on the reliability test results, all constructs in the research model showed satisfactory values and met the reliability criteria. Cronbach's Alpha and Composite Reliability (CR) were both above the minimum threshold of 0.700, indicating that the indicators in each construct were consistent in measuring the intended variables. Thus, all constructs in this study meet the criteria for reliability and convergent validity, making them suitable for further structural model analysis.

Table 5. Multicollinearity Test Results: Variance Inflation Factor (VIF)

Variabe	Item	VIF
X_1 (Self-attribution on Internal Bias)	SAI2	3.278
	SAI3	3.257
	SAI4	3.095
	SAI5	3.223
X_2 (Self-attribution on External Bias)	SAE1	1.613
	SAE3	1.922
	SAE4	1.829
X_3 (Confirmation Bias)	CB1	1.879
	CB2	2.828
	CB3	2.130
	CB4	2.613
	CB5	1.424
Y (Investment Decision)	KI5	1.493
	KI7	1.493
Z (Overconfidence Bias)	OB1	1.994
	OB2	1.821
	OB3	3.379
	OB4	4.296
	OB5	3.568

Source: Data Processed, 2025

The table above shows the values of Collinearity Statistics (VIF) for each variable. It is known that the VIF value for each variable has a cut-off value > 0.1 but still < 5. It indicates that the variables observed in this study do not violate the multicollinearity test.

Table 6. Direct Effect

Connection	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Results
X_1 → (Self Attribution on Internal Bias) →Y (Investment Decision)	0.209	0.202	0.123	1.706	0.044	Positively Significant
X_2 → (Self Attribution on Eksternal Bias) →Y (Investment Decision)	0.099	0.089	0.124	0.795	0.213	Positive Not Significant
X_3 → (Confirmation Bias) →Y (Investment Decision)	0.114	0.133	0.104	1.097	0.136	Positive Not Significant
Z → (Overconfidance Bias) →Y (Investment Decision)	0.343	0.352	0.085	4.014	0.000	Positively Significant
X_1 → (Self Attribution Bias Internal) → Z (Overconfidance Bias)	0.313	0.311	0.114	2.741	0.003	Positively Significant
X_2 → (Self Attribution Bias Eksternal) → Z (Overconfidance Bias)	0.212	0.218	0.114	1.857	0.032	Positively Significant
X_3 → (Confirmation Bias) → Z (Overconfidance Bias)	-0.095	-0.086	0.131	0.722	0.235	Negative Not Significant

Source: Data Processed, 2025

Based on the path analysis shown in the table, the hypothesis testing in this study yields several important findings. Self-attribution of internal bias significantly affects investment decisions, with a t-statistic of 1.706 and a p-value of 0.044 (<0.050), supporting the first hypothesis. In contrast, self-attribution on external bias has no significant effect on investment decisions (t = 0.795; p = 0.213 > 0.050), so the second hypothesis is rejected. Similarly, confirmation bias does not show a significant effect on investment decisions (t = 1.097; p = 0.136 > 0.050), so the third hypothesis is rejected. However, overconfidence bias has a highly significant influence on investment decisions with a t-statistic value of 4.014 and a p-value of 0.000 (<0.050), so the fourth hypothesis is accepted. Furthermore, self-attribution on internal bias also has a significant effect on overconfidence bias (t = 2.741; p = 0.003 < 0.050), as well as self-attribution on external bias, which shows a significant effect on overconfidence bias (t = 1.857; p = 0.032 < 0.050), so the fifth and sixth hypotheses are accepted. Meanwhile, confirmation bias has no significant effect on overconfidence bias (t = 0.722; p = 0.235 > 0.050), so the seventh

hypothesis is rejected. Thus, these results indicate that internal self-attribution and external bias can increase investors' overconfidence, which ultimately affects investment decisions, whereas confirmation bias has no significant effect.

Self-Attribution Bias on Internal and External Bias in Investment Decisions (H_1 and H_2)

The findings of this study indicate that self-attribution bias, particularly the internal dimension, has a significant positive effect on the investment decisions of Polytechnic students in Semarang. It means that the stronger students' tendency to attribute their investment success to personal abilities, such as analytical skills, strategy, or instincts, the greater their likelihood of making subsequent investment decisions. On the other hand, external self-attribution bias, while positively associated, does not significantly affect investment decisions. It implies that attributing failure to external factors such as market fluctuations or luck does not substantially drive investment behavior. These findings align with the study of Anggini et al. (2020), which demonstrated that internal self-attribution significantly shapes the investment behavior of accounting students in Malang, while external attribution was not impactful. Similarly, Pandji et al. (2024) confirmed that internal attribution bias strongly influenced the investment decisions of Faculty of Economics and Business, Dian Nuswantoro University (FEB UDINUS) Semarang students, highlighting the dominance of personal belief over external excuses in shaping investment choices. Additionally, Gulo & Cahyonowati (2024) found that novice university investors were more influenced by internal than external attribution, with confidence in personal ability emerging as a strong motivational factor.

Furthermore, Holly et al. (2025) found that self-attribution bias, along with mental accounting, positively influenced investment decisions among Atma Jaya Makassar University students, underscoring the centrality of internal attributions. Likewise, Anggini et al. (2020), in another study on young investors, reaffirmed that internal attributions are positively correlated with investor confidence and proactive decision-making, whereas external attributions are largely irrelevant. These five studies collectively reinforce the evidence that internal self-attribution bias is consistently more influential than external bias in shaping investment decisions among young and novice investors.

Barber et al. (2020) showed that attributing investment success to personal ability strengthens confidence and motivates further investment actions, even with limited experience. At the same time, Walters & Fernbach (2021) emphasized that attributing outcomes to external factors, such as market conditions, may shape confidence but does not directly drive investment decisions. Overall, these findings reinforce that internal self-attribution bias is more influential than external attribution in shaping investment behavior, particularly among young and novice investors. The novelty of this study lies in its focus on polytechnic students, who come from diverse academic backgrounds and generally have limited income sources, yet still demonstrate the dominance of internal attribution. It highlights internal attribution as a strong psychological driver across disciplines, not only among students formally trained in finance. Practically, strengthening internal attribution through financial literacy programs and experiential learning could encourage greater youth participation in capital markets.

Confirmation Bias in Investment Decisions (H_3)

Based on the analysis, the investment decisions made by Polytechnic students in Semarang are not statistically significantly influenced by Confirmation Bias. Thus, the third hypothesis in this study is rejected. It means that students' tendency to seek and trust

information that aligns with their personal beliefs or preferences does not strongly influence their investment decisions. The results of this study align with Kurniawan & Murhadi's (2018) findings, which show that confirmation bias does not significantly influence investment decisions. This finding is further supported by Acharya et al. (2025), who found no direct influence of confirmation bias on investment decisions among individual investors in Gujarat. However, emotional intelligence may serve as a mediating factor.

However, these findings differ from several other studies that focus specifically on student populations. For example, Husadha et al. (2022) conducted a study among university students who invested in a campus investment gallery and found that confirmation bias positively and significantly influenced investment decision-making. Similarly, Lionardo et al. (2025) in a study of students at the Faculty of Economics and Business at Universitas Klabat, found that confirmation bias significantly affected investment decisions, with financial literacy serving as a moderating variable Rose & Armansyah (2022) also found that confirmation bias influenced the investment decisions of young investors, including students, in the Indonesian capital market. Differences in respondent characteristics may explain these conflicting results. In this study, most respondents were novice investors with limited experience and restricted access to investment-related information, which likely reduced the influence of confirmation bias on their decision-making. By contrast, studies that reported a significant effect may have involved students with greater financial exposure, investment experience, or higher levels of financial literacy.

Furthermore, this study's findings reveal that other psychological factors, such as Overconfidence Bias, exert a stronger influence on students' investment decisions than Confirmation Bias. In other words, Overconfidence Bias plays a more dominant role in encouraging students to invest, rather than the tendency to seek information that aligns with existing personal beliefs. Similar conclusions were drawn by Mohanty et al. (2024), who noted that confirmation bias tends to affect experienced investors more strongly. In contrast, novice investors depend more on basic knowledge than on selective information processing.

Overconfidence Bias in Investment Decisions (H_4)

These findings are consistent with Salis et al. (2024), who found that overconfidence leads investors to ignore portfolio diversification, thereby increasing portfolio risk. The analysis in this study shows that Polytechnic students' investment decisions in Semarang are significantly influenced by overconfidence, thereby confirming the fourth hypothesis. It means that the higher the level of overconfidence, the stronger the tendency of investors to make investment decisions. High self-confidence drives individuals to take bolder investment steps without fully considering potential risks, while believing their decisions will consistently generate profits. These findings are supported by Pradhana's (2018) research, which shows that overconfidence has a positive and significant effect on investment decisions. The study shows that overconfidence has a positive and significant effect on investment decisions compared to other biases. It drives investors to take greater risks, trade more frequently, and ignore market signals, leading to less diversified and more impulsive strategies.

Thus, overconfidence influences both the tendency to invest and the quality of investment decisions. These results are in line with Malini (2025) and Ikhfani et al. (2025), who found that overconfidence has a positive and significant effect on investment decisions, encouraging investors to take greater risks and act more aggressively.

However, these findings differ from Gulo & Cahyonowati (2024) and Syahaya et al. (2024), who reported that overconfidence does not have a significant effect, as well as from Sari et al. (2024), which presented mixed results depending on the investor context. It indicates that the influence of overconfidence on investment decisions remains inconsistent across studies, largely depending on investors' characteristics and experience.

Self-Attribution on Internal and External Bias in Overconfidence Bias (H_5 and H_6)

The finding that both internal and external self-attribution increase overconfidence bias is consistent with the study by Jain et al. (2023), which shows that overconfidence acts as a mediator linking individual perceptions of ability with investment decisions. It means that when investors credit their success to personal skills or attribute outcomes to favorable external conditions, they tend to develop excessive confidence that directly shapes their future investment choices. The results of this study also confirm that both internal and external self-attribution biases have a positive and significant effect on investors' overconfidence. In other words, the more investors attribute investment success to internal factors such as personal ability, or blame failures on external factors such as market conditions, the higher their level of overconfidence. This finding aligns with previous research highlighting the role of attribution bias in shaping overconfidence. Setiawan et al. (2018) state that investors who attribute positive outcomes to their own abilities and blame external factors for failures tend to overlook risks and exhibit excessive confidence in subsequent investment decisions. A study by Husadha et al. (2022) adds that such attributional thinking triggers overconfidence and reduces investors' tendency to reflect on decision-making mistakes. Research by Anggini et al. (2020) notes that self-attribution bias significantly increases overconfidence. Investors with this tendency feel more confident in their decision-making, potentially leading them to invest without thoroughly considering the risks. Khusna (2021) also notes that the greater an investor's tendency to attribute investment outcomes to personal ability or internal factors, the greater the likelihood of excessive confidence in investing. The research by Supramono & Wandita (2017) states that the higher an investor's tendency to attribute success to personal ability, the higher their level of overconfidence.

Thus, this research reinforces the evidence that both types of self-attribution bias, intrinsic and extrinsic, significantly contribute to increasing overconfidence bias among investors.

Confirmation Bias in Overconfidence Bias (H_7)

The insignificant effect of confirmation bias on overconfidence in this study differs from the findings of Asri & Santi (2025), who found that behavioral biases such as confirmation bias can indirectly reinforce overconfidence through layered mediation processes. The role of confirmation bias may be highly context- and investor-characteristic-dependent, with stronger effects likely in environments where individuals have greater financial exposure and face more complex decision-making situations. Based on the findings of this study, confirmation bias shows a negative and insignificant influence on overconfidence bias. In other words, the greater the tendency of investors to rely only on information that aligns with their prior beliefs, while disregarding contradictory evidence, the lower their overconfidence. However, this relationship is not strong enough to draw a general conclusion; therefore, the hypothesis that confirmation bias significantly influences overconfidence bias cannot be accepted in this study.

These results are consistent with those of Syahfitri & Tryana (2024), which show that overconfidence bias is not dominant among investors with a rational attitude and

adequate financial literacy. Thus, although theoretical confirmation bias can increase the tendency toward overconfidence, in this study, the effect is not significant and even tends to be negative.

Previous research, as described by Husadha et al. (2022), indicates that confirmation bias is the tendency for investors to believe only information that aligns with their beliefs and to ignore conflicting information. This bias can reinforce overconfidence, leading investors to believe their beliefs are always correct when making investment decisions. Husadha et al. (2022) and Supramono & Wandita (2017) also state that behavioral biases, such as overconfidence, can arise when investors rely solely on subjective information they have already believed from the start. Therefore, in many cases, the higher the confirmation bias, the higher the level of overconfidence. Supramono & Wandita (2017) emphasize that confirmation bias is positively and significantly associated with overconfidence among investors, meaning that the higher a person's confirmation bias, the greater their tendency toward overconfidence.

The differences in the results of this study are likely due to the characteristics of the respondents, who are primarily young investors with a fairly high level of financial literacy. Based on the questionnaire results, most respondents have basic knowledge of financial management and a good understanding of risk. It may influence how they process information more objectively, so that, even though there is a tendency toward confirmation bias, respondents do not immediately fall into overconfidence.

Table 7. Path Coefficient (Indirect Effect)

Connection	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Results
Self-Attribution on Internal Bias → Overconfidence Bias → Investment Decision	0.107	0.111	0.052	2.048	0.020**	Positively Significant
Self-Attribution on External Bias → Overconfidence Bias → Investment Decision	0.073	0.081	0.053	1.374	0.085*	Positively Significant
Confirmation Bias → Overconfidence Bias → Investment Decision	-0.032	-0.035	0.052	0.628	0.265	Positive Not Significant

*p < 0.100; * *p < 0.050
Source: Data Processed, 2025

Based on the indirect effect test, there are three indirect relationship paths at three levels of significance (0.100, 0.050, and 0.010). The analysis results show that the indirect path (indirect effect) from Self-Attribution to Internal Bias toward Investment Decisions via Overconfidence Bias is significant, as indicated by a T-statistic of 2.048 and a p-value of 0.020. AA P-value < 0.050 indicates that Overconfidence Bias significantly mediates the influence of Self-Attribution on Internal Bias in Investment Decisions. In other words, the tendency of individuals to attribute their investment outcomes to personal ability (Self-Attribution Internal) increases their self-confidence (Overconfidence Bias), which ultimately influences their investment decisions.

Furthermore, the indirect path from Self-Attribution to External Bias towards Investment Decisions via Overconfidence Bias was found to be significant, with a T-statistic of 1.374 and a P-value of 0.085. The P-value < 0.100 indicates that

Overconfidence Bias significantly mediates the influence of Self-Attribution on External Bias towards Investment Decisions. In other words, the tendency of individuals to attribute their investment results to external factors (External Self-Attribution) increases their self-confidence (Overconfidence Bias), ultimately influencing their investment decisions.

The indirect path between Confirmation Bias and Investment Decisions through Overconfidence Bias was found to be insignificant, with a T-statistic value of 0.628 and a p-value of 0.285. A P-value < 0.100 indicates that overconfidence bias does not mediate the influence of confirmation bias on Investment Decisions. In other words, the tendency of individuals to seek information that aligns with their beliefs does not significantly influence their investment decisions through increased overconfidence.

Self-Attribution on Internal Bias toward Investment Decisions with Overconfidence as A Mediating Factor

Self-attribution bias and overconfidence significantly influence investment decisions. Self-attribution bias is the tendency for individuals to attribute their successes to personal ability or effort, while failures are often blamed on external factors. It can lead investors to feel more confident in their decisions. Overconfidence acts as a mediating factor, reinforcing the effects of self-attribution bias. Overconfident investors tend to overlook risks and make irrational decisions, which in turn can result in financial losses.

Previous studies have examined the relationship between this bias and investment decisions. Karki et al. (2024), stated that a systematic literature review emphasizes that biases such as overconfidence and self-attribution are crucial in shaping investor behavior, particularly in dynamic market contexts. Naveed & Taib (2021) discusses the psychological basis of self-attribution bias and its influence on investor decision-making.

Additionally, Khusna (2021) explores the interaction between various biases, including self-attribution and overconfidence, and their impact on the investment strategies adopted by investors. Recent research by Holly et al. (2025) and Gulo & Cahyonowati (2024) supports this pattern of relationships, in which internal bias significantly influences overconfidence and, together, both contribute to impulsive or irrational investment decision-making tendencies.

Self-Attribution on External Bias toward Investment Decisions with Overconfidence as A Mediating Factor

The hypothesis that self-attribution influences external bias in investment decisions, with overconfidence as a mediating factor, yields positive, marginally significant results, demonstrating overconfidence's mediating role in this relationship. This study explicitly examines the influence of self-attribution on external bias and the mediating role of overconfidence, both of which have rarely been examined separately in previous studies. The study shows that self-attribution bias leads investors to view investment success as a result of their own abilities, while failures are more often attributed to factors beyond their control. This condition then triggers overconfidence, which influences investment decision-making.

In line with the findings of Ekajaya & Arifin (2024), it is confirmed that investors with high levels of overconfidence tend to make bolder investment decisions even when the information they have is not entirely accurate. A study by Kusumawardani & Yuliyanti (2023) found that investors often make irrational decisions, thereby contributing to suboptimal portfolio performance. In the study by Hesniati & Dedy (2021), self-attribution bias is described as part of the overconfidence bias within

emotional bias, in which investors who experience success tend to attribute that success to their own abilities and knowledge. Meanwhile, Wirawan et al. (2022) added that, conversely, when experiencing losses, investors tend to blame external factors beyond their control for investment failure. Mishra & Darshan (2018) also explains that overconfidence and self-attribution are common behavioral biases among investors, with overconfidence decreasing with age and influenced by gender, while self-attribution becomes more dominant.

Confirmation Bias toward Investment Decisions with Overconfidence as A Mediating Factor

This study shows that the mediating effect of overconfidence bias in the relationship between confirmation bias and investment decisions is not significant. In other words, the tendency of individuals to seek and believe information that confirms their beliefs (confirmation bias) does not significantly influence their investment decisions by increasing overconfidence. A study by Zahro & Singgih (2024) shows that overconfidence bias can encourage people to make riskier investment decisions. However, this effect is not always significant and depends heavily on the characteristics of the sample and research conditions. A similar study by Paramita et al. (2018) found that overconfidence is not always an important mediator in relationships between couples.

Theoretically, Supramono & Wandita (2017) explain that confirmation bias can increase a person's confidence in their investment decisions. The study found a positive relationship between confirmation bias and overconfidence, where investors are more likely to ignore information that contradicts their beliefs. However, the increase in overconfidence was insufficient to influence investment decisions in this study. External factors, such as market dynamics, investor demographics, and other psychological factors, may cause this condition. These factors are not included in this research model.

From a practical standpoint, these findings highlight the importance of using a more comprehensive approach to investor education and training. This approach should not only focus on reducing one type of cognitive bias, but also consider how the relationship between bias and external factors can influence investment behavior. As a result, the quality of investment decision-making will improve while reducing potential losses.

CONCLUSION

This study concludes that internal self-attribution bias significantly affects investment decisions, both directly and through overconfidence bias as a mediating variable. Individuals who attribute their investment success to personal abilities tend to develop excessive confidence, which, in turn, leads to more aggressive, potentially riskier investment decisions. Conversely, confirmation bias did not show a significant effect, possibly because the respondents were novice investors with limited experience and high exposure to financial education. The implications of this study highlight the importance of integrating behavioral finance education into financial literacy programs, especially for young and beginner investors. Understanding how psychological biases influence decision-making can help reduce irrational behavior and improve investment outcomes. Financial advisors and educators should also consider designing learning modules that address overconfidence and attribution errors to foster more balanced and critical investment strategies. However, this research is not without limitations. First, the sample was limited to Polytechnic students in Semarang, which may not fully represent the

broader population of young or novice investors in Indonesia. Second, the use of self-reported questionnaires can introduce bias due to respondents' subjective perceptions. Third, the study analyzed only three cognitive biases and did not account for other potentially relevant factors, such as financial literacy, risk tolerance, or emotional influences. Therefore, future studies are recommended to use more diverse samples that include non-student and experienced investors, apply mixed-methods approaches for richer insights, and expand the scope of psychological and contextual variables to gain a more comprehensive understanding of investor behavior.

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