



Investigate The Impact Of Overconfidence Bias And Anchoring Bias On Risk Tolerance, And Subsequently, How Risk Tolerance Affects Investment Decisions

Dr.T.Sobha Rani^{1*}, S.N.V.Sushmitha², Dr.C.Vani³

^{1*}Professor, Department of Communication and Journalism, Sri Padmavati Mahila Visvavidyalayam, Tirupati 517502, Andhra Pradesh

²Research Scholar, Sri Padmavati Mahila Visvavidyalayam, Tirupati 517502, Andhra Pradesh

³Professor, Department of Communication and Journalism, Sri Padmavati Mahila Visvavidyalayam, Tirupati 517502, Andhra Pradesh

Citation: Dr.T.Sobha Rani et al (2024), Investigate The Impact Of Overconfidence Bias And Anchoring Bias On Risk Tolerance, And Subsequently, How Risk Tolerance Affects Investment Decisions, Educational Administration: Theory and Practice, 30(5), 13629-13636
Doi: 10.53555/kuey.v30i5.5915

ARTICLE INFO

ABSTRACT

Understanding how psychological factors influence investment decisions is crucial for both investors and financial professionals. This study explores the interplay between overconfidence bias, anchoring bias, and risk tolerance in shaping investment choices. Overconfidence bias leads investors to overestimate their abilities, potentially leading to excessive risk-taking. Anchoring bias occurs when investors rely too heavily on initial information, hindering their ability to adjust assessments based on new evidence. Both biases can significantly impact risk tolerance, a key factor in investment decision-making. This research investigates the impact of these biases on risk tolerance and subsequent investment choices. A sample of 410 participants completed measures of overconfidence bias, anchoring bias, risk tolerance, and investment decision-making styles. The findings support the hypotheses that overconfidence and anchoring biases significantly influence risk tolerance. Investors exhibiting these biases are more likely to display higher risk tolerance. Additionally, risk tolerance has a significant positive effect on the riskiness of investment decisions made. This study contributes to the growing body of knowledge in behavioral finance by highlighting the influence of cognitive biases on investor behavior. The findings can inform investors, financial professionals, and policymakers about the potential pitfalls of these biases and the importance of considering risk tolerance in investment decisions.

Key Words: Cognitive bias, Over Confidence bias, Anchoring bias, investment decisions.

I INTRODUCTION:

In the realm of financial decision-making, individuals are often faced with complex choices that involve assessing risks and potential rewards. Understanding the psychological factors that influence decision-making in investment contexts is crucial for both investors and financial professionals. Among the myriad cognitive biases that affect human judgment, overconfidence bias and anchoring bias stand out as particularly influential in shaping risk tolerance and investment decisions. This research aims to delve into the interplay between these biases and risk tolerance, exploring how they collectively impact investment decisions and subsequent financial outcomes.

Financial decision-making involves evaluating various investment options, weighing potential risks against expected returns, and making choices that align with one's financial goals and risk preferences. However, numerous studies have demonstrated that individuals often deviate from rational decision-making principles due to the influence of cognitive biases (Kahneman&Tversky, 1979; Barberis, 2013). These biases, rooted in human psychology, can lead to suboptimal decisions, resulting in financial losses or missed opportunities.

One of the most prevalent cognitive biases affecting financial decision-making is overconfidence bias. This bias refers to the tendency of individuals to overestimate their own knowledge, skills, and abilities, leading them to be overly confident in their judgments and decisions (Odean, 1998; Barber &Odean, 2001). In the

context of investing, overconfident investors may believe that they possess superior information or expertise, leading them to take excessive risks or engage in speculative trading (Gervais&Odean, 2001). Overconfidence bias can distort risk perceptions, leading investors to underestimate the likelihood of negative outcomes and overestimate their ability to outperform the market.

Anchoring bias is another cognitive bias that significantly influences financial decision-making. This bias occurs when individuals rely too heavily on initial information or reference points (Tversky&Kahneman, 1974). In investment contexts, anchoring bias manifests when investors anchor their decisions to irrelevant or arbitrary reference points, such as past stock prices or analyst recommendations (Barberis& Huang, 2008). As a result, investors may fail to adequately adjust their assessments of risk and return based on new information, leading to suboptimal investment decisions.

Prospect theory, developed by provides a theoretical framework for understanding how individuals Kahneman and Tversky (1979), evaluate risky choices and make decisions under uncertainty. According to prospect theory, individuals' preferences are shaped by subjective value functions that reflect both gains and losses relative to a reference point. Prospect theory posits that individuals exhibit risk aversion when facing gains but become risk-seeking when facing losses, a phenomenon known as the "reflection effect." Moreover, prospect theory suggests that individuals' risk attitudes are influenced by cognitive biases such as loss aversion, overconfidence, and anchoring.

Dual-process theory, proposed by Kahneman (2011), posits that human decision-making is governed by two distinct cognitive systems: System 1 and System 2. System 1 operates automatically and intuitively, relying on heuristics and shortcuts to make rapid judgments. In contrast, System 2 involves deliberate and analytical thinking, requiring conscious effort and cognitive resources. Dual-process theory suggests that cognitive biases, including overconfidence and anchoring, primarily arise from the intuitive processing of information by System 1. Understanding the interplay between these cognitive biases and the dual-process model can provide insights into how individuals form risk perceptions and make investment decisions.

Numerous studies have investigated the relationship between overconfidence bias and risk tolerance in investment decision-making. For example, Barber and Odean (2001) found that overconfident investors tend to trade more frequently, resulting in lower portfolio returns due to transaction costs and poor timing. Similarly, Deaves et al. (2010) observed that overconfident investors exhibit higher levels of trading activity and are more likely to hold undiversified portfolios, exposing themselves to greater idiosyncratic risk. These findings suggest that overconfidence bias is associated with lower risk aversion and higher risk-taking behavior among investors.

Research examining the influence of anchoring bias on risk tolerance has also yielded insightful findings. For instance, Rabin and Schrag (1999) conducted experiments demonstrating that individuals' risk preferences are influenced by arbitrary numerical anchors, even when those anchors are irrelevant to the decision at hand. Similarly, Northcraft and Neale (1987) found that negotiators who receive high initial offers anchor their subsequent counteroffers at higher levels, resulting in higher settlement prices. In the context of investment decision-making, anchoring bias may lead investors to base their risk assessments on irrelevant reference points, resulting in suboptimal risk-return tradeoffs.

II LITERATURE REVIEW:

Individual investor decision-making can be significantly influenced by cognitive biases (Madaan, G., & Singh, S. 2019). This research investigates the impact of two prominent biases, overconfidence and anchoring, on risk tolerance and, subsequently, how risk tolerance affects investment choices. This literature review explores existing research to establish a theoretical foundation for the study and offer insights for research article.

Behavioural finance has identified several cognitive biases that influence investor behaviour:

Overconfidence Bias: Investors tend to overestimate their knowledge, skill, and ability to predict market movements. This can lead to excessive risk-taking and potentially suboptimal investment outcomes (Shefrin&Statman, 2000, Jain, R., Jain, P., & Jain, C., 2015).

Anchoring Bias: Investors rely too heavily on the first piece of information they encounter, leading to biased judgments (Pompian, M. M, 2012). This can be particularly relevant when investors receive initial information about potential investments or market conditions (Tversky&Kahneman, 1974).

Malmendier& Pope (2006) found that overconfident investors tend to overestimate their returns and underestimate risk, leading them to exhibit higher risk tolerance. This can result in a mismatch between their risk appetite and their actual risk capacity. Benartzi&Thaler (1995) demonstrated how anchoring bias can influence risk tolerance. When presented with an initial high-risk scenario, investors may exhibit a higher overall risk tolerance compared to those presented with a low-risk scenario first. This highlights how framing of information can impact risk perception.

Risk tolerance is a crucial factor in investment decision-making. Investors with higher risk tolerance are more likely to:

Invest in Riskier Assets: They may allocate a larger portion of their portfolio to assets like stocks, which have higher potential returns but also increased volatility, compared to safer options like bonds (Grable & James, 2006).

Higher risk tolerance can be associated with a more active trading style, potentially leading to higher transaction costs and potentially lower returns due to emotional decision-making (Barber & Odean, 2000). Investors with higher risk tolerance may seek out investment strategies with greater potential for return, even if accompanied by higher potential losses (Mehra & Prescott, 1985).

III. RESEARCH PROPOSAL:



This research project aims to explore the elaborate relationship between overconfidence bias, anchoring bias, risk tolerance, and investment decisions. Overconfidence bias and anchoring bias are two well-documented cognitive biases that can significantly influence individuals' decision-making processes, particularly in financial contexts. The core hypothesis of this study is the impact of overconfidence bias, anchoring bias and risk tolerance on investment decisions. By investigating these relationships through empirical research, the study seeks to provide valuable insights into the mechanisms through which cognitive biases impact investors' risk tolerance levels and subsequent investment choices.

IV. RESEARCH DESIGN:

4.1. Objectives:

In light of the pervasive influence of overconfidence bias and anchoring bias on investor behavior, this study aims to delve deeper into their impact on risk tolerance and subsequent investment decisions. The objectives of this research are multifaceted, aiming to assess the prevalence of these biases among investors, examine their relationship with risk tolerance, analyze their influence on investment decisions, and identify potential avenues for intervention or mitigation.

1. To examine the impact of overconfidence bias on risk tolerance.
2. To analyse the influence of anchoring bias on risk tolerance.
3. To investigate the effect of risk tolerance on investment decisions.

4.2. Hypotheses:

To achieve these objectives, several hypotheses are formulated based on existing literature and theoretical frameworks in behavioral finance. These hypotheses posit relationships between overconfidence bias, anchoring bias, risk tolerance levels, and investment decisions, providing a structured framework for empirical investigation. Through rigorous empirical analysis, this study seeks to contribute to the growing body of knowledge in behavioral finance and provide valuable insights for investors, financial professionals, and policymakers.

Hypothesis H01: There is no significant impact of overconfidence bias and anchoring bias on risk tolerance.

Hypothesis H02: There is no significant impact of risk tolerance on investment decisions.

4.3. Sample technique and sample size:

For this study, a simple random sampling technique was employed to select participants from the target population. Simple random sampling ensures that each member of the population has an equal chance of being selected for the study.

The study aimed to recruit a total of 410 participants. The sample size of 410 was determined using Cochran's sample size formula, which takes into account the population size, desired level of confidence, and margin of error. This sample size provides sufficient statistical power to detect meaningful effects and relationships within the data while also ensuring practical feasibility in terms of data collection and analysis. Additionally, by adhering to a predetermined sample size, the study maintains rigor and consistency in its methodology, enhancing the reliability of the findings.

V.ANALYSIS:

The two elements of the analysis are the measurement model and the structural model. The researcher provided the constructs' convergent and discriminant validities in the section on the measuring model. The researcher examined the effects of anchoring and overconfidence biases on risk tolerance as well as the influence of risk tolerance on investment decisions in the second stage i.e. the structural model.

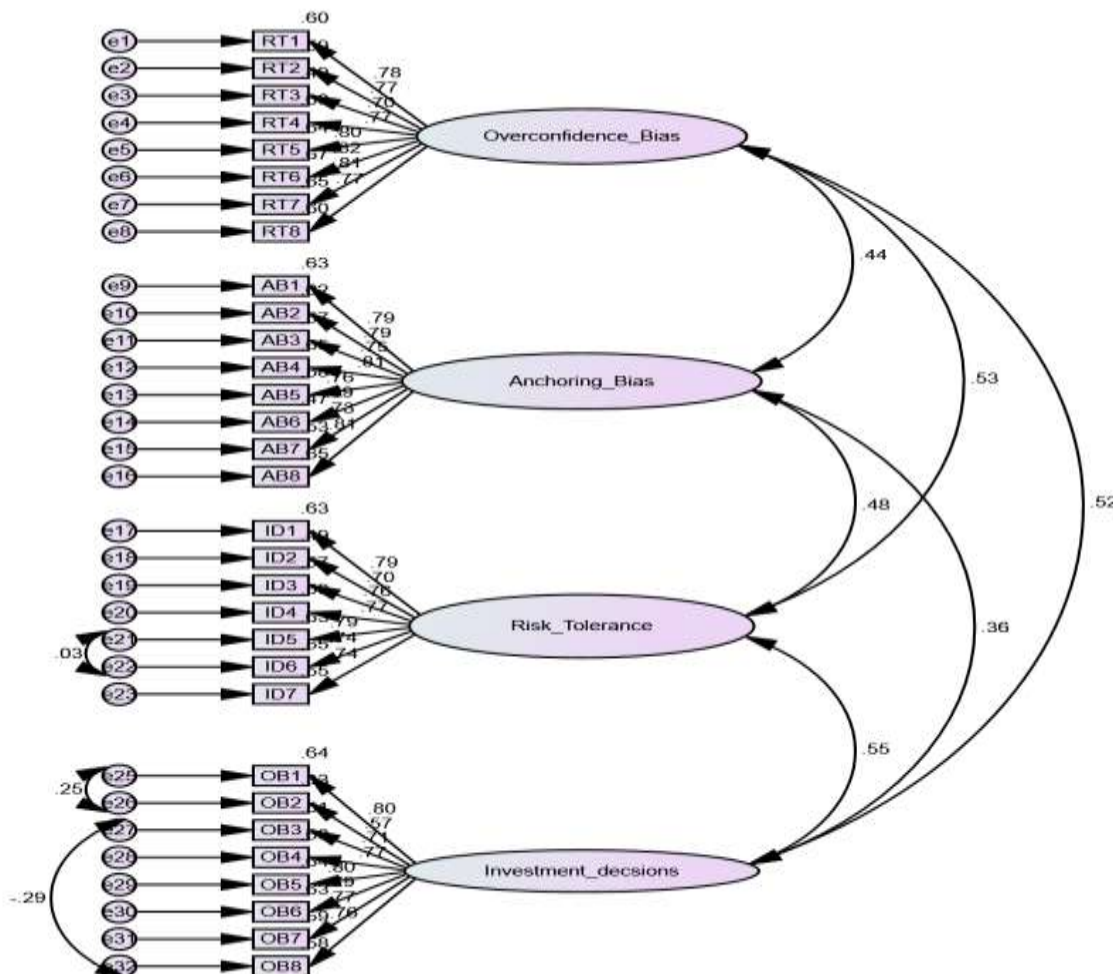
5.1. Exploratory factor analysis

Kaiser (1974) stated that in order to evaluate EFA, KMO and Bartlett test results had to be within threshold bounds, meaning that KMO had to be greater than 0.5 and the Bartlett test of sphericity had to be less than 0.05 (Field, 2013). The KMO and Bartlett's test results show that the data used for the study is suitable for factor analysis. The KMO value is high at 0.931, and the Bartlett's test is also determined to be significant. During the factor analysis process, factors having an Eigen value greater than 1 were deemed important. It can be seen from the results that only four factors had Eigen values greater than 1.

Four factors—overconfidence bias, anchoring bias, risk tolerance, and investment decisions—were taken out of 23 statements or items, as shown by the rotated component matrix. A confirmatory factor analysis is performed in order to validate the model's antecedents.

5.2. Measurement model

i. Confirmatory Factor Analysis



It's a measuring model that allows for the observation of latent variables based on indicator variables and the testing of the model's reliability. The CFA is used in the study to determine the relationship between the factors and the items (observed) as well as the relationship between the factors and reliability (Joreskog&Sorbom, 1989). This section presents model fit in addition to convergent and discriminant validities.

The principle component method was used in CFA on 23 items to verify the dimensionality of each construct. Confirmatory factor analysis is used to evaluate the validity of the four study constructs: overconfidence bias, anchoring bias, risk tolerance, and investment decisions.

It is discovered by CFA that every item in each of the four constructs completely matched the threshold values (Hulland, 1999). Additionally, CR and AVE values were included in the table below as part of the validity testing.

Table 1: Convergent Validity through CR & AVE values

S.No	Constructs	CR	AVE
1	Overconfidence bias	0.904	0.574
2	Anchoring bias	0.924	0.605
3	Risk tolerance	0.919	0.587
4	Investment decisions	0.911	0.564

The regression weights for each construct, together with the corresponding CR and AVE values, are shown in the table. According to the statistics in the table (Nunally& Bernstein, 1994; Bagozzi& Yi, 1988), every CR and AVE value was over the threshold. Thus, it is proven that convergent validity exists.

The researcher aimed to examine discriminant validity among the constructs, as demonstrated by the convergent validity. The link between the constructs is the only factor that determines its validity. The following displays the discriminant validity result as a correlation matrix.

Table 2: Discriminant Validity

	Overconfidence bias	Anchoring bias	Risk tolerance	Investment decisions
Overconfidence bias	0.757			
Anchoring bias	0.531	0.778		
Risk tolerance	0.476	0.441	0.766	
Investment decisions	0.550	0.519	0.362	0.751

All of the diagonal elements that make up the square root of AVE are found to be larger than the non-diagonal elements (Fornell&Larcker, 1981). Thus, there are no problems with the model's validity. Thus, it is proven that discriminant validity exists.

Table 3: Model Fit Indices for Structural Model

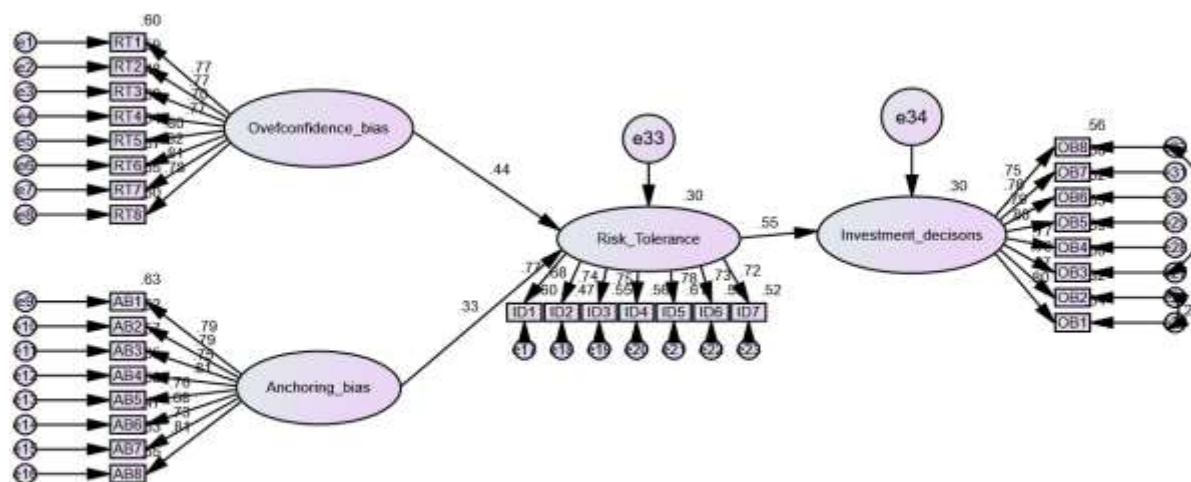
CMIN/df	GFI	AGFI	CFI	NFI	TLI	IFI	RMSEA	RMR	PGFI	RFI
2.735	0.851	0.826	0.911	0.867	0.902	0.911	0.065	0.048	0.729	0.854

It was observed that every value in the model fit was higher than the threshold values. Additionally, it is noted that the GFI and AGFI values are below the threshold value of 0.8; nevertheless, since the values are quite close to 0.9, they can still be taken into consideration (Baumgartner and Homburg, 1995, and Doll et.al, 1994). The model is therefore empirically fit.

5.3. Structural Model

The structural model is evaluated in order to estimate a number of dependent links among all constructs. Four main constructs—risk tolerance, investment decisions (an endogenous construct), anchoring bias (an exogenous construct), and overconfidence bias (an endogenous construct)—were incorporated into the structural model. To evaluate the relationships between the constructs (risk tolerance, investment decisions, anchoring bias, and overconfidence bias), a model is suggested.

The researcher will investigate the impact of independent on dependent variables in the structural model, drawing from the theoretical underpinnings.



This structural model is shown above. Table 3 displays the model fit indices for the structural model.

Table 3: Model Fit Indices for Structural Model

CMIN/df	GFI	AGFI	CFI	NFI	TLI	IFI	RMSEA	RMR	PGFI	RFI
2.754	0.839	0.814	0.898	0.854	0.890	0.899	0.069	0.136	0.726	0.136

The threshold values were met by every model fit index of the structural model. The structural model thus fits the data empirically. The dependent construct, risk tolerance, was significantly positively impacted by the independent constructs work overconfidence bias ($\beta = 0.44$, $P = 0.000$) and anchoring bias ($\beta = 0.33$, $P = 0.000$). Additionally, analysis reveals that investment decisions were influenced by risk tolerance ($\beta = 0.55$, $P = 0.000$). The inter-construct correlations were examined in addition to model fit. Risk tolerance is an endogenous construct that is significantly impacted by the exogenous constructs "anchoring bias" and "overconfidence bias." Furthermore, it has been observed that risk tolerance significantly influenced the choices made about investments. Therefore, it can be said that all of the alternative hypotheses are supported by the results and the model is fit.

VI. Results:

H01: In this study, the researcher examined anchoring and overconfidence bias as separate constructs and examined how they affected investors' dependent construct of risk tolerance. With a regression coefficient of 0.30 at the 5% level of significance, it is discovered that the overconfidence bias and the anchoring bias had a substantial direct effect on the dependant. The null hypothesis is thus rejected.

H02: In order to quantify risk tolerance's impact on investors' investment decisions (a dependent construct), the researcher treated risk tolerance as an independent construct. With a regression coefficient of 0.55 at the 5% level of significance, it is discovered that the overconfidence bias and the anchoring bias had a substantial direct effect on the dependant. The null hypothesis is thus rejected.

VII. Discussion

This study examined the interplay between overconfidence bias, anchoring bias, risk tolerance, and investment decisions. The findings confirmed that both overconfidence and anchoring bias positively influence risk tolerance. Investors exhibiting these biases were more likely to display a higher risk tolerance. This aligns with prior research on behavioral finance highlighting the impact of cognitive biases on investor behavior.

Delving deeper, the positive association between overconfidence bias and risk tolerance suggests that investors who overestimate their abilities might be more prone to riskier investments. They might underestimate potential risks or believe they possess superior skills, leading to choices that expose them to greater potential losses. Similarly, anchoring bias can distort risk perception. Investors who rely heavily on initial information might anchor their risk tolerance at a higher level if presented with high-risk scenarios first, hindering their ability to adjust risk assessments and potentially leading to suboptimal investment decisions.

These findings are supported by existing research. The positive relationship between overconfidence bias and risk tolerance aligns with studies demonstrating increased trading activity and riskier portfolios among overconfident investors. Similarly, the link between anchoring bias and risk tolerance aligns with research on the influence of irrelevant anchors on risk preferences. However, some studies yield mixed results, suggesting overconfidence might not always lead to higher risk tolerance. Future research could explore these nuances by examining the specific types of overconfidence and their varying effects on risk tolerance.

VII. Conclusion

This study highlights the significant influence of overconfidence and anchoring biases on investor behavior. Investors exhibiting these biases demonstrate a higher risk tolerance, potentially leading to riskier investment choices. These findings contribute to the field of behavioral finance by emphasizing the role of cognitive biases in decision-making. By acknowledging these biases and their mechanisms, investors, financial professionals, and policymakers can work towards promoting more informed and responsible investment practices.

References:

1. Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics*, 116(1), 261-292.
2. Barberis, N. (2013). Thirty years of prospect theory in economics: A review and assessment. *Journal of Economic Perspectives*, 27(1), 173-195.
3. Barberis, N., & Huang, M. (2008). Stocks as lotteries: The implications of probability weighting for security prices. *American Economic Review*, 98(5), 2066-2100.
4. Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science*, 16, 74-94.
5. Baumgartner, H., & Homburg, C. (1995). Beurteilung von Kausalmodellen. Bestandsaufnahme und Anwendungsempfehlungen [Evaluation of causal models. Stocktaking and application recommendations]. *Marketing: ZFP, Journal of Research and Management*, 17(3), 162-176.
6. Benartzi, S., & Thaler, R. H. (1995). Myopic Loss Aversion and the Equity. *The Quarterly Journal of Economics*, 110(1), 73-92.
7. Deaves, R., Ludvigson, S. C., & Steiner, M. (2010). The anatomy of the stock market's response to monetary policy. *Journal of Financial and Quantitative Analysis*, 45(1), 295-311.
8. Deaves, R., Palermo, J., & Taylor, L. (2010). The disposition effect, trading frequency, and the cross-section of stock returns. *Journal of Banking & Finance*, 34(1), 67-79.
9. Doll, W. J., Xia, W., & Torkzadeh, G. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS quarterly*, 453-461.
10. Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. sage.
11. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 18(1), 39-50.
12. Gervais, S., & Odean, T. (2001). Learning to be overconfident. *The Review of Financial Studies*, 14(1), 1-27.
13. Grable, J. E., & Britt, S. (2006). A further examination of the validity of the Kansas marital satisfaction scale: Implications for financial consultants. *Journal of Personal Finance*, 5(2), 17.
14. Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic management journal*, 20(2), 195-204.
15. Jain, R., Jain, P., & Jain, C. (2015). Behavioral Biases in the Decision Making of Individual Investors. *IUP Journal of Knowledge Management*, 13(3).
16. Jöreskog, K. G., & Sörbom, D. (1989). LISREL-8: Structural equation modeling with composite variables. *Psychometrika*, 54(2), 167-182.
17. Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-291.
18. Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-291.
19. Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and psychological measurement*, 34(1), 111-117.

20. Madaan, G., & Singh, S. (2019). An analysis of behavioral biases in investment decision-making. *International Journal of Financial Research*, 10(4), 55-67.
21. Malmendier, U. (2016). The bidder's curse: Reply. *American Economic Review*, 106(4), 1195-1213.
22. Mehra, R., & Prescott, E. C. (1985). The equity premium: A puzzle. *Journal of monetary Economics*, 15(2), 145-161.
23. Northcraft, G. B., & Neale, M. A. (1987). Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. *Organizational Behavior and Human Decision Processes*, 39(1), 84-97.
24. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
25. Odean, T. (1998). Volume, volatility, price, and profit when all traders are above average. *The journal of finance*, 53(6), 1887-1934.
26. Pompian, M. M. (2012). *Behavioral finance and wealth management: how to build investment strategies that account for investor biases* (Vol. 667). John Wiley & Sons.
27. Rabin, M., & Schrag, J. L. (1999). First impressions matter: A model of confirmatory bias. *The Quarterly Journal of Economics*, 114(1), 37-82.
28. Rabin, M., & Schrag, J. L. (1999). First impressions matter: A model of confirmatory bias. *The Quarterly Journal of Economics*, 114(1), 37-82.
29. Shefrin, H., & Statman, M. (2000). Behavioral portfolio theory. *Journal of financial and quantitative analysis*, 35(2), 127-151.
30. Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.
31. Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *science*, 185(4157), 1124-1131.