

# Herding influencing Investment Decisions: A Systematic Review Using “PRISMA” Protocol

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## Abstract

The purpose of this study is to analyze the previous study made in the past related to an association between herding and investment decisions based on primary data. It also explores the various instruments used for measuring herd behavior and investment decisions made by investors. Data were collected from 2 databases (ScienceDirect, and Scopus) using PRISMA guidelines. The inclusion criteria for this systematic review were (i) publication date 2012 to 2022 (ii) published in the English language (iii) open access articles (iv) Based on primary data, etc. The findings of the study support that there is a significant relation between herding and investment decision. All of the studies show that there is a lack of female participants than male participants. Most of the primary data-based open-access studies were conducted in the Asian continent. There is a sampling bias found in many studies i.e., the studies employed non-probability techniques to collect samples. There is a chance that some of the important studies might be missed due to including only open access articles and limiting search terms. This study extends the current knowledge about the previous study being researched related to an association between herding and investment decisions. This systematic review provides a clear picture of gaps in the previous research which need to be bridged by new researchers.

**Keywords:** Herding, Investment Decision, Capital Market, Behavioral Factors, Behavioral Biases

*Paper type:* Review Article

*JEL Classification:* D91, G10, G4, G11, G41

## Introduction

Over the last few decades, it has been seen that researchers are interested to know investors' behavior in the capital market, especially about when and how the behavioral pattern impacted the stock prices and commonly considered market efficiency (Blasco, Corredor, & Ferreruella, 2011). This subject area captivated the researchers to know more about the behavioral pattern of investors in the market and give rise to a new field of study called behavioral finance. Behavioral finance is the study of how psychological factors influence the investment decision of investors (Shefrin, 2002). It is a subject that attempts to explain an investor's behavior through psychology (Baddeley, 2012). It emerges as a respective discipline because it not only provides various reasons for anomalies in the stock market but also justifies them with relevant explanations about various behavioral biases affecting the investment decision of investors (Sharma & Firoz, 2020). Behavioral finance proposes that the investment decision-making process is influenced by various types of behavioral biases motivating investors to take irrational decisions and also deviating from rationality (Niehaus & Shrider, 2014). According to Madaan and Singh (2019), the theory of rationality is based on two basic assumptions viz., an act of rationality and a rule of rationality. Here, act indicates an investor's choice to act in such a way that yields maximum returns whereas rule indicates the adoption of a mode of behavior maximizing expected returns. The earliest theory shows that the investors are rational targeting maximum profit at minimum cost by evaluating all the information available to them but with advancements in technology investment decisions became a very complex process because of the availability of large information to them as compared to the past (Qasim, Hussain, Mehboob, & Arshad, 2019). As investment decisions become complex in this era, investors behave irrationally because of distortion in perception, different situations, and wrong judgment (Abiola & Adetiloye, 2012). According to Statman (1999), individuals behave normally but not always in a rational manner.

Irrational behavior gives rise to various types of behavioral biases that influence the decision-making process of individual investors. Herding behavior is one among them. According to Dewan and Dharni (2019), herding has been put in the group of behavioral biases and biases are cognitive factors that influence investors' decisions in the financial market. Herd behavior appears in a market when investors opt to imitate other trading practices they considered to be better informed rather than acting upon their private information and beliefs (Lo, 1999); (Loewenstein, 2000). The impact of herding is obvious when individuals do what others are doing and oppose utilizing their data or setting an autonomous choice (Abdeldayem & Al Dulaimi, 2020). Keynes (1936), Suggested that professional managers will “follow the herd” if they are concerned about how others will access their own ability to make a sound judgment. Ample research has been already performed to explain the effect of herding in the stock market (Sharma & Kumar, 2019). The process of making investment decisions is crucial for investors as it brings either higher profit or heavy losses (Sarwar & Afaf, 2016). This systematic review article focuses on grasping the most important research performed in the past related to an association between herding and investment decision. This study will play a valuable role in bringing the important contribution made in the past by the researchers related to herding and investment decisions based on primary data in one place.

## Method

### *Eligibility Criteria*

All the studies assessing the Herding influencing investment decision of investors are included in the study. The inclusion criteria were (i) Articles/ Research Papers published between 2012 to 2022 (till date) (ii) Written in the English language (iii) Published

in scholarly peer-reviewed Journals (iv) Open-access articles (v) Articles/ Research Papers/ Research Articles only (vi) Based on Primary Data (vii) Subject covered: Accounting, Business, Economics, Econometrics, Finance and Management (viii) conducted an assessment of herding and investment decisions.

#### Information Sources and Search

A literature search was conducted on 28<sup>th</sup> February 2022, which included academic databases viz., ScienceDirect, and Scopus. Several searches in the above-stated electronic databases were conducted and after performing various trials and error the final search term for the study were (Herd\*) AND (Behavior) AND (Invest\*) AND (Decision) AND (Capital Market OR Equity Market OR Stock Market).

#### Study Selection and Data Collection Processes

After the initial literature searches conducted from various academic databases based on the title, abstract, and keywords of each study were screened and then the most relevant studies were further assessed for eligibility. The detailed information about the selection of the studies was presented in the PRISMA flow diagram (Fig.1) and refers (Pahlevan-Sharif, Mura, & Wijesinghe, 2019) and (Şalvarlı & Griffiths, 2021) for PRISMA guidelines.

#### Results

##### Study Selection

A total number of 1,240 studies were identified in the initial search process (ScienceDirect, n=428; and Scopus, n=812). After examining the title, abstract, and keywords of each study, (n=1216) studies were excluded from the study due to unsuitability for the present systematic review of the study. Consequently, the total number of studies selected for the full-text eligibility phase is 24. Out of the studies selected for the full-text eligibility phase (n=4) papers were excluded because it is based on secondary data, (n=1) excluded being study about the role of the pandemic in herding, (n=1) assessment of overconfidence, disposition effect, and media response on investment decision, (n=1) role of communication in herding and (n=1) role of overconfidence and past investment in herding. After excluding (n=8), studies included for systematic review are (n=16).

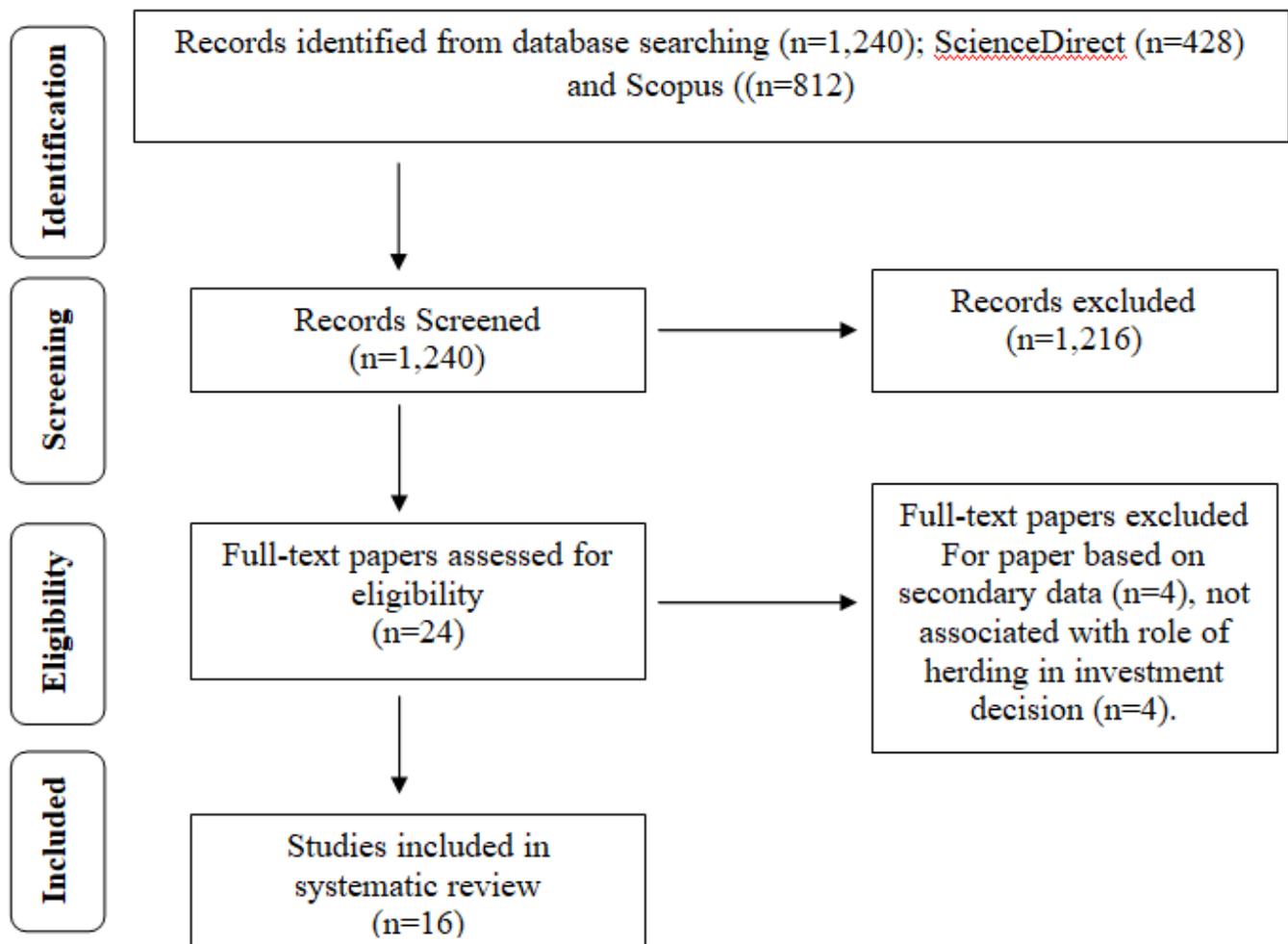


Fig. 1 PRISMA flow diagram of paper selection process used in the study

### Study Characteristics

The information related to general properties and major methodologies used in all the studies can be found in Tables 1, 2, and 3.

#### Country from which the Data collected for the study

As regards, the geographical characteristics of studies included for systematic review, six studies were from Pakistan (Ahmad F. , 2020); (Moueed & Hunjra, 2020) ;(Qasim, Hussain, Mehboob, & Arshad, 2019); (Rasool & Ullah, 2020); (Sarwar & Afaf, 2016) ; (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020), two from India (Madaan & Singh, 2019); (Sharma & Firoz, 2020), two were from Malaysia (Ahmad, Ibrahim, & Tuyon, 2018); (Bakar & Yi, 2016), one from Egypt (Hafez, 2021), one from Finland (Talwar, Talwar, Tarjanne, & Dhir, 2021), one from Hungary (Erdős, Papp, & Vörös, 2022), one from Indonesia (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020), one from Israel (Kudryavtsev, Cohen, & Hon-Snir, 2013) and one from Vietnam (Bui, Le, Quang, & Wong, 2021).

**Table 1: Major Characteristics of studies reviewed**

Authors	Country	Gender Distribution	Age Range/ Mean Age	Period of investment / Experience
(Ahmad F. , 2020)	Pakistan	68.69 % males	Range: Below 20 to Above 36 years	The dichotomous question, i.e., Yes or No
(Ahmad, Ibrahim, & Tuyon, 2018)	Malaysia	64.70 % males	Range: Below 30 to Above 49 years	Less than 3 years to up to 21 years
(Bakar & Yi, 2016)	Malaysia	54.5 % males	Range: 18 to Above 50 years	Less than 2 years to more than 11 years
(Bui, Le, Quang, & Wong, 2021)	Vietnam	69.41 % males	Range: 20 to 51 years	N/R
(Erdős, Papp, & Vörös, 2022)	Hungary	62.40 % males	Age Mean: 43.29 years	N/R
(HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020)	Indonesia	N/R	N/R	1 year to 10 years
(Hafez, 2021)	Egypt	81 % males	Range: 18 to Above 65 years	0 to more than 21 years
(Kudryavtsev, Cohen, & Hon-Snir, 2013)	Israel	78.05 % males	Range: 18 to Above 40 years	Less than 3 years to more than 10 years
(Madaan & Singh, 2019)	India	85.90 % males	Range: 18 to Above 35 years	Less than 5 years to more than 15 years
(Moueed & Hunjra, 2020)	Pakistan	N/R	Range: Above 25 years	More than 3 years
(Qasim, Hussain, Mehboob, & Arshad, 2019)	Pakistan	59 % males	Range: Below 20 to 40 years	N/R
(Rasool & Ullah, 2020)	Pakistan	77.77 % males	Range: Below 25 to Above 50 years	N/R
(Sarwar & Afaf, 2016)	Pakistan	80.70 % males	Range: Below 20 to Above 50 years	Less than 3 years to more than 10 years
(Sharma & Firoz, 2020)	India	73 % males	Range: 20 to Above 60 years	1 year to more than 7 years
(Talwar, Talwar, Tarjanne, & Dhir, 2021)	Finland	100 % males	Range: 24 years to 39 years	Should have experience
(Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020)	Pakistan	89 % males	Range: Below 19 to Above 60 years	Less than 3 years to more than 20 years

**Table 2: Sample size, characteristics, and instruments used in studies reviewed**

Authors	Sample size	Sample Characteristics	Instrument Used
(Ahmad F. , 2020)	396	Undergraduate and postgraduate students of Pakistan	Herding is measured by Devenow and Welch (1996), Lin (2011), Scharfstein and Stein (1990), Shefrin and Statman (1985, 1994), Sias (2004), Statman et al., (2006) questionnaire.
(Ahmad, Ibrahim, & Tuyon, 2018)	34	Fund managers working with asset management firms and Chartered Financial Analysts working as fund managers in Malaysia	Self Structured Questionnaire

(Bakar & Yi, 2016)	200	Individual investors of Klang Valley and Pahang, Malaysia	Herding is measured by adopting questionnaires of (Kengatharan 2014) and investment decision is determined by (Lim 2012).
(Bui, Le, Quang, & Wong, 2021)	85	Individual investors in Vietnam	Questionnaires by (Biais et al., 2005), Glaser and Weber (2007), Nosić and Weber (2010) were used with appropriate corrections for Vietnamese markets.
(Erdős, Papp, & Vörös, 2022)	117	Working adults	Experimental designs were prepared to collect profiles as well as data from the participants
(HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020)	220	Real estate auction investors at the State Assets and Auction Service Office.	Self Structured Questionnaire
(Hafez, 2021)	245	Small, medium, and professional individual investors of different brokerage firms in Egypt	Self Structured Questionnaire
(Kudryavtsev, Cohen, & Hon-Snir, 2013)	346	Professional portfolio managers and individual investors	Self Structured Questionnaire
(Madaan & Singh, 2019)	243	Individual investors in National Stock Exchange	Self Structured Questionnaire
(Moueed & Hunjra, 2020)	470	Individual investors in Pakistan Stock Exchange	Self Structured Questionnaire
(Qasim, Hussain, Mehboob, & Arshad, 2019)	100	Investors in Pakistan (Banks Employees and Individuals)	Herding bias is determined by adopting a four-item questionnaire by Nagoc (2013) and investment decisions are measured by using the five-item questionnaire by Aspra and Tikkanen (2011).
(Rasool & Ullah, 2020)	300	Individual investors in Pakistan Stock Exchange	Self Structured Questionnaire for Herding
(Sarwar & Afaf, 2016)	254	Individual investors in Lahore Stock Exchange	Self Structured Questionnaire
(Sharma & Firoz, 2020)	400	Individual investors in an equity market residing Mumbai region.	Herd behavior and investment decision were measured by adopting a questionnaire of (Lin, 2011).
(Talwar, Talwar, Tarjanne, & Dhir, 2021)	351	Millennial investors of Finland	Pre-validated scales were used by Baker et al. (2019); Barrafreem et al. (2020), Milgrom and Stokey (1982); Barber and Odean (2000) to measure herding and trading activity respectively.
(Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020)	348	Individual investors of Pakistan Stock Exchange	Herding is measured by adopting a questionnaire by Lin (2011) and investment decision making was determined by adopting a questionnaire by Mayfield et al. (2008).

**Table 3: Major findings, limitations, and risk of biases in studies reviewed**

Authors	Main Findings and Conclusion	Study Limitations	Risk of Biases
(Ahmad F. , 2020)	The results show herding behavior exists while investing investors. There is a positive effect of neuroticism personality on herd behavior. Negative emotions and extraversion are found significantly associated with herding. Researchers found that extroverts and social investors follow the investment pattern and advice of others. They also found that in an association between neuroticism personality and herding, there is a moderating effect of a risk-taking attitude. Risk-averse investors are more prone to follow the decision of other investors related to their investment decision.	Limited generalizability because only undergraduates and postgraduates students are included in the study as a sample. Real-time investment data is not used by researchers which failed to reflect the investment behavior of real-time investors.	Sampling bias because of the use of non-probability sampling techniques and samples were self-selected from two universities in Peshawar in Pakistan.
(Ahmad, Ibrahim, & Tuyon, 2018)	The study implies that fund managers commit behavioral biases with awareness of the repercussion and source. Further, researchers	Limited generalizability because of the very low sample size and self-	Sampling bias because of self-selected samples and lack of clinical

	found that in the open-ended questions asked from investors related to listing important fundamental, technical and behavioral information according to the priority of their investment analysis and portfolio management, herding in trade flow and opinion of ground staff is the most important behavioral information which affects the decisions of investors. The results indicate that both rational and irrational sources are referred to by fund managers before making investment decisions.	selected samples from Malaysia.	samples and measurement bias because of the use of general questionnaires.
(Bakar & Yi, 2016)	The researchers found that there is no significant impact of herding on investors' investment decision-making. Investors thought that while investing, simply following the crowd without identifying their personal needs and motive for investment is inappropriate.	Limited generalizability because of the low sample size and samples were selected only from Klang Valley and Pahang areas of Malaysia which do not exhibit the true and fair picture of investment decisions made by Malaysian investors as a whole.	Sampling bias due to the use of non-probability sampling techniques and self-selected samples were used in the study.
(Bui, Le, Quang, & Wong, 2021)	The finding of the study implies that herding is statistically significant and it means investors are affected by herd behavior. The result also shows that herd behavior has a positive impact on risk-taking. Investors who follow others' ideas tend to take less risk than others. Findings indicate that herding is exclusively useful for risk-taking decisions made by safe-oriented investors.	Limited generalizability because of the very low sample size and there is a lack of female participants.	Sampling bias is found because non-probability sampling techniques were used in the study and easily accessible samples by interviewing directly and through online mediums like Facebook and investors' forums are taken in the study.
(Erdős, Papp, & Vörös, 2022)	The result of the study shows that community-based signals and has the potential to influence the investors' investment decisions toward positive community-based signals. They also found that there is an importance of herding and social influence on investment decisions. They also found that additional community-based signals' positive or negative may not matter if both cognition-based and affect-based signals are positive or negative.	Limited generalizability due to small sample size. Participants were not financially motivated; it will be interesting to see whether they take the same decision in case of payment of incentive.	Sampling bias because non-probability sampling techniques were used in the study that is unrepresentative of the population.
(HALA, ABDULLAH, ANDAYANI, ILYAS, & ADOB, 2020)	The study found that herding is present in the decision made by investors while buying financial assets. They also found no adverse effect of financial literacy on herd behavior but financial literacy affects the investment decisions. The overall effects of herd behavior as an intervening variable strengthen the relationship and provide a negative influence between loss aversion and investment decision. Researchers also found that investment decision-making in financial assets is less complicated than investment decision-making in real assets.	Limited generalizability because the sample size is small. The entire samples selected for the study are male and female participants were ignored, which does not provide an overall fair picture of the investment behavior of the investors of Finland.	Sampling bias is due to the use of non-probability sampling techniques for collecting samples of the study. The samples were self-selected from the State Assets and Auction Service Office (KPKNL) South Sulawesi, Indonesia.
(Hafez, 2021)	Researchers of the study found that before that pandemic Covid-19 herding has a significant and positive impact on the investment behavior of the Egyptian investors. After Covid-19 there is no impact of herding behavior on the investment value of investors in Egypt. Researchers concluded that the theories of behavioral finance in the Egyptian Stock Market which is an emerging market and not an efficient market are	Limited generalizability because only 19 percent of female participants are included in the study which cannot be able to provide a true and fair picture of the investment behavior of Egyptian investors as a whole.	Sampling bias because data is collected through surveys by distributing the questionnaires and conducting interviews.

	valid before the pandemic Covid-19 and not valid after the pandemic Covid-19.		
(Kudryavtsev, Cohen, & Hon-Snir, 2013)	<p>Researchers found that investors behave consistently whether intuitively or rationally. Investors who are actively participating in the stock market exhibit a moderate herd behavior while making an investment decision. Investors having more experience consistently follow whether rational techniques or behavioral techniques while investing in the stock market. The result also implied that the correlation between behavioral factors is lower for female investors than male investors. The age of the investors is not found significant with behavioral factors influencing investment decisions of investors.</p>	Limited generalizability because the results do not exhibit a true and fair picture of Israeli investors as a whole due to the inclusion of lack of female participants.	Sampling bias due to self-selected professional portfolio managers and leading financial websites for online surveys.
(Madaan & Singh, 2019)	<p>The researchers found that there is a positive relationship between investment decision-making and herding bias. The investment decision-making of investors is significantly influenced by herding bias. The study emphasized that participants in the stock market are not rational in their decisions making and their choices for investment are also limited.</p>	Limited generalizability due to small sample size. The vast majority of samples are males and there is a lack of female participants.	Sampling bias because non-probability sampling techniques were used and the samples were self-selected.
(Moueed & Hunjra, 2020)	<p>The researchers found that there is a negative but significant relationship between herd behavior and investment decision-making. Herding behavior impacted the investment decision-making negatively as investors believed that others are doing right and they tended to follow the same. They found that herd behavior has a negative and significant relation with risk perception also.</p>	Findings only related to the Pakistan Stock Exchange and investors having 3 years of experience were included in the study, therefore limited generalizability, i.e., only for experienced investors.	Sampling bias because non-probability sampling techniques were used in the study. The authors excluded Day traders from the samples.
(Qasim, Hussain, Mehboob, & Arshad, 2019)	<p>The study found that there exist positive relationships between herding and investment decision. Regression Analysis has been performed by authors by controlling the demographic variables and found that herd behavior has a strong impact on the investment decision-making of investors. The reasons behind the herding bias of investors were they want to get maximum profit and to protect themselves from loss. It also depends upon the market performance.</p>	Low sample size so there is limited generalizability. There is sample heterogeneity in a very low sample size.	Sampling bias is due to the use of non-probability sampling techniques and easily accessible samples for the study.
(Rasool & Ullah, 2020)	<p>Authors observed that herding behavior exists in the stock market. Individual investors' investment decisions are affected by various behavioral factors and herding is one among them. The results indicated that the likelihood of biases in investment decisions made by investors reduces with an increase in the level of financial literacy. There is a negative and significant relationship between herding and financial literacy.</p>	Limited generalizability because the data for the study is restricted to Lahore and investors in Pakistan Stock Exchange only. There is a lack of female participants.	Sampling bias because of recruitment of only 22.23 percent of female participants and the maximum number of male participants.
(Sarwar & Afaf, 2016)	<p>Authors found with the help of Factor Analysis that the herd behavior contributes to the process of decision making of the investors; Regression Analysis also shows that herd behavior has an impact on the individual investor's decision making at Lahore Stock Exchange.</p>	<p>The sample size is small and limited generalizability because data were collected only from the participants in Lahore stock Exchange. Only 20 percent of female respondents were included in the study which limits the broader view of women regarding</p>	Sampling bias because non-probability sampling techniques were used in the study. The size of the data is also small.

		their decision-making at LSE.	
(Sharma & Firoz, 2020)	Authors of the study found that Investors are susceptible to behavioral biases as they are less financially alert in an emerging economy like India. They also found that herding bias has a significant relationship with the identification of demand of the investment avenues. They are prone to herd others' behavior while searching for the information related to the type of product in which they tend to invest.	Cross-sectional analysis of data has been done by researchers which raises the chances of transformation in investors' behavior in variable market situations. There is only 27 percent of females included in the sample of the study which limits the broad view of Women. It is also limited to a regional boundary i.e., the Mumbai region.	Sampling bias due to the use of a non-probability sampling technique and income below 3 lakh were excluded from the study.
(Talwar, Talwar, Tarjanne, & Dhir, 2021)	Herding is the most influential bias in the investment decision made by millennial investors. Researchers reveal that trading activity is increased due to higher herding behavior in the pandemic situation. Millennial investors were likely to buy more stocks as well as sell more stocks in a crisis if the other investors are doing the same. In the case of predicting recommendation intentions, herding behavior acts as a most important bias. They also observed that the behavioral bias influence is more in the case of investment decision-making related to trading activity than recommendation intentions. Researchers found the same outcome throughout the study because millennials during the pandemic consistently made stock buying and selling decisions.	The generalizability of the findings is limited to a broader population because the data for the study are only collected from Finland. The data of the study is restricted to only one gender i.e., male millennials.	Sampling Bias in the study due to the neglect of female participants. There is an existence of Common method bias in all the variables because those were collected in one wave through a single instrument.
(Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020)	Researchers found the existence of herd behavior in the Pakistan Stock Exchange. They found that there is a significant and positive impact of herding on investment decisions made by investors in the Pakistan Stock Exchange by copying the methods of others. Herding is mainly related to passive investors rather than active investors. They also found that behavioral investment type shows negative moderating participation between herd bias and investment decision.	The majority of samples are males and there is a lack of female participants. The investment behavior of females in the Pakistan Stock Exchange is somehow ignored.	Sampling bias exists because only 3 percent of females are recruited in the sample of the study and 7 percent are missing values and do not want to reveal their gender.

### ***Participants of the study***

This systematic review study consists of a total number of 4,109 participants. The majority of studies included male participants as compared to female participants. Maximum of the studies included adult samples (Ahmad, Ibrahim, & Tuyon, 2018); (Bakar & Yi, 2016); (Bui, Le, Quang, & Wong, 2021); (Erdős, Papp, & Vörös, 2022); (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020); (Hafez, 2021); (Kudryavtsev, Cohen, & Hon-Snir, 2013); (Madaan & Singh, 2019); (Moueed & Hunjra, 2020); (Qasim, Hussain, Mehboob, & Arshad, 2019); (Rasool & Ullah, 2020); (Sarwar & Afaf, 2016); (Sharma & Firoz, 2020); (Talwar, Talwar, Tarjanne, & Dhir, 2021) and (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020) apart from (Ahmad F. , 2020) whose study comprised student samples. Three studies include professional investors viz. professional portfolio managers (Kudryavtsev, Cohen, & Hon-Snir, 2013), fund managers and CFA working with asset management funds (Ahmad, Ibrahim, & Tuyon, 2018), and small, medium, and professional investors of brokerage firms (Hafez, 2021) and a study included millennial (Talwar, Talwar, Tarjanne, & Dhir, 2021).

### ***Operationalization of Herding and Investment Decision***

Operationalization of variables plays a crucial role in research because all variables cannot be easily measured and it also helps to make hypothesis clear and strong as well as standardize the variables being used in research (Tariq, 2015). It is a process of identifying specific measures to be used by researchers to evaluate the underlying concept (Rennison & Hart, 2019). Eight of the studies included in this systematic review adopted standardized instruments of different researchers to measure herding. The adopted instrument being used in previous studies (Baker, Kumar, Goyal, & Gaur, 2019); (Barber & Odean, 2000); (Barrafrem, Västfjäll, & Tinghög, 2020); (Devenow & Welch, 1996); (Kengatharan & Navaneethakrishnan, 2014); (Lin, 2011); (Milgrom &

Stokey, 1982); (Ngoc, 2013); (Scharfstein & Stein, 1990); (Shefrin & Statman, 1985); (Shefrin & Statman, 1994); (Sias, 2004); (Statman, Thorley, & Vorkink, 2006). One of the previous studies modified the standardized instrument (Biais, Hilton, Mazurier, & Pouget, 2005); (Glaser & Weber, 2007); (Nasic & Weber, 2010) and used it in the study after correction. Previous studies adopted standardized instruments to measure the investment decisions of investors (Aspara & Tikkanen, 2011); (Lim, 2012); (Mayfield, Perdue, & Wooten, 2008). One of the studies prepared an experimental design to collect the data (Erdős, Papp, & Vörös, 2022). All the remaining studies used self-structured questionnaires to measure the herding behavior as well as investment decision made by investors.

#### **Risk of Biases in individual studies**

Concerning the procedure of identifying the risk of biases, maximum studies found sampling bias due to using non-probability sampling techniques or/and including self-selected samples except three studies (Ahmad, Ibrahim, & Tuyon, 2018); (Rasool & Ullah, 2020); (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020) using combination of survey and Delphi method, multistage random sampling technique in 1<sup>st</sup> stage and random sampling technique in 2<sup>nd</sup> stage and random sampling technique respectively. Most of the studies collected more male samples than female samples except one study collected data from only male samples (Talwar, Talwar, Tarjanne, & Dhir, 2021). Some of the studies collected a very low sample size. Additionally, measurement biases were found in some of the studies being reviewed in this systematic review article due to using self-structured questionnaires and not performing the tool for checking the validity of the variables (factors) except performing Cronbach's alpha (Ahmad, Ibrahim, & Tuyon, 2018); (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020); (Hafez, 2021); (Kudryavtsev, Cohen, & Hon-Snir, 2013); (Madaan & Singh, 2019).

#### **Discussion**

This systematic review article identified the research papers published by eminent researchers in various academic journals examining herding behavior influencing investment decisions in the stock market. This systematic review also extracted various data from the previous studies that are being reviewed in the study including (i) country in which data were collected (ii) gender distribution (iii) size of sample (iv) main characteristics of samples (v) operationalization of herding and investment decision (vi) limitations in individual studies and (vii) risk of biases in individual studies.

In terms of geographical dispersion, most of the studies (n=13) were conducted in the Asian continent, and the rest of the studies were conducted in different continents. Among 3 studies 2 studies were conducted in the Europe continent (Erdős, Papp, & Vörös, 2022); (Talwar, Talwar, Tarjanne, & Dhir, 2021) and 1 study is Transcontinental i.e., African and Asian (Hafez, 2021). As the data related to gender distribution, the previous studies being reviewed in this systematic review show a similar pattern. It is identified that most of the studies comprise more male participants than female participants and one study included 100 percent male participants (Talwar, Talwar, Tarjanne, & Dhir, 2021). The sample size collected in the studies being reviewed ranges from 34 to 470. The majority of the studies included adult samples and individual investors from the general population except (Ahmad F. , 2020) comprises student sample and (Ahmad, Ibrahim, & Tuyon, 2018); (Kudryavtsev, Cohen, & Hon-Snir, 2013) comprises fund managers and CFA working in asset management firm and professional portfolio managers and individual managers respectively.

Related to the operationalization of herding and investment decision, many studies adopted standard measurement scales to measure herd behavior and investment decision of investors. Some studies included self structured questionnaire (Ahmad, Ibrahim, & Tuyon, 2018); (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020); (Hafez, 2021); (Kudryavtsev, Cohen, & Hon-Snir, 2013); (Madaan & Singh, 2019); (Moueed & Hunjra, 2020); (Rasool & Ullah, 2020); (Sarwar & Afaf, 2016). The majority of studies included in the systematic review used a validated questionnaire of (Lin, 2011) for herding behavior and different validated instruments adopted for investment decisions.

The major objective of this systematic review paper is to identify the primary data-based studies investing the relationship between herding and investment decisions. Results were confirmed by searching different databases that 16 studies were based on primary data and also have open access to examining the relationship between herding and investment decisions. Most of the studies found the existence of herding in investment decisions made by investors.

In respect of the relationship between herding and investment decision (Ahmad, Ibrahim, & Tuyon, 2018); (Ahmad F. , 2020); (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020); (Bui, Le, Quang, & Wong, 2021); (Rasool & Ullah, 2020); (Sharma & Firoz, 2020); (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020) studies found significant. (Madaan & Singh, 2019); (Qasim, Hussain, Mehboob, & Arshad, 2019) Studies found a positive relation between herding and investment decision. Moderate relation was found in (Kudryavtsev, Cohen, & Hon-Snir, 2013) study between herding and investment decision. A negative and significant relationship was found between herding and investment decision (Moueed & Hunjra, 2020). Previous studies also found a positive and strong impact of herding on investment decisions made by investors in the market (Madaan & Singh, 2019); (Moueed & Hunjra, 2020); (Qasim, Hussain, Mehboob, & Arshad, 2019); (Sarwar & Afaf, 2016); (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020). Out of these, a study found no significant impact of herding on investment decisions, investors simply follow the crowd without even identifying their own needs (Bakar & Yi, 2016).

(Ahmad F. , 2020) He determined the existence of herd behavior in investors' investment decisions. He also identified the relation of different types of personalities with herding. He found a significant association between herding with negative emotions and extraversion and a positive effect of neuroticism personality on herd behavior. There is a moderating effect of a risk-taking attitude between herding and neuroticism. (Ahmad, Ibrahim, & Tuyon, 2018) Their study identified fund managers also commit behavioral biases despite being aware of repercussions and sources. Herding in trade flow and the opinion of ground staff is the most important information that affects their decision while investing. Fund managers referred both rational as well as irrational sources before investing. The study is an exception among all the studies being reviewed in this systematic review article as it found no significant impact of herding on investment decisions made by investors (Bakar & Yi, 2016). The finding of the study implies that investors are affected by herd behavior and is statistically significant. Herd behavior also shows a positive impact on

risk-taking and concluded that investors following others' ideas tend to take a low risk (Bui, Le, Quang, & Wong, 2021). Community-based signals have the potential to influence the investment decision made by investors. There is an importance of herding as well as social influence on the investors' investment decisions. They also identified that additional positive or negative community-based signals may not matter if both cognition-based and affect-based signals are positive or negative (Erdős, Papp, & Vörös, 2022). The study found the presence of herding behavior prevails, and it influenced investors' financial decisions. They also add one more variable i.e., financial literacy in their study, and found no adverse effect of financial literacy on herd behavior but financial literacy affects investors' investment decisions. The investment decisions related to real assets are more complicated than financial assets (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020). This study shows amazing results that have been identified by the researcher; herding behavior positively impacted the investment decision of Egyptian investors before the pandemic Covid-19 but found no impact after the pandemic. The researcher concluded that theories of behavioral finance are valid in the Egyptian Stock Market before the pandemic Covid-19 but does not valid after the pandemic Covid-19 (Hafez, 2021). (Kudryavtsev, Cohen, & Hon-Snir, 2013) In their study, they not only exhibit investors' moderate herd behavior while investing but also identified that correlation between behavioral factors is higher for male than female investors. The Age of the investors is not significant with behavioral factors. There is a positive relationship between herding behavior and investment decision. Investors of the stock market are not rational and their choices are also limited (Madaan & Singh, 2019). The study found a negative but significant relationship between investment decisions and herding. They also found a negative and significant relation between herd behavior and risk perception (Moueed & Hunjra, 2020). The results were identified by controlling the demographic variables and found that there exists a positive relationship as well as a strong impact of herd behavior on investment decisions (Qasim, Hussain, Mehboob, & Arshad, 2019). Researchers in their study found the existence of herding behavior in the stock market. The investment decisions made by investors are affected by herding and also identified that with an increase in the level of financial literacy the likelihood of herding behavior while making an investment decision reduces (Rasool & Ullah, 2020). (Sarwar & Afaf, 2016) In their study, it is found that herd behavior contributes to the process of investment decisions made by investors in the stock market. (Sharma & Firoz, 2020) Their study identified that investors are susceptible to behavioral biases as they are less financially alert in an emerging economy like India. Investors are prone to herd behavior while searching for information related to the product in which they tend to invest and also found a significant relation between herding behavior and identification of investment avenues' demand. Herding behavior is the most influential bias among all the biases regarding the investment decision made by millennials. The trading activity in the market increased due to high herding behavior in the pandemic situation. In the case of predicting recommendation intentions, herding behavior acts as a most influential bias. They also observed that behavioral biases influence more in the case of investment decisions related to trading activity than recommendation intentions (Talwar, Talwar, Tarjanne, & Dhir, 2021). There exist a positive impact of herding behavior on investment decisions made by investors of the Pakistan Stock Exchange. They also identified that type of investment shows a negative and moderating association between investment decision and herding behavior. Herding behavior is mainly related to passive investors rather than active investors of the Pakistan Stock Exchange (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020). Regarding limitations in individual studies, mostly all of the studies show a problem of limited generalizability due to the inclusion of less percentage of female participants in the study. Only students sample were collected which limits the generalizability to a class of investors who were students (Ahmad F. , 2020). Only experienced investors having three or more years of experience are included in the study which limits the generalizability to only experienced investors' behavior (Moueed & Hunjra, 2020). Cross-sectional analysis of data had been done by researchers which raises the chances of transformation in investors' behavior in the variable market situations (Sharma & Firoz, 2020).

In respect of the risk of biases in individual studies, there is a high risk of sampling bias in all the studies being reviewed in this systematic review article. Apart from seven studies (Ahmad, Ibrahim, & Tuyon, 2018); (HALA, ABDULLAH, ANDAYANI, ILYAS, & AKOB, 2020); (Hafez, 2021); (Kudryavtsev, Cohen, & Hon-Snir, 2013); (Madaan & Singh, 2019); (Moueed & Hunjra, 2020); (Rasool & Ullah, 2020); (Sarwar & Afaf, 2016), all the remaining studies adopted standard questionnaire for collecting samples. Despite (Ullah, Elahi, Ullah, Pinglu, & Subhani, 2020) using random sampling, (Rasool & Ullah, 2020) multistage random sampling, and (Ahmad, Ibrahim, & Tuyon, 2018) combination of survey and Delphi method, all the other studies used non-probability sampling method to collect the data.

Therefore, further studies should utilize probability sampling for collecting the samples. Online surveys should be promoted for the collection of data as it reduces the cost, time, and social desirability of research. Female participants should be equally included with male participants to exhibit a true and fair picture of investors as a whole. Attention should be paid to aforesaid points to improve the worth of study in examining the association between behavioral factors and investment decisions.

#### **Limitation**

Despite, a thorough search across the databases (ScienceDirect, and Scopus), some of the important studies might be missed due to including only open access studies published in the English language. Selected search terms may also limit the broad view. Some of the important data might also be missed because my study included only Primary data-based research papers.

#### **Conclusion**

The findings obtained from this systematic review article are evidence of herding in investment decisions in the capital market. Previous studies provided a reference that, investors while making investment decisions undergo the process of herding. Investors do not always behave rationally because some irrational factors affect their decision-making process. Studies also identified the impact of herding on an investment decision. Further, a systematic literature review can be done by including more databases and secondary data-based research papers. Research should be undertaken by researchers to confirm the presence of herding in other markets and also suggest how to minimize the effect of herding on investment decisions.

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