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Exploring Cognitive and Emotional Influences on Investment Decisions: An Analysis of Psychological Factors Affecting Investor Behavior

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Abstract: *In the ever-evolving world of finance, understanding the factors that influence investment decisions is crucial for optimizing financial outcomes. Traditionally, financial theories have operated under the assumption that investors make decisions based on rational analysis and objective data. However, emerging research in behavioral finance has challenged this notion, revealing that cognitive and emotional biases significantly impact investment choices. This introduction explores the importance of studying these biases, their implications for investment decisions, and the relevance of this research in the context of the modern financial landscape.*

Keywords: financial landscape.

I. INTRODUCTION

The foundation of traditional financial theory is rooted in the Efficient Market Hypothesis (EMH), which posits that financial markets are efficient, and prices reflect all available information. According to this theory, investors are rational actors who make decisions based on logical assessment of information. However, behavioral finance challenges this view by incorporating psychological insights into financial decision-making, suggesting that investors are influenced by cognitive biases and emotional factors.

Cognitive biases are systematic patterns of deviation from norm or rationality in judgment, leading to illogical conclusions or decisions. These biases include overconfidence, anchoring, and confirmation bias. Emotional factors, on the other hand, involve feelings and psychological states such as fear, greed, and regret that affect investment behavior. Together, cognitive and emotional biases contribute to the phenomenon of irrational decision-making, often leading to suboptimal investment choices.

Cognitive Biases in Investment Decisions

Cognitive biases are mental shortcuts that can lead to irrational decision-making. One prominent cognitive bias is **overconfidence**, where investors overestimate their knowledge and abilities, leading them to take excessive risks or ignore critical information. Another significant bias is **anchoring**, where investors rely too heavily on an initial piece of information (the "anchor") and make subsequent judgments based on that anchor, even if it is irrelevant.

Confirmation bias is another cognitive bias where investors seek information that confirms their pre-existing beliefs and ignore information that contradicts them. This can lead to skewed decision-making and reinforce erroneous investment strategies. Understanding these biases is essential for investors and financial advisors, as it can help in developing strategies to counteract their effects and make more informed decisions.

Emotional Factors Influencing Investment Choices

Emotional factors also play a crucial role in shaping investment decisions. **Fear** and **greed** are two primary emotions that drive investor behavior. Fear of loss can lead to risk aversion and premature selling of investments, while greed can drive investors to take excessive risks in pursuit of high returns. Both emotions can lead to market volatility and contribute to irrational decision-making.

Regret aversion is another emotional factor where investors avoid making decisions that could lead to regret. This can result in missed opportunities or failure to act when needed. Similarly, **loss aversion**, a concept from Prospect Theory,

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suggests that losses are psychologically more painful than gains are pleasurable, leading investors to make decisions that avoid losses rather than seek gains.

Behavioral Finance and Market Implications

Behavioral finance offers insights into how these cognitive and emotional biases impact market behavior. Studies have shown that biases such as overconfidence and loss aversion contribute to market anomalies and deviations from the predictions of traditional financial theories. For instance, **market bubbles** and **crashes** can be partly attributed to collective investor behavior driven by biases and emotions.

Understanding these biases helps in analyzing market trends and investor behavior. For example, the phenomenon of **herding behavior**, where investors follow the crowd rather than making independent decisions, can lead to market overreactions and subsequent corrections. Similarly, **availability bias**, where investors give undue weight to recent or easily recalled information, can impact investment choices and market dynamics.

The Relevance of Cognitive and Emotional Factors in Modern Finance

In the contemporary financial environment, characterized by rapid technological advancements and increased access to information, the impact of cognitive and emotional biases remains significant. The rise of online trading platforms and social media has amplified the effects of these biases, as investors are exposed to a constant stream of information and opinions that can influence their decisions.

Moreover, the increasing complexity of financial products and markets necessitates a deeper understanding of how cognitive and emotional factors affect investment behavior. Financial advisors and institutions need to consider these factors to provide better guidance and develop strategies that mitigate the impact of biases on investment decisions.

II. REVIEW OF LITERATURE

Kumar, V., & Mishra, R. (2016) this study explores various behavioral biases impacting investor decisions in emerging markets, focusing on cognitive biases such as overconfidence and loss aversion. It emphasizes the need for understanding these biases to improve investment strategies and decision-making processes in rapidly developing financial environments. Sharma, A., & Gupta, M. (2016) investigate how emotional factors, such as fear and greed, influence investment decisions among Indian investors. Their findings highlight the significant role of emotional biases in shaping investment behavior, contributing to irrational decision-making. Singh, R., & Bansal, S. (2017) this research examines the effects of cognitive biases, including anchoring and confirmation bias, on stock market investment decisions. The study provides insights into how these biases distort investor perceptions and decision-making processes. Verma, S., & Patel, R. (2017) analyze the impact of emotional biases, such as regret aversion and herd behavior, on investor decisions. The study offers a comparative perspective, revealing how different emotional biases can lead to suboptimal investment outcomes. Gupta, N., & Singh, M. (2018) this paper explores the concept of cognitive dissonance and its influence on investment decisions. Gupta and Singh find that cognitive dissonance significantly affects investor behavior, leading to inconsistent and often irrational investment choices. Kumar, A., & Sharma, P. (2018) investigate how emotional biases, including overreaction and mental accounting, impact investment decisions. Their study provides valuable insights into how these biases can lead to systematic errors in investment judgments. Reddy, K., & Jain, R. (2019) examine the role of various behavioral biases, such as over-optimism and herd mentality, in shaping investment decisions among Indian investors. Their findings underscore the need for investor education to mitigate the impact of these biases. Agarwal, S., & Gupta, R. (2019) this study focuses on emotional biases in the mutual fund industry, analyzing how factors like loss aversion and regret affect investment decisions. Agarwal and Gupta provide insights into how emotional biases influence investor behavior in mutual fund investments. Patel, N., & Singh, D. (2020) investigate the impact of cognitive biases, such as availability bias and mental accounting, on financial decision-making. Their research highlights how these biases affect investment strategies and outcomes. Chopra, A., & Verma, S. (2020) this review consolidates recent literature on behavioral factors influencing investment decisions. Chopra and Verma provide a comprehensive overview of cognitive and emotional biases and their impact on investor behavior. Sethi, A., & Sharma, V. (2021) explore how emotional biases, such as overconfidence and risk aversion, affect the financial decision-making of high net-worth individuals. The study reveals the significant role of emotional factors in shaping investment choices among affluent investors. Joshi, P., & Kumar, S. (2021) compare cognitive biases

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affecting public and private sector investors, highlighting differences in how these biases influence investment decisions across sectors. Mehta, A., & Agarwal, N. (2022) this empirical study by Mehta and Agarwal delves into how behavioral finance concepts, including various cognitive and emotional biases, impact investment decisions. The research provides practical insights into the application of behavioral finance theories. Singh, J., & Patel, A. (2022) investigate how behavioral biases influence investment strategies in emerging markets. Their study reveals how biases affect investment approaches and outcomes in rapidly growing economies. Kumar, R., & Sharma, L. (2023) examine the impact of emotional and cognitive biases on investment decisions during periods of market volatility. Their findings highlight how these biases exacerbate the effects of market fluctuations on investor behavior. Chopra, V., & Gupta, S. (2023) this review by Chopra and Gupta discusses recent trends in behavioral finance and their implications for investment decisions. The study provides an overview of current research and suggests future directions for exploring behavioral biases in finance. Patel, R., & Singh, M. (2024) they conduct a comprehensive study on cognitive and emotional biases affecting financial decision-making. Their research provides an in-depth analysis of how these biases influence investment behavior and decision-making processes. Agarwal, R., & Kumar, V. (2024) explore the interaction between cognitive and emotional factors in investment choices through a multi-country study. The research offers valuable insights into how these factors collectively impact investor decisions across different financial markets.

Need of the Study

This study is essential for identifying and understanding cognitive and emotional factors that influence investment decisions. While traditional financial theories often assume rational decision-making, real-life evidence reveals that emotions and cognitive biases play a significant role in investment choices, leading to irrational decisions. By focusing on HDFC Bank within the context of value investing, this research aims to deepen the understanding of cognitive and emotional biases prevalent in investment contexts, such as health hazards, gains, and losses. The insights gained will help investors maximize returns, enhance financial advisory services, and improve decision-making processes within the banking system.

Significance of the Study

The study will model and analyze cognitive and emotional biases affecting individual investors. By increasing awareness of these biases, it will aid investors in avoiding pitfalls when selecting investment portfolios. For managers and financial advisors, understanding these biases will assist in developing strategies to mitigate their impact. Stockbrokers and mutual fund companies will benefit from comprehending both rational and psychological aspects influencing investment decisions, enabling them to better manage and capitalize on biases. Additionally, the study will contribute valuable knowledge to the existing literature in finance.

Scope of the Study

The scope is limited to behavioral biases in investment decisions among investors in Hyderabad, with a focus on HDFC Bank as a case study. The research will examine both emotional and cognitive factors, including representative bias, cognitive dissonance, over-optimism, herd instinct, loss aversion, and regret aversion. By analyzing how these biases affect investment choices and understanding their combined effects on investor behavior, the study aims to provide insights into financial decision-making processes at HDFC Bank.

Objective of the Study

- To identify cognitive elements influencing investors' decisions.
- To analyze psychological factors affecting investor decisions.
- To explore the relationship between emotional and cognitive factors on investment decisions.

III. RESEARCH METHODOLOGY

Research Design: Utilizes both descriptive and causal designs to explore behavioral biases affecting investment decisions, employing statistical techniques for quantitative analysis.

Population: Targets Indian investors, with a specific emphasis on those in Hyderabad.

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Sample: Uses a mixed sampling approach with convenience and random sampling methods. Initially, snowball sampling yielded 122 responses. Secondary data is gathered from research reports, periodicals, and journals.
Data Collection: Primary data is collected through a specially designed questionnaire. Secondary data comes from existing research reports, periodicals, and journals.

Tool for Analysis
Descriptive statistics (mean, mode, median, and standard deviation), inferential statistics (hypothesis testing), and causal statistics (correlation and regression analysis) are used to analyze data using SPSS.

Table -1 Illustrating the impact of behavioural biases on investment choices.

Biases of Behavioural Influence	Totally Accept (%)	Accept (%)	Neutral (%)	Reject (%)	Totally Reject (%)
Bias of Representativeness	8.65	28.41	29.64	23.47	9.89
CognitiveBias Dissonance	2.48	19.76	21.00	33.34	23.47
Overall Optimal Bias	3.71	24.70	28.41	25.94	17.29
Bias of Herd Instinct	4.95	27.17	29.64	27.17	11.12
Bias of Illusion Control	9.89	25.94	28.41	18.53	17.29
Bias of Loss Aversion	3.71	18.53	23.47	29.64	24.70
Bias of Hindsight	9.89	29.64	30.87	16.06	13.59
Bias of Self-attribution	7.42	17.29	21.00	23.47	30.87
Bias of Regret Aversion	17.29	24.70	27.17	22.23	8.65

Interpretation:
The table outlines respondents' agreement levels with various behavioural biases influencing decision-making. Biases like Regret Aversion (17.29% totally agree) and Illusion Control (9.89% totally agree) stand out with higher agreement rates, indicating strong psychological influences in investment decisions. Conversely, biases such as Hindsight (13.59% totally disagree) and Loss Aversion (24.70% reject) show mixed perceptions. These insights highlight the complexity of behavioural biases in shaping investor behaviour and decision-making processes.

Table 2 Illustrating the application of descriptive statistics in analysing emotional biases.

Biases of Emotional	No.	Mean	σ (standard deviation)
Bias of Herd Instinct	122	2.89	1.089
Bias of Loss Aversion	122	2.48	1.164
Bias of Regret Aversion	122	3.21	1.220

Interpretation:
The table gives statistics results of the respondents' emotional bias which involved 122 respondents. The mean score for The Bias of Herd Instinct category which is presented in the figure 2 is equal 2. 89, SD=1. 089, which means that the indicators are rather median and the answers of students have some dispersion concerning the following of the crowd. Regarding the Loss Aversion bias, the reported scores have a mean of 2. equal to 48 with a standard deviation equals to 1. 164, which implies less negative reaction to the losses. The mean of Bias of Regret Aversion has score higher with mean 3. 21 with the variation of 1. Thus, it can be stated that the average score in the regret-reducing domain was 220, which suggests that participants of the study had more pronounced disinclinations to experience regret in decision making.

Table 3: Using Descriptive Statistics on Cognitive Biases

Biases of Cognitive	No.	Mean	σ (standard deviation)
Bias of Representativeness	122	3.02	1.131
Bias ofCognitive Dissonance	122	2.46	1.131
Bias of Over-optimism	122	2.74	1.134

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Bias of Illusion of Control	122	2.95	1.245
Bias of Hindsight	122	3.08	1.189
Bias of Self-attribution	122	2.49	1.297

Interpretation:

The table provides insights into cognitive biases among 122 respondents. Biases like Representativeness (mean 3.02), Hindsight (mean 3.08), and Illusion of Control (mean 2.95) indicate moderate agreement, suggesting tendencies to rely on familiar patterns, assess decisions with hindsight, and overestimate personal control. Conversely, biases such as Cognitive Dissonance (mean 2.46) and Self-attribution (mean 2.49) show lower mean scores, indicating less pronounced influences in decision-making processes, though with variability as indicated by their standard deviations.

Correlation between Behavioural Biases and Investment Decisions

Pearsons Correlation		**Five-Year Average Return (5) years**
Average Annual Return for the Last Five Years **(Investment Decisions)**	Pearson's Correlation	1
	Significance (one-tailed)	
Historical performance informs current investment decisions. (**Bias of Representativeness**)	Pearson's Correlation	0.341
	Significance (one-tailed)	**0.001**
Retaining investments despite potential losses due to emotional attachment. (**CognitiveBiasDissonance**)	Pearson's Correlation	0.086
	Significance (one-tailed)	0.222
People typically rely on their instincts when deciding whom to trust. (**Overall optimal Bias**)	Pearson's Correlation	0.172
	Significance (one-tailed)	0.063
Prolonged and intense deliberation often yields minimal satisfaction. (**Bias of Herd Instinct**)	Pearson's Correlation	0.123
	Significance (one-tailed)	0.138
The investor has thoroughly researched the company's fundamentals and feels secure in their investment decisions. (**Bias of Illusion Control**)	Pearson's Correlation	0.164
	Significance (one-tailed)	0.071
The investor plans to sell their investments as soon as they reach the purchase price. (**Bias of Loss Aversion**)	Pearson's Correlation	0.074
	Significance (one-tailed)	0.256
The company's track record of profitability in similar investments greatly appealed to potential investors. **(Bias of Hindsight)**	Pearson's Correlation	0.226
	Significance (one-tailed)	**0.021**
The outcome of the last investment was primarily due to unfortunate circumstances rather than poor decision-making. (**Bias of Self-attribution**)	Pearson's Correlation	-0.068
	Significance (one-tailed)	0.273
Maintaining his investments in anticipation of imminent price recovery. (**Bias of Regret Aversion**)	Pearson's Correlation	0.239
	Significance (one-tailed)	**0.016**

Interpretation:

The table presents Pearson's correlations between various behavioural biases and five-year average returns, highlighting their statistical significance. Biases like Representativeness (0.341, p = 0.001) and Regret Aversion (0.239, p = 0.016) show positive correlations, suggesting that these biases may influence investment decisions aligned with historical returns and reluctance to sell despite losses. Conversely, biases like Self-attribution (-0.068, p = 0.273) show a weak negative correlation, indicating less impact on investment outcomes related to attributing past results to external factors rather than decision quality.

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Bias of Representativeness

Summary of the model

ModelR	Correlation	R Square	Adjusted coefficient	Standard error
1	0.341[a]	0.116	0.104	0.103

Interpretation:

The model summary indicates a Pearson correlation coefficient (R) of 0.341, suggesting a moderate positive linear relationship between variables. The R-squared value of 0.116 indicates that 11.6% of the variance in the dependent variable can be explained by the independent variable. The adjusted coefficient of 0.104 adjusts for the number of predictors in the model. The standard error of 0.103 reflects the accuracy of predictions made by the model based on these variables.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	1.65	3.280		0.52	0.62
Bias of Representativeness	3.27	1.016	0.340	3.22	**0**

Interpretation:

The model provides regression coefficients and beta coefficients for Bias of Representativeness. The intercept (1.65) represents the expected value of the dependent variable when all independent variables are zero. The Bias of Representativeness coefficient (3.27) indicates that for every unit increase in this bias, the dependent variable increases by 3.27 units on average. The t-statistic (3.22) with a significance level of 0 indicates a statistically significant relationship between Bias of Representativeness and the dependent variable.

Cognitive Bias Dissonance

Summary of the model

Model R	Correlation	R Square	Adjusted coefficient	Standard error
1	0.086[a]	0.006	-0.004	0.109

Interpretation:

The model summary shows a Pearson correlation coefficient (R) of 0.086, suggesting a weak positive linear relationship between variables. The R-squared value of 0.006 indicates that only 0.6% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of -0.004 adjusts for the number of predictors in the model but is very close to zero, suggesting minimal improvement over a model with no predictors. The standard error of 0.109 reflects the accuracy of predictions made by the model.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	9.563	2.898		3.298	0.001
Cognitive Bias Dissonance	0.829	1.077	0.085	0.769	0.442

Interpretation:

In the model, the intercept of 9.563 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Cognitive Bias Dissonance (0.829) indicates that for every unit increase in this bias, the dependent variable increases by 0.829 units on average. The t-statistic (0.769) with a significance level of

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0.442 suggests that the relationship between Cognitive Bias Dissonance and the dependent variable is not statistically significant in this model.

Overall optimal Bias

Summary of the model

Model R	Correlation	R Square	Adjusted coefficient	Standard error
1	0.172[a]	0.029	0.016	0.108

Interpretation:

The model summary shows a Pearson correlation coefficient (R) of 0.172, indicating a weak positive linear relationship between variables. The R-squared value of 0.029 suggests that 2.9% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of 0.016 adjusts for the number of predictors in the model, indicating minimal improvement over a model with no predictors. The standard error of 0.108 reflects the accuracy of predictions made by the model.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	7.122	3.125		2.278	0.024
Overall optimal Bias	1.645	1.062	0.171	1.5487	0.125

Interpretation:

In the model, the intercept of 7.122 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Overall Optimal Bias (1.645) indicates that for every unit increase in this bias, the dependent variable increases by 1.645 units on average. The t-statistic of 1.5487 with a significance level of 0.125 suggests a marginally significant positive relationship between Overall Optimal Bias and the dependent variable, but not statistically significant at conventional thresholds ($p < 0.05$).

Bias of Herd Instinct

Summary of the model

Model R	Correlation	RSquare	Adjusted coefficient	Standard error
1	0.123[a]	0.014	0.002	0.107

Interpretation:

The model summary indicates a Pearson correlation coefficient (R) of 0.123, suggesting a weak positive linear relationship between variables. The R-squared value of 0.014 indicates that 1.4% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of 0.002 suggests minimal improvement over a model with no predictors. The standard error of 0.107 reflects the accuracy of predictions made by the model, indicating moderate variability around the regression line.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	8.073	3.422		2.358	0.022
Bias of Herd Instinct	1.222	1.113	0.122	1.097	0.274

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Interpretation:

In the model, the intercept of 8.073 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Bias of Herd Instinct (1.222) indicates that for every unit increase in this bias, the dependent variable increases by 1.222 units on average. The t-statistic of 1.097 with a significance level of 0.274 suggests that the relationship between Bias of Herd Instinct and the dependent variable is not statistically significant in this model.

Bias of Illusion Control

Summary of the model

ModelR	Correlation	R Square	Adjusted coefficient	Standard error
1	0.164[a]	0.026	0.013	0.108

Interpretation:

The model summary reveals a Pearson correlation coefficient (R) of 0.164, indicating a weak positive linear relationship between variables. The R-squared value of 0.026 suggests that 2.6% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of 0.013 adjusts for the number of predictors in the model, indicating minimal improvement over a model with no predictors. The standard error of 0.108 reflects the accuracy of predictions made by the model, indicating moderate variability.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	7.387	3.078		2.398	0.018
Bias of Illusion Control	1.436	0.968	0.163	1.481	0.141

Interpretation:

In the model, the intercept of 7.387 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Bias of Illusion Control (1.436) indicates that for every unit increase in this bias, the dependent variable increases by 1.436 units on average. The t-statistic of 1.481 with a significance level of 0.141 suggests that the relationship between Bias of Illusion Control and the dependent variable is not statistically significant at conventional thresholds ($p < 0.05$).

Loss Aversion Bias

Summary of the model

Model R	Correlation	R Square	Adjusted coefficient	Standard error
1	0.074[a]	0.005	-0.006	0.109

Interpretation:

The model summary shows a Pearson correlation coefficient (R) of 0.074, indicating a very weak positive linear relationship between variables. The R-squared value of 0.005 suggests that only 0.5% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of -0.006 indicates negligible improvement over a model with no predictors. The standard error of 0.109 reflects the accuracy of predictions made by the model, indicating moderate variability around the regression line.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

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Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	9.891	2.855		3.463	0.002
Bias of Loss Aversion	0.688	1.047	0.073	0.656	0.512

Interpretation:

In the model, the intercept of 9.891 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Bias of Loss Aversion (0.688) indicates that for every unit increase in this bias, the dependent variable increases by 0.688 units on average. The t-statistic of 0.656 with a significance level of 0.512 suggests that the relationship between Bias of Loss Aversion and the dependent variable is not statistically significant in this model.

Bias of Hindsight

Summary of the model

Model R	Correlation	R Square	Adjusted coefficient	Standard error
1	0.226[a]	0.050	0.038	0.1063

Interpretation:

The model summary indicates a Pearson correlation coefficient (R) of 0.226, suggesting a weak positive linear relationship between variables. The R-squared value of 0.050 indicates that 5.0% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of 0.038 adjusts for the number of predictors in the model, indicating slight improvement over a model with no predictors. The standard error of 0.1063 reflects the accuracy of predictions made by the model, indicating moderate variability.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	5.262	3.288		1.598	0.113
Bias of Hindsight	2.067	1.002	0.225	2.062	**0.041**

Interpretation:

In the model, the intercept of 5.262 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Bias of Hindsight (2.067) indicates that for every unit increase in this bias, the dependent variable increases by 2.067 units on average. The t-statistic of 2.062 with a significance level of 0.041 suggests a statistically significant positive relationship between Bias of Hindsight and the dependent variable, indicating that this bias may influence outcomes in the model.

Bias of Self-attribution

Summary of the model

Model R	Correlation	R Square	Adjusted coefficient	Standard error
1	0.068[a]	0.004	-0.007	0.107

Interpretation:

The model summary shows a Pearson correlation coefficient (R) of 0.068, indicating a very weak positive linear relationship between variables. The R-squared value of 0.004 suggests that only 0.4% of the variance in the dependent

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variable is explained by the independent variable. The adjusted coefficient of -0.007 indicates negligible improvement over a model with no predictors. The standard error of 0.107 reflects the accuracy of predictions made by the model, indicating moderate variability around the regression line.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	13.002	2.61		4.963	0
Bias of Self-attribution	-0.56	0.942	-0.067	-0.607	0.547

Interpretation:

In the model, the intercept of 13.002 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Bias of Self-attribution (-0.56) indicates that for every unit increase in this bias, the dependent variable decreases by 0.56 units on average, although not statistically significant (t-statistic = -0.607, p = 0.547). The intercept's high t-statistic (4.963, p = 0) suggests a significant relationship with the dependent variable.

Bias of Regret Aversion

Summary of the model

Model R	Correlation	R Square	Adjusted coefficient	Standard error
1	0.239[a]	0.056	0.044	0.106

Interpretation:

The model summary reveals a Pearson correlation coefficient (R) of 0.239, indicating a weak positive linear relationship between variables. The R-squared value of 0.056 suggests that 5.6% of the variance in the dependent variable is explained by the independent variable. The adjusted coefficient of 0.044 adjusts for the number of predictors in the model, indicating slight improvement over a model with no predictors. The standard error of 0.106 reflects the accuracy of predictions made by the model, showing moderate variability.

From the table below, there is indicated the estimated regression coefficients, standard errors of the estimates, t ratio and significance levels.

Coefficients

Model	B coefficients		Beta coefficients	T-statistic	significance
	B	Std. Error	Beta		
(Intercept)	4.772	3.328		1.435	0.156
Bias of Regret Aversion	2.134	0.974	0.240	2.193	0.032

Interpretation:

In the model, the intercept of 4.772 represents the expected value of the dependent variable when all independent variables are zero. The coefficient for Bias of Regret Aversion (2.134) indicates that for every unit increase in this bias, the dependent variable increases by 2.134 units on average. The t-statistic of 2.193 with a significance level of 0.032 suggests a statistically significant positive relationship between Bias of Regret Aversion and the dependent variable, highlighting its influence in the model.

Residuals:

minimum value	1quartile	middle value	3quartile	maximum value

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-0.15977	-0.0627	-0.01485	0.03447	0.31351

Interpretation:

The data represents a set of values with their respective quartiles and minimum and maximum values. The quartiles indicate the spread and central tendency of the data distribution: the first quartile (Q1) is -0.0627, the median (Q2) is -0.01485, and the third quartile (Q3) is 0.03447. This suggests the data is skewed positively since the median is closer to Q1 than Q3, and the range between the quartiles and the extremes is relatively wide.

Coefficients:

	Estimated standard deviation	Error	T-value	Probability (>|t|)
(Constant)	0.015055	0.038440	0.393	0.6966
Bias of Representativeness	0.035774	0.013663	2.619	0.0109
Cognitive Bias Dissonance	-0.008427	0.011831	-0.711	0.4787
Overall Optimal Bias	0.012318	0.013366	0.921	0.3600
Bias of Herd Instinct	0.005168	0.015164	0.342	0.7344
Bias of Illusion Control	0.001444	0.011617	0.125	0.9016
Bias of Loss Aversion	-0.010202	0.012449	-0.820	0.4154
Bias of Hindsight	0.007080	0.014623	0.485	0.6299
Bias of Self-attribution	-0.029927	0.011632	-2.574	0.0123
Bias of Regret Aversion	0.014059	0.013807	1.019	0.313

Interpretation:

This table presents regression results with estimated standard deviations, errors, t-values, and probabilities for each predictor variable. Significant findings include Bias of Representativeness, which shows a statistically significant positive impact (t-value = 2.619, p = 0.0109), indicating it influences the dependent variable. Bias of Self-attribution also demonstrates significance with a negative impact (t-value = -2.574, p = 0.0123). Other biases such as Cognitive Bias Dissonance and Bias of Regret Aversion do not show significant impacts based on their t-values and probabilities.

The regression analysis using lm indicates an adjusted R-squared of 0.1235, implying that 12.35% of the variation in investor decisions is explained by the model. Among the biases considered, Representative Bias and Self-Attribution Bias significantly influence investment decisions ($p < 0.05$), suggesting their substantial impact. The regression equation derived is: $Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta5X5+\beta6X6+\beta7X7+\beta8X8+\beta9X9$. This equation reflects the combined influence of these biases, indicating their individual and collective significance in investment decision-making.

1. Impact of Behavioral Biases on Investment Choices

Bias of Representativeness: This bias shows a moderate positive correlation with investment returns (Pearson's correlation of 0.341, p = 0.001). It suggests that investors who are influenced by representativeness may rely on historical performance to guide current decisions. This bias has a significant impact, with an R-squared value of 0.116 indicating that 11.6% of the variance in investment returns can be explained by this bias.

Bias of Regret Aversion: This bias also has a significant positive correlation with investment decisions (Pearson's correlation of 0.239, p = 0.016). It indicates that investors who are averse to regret may be reluctant to sell investments at a loss, expecting prices to recover. This bias explains 5.6% of the variance in investment outcomes, as shown by the R-squared value.

Bias of Hindsight: The Bias of Hindsight demonstrates a moderate positive correlation with investment decisions (Pearson's correlation of 0.226, p = 0.021). This bias suggests that investors might overestimate their ability to predict past events, influencing their investment choices.

Other Biases: Biases such as Cognitive Dissonance, Herd Instinct, Illusion of Control, Loss Aversion, and Self-attribution show weaker or non-significant correlations with investment outcomes. For example, Cognitive Bias Dissonance has a very weak correlation (0.086, p = 0.222) and shows minimal impact on investment decisions. Similarly, Loss Aversion and Self-attribution biases show weak or insignificant impacts on investment returns.

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2. Descriptive Statistics Analysis

Emotional Biases: The descriptive statistics show varying degrees of agreement with different emotional biases. Regret Aversion has the highest mean score (3.21), suggesting a pronounced influence on decision-making processes. In contrast, Bias of Loss Aversion has a lower mean score (2.48), indicating less impact.

Cognitive Biases: The biases with the highest mean scores include Representativeness (3.02) and Hindsight (3.08), reflecting moderate agreement among respondents. Cognitive Dissonance (2.46) and Self-attribution (2.49) have lower mean scores, indicating less pronounced effects on decision-making.

3. Regression Analysis Findings

Bias of Representativeness: The regression analysis shows a statistically significant positive relationship with investment decisions ($B = 3.27$, $p < 0.001$). This suggests that the Bias of Representativeness significantly influences investment outcomes, supporting the idea that historical performance is a strong predictor of investment decisions.

Bias of Self-attribution: This bias has a negative impact on investment decisions ($B = -0.56$, $p = 0.547$), though it is not statistically significant. It indicates that investors may attribute past outcomes to external factors, but this bias does not significantly influence decision-making in this model.

Overall Optimal Bias: This bias shows a marginally significant relationship with investment decisions ($B = 1.645$, $p = 0.125$). Although it suggests a positive influence, it is not statistically significant at conventional thresholds.

Bias of Herd Instinct: This bias shows a non-significant relationship with investment decisions ($B = 1.222$, $p = 0.274$). It indicates that following the crowd has minimal impact on investment outcomes in this context.

Bias of Illusion Control: Similarly, this bias shows a non-significant positive relationship ($B = 1.436$, $p = 0.141$), suggesting that overestimating personal control does not significantly affect investment decisions.

Bias of Loss Aversion: This bias has a weak positive relationship ($B = 0.688$, $p = 0.512$) with investment decisions, indicating minimal impact.

Bias of Hindsight: The Bias of Hindsight shows a statistically significant positive relationship with investment decisions ($B = 2.067$, $p = 0.041$). This supports the idea that investors influenced by hindsight bias may adjust their decisions based on perceived past performance.

Bias of Regret Aversion: This bias demonstrates a statistically significant positive relationship ($B = 2.134$, $p = 0.032$), suggesting that investors who are averse to regret may make investment decisions based on anticipated future regret.

4. Residual Analysis

The residuals analysis shows that the data is moderately dispersed, with a positive skew. This indicates that while most predictions are relatively close to actual values, there are some outliers and variability in the data.

V. CONCLUSION

The study highlights that behavioral biases like Representativeness, Regret Aversion, and Hindsight have significant impacts on investment decisions. These biases can influence how investors interpret past performance and make decisions. While some biases such as Cognitive Dissonance, Herd Instinct, and Loss Aversion show weaker or non-significant correlations, others like Bias of Self-attribution and Overall Optimal Bias show mixed results. Overall, the findings underscore the complexity of behavioral influences on investment decisions and suggest that understanding these biases can provide valuable insights into investor behavior.

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