



Study of Science Philosophy: Behavioral Bias and Investment Decisions

Andhi Wijayanto^{1✉}, Mugi Harsono²

¹Department of Management, Faculty of Economics, Universitas Negeri Semarang, Semarang

²Department of Management, Faculty of Economics and Business, Universitas Sebelas Maret, Surakarta

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Abstract

Objectives This paper aims to develop a theoretical and research framework by identifying behavioral biases in investment decisions and reviewing the existing literature in the field of behavioral biases related to behavior finance from the perspectives of ontology, epistemology, and axiology. This is because behavioral biases in management, and in particular financial management, remain an interesting research area. The study by Parveen, Satti, and Bashir (2021) demonstrates that heuristics and behavioral biases do exist and impact the decisions made by Pakistani investors during COVID-19. Pakistani investors have suffered a loss due to their faulty thinking. The Pakistani stock market exhibited features of dual process theory and prospect theory throughout this outbreak. Investors can employ both gut feelings and rational analysis. Since this study illuminates the impact of COVID-19 on emerging stock markets like Pakistan's, it contributes to the expanding body of scholarship on behavioral finance in developing nations.

INTRODUCTION

The field of behavioral finance seeks to explain why certain financial decisions are made rather than those recommended by traditional finance theory. In a brief, it is often believed that the movements of stock prices are governed by the expectations and actions of rational investors. Researchers in the field of behavioral finance are encouraged to reject the rule of rationality hypothesis due to its attractive simplicity and ability to accurately predict stock price fluctuations. Several investor biases are considered, and the extent to which stock price fluctuations affect investors' actions is quantified (Mittal, 2019).

To quote Eugene F. Fama (1965), in an efficient market, all market players have access to and use the most recent information; investors are rational; and the market price of securities can be predicted with high accuracy. To rephrase, an efficient market is one where the market price of a security closely reflects that security's true value.

The conventional financial paradigm relies around the concept of the rationality of investors. Nofsinger (2001) argues that financial markets have progressed on the assumption that investors are able to make unbiased predictions and sound decisions. The 2008 financial crisis, which caused

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✉ Correspondence Address:

Institutional address: Sekaran, Kec. Gunungpati

Kota Semarang Jawa Tengah 50229

E-mail: andhi.wijayanto@mail.unnes.ac.id

a worldwide recession, shook confidence in the international economic system to its very foundations.

By factoring in these visible, systematic, and very human deviations from rationality into the standard model of financial markets, behavioral finance reduces the stringency of the assumptions underlying traditional financial economics. The first bias occurs because of investors' innate propensity for overconfidence, and the second is caused by the second's target audience's natural need to avoid regret (Barber, 2011). To avoid rejecting stock market anomalies as "accidental results consistent with the market efficiency hypothesis," behavioral finance suggests explanations based on documented psychological biases (E.F. Fama, 1998).

Supporters of the efficient market hypothesis should not be threatened by the growing importance of behavioral finance. It's more of a test to see how much bearing with strange behavior can improve its realism. To do this, the decision-making process in financial markets is refined by including more individual factors. Numerous research have shown that actual investors will not act like stock market (Sharma & Sarma, 2022).

Objectives This paper seeks to develop a theoretical and research framework by identifying behavioral biases in investment decisions and by reviewing the existing literature in the field of behavioral biases related to behavior finance from the perspectives of ontology, epistemology, and axiology, which remain an interesting research area in the field of management, in particular financial management. One definition of behavioral bias is "a pattern of variance in judgment that occurs in specific settings," which can result in what is commonly referred to as "irrationality"

due to skewed or incorrect perceptions, assessments, or interpretations. Following this abstract are the paper's methodology, research results, and discussion.

LITERATURE REVIEW

According to H. S. M. Shefrin (1985) defines bias as a predisposition to make mistakes. Investors and their advisors may have better economic results and be able to reach their financial goals if they have a clearer understanding on the impact of behavioral biases on the investment process. Clients can be saved from potential financial collapse by simply identifying behavioral biases in a timely manner.

Focused research in particular areas makes an effort to classify bias according to a number of useful frameworks. Experts disagree on how best to categorize bias, with some grouping it according to the cognitive and emotional processes that underlie it, while others labeling it a heuristic or a set of beliefs, judgments, or preferences. Despite the usefulness of the taxonomy of bias for some types of study, there is still no generally recognized explanation of investor behavior. Research in the field of behavioral finance is predicated on a body of information that explains why people's economic decisions often fail (Pompian, 2006).

Studies in ontology are referred to as the study of essence. Metaphysics, which deals with the fundamental or basic, is discussed. The ontological part of behavioral bias is a discussion of what behavioral bias is and what factors into it. The following is a taxonomy of prejudice, with definitions and categories (Pompian, 2006),(Montier, 2002)

Table 1. Definition of Types of Behavioral Bias according to several researchers

Definition	Researcher
Overconfidence. Investors tend to think highly of themselves and believe they are more astute than their peers. Their return on assets is typically lowered as a consequence of their biases and the stocks they choose.	(T. Odean, 1998); (Statman, Thorley, & Vorkink, 2006)
Disposition effect. Too often, investors hold to worthless holdings for too long after they should have sold. In contrast, they frequently rush to sell off profitable investments. A theoretical framework for deciding when to sell winning stocks and whether to hold onto losing assets was established by Shefrin and Stateman (1985).	(H. S. M. Shefrin, 1985); (Ben-David & Doukas, 2006)
Anchoring Heuristic/ Confirmation bias. To have a preconceived opinion and then rely on information to back up that notion is confirmation bias. He forced them to modify future data to fit their perspective. The outcome is unfounded behavior on the part of investors, who are more likely to side with their strongly held beliefs than they would be with the knowledge and alternate opinions available to them.	(Slovic, 1971); (Pompain, 2006)
Under reaction and over reaction. Because security prices do not really adequately respond to news in the short term, this is known as under response. Positive feedback trading by overconfident investors, as well as the self-attribution confirmation bias, representativeness heuristics, and herding behavior, can all lead to overreaction to steady news trends.	Abarbanell, J.S. and Bernard, V.L. (1992)
Loss Aversion/ House Money Effect. There is a difference in how people react to winning and losing when they're both experiencing high levels of stress and anxiety. For the reason that people have varying responses to both profits and losses, this phenomenon occurs. When presented with a sure win, they'll take no chances, but if there's a chance of losing, they'll take more. Because of this, people place a higher importance on the certainty of loss than on the possibility of gain.	Arora, M. and Kumari, S. (2015),
Herd instincts. Most investors will follow the herd without questioning whether or not the group's decisions are sound. It's in our nature to act this way. Humans have a built-in urge to conform to the norms of their social group, which drives such an impulse. Wermers (1999) has done several significant research on the topic of herd behavior in financial investing choices.	(Wermers, 1999); (Salamouris & Gulnur Mura-doglu, 2010)
Hind sight biases. The "tendency to suppose" that one would have known that an actual event was coming before it happened, in case it was later or had cause to pay attention, is what Shiller (2000) calls "hindsight bias." Many investors mistakenly assume that they can forecast the outcome of certain events that occurred in the past. Incorrect causal links may be established due to such erroneous ideas or biases, leading to oversimplification.	(Shiller, 2000); (Seppälä, 2009)
Representativeness and Availability biases. The interest of investors is typically more focused on current events than on events that occurred even not too long ago. As a result, they fail to see the big picture because they are preoccupied with the here and now. After a successful venture, people tend to take more chances. The opposite is true; following a mistake, they become less risky. Individual investors choose stocks based on factors other than price, according to a hypothesis investigated by Odean and Barber (2002).	(Barber, 2002)
Self-Attribution biases. Individuals who are susceptible to self-attribution bias are more likely to take credit for favorable outcomes and blame others or circumstances for less favorable ones. In many cases, they use their prejudice for self-preservation or self-improvement. Overconfident investors with self-attribution bias may overtrade and underperform the market. The effect is explained in "Learn to be overconfident," a popular book written by comedians Ricky Gervais and Rosie O'Donnell that was published in 2001.	(S. G. T. Odean, 2001)

Many academics, from various perspectives and cultural or environmental contexts, have examined the impact of psychological bias on the decision-making and market efficiency of individual investors, and some of their findings are particularly relevant and important for this investigation. Below is a brief summary of some research done on heuristic biases (such as overconfidence, representative, restraint and adjustment, and availability biases), market efficiency, and financial decision-making.

The term "investment" refers to the action of putting money into something with the expectation of a future gain. The investment landscape is dynamic, but with diligence and focus, you can find success. All investors strive for the best possible returns on their investments (Sharpe, 1964).

(Merton, 1987) argues that having some background in finance is necessary for making optimal and logical investment decisions. Traditional approaches to finance presume that individuals always act rationally and in possession of full relevant data.

Behavioral finance is predicated on the idea that investors' decisions may be irrational due to factors such as limited rationality (Pompian, 2006), the presence of anomalies (Ajmal, Mufti, & Shah, 2011), the use of fundamental heuristics (Baker & Nofsinger, 2010), psychological bias (Baker & Nofsinger, 2002), and behavioral bias (H. Shefrin, 2007).

The cognitive theory of decision-making posits that people are susceptible to making irrational choices due to cognitive biases and heuristics (Bazerman, 1998). Using heuristics, or "rules of thumb," can cause detrimental cognitive biases. Cognitive biases, according to Bazerman, Giuliano, and Appelman (1984), are cherished convictions that aid in making tough choices.

To overestimate one's own intuitive thinking, judgment, and cognitive talents is an example of the cognitive heuristic bias known as overconfidence (Pompian, 2006). Overconfidence shows up when people exaggerate their abilities and knowledge (Bondt & Thaler, 1985). Overconfident people, as Pompian (2006) persuasively argues, "overestimate what they are not and underestimate what is."

Moore and Healy (2008) claim that people with overconfidence bias exhibit three characteristics: overestimation, over-assignment, and over-precision. When people overestimate their abilities, they pay more attention to their own opinions than to objective measures of success (Statman et al., 2006).

The decisions made and the results achieved by investors who are influenced by overconfidence heuristics are terrible. According to studies conducted by Bakar and Yi (2016), overconfidence bias has a major bearing on the choices made by investors. Overconfident investors trade more frequently, have less diversified portfolios, and generate poorer profits or returns than the market average because they fail to adequately account for risk (Baker & Nofsinger, 2002; T. Odean, 2002). Investors overestimate their own capacity to predict trends, as stated by H. Shefrin (2000).

Overconfidence leads to excessive trading in the stock market, which in turn leads to poor returns, as stated by T. Odean (2002). Overconfident investors, according to Trinugroho and Sembel (2011), trade more frequently than they should because they think highly of their own abilities and market expertise.

The cognitive heuristic bias known as representativeness includes making moral judgments based on preconceived notions or generalizations (H. Shefrin, 2005). To what extent does an event reflect the characteristics of its parent population is what is meant by the term "representativeness" (DeBondt & Thaler, 1995). Kahneman and Tversky (1974) People tend to put more stock in their most recent experiences and less in long-term averages due to the representative nature of sampling (Ritter, 2003). As a result of the representation, people make assumptions that are not realistic given the circumstances (H. Shefrin, 2008).

Both baseline neglect and sample size neglect can lead to a lack of representation. Investors who rely on beliefs rather than data in evaluating the potential outcomes of an investment are committing basic level negligence (Pompian, 2006). When a decision maker "erroneously concludes that a small sample size is indicative of the population" (Barberis & Thaler, 2003) or "tries to generalize based on too few samples," they are committing "sampling size neglect" (Pompian, 2006).

Some research on the topic of representativeness bias and investment decisions has established a positive association between the two; this suggests that, as a result of representativeness bias, investment decisions rise. Toma (2015) explored into how representative bias affected the choices of individual investors on the Romanian stock market and concluded that it was beneficial. Because of representativeness bias, he reasoned, individual investors' returns should rise. Similarly, Irshad, Badshah, and Hakam (2016)

discovered a favorable correlation between representation bias and financial decisions. Based on the findings of Ikram (2016), representation bias positively affects the decisions of individual investors who transact on the Islamabad stock exchange, leading to higher returns for those investors.

Although many studies have shown a positive correlation between representativeness bias and financial choices, other researchers have argued that this finding is invalid. This philosophical tenet serves as the study's theoretical anchor. Representational bias causes investors to act irrationally through trading errors and poor trading decisions (Ali Shah, Ahmad, & Mahmood, 2017). Companies make poor investments due to misrepresentation, say Lakonishok, Shleifer, and Vishny (1994). Additionally, it was discovered by Yaowen, Suqing, Zhang, and Tian (2015) that representativeness bias impairs decision making. Institutional investors' monetary decisions on the Nairobi Stock Exchange are influenced by representation bias, according to research by Waweru, Munyoki, and Uliana (2008).

When people put too much stock in information that is readily available to them, a cognitive heuristic bias known as availability bias emerges (Ngoc, 2014). For investors, this is what happens when they evaluate the possibility of a result based on how readily it comes to mind (Kahneman & Tversky, 1974). The availability heuristic is a method for estimating the likelihood of an event by considering how quickly applicable examples can be conjured (Brahmana, Hooy, & Ahmad, 2012). Investors afflicted by the availability heuristic are less likely to diversify their holdings, more likely to pick investments based on their ease of retrieval rather than the results of a careful options analysis, less likely to achieve optimal asset rationing, and less likely to choose alternative investments when they would be preferable.

Numerous studies have been published on the topic of availability biases and investment decisions, and some of them reveal a favorable association between availability biased and investment decision. According to research conducted by Ikram (2016) on the trading decisions of individual investors on the Islamabad Stock Exchange, the availability bias had a beneficial effect on

the investors' results. Investment decisions made by individual investors are significantly impacted by availability bias, as Khan (2015) discovered.

The premise for this study is the contention that the findings of some researchers contradict this viewpoint. Investment advisor Clark (2014) studies the impact of availability bias on investment decisions (How news can influence your investment decisions) and concludes that it has a detrimental impact on individual investors. According to research by Waweru et al. (2008), institutional investors trading on the Nairobi Stock Exchange are impacted by availability bias in their financial decisions.

The cognitive heuristic biases of retention and fitting reveal the human propensity to place too much weight on the first piece of information considered ("anchors") in a decision-making process. When making a decision based on preliminary data, investors employ anchors and change their expectations accordingly. When one makes a decision or series of judgements, they are all based on that initial decision; this might result in inaccurate or biased conclusions about subsequent information.

According to (Slovic, 1971), humans are exposed to biases known as anchoring and adjustment because they tend to base their estimations on a few key factors before making any necessary adjustments. The problem statement and preliminary computations can be used to perfect the initial values. Estimates derived from various starting points, according to Kahneman and Tversky (1974), are skewed toward the initial value. Anchoring is the term used to describe this behavior. Consequently, the tendency of individual investors to "anchor" their ideas or thoughts on logically irrelevant reference points can account for anchoring and adjustment bias (Pompian, 2006).

Decisions made by property fund managers are found to be significantly impacted by anchoring and modifications, according to research by Lowies, Hall, and Cloete (2016). Based on their findings, Ishfaq and Anjum (2015) conclude that anchoring helps people make less hazardous investments. Institutional investors' choices in the Nairobi Stock Exchange's financial markets are affected by retention and adjustment biases, according to study by Waweru et al. (2008).

The effects of anchoring and adjustment bias on individual investors' choices on the Ho Chi Minh Stock Exchange are detailed in a study by. Investment decisions made by registered property fund managers in South Africa are affected by anchoring and adjustment biases, according to research by Abraham, Hall, and Cloete (2014). Such partiality might cause mistakes in judgment and lost business opportunities.

The study of epistemological aspects related to the construct of behavior bias includes, among other things, the history of the emergence of behavior bias, theories of behavior bias, and principles of behavior bias. Here we present the theory developed by researchers based on research (Sharma & Sarma, 2022), as follows:

According to this idea, heuristics are effective and simple rules of thumb that can be used to explain how humans can make judgments, come to conclusions, and solve issues despite the presence of uncertainty or little data. While this rule of thumb is useful in many situations, it might cause people to make incorrect assumptions in other situations (Parikh, 2011).

The authors Tversky and Kahneman acknowledge the use of human heuristics in decision making. Heuristics, as defined by Tversky, are techniques that can be employed to solve many difficult issues but do not always result in the proper solution. It's a basic method for identifying obvious results (Tversky, 1981).

According to Brabazon (2000), heuristics are a form of decision making in which investors take a trial-and-error approach to learn on their own, eventually resulting in a rule-of-thumb framework. This is especially important in today's trading environment, where there is a deluge of data and a proliferation of tools. When opposed to more time-consuming methods like rational thought, heuristics let you make decisions more quickly.

The standard financial model does not account for the use of heuristics, and instead relies solely on rational tools for decision making, which can be both advantageous and disadvantageous (H. Shefrin, 2000).

Johnsson, Lindblom, and Platan (2002), propose the following theories under heuristic and prospect theory.

Table 1. Behavioural Finance Theories

No	Heuristics	Prospect Theory
1	Anchoring	Self Control and Regret
2	Overconfidence and Over Under reaction	Loss Aversion
3	Herd Behaviour	Mental Accounting

Although the taxonomy of bias is useful for some kinds of study, there is still no generally recognized explanation of investor behavior. The field of behavioral finance seeks to explain the limitations of human judgment in economic settings by analyzing a variety of empirical findings (Pompian, 2006).

Table 2. Types of Biases

No	Cognitive Biases	Emotional Biases
1	Hindsight bias	Loss Aversion Bias
2	Framing Bias	Regret Aversion Bias
3	Availability Bias	Status Quo Bias
4	Self Attribution Bias	Confirmation Bias
5	Overconfidence Bias	Self control bias
6	Representativeness Bias	Optimism Bias
7	Illusion of control Bias	Endowment Bias
8	Recency Bias	
9	Mental Accounting Bias	
10	Anchoring and Adjustment Bias	
11	Conservatism Bias	
12	Ambiguity Aversion Bias	
13	Cognitive Dissonance Bias	

A number of common behavioral biases might cause investors to make mistakes in their decision-making. To simplify things, heuristics allow people to make predictable, sub-optimal decisions in challenging and unpredictable situations. The same logic that accounts for systematic erroneous judgment also explains behavioral bias (Chen G., Kim K., Nofsinger J.R., & M, 2007). There are three main types of bias identified by (Montier, 2002).

Table 3. Taxonomy of Biases

No	Social Interaction	Self Deception (Limits to learning)	Heuristics simplification (Information processing errors)	
1	cascades	Confirmation Bias	Representativeness	Emotion/Affect
2	contagion	Overconfidence	Categorization	Ambiguity Aversion
3	Herding	Self Attribution Bias	Framing	Mood
4	Imitation	Over optimism, Illusion of control, Illusion of Knowledge	Anchoring/Salience	Self control
5		Hind sight Bias, Regret Theory, Cognitive Dissonance	Availability Bias, Cue competition, Loss Aversion, Prospect theory	

Behavioral Bias' Axiological Components

The axiological worth of scientific knowledge. This paper explores the ethical implications of using behavior bias, or the axiological side of behavior bias. A number of common behavioral biases might cause investors to make mistakes in their decision-making. To simplify things, heuristics allow people to make predictable, sub-optimal decisions in challenging and unpredictable situations. The same logic that accounts for systematic erroneous judgment also explains behavioral bias (Chen G. et al., 2007).

According to research conducted in the field of psychology, there are a number of distinct patterns of behavior that can be attributed to Bias while making decisions. Although the effects of biases like these are felt broadly, they are most noticeable in the realm of finance, and more specifically, investment. People's biases are often linked to the ways in which they evaluate information and make decisions (H. Shefrin, 2000).

METHOD

By gathering academic publications on herding behavior in the capital market, performing a critical evaluation, and integrating qualitative research findings, this study attempts to conduct a systematic review of the literature. The profile of heuristic bias research was also determined by a quantitative analysis performed in this study utilizing bibliometrics. When conducting bibliometric analysis, three main questions should be asked: Where can I find a copy of this article? What are some common search terms used to investigate heuristic bias? Which scientists have made the greatest contributions and had the biggest impact? Articles are sought out via internet databases as the first stage of a systematic literature review and bibliometric analysis.

Conceptual papers are separated from theoretical ones, while empirical studies are placed in a third group. According to our definitions, conceptual papers explain heuristic biases in investment decision making while empirical research uses evidence-based data to answer research questions. Finally, we classify as theoretical publications that use simulations or mathematical models to investigate heuristic bias rather than actual data collection.

By utilizing empirical publications, we were able to create a road map of the most commonly used terms in prior research for the bibliometric study. Overconfidence, representativeness, availability, anchoring, and adjustment were used in the Publish or Perish software to filter empirical studies; these terms had to appear in the study's title or abstract. Investing-related keywords are also used to narrow the scope and find the most applicable empirical research for this study. The following are some additional tests applied to empirical studies:

The first group consists of pieces that appeared between 2010 and 2022; The article has been submitted to Google Scholar.

To round out the research profile and describe the aspects of herding behavior, we conducted a comprehensive literature survey that included both theoretical and conceptual papers. We employ the snowball approach to get conceptual and theoretical research without restricting the year and publisher's name, in contrast to screening empirical research. After that, we sort them by how high a quote is. Even if an article isn't indexed in Google Scholar, we'll still consider it for inclusion in the literature review if it is highly cited by other scholars.

The primary screening led to the collection of 510 publications published between 2010 and 2022. The background of the investing deci-

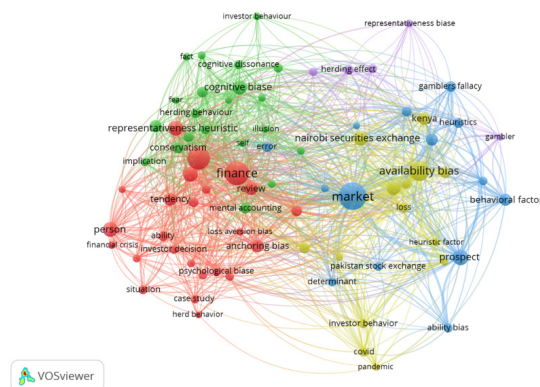
sions guided the reading and selection of articles. The following procedures were used to compile a comprehensive literature review based on the selected papers:

Methods, units, variables, countries, and empirical findings should all be given for each article.; Two, developing primary and secondary factors for herding in the financial markets.; Separate study variables into meaningful categories.; Create a mind map that illustrates how the various dimensions and sub-dimensions relate to one another

To thoroughly describe herding behavior in the capital market and explore research potential, the conceptual map results are used as the basis for a literature review.

We used VOS viewer's keyword analysis tool to draw a diagram of the most common terms describing herding. If the circle around the keyword is bigger, it means more attention has been paid to it. In this investigation, we restricted the use of keywords to appearances of four or more across all of the empirical papers analyzed. Figure 3 is a visual representation of a subset of the most common terms used in empirical studies on herd behavior.

Figure 1. Empirical research keyword analysis

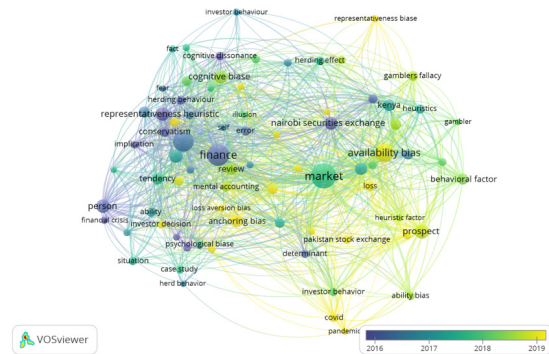


Researchers used a wide variety of approaches to codify concepts like "behavioral bias" and "investment choice" as keywords in their introductory analyses of scholarly works. Seven terms are used interchangeably. However, to streamline the investigation, we provide definitions for the phrases behavior bias and investment decision.

More commonly than investors' decision making, the term "biased conduct" is used in Figure 1. Additionally, these two keywords are connected to other aspects. In contrast to the representativeness heuristic, confirmation biases, market and availability biases, which are more strongly associated with the term investors decision

making, the keywords behavior biases have a stronger association with these concepts. This link indicates that experiments are a common place to test hypotheses on heuristic bias and financial choices.

Figure 2. Keywords that often appear based on the year of observation.



Timeline of the evolution of empirical studies on bias behavior is presented in Figure 2. (see the bar line in the lower right corner). Since far before 2017, researchers have been interested in bias. Common terms from this time frame include behavioral factors, the securities market in Kenya, optical illusions, and surveys. Indeed, at the outset of bias's popularity, researchers tended to use the phrase behavioral component, and surveys were frequently conducted on the Kenyan stock exchange. The focus of empirical research on bias behavior has shifted this year, with new studies focusing on specific forms of bias such as herding, overconfidence, anchoring, and availability bias. In the years between 2020 and 2022, a lot happened, covering a wider range of subjects. During this time, empirical study on biased behavior was linked to risk perception, financial literacy, and moderating factors, in addition to market conditions.

Analysis of reference citations based on papers having at least five joint citations resulted in five categories to help detect trends in the literature on behavioral bias variables influencing investing decisions (see table 4). These categories are as follows: (1) the influence of herd mentality on relationships between anchoring bias, behavioral bias, and confirmation bias; (2) the impact of herd mentality on relationships between individual investment decisions; (3) the influence of behavioral factors and the behavioral likelihood effect on individual investment decisions; (4) the influence of behavioral factors on investors' behavior; and (5) the influence of the herd mentality on gamblers' motivations.

Table 4. Keyword analysis that often appears based on clusters

No	Cluster 1	Cluster 2	Cluster 3	Cluster4	Cluster 5
1	Ability	Adjustment	Ability bias	Availability bias	Gambler
2	Analyst	Cognitive biase	Behavioural factor	Behavioural factor	Herding Effect
3	Anchoring bias	Cognitive dissonance	Behavioural biases	Confidence	Regret aversion
4	Behavioural bias	Conservatism	Determinant	Covid	Representative-ness bias
5	Case study	Control	Error	Heuristic factor	Self attribution bias
6	Confirmation bias	Empirical study	Gamblers fallacy	Information	
7	Finance	Example	Heuristic	Investor behaviour	
8	Financial crisis	Fact	Individual investment decision	Kenya	
9	Financial decision	Fear	Investment performance	Loss	
10	Financial decision making	Herding behaviour	Market	Nairobi securities exchange	
11	Financial market	Hindsight bias	Pakistan stock exchange	Pandemic	
12	Group	Illusion	Prospect	Retail investor	
13	Herd behaviour	Implication	Self attribution	Risk aversion	
14	Herding bias	Investment behaviour	Suvey	Stock invest-ment decision	
15	Investor decision	Investor behaviour			
16	Literature	Investor sentiment			
17	Loss aversion bias	Literature review			
18	Person	Mental accounting			
19	Psychological bias	Regret			
20	Psychological factor	Risk perception			
21	Representative heuristic	Self			
22	Review				
23	Situation				
24	Tendency				

Indicative of a researcher's stature is the frequency with which his or her works are cited by other scholars. Following this, we will show you the top citation rates for each category of work as of December 3, 2022. Since Google Scholar incorporates citations from both Scopus and other databases, including the most recent ones, we use it to compile our citation counts.

According to Table 5, Nofsinger (2017) has the most citations, followed by Bakar (2017) and Yi (2017). (2016). The high number of citations suggests that this study is of greater scientific significance to the scientific community as a whole.

Summary and Proposed Research Directions

We conclude that there is a strong relationship between four clusters based on a review of the current literature and clusters obtained from joint citations of the 998 documents in the sample: (1) anchoring bias, behavioral bias, and confirmation bias in relation to investment decisions; (2) the impact of herd behavior in the investment decision relationship; (3) behavioral factors and behavioral factors towards individual investment decisions; and (4) behavioral factors towards institutional investment decisions.

Table 5. Top 10 most cited article

No	Author/year	Journal	Cited count	Title
1	JR Nofsinger/ 2017	Tylor Francis	786	The psychology of investing
2	S Bakar, ANC Yi/ 2016	Procedia Economics and Finance	256	The impact of psychological factors on investors' decision making in Malaysian stock market: a case of Klang Valley and Pahang
3	L Kengatharan, N Kengatharan/ 2014	Asian Journal of Finance & ...	250	The influence of behavioral factors in making investment decisions and performance: Study on investors of Colombo Stock Exchange, Sri Lanka
4	T Dinev, AR McConnell/ 2015	Information Sys- tems ...	238	Research commentary—informing privacy research through information systems, psychology, and behavioral economics: thinking outside the “APCO” box
5	MM Pompian/ 2012		203	Behavioral finance and investor types: managing behavior to make better investment decisions
6	LTB Ngoc/ 2014	International Jour- nal of Business and Management	169	Behavior pattern of individual investors in stock market
7	N Chater, S Huck, R In- derst/ 2010	Report to the Euro- pean Commission ...	168	Consumer decision-making in retail investment services: A behavioural economics perspective
8	HK Baker, S Ku- mar, N Goyal, V Gaur/ 2018	Managerial Finance	148	How financial literacy and demographic variables relate to behavioral biases
9	SA Zahera, R Bansal/ 2018	Qualitative Re- search in Financial Markets	144	Do investors exhibit behavioral biases in investment decision making? A systematic review
10	SZA Shah, M Ahmad, F Mahmood/ 2018	Qualitative Re- search in Financial ...	131	Heuristic biases in investment decision-making and perceived market efficiency: A survey at the Pakistan stock exchange

The results of the study conducted by Parveen, Satti, and Bashir (2021) show that heuristics and behavioral biases do exist and have an effect on the choices made by Pakistani investors during COVID-19. As a result of this cognitive bias, Pakistani investors have lost money. During this pandemic, the Pakistani stock market also showed evidence of dual process theory and prospect theory. Both intuitive and logical frameworks are used by investors. This research will add to the growing body of literature on behavioral finance in developing nations, as it has shed light on the effect of COVID-19 on developing stock markets like Pakistan's.

Applying the findings to other developing economies like India, Indonesia, Korea, and Malaysia is possible. The structure, liquidity, risk, culture, investor values, income, and development stage legislation and regulations of a given emerging market are all the same. Since investors in these countries are relatively immune to risk, the study's findings should be applicable to investors in other emerging economies (Parveen et al., 2021).

Academics, researchers, and policymakers in underdeveloped countries will benefit from this study's conclusions. New behavioral models that describe solutions for dealing with uncertain situations like COVID-19 can be developed by academics, while crisis management strategies can be developed by policymakers using concepts from the field of behavioral finance to help deal with future events like COVID-19 and mitigate the financial losses they cause.

The Securities and Exchange Commission plays a crucial part because of its function in policing the financial sector. In times of crisis, the adaptive market hypothesis can be used to create seminars where investors can learn how to balance irrational and logical decision making. Lo (2004). include all possible market abnormalities and behavioral and heuristic biases. It's also limited to a single nation. The effect of COVID-19 on investor confidence may be studied in the future through the lenses of market anomalies, sex, income, and level of financial literacy. The same framework can be used to compare research study results across different emerging markets.

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