



## The Role of Behavioral Factors on Investment Decision Making: Moderating Role of Financial Literacy

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### ABSTRACT

The purpose of this paper is to examine the impact of behavioral finance factors on stock market investment behavior. Moreover, it also determines the moderating role of financial literacy in behavioral finance factors and stock investment in Pakistan. Studies have been conducted on Pakistan Stock market investors. Data has been collected through a structured questionnaire. The survey was performed among 165 investors in the Pakistan stock market. SPSS and Smart PLS 3.0 were used to test the hypotheses. The study concluded that Overconfidence, Herding, Loss Aversion, and Risk Perception significantly impacted the performance of Stock Investment decision-making. Moreover, Stock Investment decision-making was also moderated by Financial Literacy except for risk perception. The findings of this study would help to comprehend the behavior of investors in the Pakistan stock market. Moreover, to achieve favorable outcomes, investors must possess financial literacy about the stock market.

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## 1. Introduction

Stock exchange investment behavior has grown worldwide and is considered the most reliable source for generating profit. As a result, organizations are increasingly connecting with the stock exchange to attract investors, fulfilling dual objectives: investors benefit from purchasing stocks while organizations secure investments. The stock exchange serves as a substantial financial instrument, serving various purposes, and enabling the public to participate in activities beneficial for both investors and organizations alike (Bonga, 2014). A stock market is a financial mechanism that enables organizations to fulfill their long-term financing needs by selling stocks or issuing bonds (Hartono, 2022). Investor decision-making is a major tool for manifesting the micro and macro levels of an economy. Ventures play a fundamental role in nourishing the economy (Chakraborty, Gupta, Mahakud, & Tiwari, 2023). According to traditional finance, the stock exchange has always been beneficial for the economy, and the costs associated with the stock exchange have consistently reflected all relevant information. Additionally, conventional finance recommends that investors are usually analytical in the market and base their portfolio development on these rational assumptions (Ahmad, Sohail, Hussain, & Hussain, 2020).

Volatility is a measure of the vulnerability or risk associated with the magnitude of changes in a security's value. (Banumathy & Azhagaiah, 2015). Monetary markets are highly unstable, with volatility and vulnerability causing high variance in revenue. Financial backers do not achieve ideal results because they are human, and their behavior has been studied for a long time (Yüksel & Temizel, 2020). The decision to invest is the process of acquiring assets

from reserves that are easily accessible to achieve a splendid future outcome. Investment decisions are conventionally based on realistic outcomes, with investors molding their notions in view of present knowledge and increasing anticipated outputs at a certain hazard verge. Latest research exhibits that financiers strive to construct realistic conclusions Kubilay and Bayrakdaroglu (2016) and utilize several samples and traditional monetary philosophies to compute the risk and expected output of their decisions Arora and Kumari (2015) few investors adopted long period investment while short term taken by other. In the investment decision-making act Standard finance expects one's behave realistic and take into consideration all accessible data.

The behavior of investment by individual investors has become famous in academic circles owing to the assistance of one person. Investment decisions in the stock exchange have quickly enhanced in modern times (Calvet, C  l  rier, Sodini, & Vall  e, 2017). There are several reasons for the increase in stock market profits. The primary reason is the exceptional profit from the assets of the stock market. In investment of finance, investors have a chance of making their money work and getting a profit on it. The vast convertible assets of financial instruments, it meant investors, might immediately change their stock exchange tools into money another supporting reason of it. Number of monetary instruments is accessible for investors, they can select an asset according Their investment objectives it's another assisting cause of it. (Akhtar & Das, 2019). A large number of financiers end in a smoke to construct make realistic financing choices due to neglecting their venture objectives (Sabir, Mohammad, & Shahar, 2019). In addition, masses are betrayed and misled in view of their venture goals and lose to attain their asset objectives due to their inability to coordinate with anticipated profits and adventuresome behavior (Hoffmann & Post, 2017). Overconfidence is a psychological characteristic in the domain of behavioural finance which significantly intervene on one venture choices , which might be venture choices or other venture selections (Joo & Durri, 2017). ,Overconfidence is a psychological attribute which strongly intervene on one venture choices, in the domain of behavioral finance (Haseeb, 2019). To estimate the venture efficiency of a speculator that are abide by market fluctuation overconfidence is correspondingly encouraging forecaster (ul Abdin, Farooq, Sultana, & Farooq, 2017). In the field of stock market When number of investors simultaneously copy the activities of other speculator by having insufficient exposure and constrained data it will be known as Herding.(Ngoc, 2014). An often incline of human to share, observe and repeat others behaviour in financial market throughout unstable state of financial market presence (Yu, Dan, Ma, & Jin, 2018) Investors do not behave logically in their investment choices in the existence of herding.

Financer desire to abide the notions and envisages of others when making financing choices. Therefore, while investors abandon their decision and lead various others choices it's known as Herding Behaviour. When the market is behaving is in discomfort manner like in the phase of market anomalies, future increase in prices and buzzes, the impact of herding behaviour is highly abstruse (Mertzanis & Allam, 2018). Majority of the financer succeed the behaviour of some other successful investor Investors have possessed the herding behaviour deliberately copy the activities of future financer (Kamil & Abidin, 2017). Herding behavior exhibited by an investor takes his decision to rely on others, which results in resentment about the return on investment. If herding behavior is not revealed by investors they are competent of succeeding independent investment choices and all they achieve their investments elevate their confidence as well (Munoz Torrecillas, Yalamova, & McKelvey, 2016). Theory of prospects describe the emotional bias in loss aversion behaviour. In Prospectus theory these two famous scholars systematically exhibited the loss aversion phenomenon and placed the basis of emotional biases. S-shaped kind of function was describe by the theory of loss aversion, where all likely profits and losses in regard to a pre-determined standard by an investor contrast and it's been exhibited by investor the propensity of being more vigilant to losses despite. B. Lee and Veld-Merkoulova (2016). Investor follows the loss averse emotional bias always select investment opportunities with low projected losses in regard of profit. It's been discovered by them that loss aversion bias intervene on the financer commerce dealing behaviour. Outcomes has been concluded that loss aversion and anchoring bias participate toward the commercial decisions and periodic of the real state (Durand, Fung, & Limkriangkrai, 2019). The phenomenon of resolution of separation or emphasize on delusion is a crucial component in experiential implications of loss aversion. It refers to the tendency of a

single decision to hold the entire situation (Lackes, Siepermann, & Vetter, 2020). In financial markets, many investors believe that they make perfect, rational, and planned decisions in any situation. However, this is not the case, as most investors lack experience (Onyekachi, Marshal, & Solomon, 2016). In market the behaviour of non-habitual is one of the significant questions that lead to the rational investment, In case of negligence it lead to more stress. While making potential investments majority of investors can't make understanding with the scope of the market and truly consist on the decisions and efficiency of others (Bian, Xu, Li, & Liu, 2016; Lan, 2020). The behavior of in habitually investors is the major issues that centrals to irrational financing in the market, foremost to more pressure in the situation of carelessness.. In order to do probable investments, majority of investors couldn't make compatibility with the market situation and wholly trust on decisions and activities of others (Czaja & Röder, 2020; H. Wang, Wang, Bu, Wang, & Pan, 2018). In Addition Nguyen, Gallery, and Newton (2019) in financial manufacturing goods investors who have greater experience regarding product incline could observe less hazardous product.

According to Giesler and Veresiu (2014) a tool use to identify the best investment options is financial literacy. Consequently, to take best investment decisions it's wholly assisted, Different techniques ,tools, strategies applied by those investors who have enough knowledge about finance, while others one's depend on their Friends advice who do not know about finance. In order to apply technical analysis in decision making financial literate investors have the superiority which illiterate one's don't have (Sultana, Zulkifli, & Zainal, 2018). It has been determined that financial literacy is an essential aspect that may assist investors in making informed investment choices and avoiding irrational behavior in the market. According to number of studies, having a strong understanding of finances may lessen that cognitive biases can intervene the financing choices options and optimize the performance of education programs in financial behavior (Agnew & Harrison, 2015). In addition, it has been shown that one's factor in the knowledge of finance might limit the correlation among major factors and the process of financing choices in stock exchange , Ul Abdin, Qureshi, Iqbal, and Sultana (2022) the knowledge of finance is contributing as core dimension which could affect the investor decision making. Future, It can increase the performance of individual investment. In the domain of traditional finance, For the objective of profit maximization, its supposed that the realistic members in the financial markets in order to take decision, but occasionally, number of other elements like experience and moods intervene on investment decision. So, in those conditions investors behave illogically and unwisely.(Gill, Khurshid, Mahmood, & Ali, 2018) It is manifested by conventional finance that investors are rational. regarding their choices of investment is associated with a true understanding of market Information, but it's unfeasible for making investment options by each investors on a realistic basis, as financial behaviour exhibited that financial biases have been prone to every behavioral bias.to study the psychological (Metawa, Hassan, Metawa, & Safa, 2019).

Factors of investment decisions are essential to make strong compatibility with perception of investor for making decision toward investment for the time being of market irregularities (Kumar & Babu, 2018). The investors who possessed an overconfident attitude they have determined to make the investment decisions on their own and concluded that decisions taken by others could be characterized by emotions, envisage, and circumstances. Their notion is truly supported by their overconfident behavior and guides them that the choices and recommendations of others are illogical and aesthetic (Rachmatullah & Ha, 2019). The masses who possess herd behavior decide to abide by the actions of others owing to that they perceive it as more convenient. Consequently either one Investor or Institutional investor, investment decisions will intervene irrational attitude and emotion of the herd (P. Wang & Nuangjamnong, 2022). While making financial decision the Loss aversion behaviour can not be acceptable. It induces one to truly oppose what investors are eager for; enhanced risk, with lower returns. To diminish losses and increase the profit , investor have to take risks(Areiqat, Abu-Rumman, Al-Alani, & Alhorani, 2019).Lower equity investment and vice versa is lead to a intensity of risk perception (Bhattacharjee, Singh, & Kajol, 2020). For the prosperity of the economy, investment is truly a significant tool. Owing to this the worthiness of speculation decisions has been enhancing day by day. Therefore, it is highly recommended to consider the compatibility with the factors of behaviour in the light of literacy of finance when making verdicts. The main objective of the study is to examine the moderating role of financial literacy in behavioral finance factors and stock investment decision-making. The sub-objectives of the study are as follows:

1. To investigate the relationship between overconfidence and stock investment decision-making.
2. To evaluate the relationship between loss aversion and investment decision.
3. To determine the relationship between risk perceptions on stock Investment decisions.
4. To determine the relationship between herding behavior and stock investment decision-making.
5. To examine the moderating role of financial literacy in the relationship between overconfidence and stock Investment decision-making.
6. To determine the degree of moderating impact of financial literacy on the relationship between loss aversion and stock investment decision-making.
7. To determine the degree of moderating impact of financial literacy on the relationship between risk perception and stock Investment decision.
8. To determine the degree of moderating impact of financial literacy on the relationship between Herding and Stock investment decision-making.

This research arises couple or questions that, will overconfidence, loss aversion, risk perception, herding behavior increase stock investment decision? And can financial literacy play moderating effect on their relationships?

## **2. Literature Review and Hypotheses Development**

### **2.1. Loss aversion**

Loss aversion is known to impact various facets of decision-making, encompassing financial choices. This phenomenon can culminate in a psychological condition referred to as "investor paralysis" (Kumar & Babu, 2018) state that, Loss aversion investors tend to be more vigilant and deliberate in safeguarding their capital against potential declines, prioritizing the avoidance of losses over the pursuit of gains, which aligns with the concept of loss aversion from prospect theory. Individuals may also exhibit heightened attention to both losses and gains due to their tendency to underestimate how swiftly they can adapt to such alterations. Loss aversion encompasses this dual aspect of being more attuned to losses than gains and frequently reassessing the outcomes, which aligns with the concept of loss aversion (M. Z. U. Khan, 2017).

### **2.2. Overconfidence**

Overconfident investors make independent decisions, believing that the choices made by others are influenced by emotions, circumstances, and perceptions. Their excessive self-assurance reinforces their beliefs, causing them to view alternative options and suggestions from others as irrational and unappealing. Overconfident traders, accepting risk as an inherent part of their financial strategy, often disregard risk levels and engage in excessive trading driven by their unwavering confidence, which may not always have negative consequences. Nevertheless, critics argue that persistent overconfidence can lead to increased trading activity, potentially diminishing market efficiency (Rachmatullah & Ha, 2019). Overconfidence is characterized by an inflated sense of certainty, leading investors to both overestimate and underestimate their predictions. Investors with high levels of confidence tend to be more inclined to take risks, whereas rational investors always aim to maximize returns while minimizing risk (Kartini & Nugraha, 2015).

### **2.3. Herding Behavior**

Investors who deliberately replicate the actions of their peers are described as displaying herding tendencies. These investors consistently imitate the trading and investment approaches of others (Kamil & Abidin, 2017). Herding behavior often arises when investors have insufficient information to make well-informed decisions about trading assets, as discussed in the research by (Y.-C. Lee, Wu, & Lee, 2021).

### **2.4. Risk Perception**

Riyadi (2016) suggests that investment risk can be seen as a departure from the anticipated profit (Riyadi, 2016). Meanwhile, according to Tandio and Widanaputra (2016), emphasizes that risk is a factor that evokes concerns in various individuals, including investors. Investors exhibit varying levels of risk tolerance, with some opting for low-risk options while others are willing to engage in high-risk ventures. According to Tandio and

Widanaputra (2016), perception pertains to an individual's perspective or interpretation of a situation. In contrast, risk represents a potential negative event that arises due to uncertainty.

## **2.5. Financial Literacy**

Literacy of finance intervene a crucial part in aiding financier in constructing well-informed speculation choices and avoiding irrational behavior within the market. Several studies have indicated that a robust understanding of monetary concepts which diminish the impact of cognitive biases on investment decisions and improve the efficacy of financial education programs. (Agnew & Harrison, 2015). Furthermore, research indicates that a person standard of literacy of finance may moderate the relationship among important factors and the financing choice making (Rasool & Ullah, 2020).

## **2.6. Loss Aversion and Investment Decision-Making**

Loss aversion intervene a major role in shaping financing choices as it relates to the risk-averse and rational nature of stock market investors (Mumtaz, Saeed, & Ramzan, 2018), Investors tend to become risk-averse when the profit or return from their previous stock buy surpasses their determined goal, while they may adopt a more risk-seeking approach when their prior degree of output has resulted in a loss (Javed, Bagh, & Razzaq, 2017). Ghelichi, Nakhjavan, and Gharehdaghi (2016), suggest that loss aversion has a negative impact, implying that investors with a greater inclination towards risk-seeking behavior tend to engage in more transactions and potentially experience higher returns. M. Z. U. Khan (2017). Our study recommends that investors with loss aversion bias tend to make more irrational investment decisions. Therefore, we identify two types of investors: one who is influenced by loss aversion bias and avoids unnecessary risks to save capital from loss, resulting in positive outcomes; and the other who is not affected by such bias and experiences negative impacts on financing choices.

H1: There is a positive relationship between loss aversion and stock Investment decision-making

## **2.7. Impact of Overconfidence on Stock Investment Decision Making**

The overconfidence bias plays a significant role in shaping financing choices is categorized by an extreme level of self-assurance (Chandra & Kumar, 2012; Ghelichi et al., 2016) Overconfident individuals often disregard input from other realistic speculation, relying instead on their exposure and experience when making transactions (Alquraan, Alqisie, & Al Shorafa, 2016). According to Javed et al. (2017), there is a positive relationship between overconfidence and investment decisions, primarily driven by the behavior exhibited by overconfident investors. However, it's worth noting that this relationship has a negative aspect, as overconfident investors may incur losses due to their psychological tendencies rather than rational decision-making Boda and Sunitha (2018), These investors tend to have unwavering confidence in their choices, believing they are consistently making the right decisions (Bakar & Yi, 2016).

H2: There is a positive relationship between overconfidence and stock investment decision-making.

## **2.8. Impact of Herding Behavior on Stock Investment Decision Making**

To investigate the influence of herding bias on a financier choices, researchers proposed an other technique to examine the asymmetric risk-return relationship with in stock market, taking into account the presence of herding behavior. The study's findings revealed a reverse feedback loop observed in Asian financial markets, attributed to the herding phenomenon (Bekiros, Jlassi, Lucey, Naoui, & Uddin, 2017). In comparison to individual investors, institutional investors exert a stronger herd effect, which tends to positively influence individual investment decisions (P. Wang & Nuangjamnong, 2022). Herding, defined as mimicking the investment choices of other fund managers simultaneously, and positive outcome commercial, characterized by buying winners and selling losers, play significant roles in financial markets. Following the herd and succumbing to the "fear of missing out" (FOMO) are behavioral phenomena that impact investment decisions. These tendencies can lead individuals to make irrational decisions with minimal research (Chhapra, Kashif, Rehan, & Bai, 2018).

H3: There is a positive relationship between herding behaviour and stock Investment decision-making

### **2.9. Impact of Risk Perception on Stock Investment Decision Making**

Variables such as risk perception and motivation are believed to be influential factors in the realm of investment. Risk is often linked to deviations from anticipated outcomes (Frans & Handoyo, 2020). Hoffmann, Post, and Pennings (2015) described variables such as risk perception and motivation are believed to be influential factors in the realm of investment. Risk is often linked to deviations from anticipated outcomes. likely, Ainia and Lutfi (2019) have documented that investors' decisions and the frequency of their commercial activities are notably affected by their perception of risk and their prior profit history. Wibowo, Indrawati, and Aisjah (2023) exhibit that investors' risk perception positively intervene on financing choices, which means that if an investor has a high-risk perception, they frequently reconsideration their speculation decisions.

H4: There is a positive relationship between Risk Perception and stock Investment decision-making

H5: Literacy Moderates the relationship between Risk Perception and stock investment decision-making.

### **2.10. The Moderating Role of Financial Literacy**

Quddoos, Rafique, Kalim, and Sheikh (2020) elucidated that financial literacy assumes a pivotal positive moderating role when positioned as an intermediary factor between investors' overconfidence and their decision-making processes (Ullah, 2015). Furthermore, their findings underscored that the inclusion of financial literacy as a moderator exerts a favorable influence on self-serving bias and investor choices, while concurrently exerting a mitigating effect on the impact of the illusion of control on investors' decisions Dinç Aydemir and Aren (2017) ascertained that financial literacy exercises a modulating effect on the correlation between investors' decisions and their proclivity towards embracing risky investment ventures. A comprehensive study, focusing on middle-class individuals residing in developing nations, sought to probe the repercussions of financial literacy on investment behaviors. The outcomes revealed that individuals endowed with financial literacy tend to allocate a more substantial portion of their investments toward assets, as opposed to conventional savings accounts. These financially enlightened individuals also display a higher propensity for utilizing credit cards. In contrast, it was discerned that financial literacy fosters enhanced proficiency in making sound financial decisions (Grohmann, 2018).

H5: Financial Literacy Moderates the relationship between Risk Perception and stock Investment decision-making

H6: The relationship between Overconfidence and Stock investment decision-making is moderated by Financial Literacy.

H7: The relationship between Herding and Stock investment decision-making is influenced by Financial Literacy.

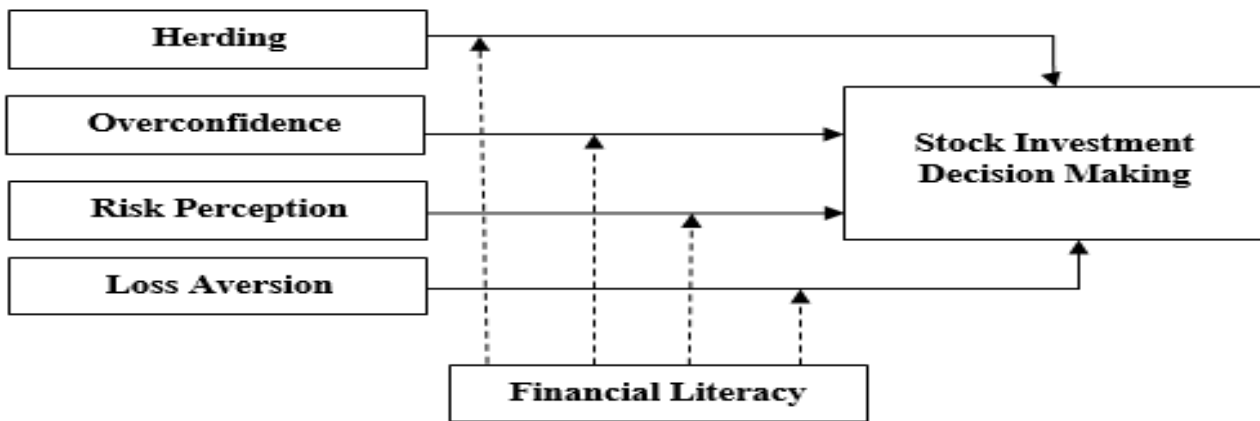
H8: The relationship between Loss Aversion and Stock investment decision-making is intervened by Financial Literacy.

### **2.11. Theoretical Framework**

The Prospect Theory by Kahneman (1977) is followed in this study model which is main theory. This theory is illuminating the behavior of investor toward investment in risk and uncertain environment. It describes how people actually perform action according to their observations (Altman, 2010). Most of the people are taking decision about investment in the perspective of own knowledge and intuition not much considering the presence of wealth. They observing the risk opportunities toward making investment decision and feel the investment can be loss than more profitable. The individual investor felt lot of pressure for taking decision in investment perspective and he/she would be felt more painful feeling after loss than pleasure of gain. Individual feels two times more panic feelings as compared to the pleasure-full feelings and celebrations after gain. Consequently, this theory explained the effects of loss aversion feelings of the individual which further create pressure on his investing behavior (Fisher & Dellinger, 2015). Based on this theory, this study formulates a theoretical framework. The purpose of this framework is to examine the effect of herding, overconfidence,

risk perception and loss aversion attitude of the investor for making decisions toward investment. This study will test how individuals feel during the investment decision making.

**Figure 1: Behavioral Factors**



### 3. Research Methodology

This section of the study explains the purpose, research design, sampling technique, target population, and setting. A quantitative study was conducted to analyze the impact of investors’ stock market decision-making. Data was collected from a non-probability random sample of (number) stock market investors in Lahore, Pakistan. A 30-item structured questionnaire was designed to ascertain the hidden links between the influencers and the target population. The target population of this study included both undergraduate and postgraduate investors from stock markets. The sample size of the present study was 165. This study examines the impact of Overconfidence, Loss Aversion, Risk Perception, and Herding Behavior as independent variables, with Financial Literacy as a moderating variable, and Stock Investment Decision Making as the dependent variable. The study used six major constructs, including Overconfidence, Loss Aversion, Risk Perception, and Herding Behavior, with Overconfidence being a construct on four dimensions. The overconfidence scale has been adapted from the study of (Areiqat et al., 2019). Herding Behavior is also constructed on four dimensions. The herding behavior scale has been adapted from the study of (Areiqat et al., 2019). Loss Aversion is constructed on five dimensions. Loss Aversion scale has been adapted from the study of (Areiqat et al., 2019). Risk Perception is constructed on six dimensions. Risk Perception scale has been adapted from the study of (Areiqat et al., 2019). Financial literacy is constructed on five dimensions. The financial literacy scale has been adapted from the study of (M. U. Khan, 2017). Investment decision-making is constructed on eight dimensions. The investment decision-making scale has been adapted from the study of (M. U. Khan, 2017).

### 4. Results and Findings

For assessing the measurement study model and structural equation model, this study used SMART-PLS program version 23.0, which is a variance-based technique for testing the study hypotheses. There is no need to test the normality distribution of data. Secondly, the study tested the direct and moderating effects of study variables on the dependent variable, which further examined whether the proposed hypotheses were supported or not.

#### 4.1. Measurement Model Assessment

After entering and managing the data, the measurement model of the study was assessed by testing the satisfaction of convergent and discriminant validities of the study model.

Table 1 presents the factor loading scores of each item of related constructs, Cronbach’s alpha, composite reliabilities, and average variance extraction of the study constructs. The factor loading scores of each item of the study variables are greater than 0.5, and the average variance extractions of each construct are also greater than 0.5. Additionally, Cronbach’s alpha values and composite reliabilities of each study construct are greater than 0.7. Therefore, the convergent validity of this study measurement model is satisfactory, and this study is eligible to test further result processes.

**Table 1: Convergent validity**

Variables	Items	FL	HB	ID	LA	OC	RP	$\alpha$	CR	AVE
Financial Literacy (FL)	FL1	0.891						0.865	0.904	0.654
	FL2	0.871								
	FL3	0.758								
	FL4	0.714								
	FL5	0.794								
Herding Behaviour (HB)	HB1		0.87					0.773	0.835	0.569
	HB2		0.906							
	HB3		0.629							
	HB4		0.549							
Investment Decision (ID)	ID1			0.874				0.908	0.932	0.732
	ID2			0.856						
	ID3			0.86						
	ID4			0.847						
	ID5			0.84						
Loss Aversion (LA)	LA1				0.903			0.918	0.942	0.803
	LA2				0.928					
	LA3				0.865					
	LA4				0.889					
Overconfidence (OC)	OC1					0.862		0.865	0.908	0.711
	OC2					0.884				
	OC3					0.826				
	OC4					0.799				
Risk Perception (RP)	RP1						0.632	0.799	0.867	0.623
	RP2						0.778			
	RP3						0.886			
	RP4						0.838			

Note:  $\alpha$  = Cronbach's Alpha, CR = Composite Reliability, AVE = Average Variance Extraction

**Table 2: Discriminant Validity**

Variables	Mean	SD	1	2	3	4	5
1. Financial Literacy	3.47	0.067					
2. Herding Behavior	3.63	0.054	0.474				
3. Investment Decision	3.87	0.043	0.683	0.508			
4. Loss Aversion	3.11	0.078	0.576	0.828	0.674		
5. Overconfidence	3.01	0.056	0.610	0.491	0.777	0.553	
6. Risk Perception	2.87	0.049	0.223	0.189	0.222	0.139	0.160

Note: Heterotrait-Monotrait Ratio (HTMT) values shown in the matrix

Table 2 presents the Heterotrait-Monotrait (HTMT) Ratio values of each study construct. If all the HTMT ratio values of each study variable are less than 0.90, then the discriminant validity of the study measurement model is satisfied. The HTMT ratio values of financial literacy with herding behavior (0.474), investment decision (0.683), loss aversion (0.576), overconfidence (0.610), and risk perception (0.223) are less than 0.90, indicating that the discriminant validity is true for the financial literacy construct. Similarly, the HTMT ratio of herding behavior with investment decision (0.508), loss aversion (0.828), overconfidence (0.491), and risk perception (0.189) are less than 0.90, indicating that the discriminant validity is also true for the herding behavior construct. Likewise, the HTMT ratio of investment decisions with loss aversion (0.674), overconfidence (0.777), and risk perception (0.222) is less than 0.90, indicating that the discriminant validity is true for the investment decision construct. The HTMT ratio of loss aversion with overconfidence (0.553), and risk perception (0.139) are less than 0.90, indicating that the discriminant validity is true for the loss aversion construct. Finally, the HTMT ratio of overconfidence with risk perception (0.160) is less than 0.90, indicating that the discriminant validity is true for the overconfidence construct. The overall values of HTMT ratios of all study constructs are less than 0.90, therefore the discriminant validity of this study measurement model is satisfactory. Consequently, this can precede further result analysis.

#### 4.2. Structural Equation Model

After analyzing the convergent and discriminant validities of the measurement model, the study aims to examine the direct and moderating effects of the study variables on the



dependent variable. The study will test the confirmation and non-confirmation of the assumed hypotheses.

### 4.3. Direct effects

**Table 3: Direct Relationship Analysis**

Paths	Beta	Standard Deviation	T-Statistics	P Values	Decision
LA → SIDM	0.396	0.039	8.788	0.000	H1 Supported
OC → SIDM	0.478	0.046	9.879	0.000	H2 Supported
HB → SIDM	0.215	0.029	5.763	0.001	H3 Supported
RP → SIDM	0.194	0.037	4.997	0.002	H4 Supported

Note: FL = Financial Literacy, SIDM = Stock Investment Decision Making, OC = Overconfidence, HB = Herding Behavior, LA = Loss Aversion, RP = Risk Perception

Table 3 reveals the direct relationships of study variables. Loss aversion (Beta = 0.396,  $p < 0.05$ ,  $t = 8.788$ ), overconfidence (Beta = 0.478,  $p < 0.05$ ,  $t = 9.879$ ), herding behavior (Beta = 0.215,  $p < 0.05$ ,  $t = 5.763$ ), and risk perception (Beta = 0.194,  $p < 0.05$ ,  $t = 4.997$ ) all have significant and positive effects on stock decision-making. Therefore, the first (H1), second (H2), third (H3), and fourth (H4) hypotheses are supported.

### 4.4. Moderating Effects

Table 4 indicates the moderating effects of the study variable. Results show that financial literacy has no significant moderating effect on the relationship between risk perception and stock investment decision-making (Beta = 0.022,  $p = 0.34$ ,  $t = 0.954$ ), so the fifth hypothesis (H5) is not supported.

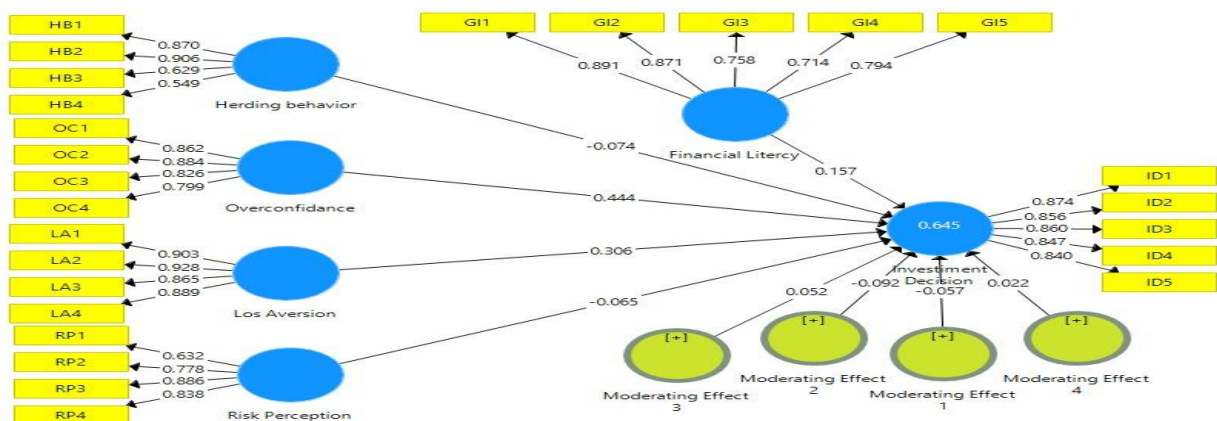
**Table 4: Moderating Effects Analysis**

Paths	Beta	Std Dev	T-Stat	P Values	Decision
FL*RP → SIDM	0.022	0.023	0.954	0.34	H5 Not Supported
FL*OC → SIDM	0.052	0.022	2.360	0.019	H6 Supported
FL*HB → SIDM	-0.057	0.027	2.076	0.038	H7 Supported
FL*LA → SIDM	-0.092	0.027	3.375	0.001	H8 Supported

Note: FL = Financial Literacy, SIDM = Stock Investment Decision Making, OC = Overconfidence, HB = Herding Behavior, LA = Loss Aversion, RP = Risk Perception, \* shown interaction/product of

However, financial literacy has a significant moderating effect on the relationship between overconfidence (Beta = 0.052,  $p = 0.019$ ,  $t = 2.360$ ), herding behavior (Beta = -0.057,  $p = 0.038$ ,  $t = 2.076$ ), and loss aversion (Beta = -0.092,  $p = 0.001$ ,  $t = 3.375$ ) with stock investment decision-making. Therefore, the sixth (H6), seventh (H7), and eighth (H8) hypotheses are supported.

**Figure 2: Path Analysis with Regression Coefficient Values**

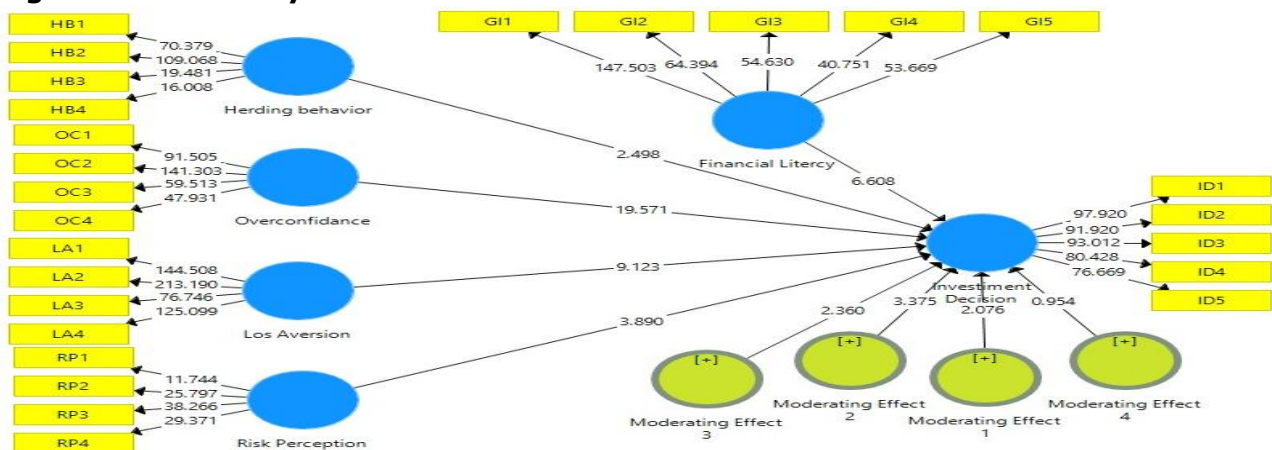


## 5. Discussion

The first objective of this study to examine the effect of overconfidence on stock investment decision. Consequently, the study proved the first study hypothesis such as overconfidence has a positive relationship with decision-making) and this result is consistent with previous studies (Adielyani & Mawardi, 2020; AHMED, Riaz, AQDAS, & Hassan, 2021; Chandra & Kumar, 2012; Tabassum, Soomro, Ahmed, Alwi, & Siddiqui, 2021; Yuwono & Elmadiani, 2021). They examined the significant relationships of overconfidence with the stock investment decision making. Consequently, the study proved the second study hypothesis

such as loss aversion has a positive relationship with decision making and this result is consistent with previous studies (Rooh & Hussain, 2022; Yusbardini & Natsir, 2022; Yuwono & Elmadiani, 2021). They examined the significant relationships of loss aversion with the stock investment decision making. Likewise, the study demonstrated that herding behavior has a positive relationship with decision making and this result is consistent with prior studies (Kizys, Tzouvanas, & Donadelli, 2021; Quddoos et al., 2020; Yuwono & Elmadiani, 2021). Moreover, to ascertain the effect Shah and Malik (2021) of Risk Perception on stock investment decisions. Later, such as herding behavior has a positive relationship with decision making and this result is consistent with previous studies (Bhattacharjee et al., 2020; Shah & Malik, 2021). Furthermore, to examine the moderating effect of financial literacy in between behavioral bias and stock investment decision-making. therefore, the study demonstrated that financial Literacy has a positive moderating effect on Behavioral Bias and stock investment decision making and this result is consistent with prior studies (Apochi, Ahmed, Okpanachi, & Agbi, 2023; Wijaya, Sembel, & Malau, 2023). They examined the significant relationships of financial literacy plays moderating effect with the stock investment decision behavior.

**Figure 3: Path Analysis with T-Statistics Values**



### 5.1. Practical Implications

The investors who possessed an overconfident attitude they have determined to make the investment decisions on their own and concluded that decisions taken by others could be characterized by emotions, envisage, and circumstances. Their notion is truly supported by their overconfident behavior and guides them that the choices and recommendations of others are illogical and aesthetic (Rachmatullah & Ha, 2019). The masses who possess herd behavior decide to abide by the actions of others owing to that they perceive it as more convenient. Consequently either one Investor or Institutional investor, investment decisions will intervene irrational attitude and emotion of the herd (P. Wang & Nuangjamnong, 2022). In the process of financial decision making the behavior of Loss Aversion cannot be acceptable. It induces one to truly oppose what investors are eager for; enhanced risk, with lower returns. investors need to take risks to enhance profits, not to mitigate losses (Areiqat et al., 2019). A high degree of Risk perception leads to lower equity investment and vice versa (Bhattacharjee et al., 2020). For the prosperity of the economy, investment is truly a significant tool.

### 5.2. Theoretical Implication

The Prospect Theory by Kahneman (1977) is followed in this study model which is main theory. This theory is illuminating the behavior of investor toward investment in risk and uncertain environment. It describes how people actually perform action according to their observations (Altman, 2010). Most of the people are taking decision about investment in the perspective of own knowledge and intuition not much considering the presence of wealth. They observing the risk opportunities toward making investment decision and feel the investment can be loss than more profitable. The individual investor felt lot of pressure for taking decision in investment perspective and he/she would be felt more painful feeling after loss than pleasure of gain. Individual feels two times more panic feelings as compared to the pleasure-full feelings and celebrations after gain. Consequently, this theory explained the effects of loss aversion feelings of the individual which further create pressure on his investing behavior (Fisher & Dellinger, 2015). Based on this theory, this study formulates a theoretical

framework. The purpose of this framework is to examine the effect of herding, overconfidence, risk perception and loss aversion attitude of the investor for making decisions toward investment. This study will test how individuals feel during the investment decision making.

### 5.3. Limitations and Future Directions

This study highlighted couple of limitations. Firstly, data was collected from individuals who may create common method biases problem. Secondly, the data sample size was too short so the sample size could be large. Thirdly, this study only was focused on few variables. In future, some important independent variables can be added such as capital investment, resources availability. There would also be taken an mediating variable such as knowledge acquisition about stock markets and other environmental and cultural variables be treated as moderator in this study in the future.

## 6. Conclusion

This study has been designed to examine the moderating effect of financial literacy between behavioral factors and stock investment decisions. This study highlights practical, policy, and management implications of factors affecting investor decision-making in the stock market. It includes overconfidence, herding behavior, risk perception, and loss aversion. Financial literacy moderates the relationship between these factors and stock investment decision-making. The data obtained from this study would be valuable for investors who are involved in the investment decision-making process, whether at an individual or institutional level. This knowledge would assist managers in making investment decisions and creating investment portfolios to achieve desired outcomes. This study's results help align investor behavior and attitude with their performance in emerging markets. It can improve investor performance by empowering them to make immediate decisions in an ambiguous environment under the influence of heuristic biases like overconfidence. It also supports great investment returns in a volatile financial environment like Pakistan. Financial literacy can help mitigate irrational behavior in investment decision-making.

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