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IMPACT OF FINANCIAL LITERACY ON HEURISTICS DRIVEN BIASES

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INTRODUCTION

In the complex world of personal finance and investment, individual decision-making is often influenced not only by rational analysis but also by cognitive shortcuts and biases. This study seeks to examine the impact of financial literacy on heuristic-driven biases among individual investors in India, particularly focusing on university students. The research categorizes students into two groups: those pursuing finance-related disciplines and those from non-finance backgrounds. By doing so, the study aims to assess whether a higher degree of financial knowledge assists students in mitigating the influence of heuristic biases and enables them to make more rational financial decisions.

The field of *behavioral finance* provides the theoretical foundation for this study. Unlike traditional finance theories that assume investors are fully rational and always act in their best financial interest, behavioral finance integrates insights from psychology to explain why individuals often deviate from rationality. Pioneering works by Daniel Kahneman and Amos Tversky (1974, 1979) introduced the concept of heuristics—mental shortcuts used in decision-making under uncertainty—which often lead to systematic biases such as overconfidence, representativeness, anchoring, and availability bias. These biases can result in suboptimal financial decisions, particularly among inexperienced or financially illiterate individuals.

Financial literacy, defined as the ability to understand and apply financial concepts in decision-making, has been recognized as a crucial factor in promoting sound financial behavior. Researchers such as Lusardi and Mitchell (2007), and Van Rooij, Lusardi, and Alessie (2011), have consistently shown that higher levels of financial literacy are associated with better financial planning, investment diversification, and lower susceptibility to behavioral biases. However, the relationship between financial literacy and heuristic-driven biases remains underexplored, particularly in emerging economies like India where financial markets are rapidly expanding and individual participation is on the rise.

In this context, university students represent a vital demographic to study. As future professionals and participants in the financial system, their ability to process financial information critically is essential. By comparing finance students—who are presumably more financially literate—with their non-finance counterparts, this study aims to explore whether financial education contributes to more rational financial behavior and reduces reliance on heuristics. The findings may provide insights into the role of educational interventions in promoting sound financial decision-making among young investors in India.

Transition from Standard Finance to Behavioural Finance

Standard finance is based on the assumption that investors are rational, markets are efficient, and individuals make decisions by logically processing all available information to maximize utility. Models such as the Efficient Market Hypothesis (EMH) and Modern Portfolio Theory (MPT) reflect this approach, assuming predictable behavior driven by mathematical optimization. However, real-world market anomalies and irrational investor behaviors have highlighted the limitations of these assumptions.

Behavioural finance emerged to address these limitations by incorporating insights from psychology into financial theory. It acknowledges that investors often act irrationally due to cognitive biases and emotional influences. Behavioural finance provides a more realistic framework for understanding market movements and investor behavior by focusing on how heuristics and biases—such as overconfidence, representativeness, availability, and anchoring—affect financial decision-making.

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Overconfidence Bias

Overconfidence bias arises when individuals place excessive trust in their own knowledge, judgment, or decision-making abilities. In the context of finance, overconfident investors often believe they possess superior information or skills, leading them to trade more frequently than necessary. This overtrading can result in higher transaction costs and lower net returns. Moreover, overconfident individuals tend to underestimate risks, ignore warning signs, and maintain unwarranted optimism about market outcomes. Such behavior can cause asset bubbles and amplify market volatility. Overconfidence is especially prevalent in bullish markets, where past successes may reinforce the illusion of control and predictive power.

Representativeness Bias

Representativeness bias involves assessing the likelihood of an event based on how closely it resembles a known category or stereotype, rather than using objective probability or statistical logic. Investors affected by this bias may assume that a good company must be a good stock, or that past performance will continue into the future, regardless of current fundamentals. For example, if a stock has recently performed well, an investor might incorrectly assume it will continue to do so simply because it "represents" a winner. This can lead to pattern-seeking behavior, overreaction to short-term trends, and mispricing of assets, ultimately distorting rational investment choices.

Availability Bias

Availability bias occurs when individuals rely heavily on information that is most recent, vivid, or easily recalled, rather than considering a full range of data. This mental shortcut leads investors to overemphasize news stories, recent market movements, or personal experiences, while neglecting long-term trends or broader financial indicators. For instance, after hearing frequent media reports about stock market crashes, an investor might become overly cautious, even if data suggests long-term growth. Conversely, after a surge in stock prices, investors might become overly optimistic. This bias can lead to herd behavior and short-term thinking in financial decision-making.

Anchoring Bias

Anchoring bias is the tendency to rely too heavily on an initial reference point (the "anchor") when making decisions, even if that anchor is arbitrary or irrelevant. In finance, investors might fixate on the original purchase price of a stock when deciding whether to sell, rather than evaluating its current fundamentals or market conditions. Anchoring can also manifest in forecasts, where analysts stick too closely to prior estimates despite new information. This rigidity can prevent individuals from adapting to changing circumstances and lead to suboptimal investment choices. Anchoring often operates unconsciously, making it particularly challenging to overcome.

LITERATURE REVIEW

Overconfidence Bias and Financial Literacy

Overconfidence bias has been extensively documented in the behavioral finance literature. Abreu and Mendes (2012) observed that overconfident investors tend to trade more frequently, and their trading behavior is highly sensitive to the sources of information. Their study revealed that both overconfident and non-overconfident investors rarely act on information from family and friends, but when it comes to institutional sources such as banks and portfolio managers, non-overconfident investors actually trade more actively. This nuanced finding suggests that overconfident investors rely excessively on self-generated or selectively trusted information, which can lead to poor investment decisions due to an inflated sense of knowledge.

Bakar and Yi (2016), as well as Trinugroho and Sembel (2011), supported this view by confirming that overconfident investors are prone to taking greater risks and trading more frequently than their less confident counterparts. However, Rekik and Boujelbene (2013), in their study on the Tunisian Stock Exchange, argued that overconfidence did not significantly impact investor behavior, suggesting that the expression of overconfidence may vary depending on market characteristics or investor profiles.

Financial literacy plays a crucial role in moderating overconfidence bias. Individuals with high financial literacy are more likely to critically evaluate their own financial knowledge and capabilities. They are also more likely to understand risk-return trade-offs and the limitations of relying on intuition or past success. According to Lusardi and Mitchell (2014), financial education helps investors develop a realistic assessment of their own investment skills and

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encourages more prudent financial behavior. In turn, this can lead to reduced trading frequency, better diversification, and improved portfolio performance.

Representativeness Bias and Financial Literacy

Representativeness bias leads investors to draw conclusions based on similarities or patterns that may not reflect reality. Studies by Boussaidi (2013), Chen, Kim, Nofsinger, and Rui (2004), and Rekik and Boujelbene (2013) confirmed the presence of representativeness bias in the Chinese and Tunisian stock markets. Chaffai and Medhioub (2014) identified representativeness as the most common psychological bias among Tunisian investors, affecting 54.4% of respondents. Bektur and Atasaygın (2017), however, found that representativeness bias was not significantly different across investor groups based on education, highlighting the complexity of how such biases manifest.

Financial literacy equips individuals with the tools to evaluate investment options based on fundamentals rather than perceived patterns or recent trends. Investors with higher financial literacy are better able to understand that past performance is not a reliable indicator of future returns and are thus less likely to fall prey to representativeness heuristics. Research by van Rooij, Lusardi, and Alessie (2011) showed that financially literate individuals are more likely to engage in sound investment planning and less likely to be influenced by noise or superficial information. They also found a strong correlation between financial knowledge and more diversified, risk-appropriate investment portfolios.

Availability Bias and Financial Literacy

Availability bias occurs when individuals assess the likelihood of events based on how easily examples come to mind, often leading to distorted perceptions of risk. Bakar and Yi (2016), along with Chaffai and Medhioub (2014), found that a unit increase in availability bias significantly increased investors' risk-taking behavior, by as much as 0.568 units. Furthermore, Chaffai and Medhioub (2014) found that availability bias was present in 35.6% of the investor population, indicating a considerable influence on market behavior.

Financial literacy can help investors avoid overreliance on recent or salient information. A well-informed investor is more likely to perform comprehensive due diligence, consider a wider range of data, and avoid reacting impulsively to sensational news or media hype. Hastings, Madrian, and Skimmyhorn (2013) noted that financial education increases individuals' ability to process information critically and contextualize short-term market movements. This broader perspective helps reduce the influence of availability bias, leading to more stable and informed investment strategies.

Anchoring Bias and Financial Literacy

Anchoring bias refers to the tendency of individuals to base decisions on an initial piece of information, even if it is irrelevant. Rekik and Boujelbene (2013) observed that anchoring significantly influenced investor behavior in Tunisia, especially among women. They also noted that increased age and investment experience reduced susceptibility to this bias. Chaffai and Medhioub (2014) found that anchoring was observed in 32.55% of investors, suggesting a widespread reliance on reference points, such as purchase price or media-reported estimates, when making financial decisions.

High financial literacy can help individuals recognize and correct for anchoring by encouraging a more dynamic and evidence-based approach to investment decisions. Educated investors are more likely to update their beliefs in response to new information and evaluate assets based on current market fundamentals rather than outdated reference points. According to studies by Fernandes, Lynch, and Netemeyer (2014), financial literacy programs improve decision-making under uncertainty and reduce cognitive rigidity, making individuals less prone to anchoring.

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According to studies by Fernandes, Lynch, and Netemeyer (2014), financial literacy programs improve decision-making under uncertainty and reduce cognitive rigidity, making individuals less prone to anchoring.

The Importance of Studying Heuristic-Driven Biases and Financial Literacy Together

Understanding the relationship between heuristic-driven biases and financial literacy is essential for developing effective interventions in investor education and financial planning. Behavioral biases often operate unconsciously, and without adequate financial knowledge, investors may not even recognize these biases in themselves. Studies by Nicolini (2019) and Muradoglu and Harvey (2012) emphasize that financial literacy can act as a buffer against irrational decision-making, improving judgment under uncertainty and fostering long-term wealth accumulation.
Moreover, by integrating behavioral finance principles into financial literacy programs, educators and policymakers can design more targeted curricula that address specific cognitive pitfalls. This synergy not only improves individual financial outcomes but also contributes to healthier, more stable financial markets by promoting rational and informed investment behavior.

METHODOLOGY

This study aims to examine the impact of individuals' financial knowledge on their susceptibility to psychological biases in the context of financial investment decisions. To achieve this objective, a quantitative research design was adopted, utilizing a structured questionnaire to collect primary data.

A total of 230 university students were selected through a simple random sampling method from universities in the Jammu and Kashmir provinces. The sample was stratified into two distinct groups to allow for comparison based on exposure to financial education. The first group, referred to as *finance students*, comprises individuals enrolled in finance-related departments who are assumed to have formal financial education through their coursework. The second group, referred to as *other students*, consists of individuals from non-finance academic disciplines with no formal inclusion of financial education in their curriculum.

Although students in finance departments are more likely to have had exposure to financial concepts through coursework and academic training, the study does not collect direct information on whether each participant has undergone specific financial education outside their curriculum. This limitation is acknowledged and considered in the interpretation of the results.

To measure heuristic-driven biases influencing investment decisions, a standardized scale was employed. The scale was adapted from the study conducted by Öncü and Özevin (2017), which explored heuristic biases within the behavioral finance framework. The instrument includes validated items designed to assess common psychological biases such as representativeness, availability, anchoring, and overconfidence that affect investment behavior.

The questionnaire was structured into two main sections. The first section collected demographic and background information, including academic discipline, age, and gender. The second section focused on items measuring behavioral biases, using a Likert-type scale to gauge agreement levels with various bias-related statements.

Data were analyzed using appropriate statistical methods, including descriptive statistics, independent samples t-tests, and regression analysis, to identify differences in behavioral biases between the two student groups and assess the influence of financial knowledge on susceptibility to such biases.

Ethical considerations were observed throughout the data collection process. Participation was voluntary, and respondents were assured of the confidentiality and anonymity of their responses.

FINDINGS

This section begins with a presentation of the demographic characteristics of the 230 university students who constitute the study sample. The demographic profile includes variables such as gender, age, academic discipline (finance vs. non-finance students), and geographic location (Jammu or Srinagar), offering a foundational understanding of the sample's composition.

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Following the demographic analysis, descriptive statistics related to the research instrument are presented, including the mean, standard deviation, and response trends for each item on the scale. Additionally, internal consistency reliability is assessed using Cronbach's alpha coefficients to ensure the reliability and validity of the scale used to measure heuristic-driven behavioral biases.

Table 1. Properties of Sampling Group.

Variable	Group	N	Percentage
Gender	Male	154	66.96
	Female	76	33.04
Age	22 to <22	106	46.09
	23 to 30	80	34.78
	31 to >31	44	19.16
Status	Finance students	98	42.61
	Other students	132	57.39
City	Jammu	103	44.78
	Srinagar	127	55.22

The study sample consists of 230 university students from the Jammu and Kashmir provinces. Of these, 154 participants (66.96%) are male, while 76 participants (33.04%) are female. In terms of age distribution, the majority of respondents (106 or 46.09%) are under the age of 22, followed by 80 participants (34.78%) aged between 23 and 30 years, and 44 participants (19.13%) above the age of 31.

Regarding academic status, 98 students (42.61%) are enrolled in finance-related programs, and 132 students (57.39%) are from non-financial disciplines. Geographically, 103 respondents (44.78%) are from Jammu, and 127 respondents (55.22%) are from Srinagar.

The responses to the items related to psychological biases, as identified in the behavioral finance literature, are presented in Table. The first 18 items of the scale are structured as 5-point Likert-type questions, ranging from "Strongly Disagree" to "Strongly Agree." To assess the internal consistency of these items, Cronbach's alpha reliability coefficient was calculated and found to be $\boldsymbol{\alpha = 0.73}$, indicating an acceptable level of reliability for the scale. Furthermore, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was **0.71**, and Bartlett's Test of Sphericity yielded statistically significant results, confirming the suitability of the data for factor analysis.

Items	Mean	s	S_k	K_{rt}
I trust my experience in investment rather than new information.	3.29	1.12	0.39	-0.46
The most recent performance of an investment tool shows the future profit loss of that investment tool and I make my investment accordingly.	3.75	1.13	0.45	-0.73
Advertisements are the main source of information for my investment decision.	2.96	1.35	0.14	-0.55
I feel I lost if I do not sell the stock, which I bought with 10 rupee, when its price is 20 rupee when I sell it with 15 rupee.	3.06	1.19	0.29	-0.65

The descriptive statistics for four selected items related to behavioral biases in investment decision-making provide valuable insights into the psychological tendencies of the respondents. The item *"I trust my experience in investment rather than new information,"* which represents overconfidence bias, has a mean score of 3.29, indicating a moderate tendency among participants to rely on personal experience rather than incorporating new or external data into their decisions. The slight positive skewness (0.39) suggests that more respondents leaned toward agreement with this statement, while the negative kurtosis (-0.46) points to a flatter distribution, indicating some variability in responses. The second item, *"The most recent performance of an investment tool shows the future profit/loss of that investment tool and I make my investment accordingly,"* relates to the representativeness bias. This item has the highest mean score of 3.75, suggesting a strong tendency among individuals to assume that recent trends will continue into the future, a common heuristic in financial behavior. The skewness (0.45) supports this interpretation, as the responses are slightly skewed toward agreement, while the kurtosis value (-0.73) again suggests a relatively flat distribution.

The third statement, *"Advertisements are the main source of information for my investment decision,"* measures availability bias. The mean value of 2.96 is near the neutral point on the Likert scale, suggesting that advertisements

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are not a dominant source of investment information for most respondents. However, the higher standard deviation (1.35) reflects a wide range of responses, and the relatively small skewness (0.14) and moderate negative kurtosis (-0.55) indicate a diverse spread of opinions, with no strong central tendency.

Lastly, the item *"I feel I lost if I do not sell the stock, which I bought with ₹10, when its price is ₹20 and I sell it at ₹15,"* is associated with anchoring bias and aspects of loss aversion. The mean score of 3.06 suggests that participants are slightly inclined to perceive this scenario as a loss, despite making a profit. This reflects the tendency to anchor emotionally to a perceived peak value (₹20) rather than evaluating the actual gain from the original price. The skewness (0.29) shows a slight lean toward agreement, while the kurtosis (-0.65) again shows some dispersion in responses.

In summary, the data suggest that representativeness bias is the most dominant among the participants, followed by overconfidence and mild tendencies toward anchoring and availability biases. The results underscore how different cognitive shortcuts influence investment decisions, potentially leading to irrational or emotionally driven behavior in financial contexts.

To examine the impact of financial literacy—central to the purpose of this study—on behavioral tendencies aligned with behavioral finance models, the data presented in Table is utilized. In this context, the investment-related behaviors of finance students and other students are compared across various heuristic-driven psychological biases identified in the behavioral finance literature.
The analysis is guided by the following general hypotheses:

- **H_0**: Educational status of individuals does not lead to any significant difference in cognitive biases.
- **H_1**: Educational status of individuals leads to a significant difference in cognitive biases.

To test these hypotheses, the homogeneity of variances was first assessed for each bias to determine whether the groups could be compared. The results indicated that variances across the questions were homogeneous, allowing for valid comparison. Following this, a Tukey post hoc test was conducted to further examine the differences between the two educational groups.

The findings reveal that educational status does have a statistically significant impact on all four heuristic-driven biases assessed in the study. Specifically, the bolded values in Table indicate where significant differences were observed. These results support the conclusion that students with a background in finance education demonstrate distinct behavioral patterns compared to students from non-finance backgrounds, affirming the role of financial literacy in influencing susceptibility to cognitive biases in investment decisions.

Articles	Group	N	Mean	S	F	P
Overconfidence	Finance students Other students	98 132	3.06 3.64	0.89 0.65	5.21	0.04
Representativeness	Finance students Other students	98 132	3.19 3.89	1.17 1.12	6.34	0.01
Availability	Finance students Other students	98 132	2.13 2.89	1.96 1.84	3.32	0.02
Anchoring	Finance students Other students	98 132	3.21 3.98	1.12 0.98	5.33	0.00

The comparison of finance students and other students in relation to heuristic-driven psychological biases reveals notable differences across all four biases. For overconfidence bias, a statistically significant difference is observed between the two groups F=5.21;p=0.04<0.05F = 5.21; p = 0.04 < 0.05F=5.21;p=0.04<0.05. Other students have a higher mean score (3.64) compared to finance students (3.06), indicating that students without formal financial

education exhibit stronger overconfidence tendencies, potentially due to limited understanding of investment risks and an inflated belief in their judgment.

Similarly, a significant difference is found in representativeness bias F=6.34;p=0.01<0.05F = 6.34; p = 0.01 < 0.05F=6.34;p=0.01<0.05. Other students again show a higher average score (3.89) compared to finance students (3.19). This suggests that students lacking financial literacy are more likely to rely on recent patterns or perceived similarities in financial decision-making, a common manifestation of representativeness bias.

In the case of availability bias, the difference between the two groups is also statistically significant F=3.32;p=0.02<0.05F = 3.32; p = 0.02 < 0.05F=3.32;p=0.02<0.05. The mean score of other students is 2.89, while that of finance students is 2.13, indicating that those without a finance background are more influenced by easily accessible or recent information, such as media coverage or anecdotal evidence, in their investment choices.

Finally, for anchoring bias, there is a highly significant difference F=5.33;p=0.00<0.05F = 5.33; p = 0.00 < 0.05F=5.33;p=0.00<0.05. Other students report a mean score of 3.98, while finance students report 3.21, suggesting that non-finance students are more inclined to base decisions on initial values or reference points, rather than revising judgments in light of new information.

In conclusion, the results clearly show that educational background in finance plays a crucial role in moderating the impact of heuristic biases. Students without financial education exhibit higher levels of overconfidence, representativeness, availability, and anchoring biases, underlining the importance of financial literacy in promoting rational investment behavior.

CONCLUSION

The study set out to examine the relationship between educational background and the presence of heuristic-driven cognitive biases in investment decision-making. The hypotheses tested whether individuals with financial education exhibit significantly different levels of cognitive biases compared to those without such education. Using statistical tools including tests for homogeneity of variances and the Tukey post hoc test, the findings reveal consistent and statistically significant differences between finance and non-finance students across all four biases analyzed: overconfidence, representativeness, availability, and anchoring.

The data shows that students without a financial background consistently score higher in each of the four biases. This suggests that a lack of financial education may lead individuals to rely more heavily on heuristics, potentially due to limited exposure to structured financial thinking or risk evaluation frameworks. For instance, the higher levels of overconfidence among non-finance students may stem from a lack of awareness about market unpredictability, while their susceptibility to representativeness and availability biases could be attributed to a stronger reliance on intuitive or anecdotal reasoning.

These results underline the critical importance of financial literacy in mitigating cognitive biases and fostering more rational, informed decision-making in investment contexts. Educational programs that incorporate behavioral finance principles can equip individuals with the tools to recognize and counteract these biases. Ultimately, enhancing financial education could lead to more sound investment behavior, not only among students but within the broader population as well.

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