Jinnah Business Review
July 2023, Vol. **11**, No. 2, pp. 1-19

The Impact of Herding, Loss Aversion, and Cognitive Dissonance on Individual Investor's Investment Decision Making: Moderating Role of Financial Literacy

M. Hussain*[1], B. Zulfiqar[2], A. Shafique[3], L. Malik[4], P. Ashraf[5]

[1] *Bangor University, UK*
[2,3,4,5] *University of Arid Agriculture, Rawalpindi , Pakistan*

Abstract. The objective of this study is to examine the impact of loss aversion, Herding behavioral and Cognitive dissonance on an individual investor's investment decisions making in Pakistan. The study used the moderating role of financial literacy with behavioral and cognitive biases to influence on investment decisions. The study is quantitative in nature and used major behavioral and psychological biases that impact investors' investment decisions making in Pakistan. The data is collected by using questionnaires. The population of the study consists of investors in the twin cities of Islamabad and Rawalpindi. The sample size included study was about 251 respondents. The study used SPSS and Smart PLS software to analyze the data. The study used a convenient sampling technique. The major estimation tools used in the study are the alpha correlation matrix, descriptive summary, regression, etc. The findings of the study reveal that there is a significant impact of loss aversion, and herding on investment no significant relationship exists between cognitive dissonance and investment decision-making. The study is limited to developing market individual investors of Islamabad Pakistan. This study is implacable for students, researchers, and investors to take certain decisions and control biases. In the future, the study can be extended to some institutional investors' biases, and other behavioral and cognitive biases can be added to the study. The study can be extended by using the mediating role of human moderators as well.

Key words: Loss aversion, Herding, Cognitive dissonance, Individual investor's investment-making decision.

1 Introduction

Introduction of the study including, overview, background of behavioral finance, a short comparison of behavioral vs traditional finance, concept of irrationality and biases that leads towards irrationality especially in context of Pakistan. The problem identification, and problem statement, research objectives, questions, the significance and scope of study are added below.

Investment decision making a cognitive process to select the best option (Bhatia et al., 2020). Toma (2015) documented that investors do not analyze in the same way nor do they have similar

*Corresponding author.
Email: munawar1069@gmail.com

information in a poor and inconsistent decision-making process. In any investment offers the perceived fairness influences the investment decisions. Previous research documented the major cognitive and behavioral biases especially in the era of 1970s by Kahneman and Tversky (2013), with the seminal work of prospect theory. The modern perspective of finance named behavioral finance consists of various biases i.e. behavioral and cognitive biases.

In the historical perspective of finance, paradigms shift from economic, psychological, and traditional finance. Several researchers developed a list of theories from various perspectives. Theory of Prospect by Tversky and Kahneman (1974), psychology theory was implemented in the modern era of behavioral finance. It addressed the individual investor's perceptions to evaluate the gains and losses in certain situations.

In the light of previous research, the real issue of, behavioral biases existing in investors remained less explored. Several researchers directly cheeked the impact of behavioral and cognitive factors on investors' investment decisions. For instance, the role of financial literacy mainly remains less explored, especially in the situation of Pakistan. This study mainly tends to focus on the impact of behavioral biases on investors' decisions moderating the role of financial literacy in the context of less developed markets i.e. Pakistan. Recently, HUSSAIN et al. (2022), found that the impact of behavioral and cognitive biases have a significant impact on investment decisions.

Previous research differences both perspectives i.e. traditional and behavioral accordance with investors thinking and market anomalies etc. For instance, the investor's accordance with traditional finance is rational and takes certain decisions through critical thinking. In contrast, the investor's accordance with the behavioral era is irrational and often takes decisions with behavioral biases. Biases are mental or individual perception errors. However, behavioral finance is a new trend in finance history and consists of the irrationality of investors, modes, and temporary thinking, in short contrast to the traditional perspective.

Several researchers documented the impact of cognitive biases on investment decisions. The major cognitive biases included overconfidence, representativeness, heuristic bias, mental accounting, self-attribution, etc. Kushwaha et al. (2023). Tversky and Kahneman (1974), defined "Representativeness as a mental shortcut the learning with irrationality attribute appearances to inferring another." However, Heuristic and representativeness are stereotyped in nature judged by irrationality, and serve too quickly (Shefrin, 2001). Similarly, researchers also documented behavioral biases such as, herding, mode, attitude etc, (Banerji et al., 2020; Ilyas et al., 2020).

Finally, previous research explored the behavioral and cognitive biases on investor's investment decisions especially in most advanced markets. A few studies also documented emerging and developing markets. Several researchers also documented impact of behavioral and cognitive biases on investment decisions (Berthet, 2022).

This study contributes to the literature by examining the impact of psychological biases i.e. herding, Loss aversion, cognitive dissonance, etc. on an investor's investment decisions. The study tends to focus on less developed markets like Pakistani investors. The main contribution of this study is to add the role of financial literacy in the model to explore its moderating influence among psychological biases in investors' investment decisions. Financial literacy can mitigate psychological biases and investors make strong decisions, especially in some uncertain conditions. The study contributes to literature by examining the psychological factors' impact on moderating role of financial literacy in the context of Pakistan. The study also focuses on Structural Equation Model (SEM) to check the reliability and consistency of each factor including as measurement of latent factors.

In context of Pakistan the investors have various biases in their mind and behaviour as

well. These biases also exist in the mind of investors of local area i.e. Islamabad Pakistan. This study mainly focusing on the biases to examine the problems of irrationally of local area of Pakistan. Recently, HUSSAIN et al. (2022) explored the role of financial literacy to eliminate the irrationality from the mind of investors. This study mainly considering investors from local area their biases and how the problem of irrationality eliminate in context of developing market like Pakistan.

1.1 Problem Statement

Investors make judgments when it comes to investing. The error in these judgments is due to psychological influence. The psychological aspect of finance is dealt with the domain of behavioral finance. According to traditional financial theories, observe how people with wealth maximization, whereas in financial background, behavioral finance is concerned in how people "actually" behave (Fakhry and Heykal, 2016). Further, not all individuals perceive and process information in the same way. They will read and see things differently, and everyone will have a distinct perspective on what they see. This factor is the driver of behavioral biases in investing. According to a research study conducted Rieger (2020), the researcher looked into the complicated structure of the financial products and explained how investors perceived them. Financial literacy of investors in less developed markets causes the investors' perceptions of their biases and investors investment decisions in certain ways. Recently, HUSSAIN et al. (2022) argued that financial literacy is a vital factor that can mitigate the biases of investors in certain decisions making processes. The question remain untapped whether the financial literacy of less developed areas, investors adversely cause investments decisions. The research objectives of this study are as follows.

1.2 Research Objectives

- To find the impact of loss aversion on individual investors' investment decisions.
- To examine the impact of herding on individual investors' investment decisions.
- To find the impact of cognitive dissonance on individual investors' investment decisions.
- To examine the role of financial literacy moderate the relationship between aversion and individual investors' investment decisions.
- To check the role of financial literacy moderate the relationship of herding and individual investors' investment decisions.
- To examine the role of financial literacy moderate the relationship of cognitive dissonance and individual investors' investment decisions.

1.3 Research Questions

- What is the impact of loss aversion on individual investors' investment decisions?
- What is the impact of herding on individual investors' investment decisions?
- What is the impact of cognitive dissonance on individual investors' investment decisions?
- What is the role of financial literacy to moderate the relationship of loss aversion and individual investors' investment decisions?

- What is the role of financial literacy to moderate the relationship of herding and individual investors' investment decisions?
- What is the role of financial literacy to moderate the relationship of cognitive dissonance and individual investors' investment decisions?

1.4 Significance of the Study

Study has several significance for the policy makers, researchers, students and investors. Finally, study has various importance for the economic and social benefits of the members of entities and institutional investors as well. The findings of this study would be implacable for investors of developing and other markets to control their biases i.e. cognitive as well the behavioral biases. The financial literacy fully implacable to eliminate the biases from the mind of investors of local areas.

2 Literature Review

This section including the theoretical and empirical literature review regarding behavioral finance. The details theoretical background and other factors explanations added in this section. The conceptual framework and hypotheses development on the base of existing literature are also given below.

In the light of previous literature number of researchers examined in most advanced markets both the cognitive biases and behavioral biases impact on investors investment decisions (Banerji et al., 2020; Rieger, 2020). Similarly, in some developing and emerging markets the biases and investors investment decisions mainly investigated with some biases. The research on individual investors and market based investors remained explored. However, the research on individual's investors rather than stock markets remain less explored. Same like another group of researchers documented from emerging and developing markets (HUSSAIN et al., 2022; Ilyas et al., 2020).

Investor decisions on the stock market have a significant influence in setting market trends, which consequently have an impact on the economy. Some investors are rational; their decision concerning investment is involved in a careful understanding of information on the market. On the other hand, there are investors who make irrational decisions.

In other words, behavioral finance is distributed into a macro and micro behavioral finance (Pompian and Wood, 2006). According to Jurevičienė et al. (2012), macro behavioral finance identifies and discusses inconsistencies that can be described by behavioral models. On the other hand, the actions and deviations of separate investors are examined by micro behavioral finance.

If they become familiar with the factors that go into making such a decision, then there is a possibility that they can make rational decisions. That is the reason to proceed working on the selected variables (loss aversion, herding, and cognitive dissonance).

According to the prospect theory, people consider the likely value of gains and losses in addition to utility considerations when making decisions. Tversky and Kahneman (1974), claimed that people rely on an insufficient number of investigative philosophies rather than statistical approaches when making decisions. They contend that, in contrast to anticipated utility theory, people give varied probabilities and weights to gains and losses. They discovered that possible losses have a considerably greater impact on individual investors than comparable gains. The

theory deals with the risk and loss side of the investment and how human base their decisions under their influence.

Theory of Prospect indicates the gains and losses of individual's investors. The loss is more considerable for investors as compared to the gain. For instance, the theory suggests that loss aversion happens because of the psychological effects of losses are stronger than the psychological effects of earnings. Further, if the investors feel that mimicking other investors (herding) can benefit them and can enable them to gather accurate information they may favor it. Finally, cognitive dissonance, which may result in the imbalance and mental unease due to two opposing, conflicting viewpoints may impact the financial decision making of the investors as well.

2.1 Loss Aversion Bias and Investors Investment decision

Loss aversion is a common trait among investors. Studies on loss aversion have revealed that people experience more discomfort when witnessing losses than joy when witnessing similar benefits (Barberis et al., 2001). On average, the prospect of losing money is twice as motivating as the prospect of making the same amount (Barberis et al., 2001). According to Barberis et al. (2001), loss aversion plays a significant role in influencing how people view risky bets. Loss aversion, according to Dar and Asif (2018), is a phenomena that happens when investors are less satisfied with their investment results and more fearful of potential losses. Investors typically sell appreciated stocks and hold onto ones that have decreased in value, according to a study, which implies that the dispositions effect or loss aversion significantly influences investor behavior and decision-making.

2.2 Cognitive dissonance and Investors Investment Decision

According to the empirical data, investors have a cognitive dissonance bias (Kanojia et al., 2022). When dissonance levels increase, confirmation and self-confidence biases that show up in their illogical behavior are more likely to have an effect (Olsen, 2008). Any investor who suffers from cognitive dissonance will feel the unbalance and dissatisfaction brought on by having two divergent, competing points of view. It frequently favors incorrect financial choices.

2.3 Herding and Investor Individual Decision

Herding, often referred to as the bandwagon effect, is a bias in which individuals are significantly influenced by the choices made by those around them in order to seem similar to them and feel linked to them. In a study, several types of herd behavior studies are assessed, the impact the herding effect has on investors' choices, and shifts in how the herding effect influences behavior through time and across national boundaries. According to Banerji et al. (2020), investor herd behavior increases in a bearish stock market and continues to rise with the expectation of a financial disaster. Whereas, found in their study that herd behavior occurs frequently in both bullish and bearish markets.

2.4 Financial Literacy and Investors Investment decision

The financial literacy indicates the sufficient knowledge of investors regarding investment opportunities and financial instruments. In contrast, people have don't enough financial literacy make some weak investment decisions. The financial literacy moderates the relationship of

investments decisions and behavioral biases with great influence. Jappelli and Padula (2013) explored the role of financial literacy and investment decision argued that the behavioral biases can be control by increasing the financial literacy.

The irrational investors can decrease the behavioral and cognitive biases by getting the more financial knowledge. According to Jappelli and Padula (2013), people don't have basic knowledge of economic, behavioral and macroeconomics factors, for instance, they more likely to fall in behavioral and cognitive biases. Various researches examine the relationship of financial literacy and investment decisions in advance markets and documented that financial literacy decrease the investors biases and leads to better future decisions (HUSSAIN et al., 2022; Ilyas et al., 2020; Jurevičienė et al., 2012).

It is summarized in the light of above discussion that existing literature full filled by the researchers of developed and emerging markets. Various researchers from advance and emerging markets investigated the investor's cognitive and behavioral biases. For instance, the moderating role of financial literacy mainly remained less explored. Similarly, the biases of local area of less developing markets also remained very less explored. It is stated that the study full filling the gap by adding moderating role of financial literacy especially for the investors of local area of Pakistan. The study developed a conceptual framework as follows.

2.5 Conceptual Framework

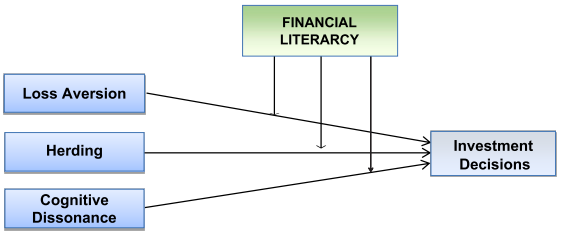

Figure 1: Conceptual Framework

2.6 Research Hypotheses

- *[H_1:] Loss aversion bias has a positive impact on individual investors' investment making decision.*
- *[H_2:] Cognitive dissonance has a positive impact on individual investor's investment making decision.*
- *[H_3:] Herding behavior has a positive impact on the individual investor's investment making decisions.*
- *[H_4:] Financial Literacy has significant impact on the relationship of loss aversion and individual investors' investment making decision.*
- *[H_5:] Financial Literacy significant impact on the relationship of Cognitive dissonance and individual investors' investment making decision.*
- *[H_6:] Financial Literacy significant impact on the relationship of Herding behavior and individual investors' investment making decision.*

3 Research Methodology

This section consist on research methods used in study i.e. research design, analysis of study, methods of data collection, the population, sample and sampling techniques etc. the section include SEM technique, the validity and reliability of items. The other tools of analysis and details of questionnaires used in this study.

3.1 Research Design

There are two major categories of research i.e. qualitative and quantitative in nature. Qualitative research is quite different from the quantitative. Kanojia et al. (2022) differentiate as qualitative research is cheap, easy and, more reliable as compare to the quantitative method. In contrast, the quantitative design has less biases and accessible through internet sources. Qualitative research is time taking costly and the individuals may not understand easily. In contrast, the quantitative research is less costly and easy for the researcher to measure its factors. The research is qualitative because the data will be collected from questionaries' etc.

3.2 Primary Analysis

This research used primary data to examine the impact of different individual biases on investment decisions. The respondent's give feedback through questionnaires. The research is primary in nature and used qualitative data.

3.3 Data Collection

Data was collected from the individual investors of Pakistan. The study collected data from the respondents from the target area of Islamabad. Total of 260 questionnaires were distributed, finally 251 respondents feedback was analyzed by using SPSS and Smart PLs software.

3.4 Population and Sample

The sample size of this study included 251 respondents from the target and local area of the Islamabad stock exchange. The respondents counted in the questionaries' for analysis given in the next section are 251.

3.5 Sampling Technique

The population of this study is unknown, so the sampling techniques used are convenient. The convenient sampling techniques are easy to access and reliable for such types of populations.

3.6 SEM

The study used Structural Equation Model (SEM) by smart PLS to analyze the conformity factor analysis. The CFA stands for conformity factor analysis examined by adding all items of related latent variables in one equation at one time. It also indicates the discriminant analysis and mean-variance of each factor.

3.7 Reliability of Data

The major tools of analysis like unit root test descriptive summary correlation matrix and old regression etc. The study used a frequency test to examine ratio of respondents. Alpha test used to check the reliability of data. The data is considered reliable if the value became more than 60%. The data will be more reliable with the values like 70%, 80% and 90% with highest level. Secondary the descriptive summary used to check the behavior of data. The data shows its behavior by mean median mode standard deviation and minimum maximum values. The mean will show the normal distribution of data. However the standard deviation will show the risk on factors.

Same like the correlation matrix will be used to check the issue of multi collinearity between the variables. The correlation matrix always checks between independent variables. The correlation exists when two or more factors highly correlate with each other. If the variables correlate more than 70% it will showed the issue of multi collinearity between factors.

According to Shah and e Kausar (2012) in OLS firms estimators are homogenous, moreover the examiner found there is insignificant effect of time. According to a study, the fixed affect model creates difference in cross sectional as well as time sequence on its variables. In linear regression model for evaluation Ordinary Least Square will be for identified parameter. This form too identify as constant coefficient in the statistics or econometrics.

The responses were obtained from Individual having experience of investment in the Pakistani Stock Market. It is suggested that the sample size should fall into three categories: less than 100, between 100 and 200, and more than 200. 250 responses were finalized for the underlying study for the purpose of analysis. As the target population of the study included the investors in the Stock Market of Pakistan, convenience-sampling method was used to obtain data.

3.8 Variables Measurements

The variables are measured by using the five Likert scale i.e. agree, strongly agree, neutral, strongly disagree and disagree etc. the study adopted questionnaires from existing body of literature. However the numbers of items added on the base of previous evidence the details for each variable including dependent and moderator are as follows.

Loss Aversion

The loss aversion indicates the investor's biases towards risk averse. The loss aversion is measured by using the seven basic items. The questionnaires used in loss aversion by using the following researchers i.e. (Hassan, Khalid, and Habib 2014; Nur Aini and Lutfi 2019).

Herding

The herding behavior represent investor's similar actions. Most probably the investors used similar actions performed by other investors in market. The herding behavior is measured by using the five liker scale. The six items were used in herding behavior. Herding behavior questionnaires adopted by using the previous literature i.e. (Ahmed et al. 2022).

Cognitive Dissonance

The cognitive dissonance is a cognitive bias exist in mind of investors. However, previous researchers measured by using both quantitative and qualitative methods. The research also measured it by using the ratios scale. This study used same like five Likert scale to measure eth cognitive dissonance. The study adopted questionnaires from literature i.e. (Goetzmann and Peles 1997; Nur Aini and Lutfi 2019; richard oliver dalam Zeithml. 2021). The study added three items to measure the cognitive dissonance.

Financial Literacy

Financial literacy is measured by using the five Likert scale and adopted by existing literature. The financial literacy indicates the knowledge or information regarding investment decision. Investors of different markets have different literacy. It have great effects on investment decisions. Financial literacy can be used to eliminate the behavioral and cognitive bases. This study used financial literacy as moderating factor. The study used questionaries by adopted process from the study of Waqar et al., (2022). The study used five basic items to measure the financial literacy.

Investment Decisions

Investment decision is dependent variable measured by using the questionnaires. The five Likert scale also used to measure the investment decision. The study used five basic items as adopted from existing literature to measure the investment decision. Study adopted research questionnaires by using existing literature i.e. (Ahmed et al., 2022; Ogunlusi and Obademi, 2021).

4 Results and Analysis

This section consist on results and its interpretation major results frequency, descriptive summary, correlation matrix table, Structural Equation Model (SEM), Anova summary and simple regression etc. The details explanations for the interpretation of each table is also mentioned below.

Table 4.1: Gender

	Frequency	Percent
Male	147	58.6
Female	104	41.4

According to the gender breakdown in the above table, 147 respondents or 58.6 percent of the total 251 respondents were men. On the other hand, 41.4 percent of the respondents 104 in total were women.

Based on age, the aforementioned demonstrate shows that 38.6% of 97 respondents were between the ages of 18 & 22. Similar to this, 35.5 percent of 89 respondents, or respondents, were

Table 4.2: Age

	Frequency	Percent
18 – 22 years	97	38.6
22 – 32 years	89	35.5
32 – 42 years	53	21.1

between the ages of 22 and 32. However, 53 respondents, or 21.1 percent, indicated that they were between the ages of 32 and 42. Additionally, 12 respondents (4.8% of the total) reported being 52 years of age or older.

Table 4.3: Educational Level

	Frequency	Percent
Matric	9	3.6
Intermediate	21	8.4
Bachelors	150	59.8
Masters or above	71	28.3

Based on education, Table 4.1.4 reveals that 9 respondents, or 3.6 percent, were matriculants. Similar to this, 21 respondents (8.4%) fell into the intermediate category. 150 respondents, or 59.8% of the total, were bachelors. In addition, 71 respondents, or 28.3 percent, had a master's degree or higher. There are not many respondents, 8.4% percent and 3.6 percent, who are over 21 and have less than nine years of education.

Table 4.4: Experience

	Frequency	Percent
Less than a year	139	55.4
1 – 3 year	60	23.9
4 – 5 year	32	12.7
More than 5 years	20	8.0

According to the above mentioned table, 139 respondents had investments that lasted less than a year, or a percentage of 55.4 percent. Additionally, 23.9 percent of the 6040 respondents had investments lasting one to three years. Additionally, 32 respondents, or 12.7% of the total, said that they had invested between four and five years. Additionally, 20 respondents (8.0%) had investments that lasted longer than five years.

The marital status of respondents who were classified as married and single is shown in Table 4.1.6. Women who are married make up 29.1% of the total respondents, while women

Table 4.5: Marital Status

	Frequency	Percent
Married	73	29.1
Unmarried	178	70.9

who are not married make up 70.9%. The high proportion of married women in this sample suggests that the findings will shed light on the attitudes of respondents who are responsible for a family. Furthermore, study also use the descriptive summary to examine the behavior of data. The details of descriptive summary are as follows.

Table 4.6: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
LA	251	12	40	28.96	5.352
H	251	10	35	25.7	4.95
CD	251	6	20	14.71	3.209
ID	251	7	25	17.37	4.451
FL	251	5	20	13.03	3.541

The table above presents the descriptive statistics, including the mean values and standard deviation for each variable. Loss aversion, herding, cognitive dissonance, and investment decision have respective mean values of 28.96, 25.70, 14.71, and 17.37. No mean value is close to an extreme, either positive or negative. However, loss aversion has the highest mean value.

4.1 Reliability

Using Cronbach's Alpha, the structured questionnaire's reliability has been assessed to determine how closely it captures the intended outcomes. The survey is thought to be more reliable if there are fewer changes between the repeated interval readings. The validity of the questionnaire, the similarity and connectivity of its questions, and their interconnectedness all affect how reliable the instrument is. The same sample of participants is tested twice, and the outcomes are compared by computing a reliability coefficient. The Cronbach's Alpha reliability test conducted for this study's structured questionnaire produced the results displayed below.

The closer the reliability coefficient is to 1, the higher the internal consistency reliability. Cronbach's alpha is 0.784, which is a very common value for our study, according to reliability statistics. The higher level of consistency and reliability that the questionnaire used in the study's primary research possessed is evident from its Cronbach's alpha value. The used questionnaire and the respondents' responses are both shown to be valid by the Cronbach's alpha value of 0.885, which is very close to 1.

Table 4.7: Reliability Test

	Cronbach alpha	rho-A	Composite Reliability	Average Variance
ID	0.784	0.808	0.851	0.535
HERD	0.842	0.848	0.884	0.559
LA	0.888	0.902	0.914	0.608
FL	0.851	0.867	0.890	0.619
CD	0.841	2.196	0.845	0.651

Table 4.1.8 presents the results of the reliability analysis for each variable. With alpha values of 0.839 and 0.760, respectively, investment decision and herding both have very high levels of reliability. The alpha values for loss aversion, financial literacy 0.851 and cognitive dissonance, however, are 0.888 and 0.842, respectively, which are both significantly higher than the 0.7 threshold needed for a scale to be considered reliable.

4.2 Normality of Data

Skewness and kurtosis, which range from -2 to 2 for normal data, were used to determine whether the data were normal (Field, 2000; Gravetter and Wallnau, 2014; Trochim and Donnelly, 2006). Each value is comfortably within the range.

Table 4.8: Normality of Data

Mean	Std. Deviation	Skewness	Kurtosis
Statistic	**Statistic**	**Statistic**	**Statistic**
28.96	5.352	-.303	.620
25.70	4.950	.049	-.258
14.71	3.209	-.180	-.452
17.37	4.451	-.003	-.740

The normality data is less than 1.96 so the data is normally distributed.

4.3 Correlation Analysis

The measure of a relationship's strength between two variables is called correlation. The correlation will be high or strong when there is a strong relationship between two variables; on the other hand, it will be low when there is a weak relationship, which means the variables are not strongly correlated. Through correlation analysis, the strength of a relationship is evaluated using the available data. The range of a correlation coefficient is, respectively, from -1 to +1. Hinkle et al. (2003); Swinscow et al. (2002). The Pearson r correlation coefficient is the one that

is most frequently used. In correlation results, two double asterisks denote a highly significant relationship between two variables, while no values denote no relationship.

Table 4.9: Correlations Results

		LA	H	CD	ID	FL
Sig. (2-tailed)						
N	251					
H Pearson Correlation	.543**	1				
Sig. (2-tailed)	0					
N	251	251				
CD Pearson Correlation	.582**	.510**	1			
Sig. (2-tailed)	0	0				
N	251	251	251			
ID Pearson Correlation	.472**	.434**	.361**	1		
Sig. (2-tailed)	0	0	0			
FL Pearson Correlation	.482**	.533**	.361**	.451**	1	
Sig. (2-tailed)	0	0	0			
N	251	251	251	251	251	

The analysis shows a highly significant relationship between loss aversion and herding, with a magnitude of .543** and a positive direction, at the 0.01 level. Conversely, the correlation between investment decision and loss aversion is highly significant, with a magnitude of .472** and a positive direction. Additionally, a significant at the 0.01 level and magnitude of .434** positive relationship between herding and investment choices exists. However, Cognitive dissonance and loss aversion have a significant and favorable relationship, with a magnitude of .582**. Similar to this, there is a significant, positive relationship between loss aversion and herding that has a magnitude of.434**. Additionally, Cognitive dissonance and investment decision-making have a significant, magnitude.361** positive relationship.

The multi-collinearity threshold should be 50%. Loss aversion and herding, as well as loss aversion and cognitive dissonance, have neutral multi-collinearity. These independent variables' multi-collinearity equals to 50% approximately. That's why the multi-collinearity of these variables are neutral.

4.4 Regression Analysis

The type and strength of the relationship between the dependent and independent variables can be determined through regression. Also highlighted is the reliability of the theoretical framework model that served as the basis for developing the research study's hypotheses. The results of regression analysis are provided below. When analyzing data, a different phrase known as regression analysis is also used. In this study, we used a linear regression to account for our variables. When these results are obtained after the entire process, they can offer the most useful and

reliable information.

Table 4.10: Correlations Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.520[a]	0.27	0.262	3.83	1.668

The percentage of the dependent variable's variance that can be accounted for by changes in the predicting variables is shown by the adjusted R-square value (cognitive dissonance, loss aversion, herding). The model's R Square value demonstrates that herding, loss aversion, and cognitive dissonance are all taken into account. Variance in investment choice of .27 percent. The Durbin Watson value is 1.668, falling between 0 and 4.

Table 4.11: ANOVA[a]

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	1339.059	3	446.353	30.5	.000[b]
Residual	3613.219	247	14.628		
Total	4952.279	250			
Dependent Variable: ID					
Predictors: (Constant), CD, H, LA					

The table shows that the model's significant value is less than 0.05 and that the model's F value, which measures model fitness, is greater than 4, the better, the lower the value. It is assumed that the model failed to adequately fit the data if the sig value is greater than 0.05. So, the model is statistically significant, we can say.

Table 4.12: Regression

Model	***B***	***Std. Error***	***Beta***	***T***	***Sig.***
C	0.124	3.29	1.502	2.152	0.032
LA	0.257	0.321	0.309	4.324	0.001
FL	0.216	0.223	0.285	0.151	0.015
H	0.61	0.432	0.235	3.488	0.001
CD	0.79	0.943	0.062	0.883	0.378

a. Dependent Variable: ID

The table above lists the factors that positively affect investment decisions. The statistical insignificance of cognitive dissonance's relationship to investment decision is demonstrated by the fact that its significance value is greater than 0.05. Focusing on the three predictors will help us determine whether they are statistically significant and, if so, which way the relationship is going. Positive coefficient and significance of loss aversion (b=0.257; p=0.000) would suggest a link between high investment decision and high loss aversion. Financial literacy (b=0.216), and p value is significant (p=0.051) Herding (b=0.212), on the other hand, is significant (p=0.001) and has a positive coefficient, suggesting that high herding is associated with high investment decisions. Contrarily, cognitive decision (b= 0.085) is insignificant (p= 0.378), and that there is no correlation between cognitive dissonance and investment decision, as indicated by the coefficient value's negligible positive value. Finally, moderate the relationship of behavioral and cognitive biases impact on investment decision in local areas. The results for moderation are as follows.

4.5 Moderation Effects (Financial Literacy)

Table 4.13: Moderation Effects (Financial Literacy)

Moderator Path	Effects	SE	LLCI	ULCI	P_VALUE	Hypothesis
FL	LA	1.98	0.223	22.344	0.0001	Accepted
FL	HERD	1.96	0.335	35.4332	0.015	Accepted
FL	CD	1.97	0.232	45.078	0.378	Rejected

As shown by above results financial positive significantly moderate the impact of loss aversion, herding and investors investment decision. In contrast, the financial literacy not moderates the relationship of cognitive dissonance and investors investment decisions.

Financial knowledge reliefs to investors make observed choices concerning investment, it also inspirations the investment decision instrument and intelligences that those who do not distinguish the wealth market decrease in border and take decisions founded on propositions from other people. Various researches examine the relationship of financial literacy and investment decisions in advance markets and documented that financial literacy decrease the investors biases and leads to better future decisions (Barberis et al., 2001; Hinkle et al., 2003; HUSSAIN et al., 2022; Ilyas et al., 2020).

4.6 Structural Equation Model (SEM)

The latent variables measured by the above items included in model. The cognitive dissonance item CD1 is deleted because it was below than criteria. Same like two items herding biases are also deleted. The above model is SEM to indicate the items and latent variables confirmations of each item.

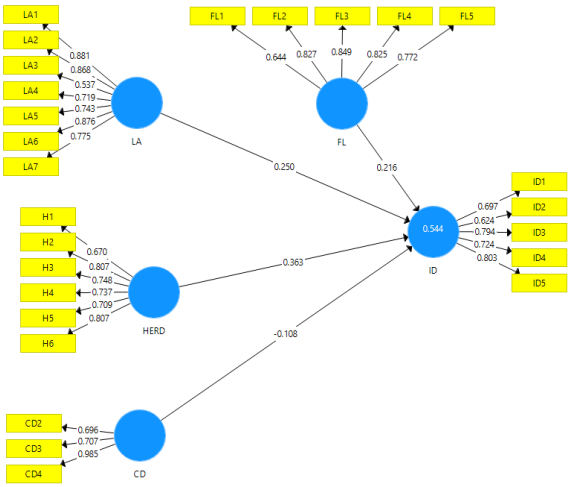

Figure 2: Structural Equation Model (SEM)

5 Key Findings and Recommendations

This section including the key findings of study, conclusion and discussion in line with acceptance of results. The study also added the results supports from previous literature. Finally, the implications of study for policy makers, investors to control their biases, financial institutions and other group of researchers also added in this section. The limitations and future recommendations of study added at the end of section.

The findings of this study indicate that there is significant relationship between herding bias and individual's investor's investment decision of local areas. The underlying assumption of Prospect theory indicates that investors tends to more focus on loss rather than gains. Loss aversion has positive impact on individual investor's investment decision making in Pakistan. Most probably investors in developing market and local areas of Pakistan are less sensitive to loss. The hypothesis is accepted about loss aversion and fully supported by existing body of literature. The results are supported by number of researchers, the arguments are same like (Ainia and Lutfi, 2019; Hassan et al., 2014).

Herding has positive impact on individual investor's investment decision making in Pakistan. The second hypothesis is also accepted and full supported by the existing literature. The positive sign indicates that due to increase in similar actions of local area investors the group of investors decide to perform same. In developing areas the herding behaviour cause greater benefits and have positive significant impact (Ahmad et al., 2022). However, the findings of this study are contrast of some advance markets, because the herding behavior in advance countries reported adverse impact.

Cognitive dissonance has positive impact on individual investor's investment decision making in Pakistan. The hypothesis is rejected and study reported in contrast arguments from the existing literature. The findings of cognitive dissonance are same like investors can't take some sign serious and perform as per their personal thoughts.

Finally, the financial literacy moderates the relationship between herding bias and loss aversion. It is summarized that the financial literacy have positive and significantly moderates the

relationship of behavioral, cognitive biases and investors investment decision. It is stated that financial literacy have greater impact to moderate the impact of biases on investment decisions. The financial literacy significantly impact the investment decision process. Findings are supported by existing literature Barberis et al. (2001), recently argued that financial literacy can be used to control the biases.

It is concluded in the light of above discussions that the study confirms the significant impact of the psychological factors used in the study (Loss aversion, cognitive dissonance, herding) on the investment decision making. The findings and the implications of the study could be helpful for the retail investors and the policy makers to avoid their decision based on the emotional judgments. It is concluded that study examine the impact of loss aversion, Herding behavioral and Cognitive dissonance on an individual investor's investment decisions making in Pakistan. The study used the moderating role of financial literacy with behavioral and cognitive biases influence on investment decision. The study is quantitative in nature and used major behavioral and psychological biases that impact investors' investment decisions making in Pakistan. The data is collected by using questionnaires'. Population of the study consists of investors in the twin cities of Islamabad and Rawalpindi; sample size included study was about 250 respondents. The study used SPSS software to analyze the data. The study used a convenient sampling technique.

The study is limited to developing market individual investors of Islamabad Pakistan. The study is implacable for students, researchers, policymakers, and other sectors as well. This study is implacable for investors to take certain decisions and control biases.

The underlying study is not exempted from limitations. First, the number of variables undertaken is limited. More biases and heuristics may be taken into consideration for instance, availability bias, conservatism etc. further, the sample of the study is limited to the twin cities of the country.

The study is cruel for students, researchers, policymakers, and other sectors as well. This study is implacable for investors to take certain decisions and control biases. The study is fully implemented for the institutional and other individual's investors of stock markets. Especially, for the investors to control their biases like behavioral and cognitive as well. The study also pouring implications for behavioral finance micro and macro investors.

In the future, the study can be extended on some institutional investors' biases, and other behavioral and cognitive biases can be added in the study. The study can be extended by using the mediating role of human and moderator's role as well. Behavioral biases of gender differences regarding investment decision can be evaluated in near future. Especially in context of local areas female investor's vs male investors need to explore.

References

Ahmad, M., Ahmed, Z., Yang, X., Hussain, N., and Sinha, A. (2022). Financial development and environmental degradation: do human capital and institutional quality make a difference? *Gondwana Research*, 105:299–310.

Ahmed, Z., Ahmad, M., Rjoub, H., Kalugina, O. A., and Hussain, N. (2022). Economic growth, renewable energy consumption, and ecological footprint: Exploring the role of environmental regulations and democracy in sustainable development. *Sustainable Development*, 30(4):595–605.

Ainia, N. S. N. and Lutfi, L. (2019). The influence of risk perception, risk tolerance, overconfidence, and loss aversion towards investment decision making. *Journal of Economics, Business, & Accountancy Ventura*, 21(3):401–413.

Banerji, S., Kodur, V., and Solhmirzaei, R. (2020). Experimental behavior of ultra high performance fiber reinforced concrete beams under fire conditions. *Engineering Structures*, 208:110316.

Barberis, N., Huang, M., and Santos, T. (2001). Prospect theory and asset prices. *The quarterly journal of economics*, 116(1):1–53.

Berthet, V. (2022). The impact of cognitive biases on professionals' decision-making: A review of four occupational areas. *Frontiers in psychology*, 12:802439.

Bhatia, A., Chandani, A., and Chhateja, J. (2020). Robo advisory and its potential in addressing the behavioral biases of investors—a qualitative study in indian context. *Journal of Behavioral and Experimental Finance*, 25:100281.

Dar, J. A. and Asif, M. (2018). Does financial development improve environmental quality in turkey? an application of endogenous structural breaks based cointegration approach. *Management of Environmental Quality: An International Journal*, 29(2):368–384.

Fakhry, A. and Heykal, M. (2016). The effect of board of commissioners' experience and education and company's size on the quality of financial statements in goods consumer companies listed in indonesia stock exchange in 2015-2017.

Field, A. (2000). Discovering statistics using spss for windows sage publications. *London*, 2:44–322.

Gravetter, F. J. and Wallnau, L. B. (2014). Introduction to the t statistic. *Essentials of statistics for the behavioral sciences*, 8(252).

Hassan, S., Wright, B. E., and Yukl, G. (2014). Does ethical leadership matter in government? effects on organizational commitment, absenteeism, and willingness to report ethical problems. *Public Administration Review*, 74(3):333–343.

Hinkle, D. E., Wiersma, W., and Jurs, S. G. (2003). Applied statistics for the behavioral sciences. *(No Title)*.

HUSSAIN, M. A., WAQAR, A., Saddiq, A., HAFEEZULLAH, K., and Zafar, A. (2022). Governance innovation and firm performance: Empirical evidence from the automotive industry in pakistan. *The Journal of Asian Finance, Economics and Business (JAFEB)*, 9(4):399–408.

Ilyas, G. B., Rahmi, S., Tamsah, H., Munir, A. R., and Putra, A. (2020). Reflective model of brand awareness on repurchase intention and customer satisfaction. *Journal of Asian Finance, Economics and Business*, 7(9):427–438.

Jappelli, T. and Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, 37(8):2779–2792.

Jurevičienė, M., Kaffemanienė, I., and Ruškus, J. (2012). Concept and structural components of social skills. *Baltic Journal of Sport and Health Sciences*, 3(86).

Kahneman, D. and Tversky, A. (2013). Prospect theory: An analysis of decision under risk. In *Handbook of the fundamentals of financial decision making: Part I*, pages 99–127. World Scientific.

Kanojia, S., Singh, D., and Goswami, A. (2022). Impact of herding on the returns in the indian stock market: an empirical study. *Review of Behavioral Finance*, 14(1):115–129.

Kushwaha, B. P., Shiva, A., and Tyagi, V. (2023). How investors' financial well-being influences enterprises and individual's psychological fitness? moderating role of experience under uncertainty. *Sustainability*, 15(2):1699.

Ogunlusi, O. E. and Obademi, O. (2021). The impact of behavioural finance on investment decision-making: A study of selected investment banks in nigeria. *Global Business Review*, 22(6):1345–1361.

Olsen, R. A. (2008). Cognitive dissonance: the problem facing behavioral finance.

Pompian, M. M. and Wood, A. S. (2006). Behavioral finance and wealth management: How to build optimal portfolios for private clients.

Rieger, M. O. (2020). How to measure financial literacy? *Journal of Risk and Financial Management*, 13(12):324.

Shah, S. Z. A. and e Kausar, J. (2012). Determinants of capital structure of leasing companies in pakistan. *Applied Financial Economics*, 22(22):1841–1853.

Shefrin, H. (2001). Behavioral corporate finance. *Journal of applied corporate finance*, 14(3):113–126.

Swinscow, T. D. V., Campbell, M. J., et al. (2002). *Statistics at square one*. Bmj London.

Toma, F.-M. (2015). Behavioral biases of the investment decisions of romanian investorson the bucharest stock exchange. *Procedia Economics and Finance*, 32:200–207.

Trochim, W. and Donnelly, J. P. (2006). The research methods knowledge database. *Non-probability Sampling. Retrieved on April*, 22:2007.

Tversky, A. and Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *science*, 185(4157):1124–1131.