Cognitive and Emotional Drivers of Risk Perception and Financial Success: Pakistan Stock Market Perspective

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Abstract

This study investigates the impact of cognitive and emotional biases; herding behavior, loss aversion, cognitive biases, and overconfidence on risk perception and financial performance in the Pakistani stock market. Employing Structural Equation Modeling (SEM) to analyze data from 248 individual investors, the findings reveal that herding behavior, cognitive biases, and overconfidence significantly influence risk perception, whereas loss aversion has an insignificant effect. Risk perception mediates the relationship between psychological factors and financial performance, highlighting its critical role in investment outcomes. The study underscores the importance of addressing behavioral biases to improve decision-making and economic success. Practical implications include the need for investor education and strategies to mitigate biases, thereby promoting rational investment behavior in emerging markets like Pakistan. This research contributes to the behavioral finance literature by providing localized insights into the psychological drivers of investor behavior and their implications for financial performance.

Keywords: Herding behavior; overconfidence; risk; financial performance.

JEL Classification: G41, D81, G11, G15

1. Introduction

Stock exchanges and other financial markets are important barometers of a country's economic status as they are important channels of resource mobilization and wealth creation (Hossain & Siddiqua, 2022). The PSX has great potential for investors but is very volatile in response to economic changes (Almansour et al., 2023). It is agreed that investor behaviors in the stock markets are inclined through such behavioral biases that include herding behavior

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overconfidence and loss aversion that impact the risk perception section and financial performance (Quaicoe & Eleke-Aboagye, 2021). Heuristic and affective biases affect the investor's capacity to make rational decisions on risks hence resulting in low investment returns (Hossain & Siddiqua, 2022). These biases relate to the Prospect Theory that (Ruggeri et al., 2020) developed to show that human beings do not make rational investment decisions as they are subjected to psychological factors. These psychological factors in the trading environment of Pakistan are important to understand investment behavior and the market.

Behavioral finance has emerged as an important factor in investment decisions through research done in the recent past (Alrabadi et al., 2018). For instance, Almansour et al. (2023) explain that psychological factors of behavioral finance including herding or overconfidence influence risk perception that influences investment performance. However, most of the prior research has been conducted in developed countries. Hence, there is a lack of knowledge about how these biases work in emerging economies such as Pakistan (Alshebami & Aldhyani, 2022). Due to the peculiarities of the socio-economic and cultural environment of Pakistan, it is crucial to examine the local investors' behavior. This is in concordance with other papers such as that of Quaicoe and Eleke-Aboagye (2021) which establish that cultural and economic factors distort investor preferences, which require context-specific examination.

In addition, the fluctuation of the Pakistan Stock Exchange (PSX) also supports the rationale for this research. The PSX has shown volatility over the period and most specifically the downturn in the period of 2017 up to 2019 and the recovery after the pandemic has had impacts on the investors (Alshebami & Aldhyani, 2022). Unlike the developed markets where standard setting authorities and market stability adjust minor bias, the emerging markets, for example, Pakistan is highly susceptible to cognitive and emotional factors. While previous works have investigated investor biases in Bangladesh (Hossain & Siddiqua, 2022) and Ghana (Quaicoe & Eleke-Aboagye, 2021), there is not abundant literature on the Pakistani context. This study aims to fill this gap by evaluating the impact of several behavioral heuristics such as herding behaviour, loss aversion, cognitive biases and overconfidence on risk perception and PSX's financial performance.

Furthermore, whereas first-order effects of those behavioral biases on investment decisions have been investigated in prior studies, second-order sequences like the risk perception Victorian as a moderator have been paid little attention to in the Pakistan stock market (Eaton et al., 2022). To this extent, this research will fill this gap by providing a systematic synthesis of the processes through which risk perception influences the impact of cognitive/emotional bias on business returns.

This study is a new contribution to the literature on emerging markets by using the behavioral finance theory as well as contribution to knowledge will help in the understanding of investor behavior in Pakistan as well as provide a comparison with various similar economies like

India, Malaysia and Bangladesh thereby extending the knowledge base of behavioral finance in emerging economies.

2. Literature Review

2.1 Herding Behavior

Herding behavior is defined as investors' tendency to follow the actions of other investors without engaging in their analysis (Sewando, 2022). This results in market inefficiencies, asset mispricing, and high volatility especially in the emerging markets where there is low financial awareness and less regulatory environment (Zafar et al., 2024). Three modules that are specific to Pakistan include peer effects, speculation, and inefficient information generation and use which leads to herding behaviour due to inefficiency in investment decision-making (Awais et al., 2016).

It has been found that various cultural and social factors are responsible for the herding behaviour lately. For example, Callero (2023) explains how social influence influences financial decisions, which is in concordance with the study done in Pakistan where investors use word of mouth instead of fundamental analysis. The study also indicates that due to the collectivist culture of Pakistan, herding behavior may be even more prominent and hence, needs context-based solutions to reduce irrationality in investment.

2.2 Loss Aversion and Cognitive Biases

According to Ruggeri et al. (2020), investors are risk-seekers concerning losses and gain, thus making decisions that are irrational in the financial domain. Loss-averse investors also tend to hang on to their losing stocks in the hope that they will recover, which is not good for the portfolio (Malik et al., 2024). In Pakistan, economic and regulatory risks heighten loss aversion, making investors more risk-averse and reluctant to exit positions.

In addition, there are other cognitive biases that affect risk assessment including the anchoring effect, availability heuristics, and confirmation bias (Cao et al., 2021). In Pakistan, such biases are more eminent due to the few numbers of stock exchange companies providing consistent and accurate financial information as well as low investor knowledge, which results in major inefficiencies (Malik et al., 2024). Some of the other strategies identified in these theories include the use of noxious incentives, use of financial literacy and behavioral interventions among them (Rojo et al., 2020).

2.3 Overconfidence and Risk Perception

Overconfidence where the investors tend to be overoptimistic about information and prediction ability results in speculation frequent trading, and increased fluctuations in the prices of

securities (Ngene & Mungai, 2022). Research shows that overconfident investors fail to consider negative information, engage in herding, and underestimate risks, which is more evident among retail investors in Pakistan (Zafar et al., 2024).

Risk perception is therefore another parameter that moderates the main relationship between behavioural biases and financial performance as posited by (He & Strub, 2022). Risk perception is a function of cultural, social and economic factors that are associated with investors. For example, in Pakistan, there are perceptions different from what can be experienced in developed countries such as high inflation, political instability and regulation factors (He & Strub, 2022). Pakistani investors are more likely to act emotionally rather than logically when it comes to risk as compared to developed markets (Holliday, 2020; Babajide & Adetiloye, 2012).

Although there is a vast literature on investor biases in developed countries, research on Pakistan and other emerging markets is scarce. Most of the existing studies do not incorporate cultural factors and do not consider how social and governance factors affect investors. This paper intends to enhance this literature by presenting a more localized investigation of herding behavior, overconfidence, cognitive bias and loss aversion, risk perception and performance of PSX.

2.4 Prospect Theory

The theory that best explains the decision-making process of investors under risk is Prospect Theory advanced by (Ruggeri et al., 2020). While the neoclassical theories of economics assume that people are rational in their decision-making, Prospect Theory posits that people make different evaluations of gains and losses, hence making irrational decisions in their financial decisions (Baddeley et al., 2010).

Another aspect of the Prospect Theory that proves crucial is that people undergoing losses are carried more intensely than gains (Bekiros et al., 2017). This bias is the reason why investors in Pakistan continue to invest in stocks that are in the red, waiting for a market rebound that may never come (Malik et al., 2024). In addition, the framing effect indicates that the way investment options are presented affects the decision-making process (Bashir et al., 2013). For instance, Pakistani investors may be more risk seeking when they are in the process of making up for their losses, which may lead to speculation and thus high volatility in the market (Bekiros et al., 2017).

Further, recent studies reveal how cultural and, in particular, economic factors worsen these biases in emerging markets. According to Rojo et al. (2020), the cultural factors like uncertainty avoidance and collectivism influence the investor behavior and are especially significant in the high-risk market of Pakistan. Thus, incorporating these cultural dimensions, this research provides a better understanding of the application of Prospect Theory to the Pakistani stock market (He & Strub, 2022).

2.5 Behavioral Finance Theory

Behavioral Finance Theory is a theory that embraces the fact that ideas such as implied in the EMH theory are not valid in the real world since people are not always rational and therefore markets do not fully incorporate all the available information (Cao et al., 2021). However, behaviour of the investors in the stock market is influenced by such psychological factors and emotions and these are generally referred to as behavioural anomalies, which create inefficiency (He & Strub, 2022).

2.6 Behavioral Biases and Market Instability

The behavioral factors are a major cause of inefficiency and volatility in the stock exchange in Pakistan. This concept, known as herding, which involves investors mimicking the actions of other investors has been associated with bubbles and crashes in the markets; research on the emerging markets (Zafar et al., 2024). Overconfidence, which is another systematic error, makes the investors over-estimate their information and forecasting effectiveness and in the process engage more in frequent trading that tends to increase the transaction costs, hence lowering the total return (Malik et al., 2024). Besides, other cognitive biases like the anchoring and the availability heuristics make risk assessments to be off target, thus incorrect investment decisions are made (Cao et al., 2021). Based on these challenges, it is important for policymakers and investors to come up with measures that reduce these biases. Overconfidence can be checked through investor education and regulation that reduces the impact of herds due to increased knowledge and enhanced transparency (Hasan et al., 2023). Herding. It is crucial to eliminate these behavioral biases to increase market stability and the efficiency of investors' decisions in the Pakistan stock exchange.

2.7 Cultural Dimensions and Investor Behavior

By emphasizing certain aspects of Hofstede's cultural dimensions and the importance of cultural and economic measures in investor behavior, the role of investor cultural factors in the Pakistani context has been established (Cassidy, 2010). According to the Hofstede's cultural dimensions, Pakistan has a high uncertainty avoidance index, which makes investors avoid risks and opt for conventional and less risky investments even though they can get higher returns from risky investments (Rojo et al., 2020). Moreover, another key reason in the case of Pakistan is the high power of herd behavior resulting from her country's collectivistic culture, which depicts investors making decisions based on gossip, relatives, friends, colleagues, and rumors rather than analysts (Scott et al., 2024). In addition, the country's social structure is highly polarized, and this is evident in the way that financial information is controlled and only a few institutional investors are able to access such information (Sewando, 2022). While the Western theories presuppose rationality and efficiency of markets, knowledge of these cultural factors offers a broader view of Pakistani investors (Combrink & Lew, 2020). Thus, by including cultural and psychological

aspects in behavioral finance theory, this work provides a more context-sensitive approach to studying investment decision-making biases in emerging markets (Albertsen et al., 2020).

2.8 Hypotheses Development

Herding behavior is a significant factor that influences the risk perception of investors especially in emerging markets such as Pakistan where information asymmetry is a major issue. Zafar et al. (2024) note that Pakistani investors rely on the market information instead of conducting their research, which results in over- or under-estimation of risks. It amplifies the decision-making, which makes herding behavior affirm the volatility that characterizes investment risk perception and decision making (Kartini & Nahda, 2021). It is important to understand these dynamics in order to find out where the inefficiencies and behavioral biases are in the market that affects the financial performance. Therefore, H1 is designed as:

H1: There is a significant relationship between herding behavior and risk perception.

The overestimation of losses as compared to gains that is postulated by Loss Aversion (Ruggeri et al., 2020) shows that people are more sensitive to losses than to gains. In the context of the Pakistani stock market, it has been observed that investors are highly sensitive to risk and tend to avoid it and they also tend to hold on to their losing stocks for a longer period. Malik et al. (2024) also pointed out that loss aversion increases the perceived risk and thus results in over-conservative investment decisions. This implies that loss-averse investors tend to exhibit higher uncertainty even in non-transitory turbulences and can therefore probably be discouraged from participating in higher return investments (Fiet, 2022). Therefore, H2 is designed as:

H2: Loss aversion has a large effect on the risk perception.

The presence of other biases known as cognitive biases like the anchoring effect, availability heuristics, and confirmation biases greatly interferes with the risk assessment process by investors. According to (Cao et al., 2021), all these biases have a systematic effect on the risk and thus lead to the making of wrong decisions. In Pakistan, the level of financial literacy is still low and the information about the market is not always available, so investors may use heuristics instead of rationality. Zafar et al. (2024) affirm that such biases contribute towards the mispricing of assets as well as increase an exaggerated risk perception thus making investors to develop irrational reactions towards oscillation in the market. These biases could be changed through educating people on personal financial management and modifying their behavior to enhance the performance of the market (Dahlquist et al., 2017). Therefore, H3 is designed as:

H3: Cognitive biases have a strong impact on risk perception.

Overconfidence bias makes investors overemphasize their knowledge and skills in

making decisions hence underestimating risks. Malik and his colleagues conducted a study and they revealed that overconfidence makes an investor trade more frequently, overlook warning signs, and minimize losses; this distorts the risk perception of the investor (Malik et al., 2024). This bias is most evident in Pakistan's retail investor segment where self- perceived knowledge takes precedence over sound financial analysis (Yu & Huang, 2023). Therefore, overconfidence is not only a factor that influences the individual's risk perception but also a factor that leads to market fluctuations and speculation. Therefore, H4 is designed as:

H4: Overconfidence significantly influences risk perception.

Although psychological biases can influence financial performance, risk perception serves as a mediator in the relationship between them. According to He and Strub (2022), the perceived risk has a direct impact on the financial performance of the investors. As it is widely known, behavioral biases play a significant role in the decision-making process in Pakistan and risk perception moderates the influence of herding behaviour, loss aversion, cognitive bias, and over confidence on the financial returns according to Zafar et al. (2024). For instance, investors with a high-risk sensitivity may miss high return opportunities and thus, their returns will be low while investors with biased risk estimates will make wrong investment decisions (Ruggeri et al., 2020). It, thus, posits that risk perception serves as a psychological mechanism that mediates between investor biases and the financial performance in the stock market of Pakistan. Therefore, H5 is designed as:

H5: Risk perception will moderate the relationship between psychological factors and financial performance.

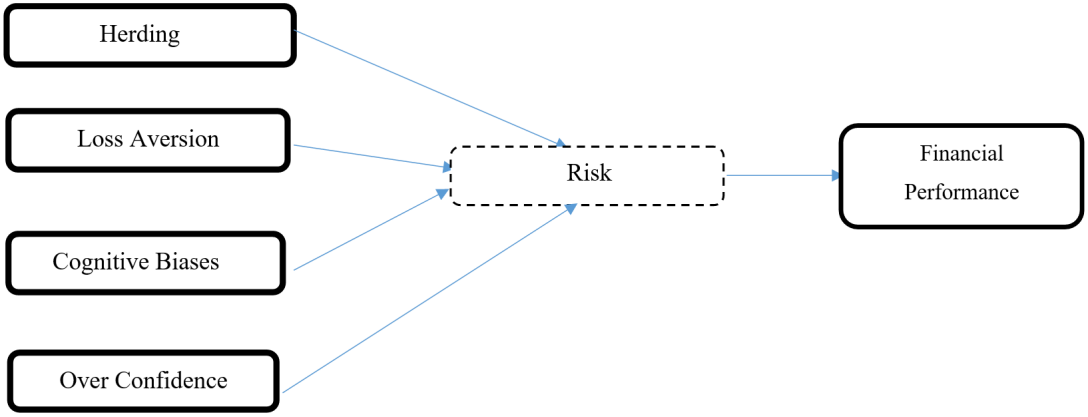

Figure 1: Conceptual Framework

3. Methodology

This research has been designed to use a quantitative research method to find out the effects of psychological factors such as herding behaviour, overconfidence, cognitive biases and loss aversion on risk perception and financial performance of the Pakistan Stock Exchange (PSX). SEM is a suitable analytical tool for this research because it allows for the evaluation of multiple relationships, including the mediating variable, risk perception.

3.1 Data Collection and Preprocessing

The study utilizes a descriptive and correlational type of research since the research objectives seek to establish the relationship existing between cognitive and emotional biases and financial performance. This design is suitable for detecting the nature and strength of the relationships between the variables and for testing hypotheses (Malik et al., 2024). Since investor decision, making biased by cognitive distortions and market characteristics this research design provides a detailed idea about psychological factors that influence investors at an emerging market as Pakistan. The target population is the individual investors involved in trading in the Pakistan Stock Exchange (PSX). Participants are recruited from different demographic, socio-economic, and investment status to increase the external validity of the study. According to the literature review, education, experience, and income level are some of the factors that affect market participation in Pakistan (Zafar et al., 2024). Such variations make it possible to make a comparison and determine how one investor group holds or views risks compared to other investor groups.

3.2 Sample Size

The study adopts Cochran's formula to estimate the sample size of 248 investors, which is standard in behavioral finance research to guarantee an adequate sample size. The variables used in the formula include a 95% confidence level, which is common in behavioral research and a 5% margin of error to ensure accurate estimation. In addition, the population proportion is fixed at 0.5, a conservative measure that ensures maximum variation in the sample. This sample size is adequate to reduce the likelihood of Type II errors while at the same time enabling comparisons to be made between subgroups. Moreover, to analyze the impact on the sample, to consider market heterogeneity, the sample has been drawn from investors of different experiences, risk taking, and trading activities and kept as diverse as possible to get the comprehensive result from the Pakistan Stock Exchange (PSX).

3.3 Sampling Technique and Bias Mitigation

The study uses a stratified random sampling technique to ensure that all the major categories of investors are included in the sample. The population is divided into strata according

to age, income, and experience in investments to ensure that all the different market players are well represented. This approach increases the validity and transferability of the results, especially in the context of an emerging economy such as Pakistan, where investors' characteristics differ (Rojo et al., 2020). Nevertheless, obtaining samples through stratified sampling may be affected by several types of bias, including selection bias where some of the variables are not considered in the process, lower participation rates of some groups in the study, and misclassification of the investors in their respective classes. The following measures are used to deal with these risks: (1) the use of weights to increase the number of respondents to the proportion of the population in each of the categories, (2) non-response weights that are used to increase the number of respondents within the different categories that have low responses, and (3) adjustment of classification to reduce chances of an inaccurate classification which may lead to misclassification errors. These measures increase validity and reliability, which means that the sample used in the study is a good representation of the investors in the PSX.

To construct the primary data, the authors use a self-administered structured questionnaire that was developed from previously validated scales found in the literature to assess the variables used in the study. The questionnaire measures psychological biases including herding, overconfidence, and cognitive biases, risk perception based on the investor's attitude towards risk taking and risk return, and financial performance, self-reported investment performance. To eliminate any chances of measurement bias, the content validity and measurement of the questionnaire is checked through pre-testing and expert validation. Since behavioral biases are self-report measures, responses are collected using Likert-scale based instruments that are widely used in behavioral finance studies (Holliday, 2020). Standardized scales help to increase the reliability of the response, thus making it easier to compare results and conduct statistical analysis.

The research hypotheses are tested using Structural Equation Modeling (SEM) because it is a suitable technique for analyzing the interrelations between psychological biases, risk perception, and financial performance. Using SEM, the above relationships can be tested in the same model, and as a result, the mediating effect of risk perception in investment decision making will be achieved. Moreover, SEM has the advantage of providing a good control of measurement errors, which enhances the validity of the results. However, to maintain statistical validity, assumptions of SEM are checked out. Normality is checked by skewness and kurtosis tests to ensure that the distribution of the data is suitable for analysis. Multicollinearity is tested using the VIF test to ensure that there is no high correlation between the independent variables. Last, CFI, RMSEA, and SRMR are used to assess the fit of the model to the data to ensure that the structural model is a good fit for the data.

4. Results Analysis

According to the results of this study, herding behavior, working cognitive biases, and overconfidence predictably determine risk perception and financial performance. However, loss

aversion does not show any effect, which is contrary to behavioral finance theory. Such a result may call for looking into cultural factors, competitive forces, or issues related to measurement. Besides, the strengthening relationship between herding and overconfidence necessitates the elimination of multicollinearity issues. The findings help in explaining the behavioral biases in the PSX and how they influence investment decisions.

4.1 Profile of Respondents: Their profiles include demographic information presented in Table 1

Table 1
Profile of Respondents

Parameters	Items	Frequency
Investment	No	55
	Yes	248
Gender	Female	43
	Male	205
Age	Below 30	23
	30 to 40	76
	41 to 50	117
	51 and above	42
Education Level	Graduate	20
	Masters	159
	M Phil / PhD	33
	Other	36
Monthly Salary	Below 50,000	42
	50,000 to 100,000	120
	101,000 to 150,000	71
	151,000 and above	15

This table presents the demographic and behavioral characteristics of the study's participants, categorized by key parameters. Among the 303 total participants, 248 (82%) reported making investments, while 55 (18%) did not. In terms of gender, 205 participants (68%) were male, and 43 (14%) were female. Age distribution shows that the majority (117 participants, 39%) For monthly salary, most participants (120, 40%) earned between 50,000 to 100,000 PKR, with fewer earning 101,000 to 150,000 PKR (23%), below 50,000 PKR (14%), and above 151,000 PKR (5%). These distributions reflect the diverse socio-economic and educational backgrounds of the sample.

Table 2
Outer Loading Values

Variable	Indicator	Outer loadings
HB	HB 1	0.844
	HB 2	0.835
	HB 3	0.876
	HB 4	0.882
	HB5	0.743
LA	LA1	0.900
	LA2	0.931
	LA3	0.903
	LA4	0.831
CB	CB 1	0.875
	CB 2	0.873
	CB 3	0.892
	CB 4	0.821
	CB 5	0.788
OC	OC 1	0.856
	OC 2	0.871
	OC 3	0.892
	OC 4	0.868
	OC 5	0.769
RK	RK 1	0.872
	RK 2	0.883
	RK 3	0.789
	RK 4	0.852
	RK 5	0.752
FP	FP 1	0.865
	FP 2	0.853
	FP 3	0.892
	FP 4	0.811
	FP 5	0.768

The table highlights the reliability and validity of various constructs used in the study. Outer loadings indicate the correlation between an indicator and its respective latent construct. All indicators (HB1-HB5) show strong loadings, with values ranging from 0.743 to 0.882, suggesting that the measurement items reliably reflect the construct of herding behavior. The indicators (LA1-LA4) demonstrate high outer loadings, all exceeding 0.831. This indicates that the items strongly measure the construct, ensuring its validity in capturing loss aversion. CB1 to CB5 exhibit loadings between 0.788 and 0.892, signifying that these indicators robustly represent.

The outer loadings for OC indicators are between 0.769 and 0.892, and OC5 is slightly lower than the others but still higher than the acceptable level, which indicates that the indicators are consistent in measuring the construct. The outer loadings of RK1 to RK5 range from 0.752 to 0.883, which supports the conclusion that the risk perception construct is well captured by these indicators. The loadings of the indicators (FP1-FP5) are high and range from 0.768 to 0.892, which indicates that the indicators are reliable in measuring the construct of financial performance.

Cronbach's Alpha and Composite Reliability should be greater than 0.7 for a construct to be considered as reliably measured. The construct's validity is established by the Average Variance Extracted (AVE) value being greater than 0.5. The values of Composite Reliability, Cronbach's Alpha, & AVE are presented in Table 4.3 below.

Table 3
Values of Composite Reliability, Cronbach's Alpha, AVE

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
HB	0.898	0.903	0.925	0.711
LA	0.914	0.915	0.940	0.796
CB	0.894	0.894	0.922	0.704
OC	0.905	0.911	0.929	0.724
RK	0.905	0.905	0.930	0.726
FP	0.887	0.892	0.918	0.691

Reliability coefficients, Cronbach Alpha for all the constructs are above 0.7, suggesting high internal consistency of the items of each construct. All the Composite Reliability values are above 0.9, which also supports the reliability of the constructs.

AVE values for all the constructs are greater than 0.5, thus indicating a reasonable degree of convergent validity. This shows that the constructs account for a large amount of variance in the measured variables. With a Cronbach's Alpha of 0.898 and an AVE of 0.711, it is clear that the construct is relatively reliable and valid implying that the items used in this study measure the phenomenon of herding behaviour. This construct exhibits the highest AVE (0.796), reflecting that it is particularly well measured by the selected items. Strong reliability (Cronbach's Alpha of 0.905) and an AVE of 0.724 highlights that this construct is accurately represented in the model. As a mediator, this construct also meets all reliability and validity criteria, ensuring its robustness in mediating the relationships in the model. This dependent variable has an AVE of 0.691, indicating that the items sufficiently explain variance in financial performance.

4.2 Discriminant Validity

Table 4
Heterotrait-monotrait ratio (HTMT)

	HB	LA	CB	OC	RK	FP
HB						
LA	0.707					
CB	0.745	0.773				
OC	0.840	0.853	0.787			
RK	0.754	0.684	0.740	0.784		
FP	0.780	0.763	0.893	0.840	0.711	

HB has a strong correlation with Overconfidence (OC) (r=0.840), showing that herding tendencies often accompany overconfidence in decision-making. Its moderate correlation with Financial Performance (FP) (r=0.780) indicates an impact on investment outcomes. LA is highly correlated with OC (r=0.853) and Cognitive Biases (CB) (r=0.773), reflecting interconnectedness. OC correlates strongly with LA (r=0.853) and FP (r=0.840), showing its significant influence on risk perception and financial outcomes.

Table 5
The Fornell-Larcker Criterion

	AT	BA	BF	BI	ID	PT
HB	0.843					
LA	0.826	0.892				
CB	0.669	0.699	0.839			
OC	0.772	0.791	0.717	0.851		
RK	0.680	0.624	0.669	0.714	0.852	
FP	0.707	0.697	0.802	0.774	0.649	0.831

The correlation table is used to show the relationship between Herding behavior (HB), Loss aversion (LA), Cognitive Biases (CB), Overconfidence (OC), Risk (RK), and Financial performance (FP). When tested for correlation, Herding Behavior (HB) has a high positive correlation with Loss Aversion (r = 0.843) and Overconfidence (r = 0.772) confirming our proposition that these psychological influences tend to be complementary. LA is significantly and equally positively related to Overconfidence and moderately related to FP implying important roles in choice and consequences. These results confirm the theoretical model, showing how the effects of psychological factors are associated in terms of increasing and reducing risk perceptions related to performance.

Construct	R-square	Q-square
HB	**0.730**	**0.718**
FP	**0.462**	**0.473**

The significance of the model is supported by R-squared (R^2) and Q-squared (Q^2) coefficients illustrating explanatory and predictive abilities. Herding Behavior (HB) has an R^2 of 0.730, which means that the model, and a Q^2 of 0.718, which shows good predictive power, can explain 73% of the changes in HB. FP has an $R^2 = 0.462$, meaning 46.2% of the variance in FP is accounted by the model; $Q^2 = 0.473$ which indicates moderate usefulness in terms of prediction. In general, these results support the model's ability to accurately explain and predict the interdependence of variables.

The assessment of the structural model involves examining the relationships between constructs and their significance, as indicated by the t-statistic or p-value from the PLS output. Table 4.5 displays the path coefficients, and those with a p-value < 0.05 (at a significance level of 5%) are considered statistically significant.

Table 6
Path Coefficient

Hypothesis	Original sample (O)	Sample mean (M)	Standard deviation	T statistics	P values	Results
RK -> FP	0.680	0.681	0.046	14.630	0.000	Significant
HB -> RK	0.537	0.537	0.069	7.783	0.000	Significant
LA -> RK	0.014	0.018	0.069	0.201	0.841	Not Significant
CBI -> RK	0.222	0.219	0.081	2.731	0.006	Significant
OC -> RK	0.150	0.150	0.075	2.000	0.046	Significant

The hypothesis results highlight significant relationships among the variables studied. Risk perception (RK) significantly influences financial performance (FP) confirming its critical mediating role in linking psychological factors to financial outcomes. Herding behavior (HB) significantly affects RK ($p<0.001$), underscoring the influence of social tendencies on risk assessment. Loss aversion (LA) does not significantly affect RK ($T=0.201$, $p=0.841$), suggesting its minimal role in shaping risk perception within the study's context. Cognitive biases (CBI) and overconfidence (OC) significantly influence RK ($p=0.046$), reflecting their substantial impact on risk evaluation.

These findings validate the theoretical model, showing that cognitive and emotional drivers, except for loss aversion, play pivotal roles in shaping risk perception and financial performance in the Pakistani stock market. The significance of RK as a mediator is further reinforced by its strong influence on FP.

Table 7
Total Indirect Effects

Hypothesis	Original sample (O)	mean (M)	Standard deviation	T stats	P values	Results
HB -> RK	0.365	0.365	0.049	7.441	0.000	Significant
LA -> RK	0.009	0.013	0.047	0.200	0.842	Not Significant
CB -> RK	0.151	0.150	0.058	2.592	0.010	Significant
OC -> RK	0.102	0.102	0.052	1.977	0.048	Significant

Herding behavior (HB) has a significant influence on risk perception (RK) (O=0.365O, T=7.441T = 7.441T=7.441, p<0.001), confirming its critical role in shaping risk assessment. Loss aversion (LA), however, does not show a significant impact on RK (O=0.009, T=0.200, p=0.842), suggesting that it is less relevant to risk perception in this context. Cognitive biases (CB) significantly affect RK (O=0.151, T=2.592, p=0.010), indicating their influence on decision-making under uncertainty. Likewise, overconfidence (OC) also shows a positive influence on RK (O=0.102, T=1.977, p=0.048). Altogether, these results bear out psychological factors, particularly herding, heuristics, and overconfidence in explaining risk assessment by investors.

The findings are useful in understanding the behavioral biases that influence investment decisions in the Pakistani stock market and are consistent with the literature. The fact that herding behavior, cognitive biases, and overconfidence affect risk perception is in line with Hussain et al. (2023) who established that Pakistani investors make decisions based on herding and cognitive heuristics instead of financial analysis. In the same way, Shah and Hussain (2024) noted that overconfidence increases herding behavior, which results in market anomalies and speculation. These findings provide credence to the sentiments that carry out a significant role in the determination of stock prices, especially in the emerging markets since they pose a threat due to low financial literacy levels and information asymmetry (Ngene & Mungai, 2022).

However, the lack of significance of loss aversion is in contrast with the previous studies especially Ahmed et al. (2022) who established a positive correlation between loss aversion and risk perception in emerging markets. Another reason could be that due to the exposure to high risk markets and fluctuating economic conditions in Pakistan, the psychological effect of loss aversion may not be as strong in Pakistani investors (He & Strub, 2022). Furthermore, Zafar et al. (2024) argue that the loss aversion of retail investors may be replaced by risk-seeking behavior especially when trying to recover their losses. Further research should be aimed at cultural aspects, investment experience of individuals, as well as the density of the stock market when analyzing the moderating role of loss aversion.

Such effects are profound when going deeper than probabilities: these findings have theoretical and practical implications. This paper furthers the cause of the behavioral finance theory in relation to the risk perception within the emerging markets regarding the cognitive and the emotional biases that affect the behavior of the investors and integration of the theories within

the particular region. In practical implications, the results imply that more financial literacy and appealing behavioral interventions can be used in helping the investors make better decisions by avoiding herding and overconfidence. Thus, there are recommendations on the adoption of investor protection mechanisms and risk assessment to eliminate biases that negatively influence the efficiency of the market.

Nevertheless, the present study has implications and suggestions for future research as follows. Since herding and overconfidence seem to be related, they may not be entirely separate factors that impact investment decisions, and further analysis needs to be done on this dependence. Therefore, future research should also look at the effects of behavioral biases on the performance in the long run and also the effects of macroeconomic variables such as inflation and interest rates on the investors in Pakistan. This study is significant as it implements cultural and economic factors in behavioral finance theory by adding culture as the social psychological mechanism and framing it in the economic climate of an emerging market nation.

5. Discussion and Conclusion

This study examines various psychological factors and their impact on risk perception and financial performance in the Pakistan Stock Exchange (PSX) such as herding behavior, overconfidence, and different kinds of cognitive biases. The study re-echoes the fact that these psychological factors play an essential role in determining investment choices but at the same time, denounces the conventional behaviour finance theories where loss aversion see little importance here. Rather than present the results as a set of conclusions, the significance of this study is that it contributes to the work on analyzing the behavior of investors those that operate in the emerging markets characterized by low financial literacy, high fluctuations, and cultural factors. Thus, by pointing out risk perception as a mediator, the study provides practical recommendations for increasing the rationality of investments, stabilizing the market, and developing strategies for financial decision-making in emerging economies.

To mitigate the bias found to exist at the cognitive and emotional levels in this paper, there is a need for policy makers and financial institutions to come up with awareness creation and investors' awareness creating activities that can help investors realize that they are overconfident or are herding. Thus, applying the principles of behavioral finance when providing advisory services could minimize situations in which the client displays irrational behavior in trading. Strengthening market transparency and information access within financial markets instead must be extended in order to lessen the impact of speculative or even manipulative herding mainly influenced by rumors. Also, the sophistication of investment products that responded to the maximum, minimum, and average tolerance of risk of the investors can help in reducing the impact of irrational behavior on performance. These recommendations are intended to establish a more effective and psychologically sensitive financial market for the individual investors and the overall economy.

The study focuses solely on investors in the Pakistan Stock Exchange, which may limit the generalizability of findings to other emerging markets. The research adopts a cross-sectional approach, restricting the analysis of dynamic changes in investor behavior over time. Reliance on self-reported measures may introduce social desirability bias or inaccuracies in responses. The study examines selected psychological factors, potentially overlooking other relevant biases influencing investment behavior.

Therefore, future studies could follow up on these observations with longitudinal designs in order to observe how psychological factors change with time, and how they interact to affect risk perception and financial outcomes. This would give a more detailed and timely insight into the investors' behavior. To support these arguments, comparative research with other emerging and developed countries might be useful to compare these values and discuss their impact of cultural factors on the behavioral biases of investors. The inclusion of regret aversion, mental accounting, and framing effects would be useful in broadening the biases' definition. Besides, in the middle of digital trading facilities, algorithmic systems, and robo-advisors, research that tries to understand how these technologies help decrease (or augment) behavioral biases would be more relevant to current contexts. Last but not least, examining the effects of regulatory changes on investors and financial performance in emerging markets may provide useful information to the policy makers who want to enhance the stability of the markets and investors' confidence.

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