

# Cognitive biases and financial decisions of potential investors during Covid-19: an exploration

Financial  
decisions of  
potential  
investors

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## Abstract

**Purpose** – This paper aims to identify, examine, and present an empirical research design of behavioral finance of potential investors during Covid-19.

**Design/methodology/approach** – A well-structured questionnaire was designed; a survey was conducted among potential investors using convenience sampling, and 200 valid responses were collected. The research work uses multiple regression and discriminant function analysis to evaluate the influence of cognitive factors on the financial decision-making of investors.

**Findings** – Recency and familiarity bias are proven to have the highest significant impact on the financial decisions of investors followed by confirmation bias. Overconfidence bias had a negligible effect on the decision-making process of the respondents and found insignificant.

**Research limitations/implications** – Covid-19 is a temporary phase that may lead to changes in financial behavior and investors' decisions in the near future.

**Practical implications** – The paper will help academicians, scholars, analysts, practitioners, policymakers and firms dealing with capital markets to execute their job responsibilities with respect to the cognitive bias in terms of taking financial decisions.

**Originality/value** – The present investigation attempts to fill the gap in the literature on the intended topic because it is evident from literature on the chosen subject that no study has been undertaken to evaluate the impact of cognitive biases on financial behavior of investors during Covid-19.

**Keywords** Financial decisions, Cognitive biases, Recency, Confirmation, Familiarity, Overconfidence, Covid-19

**Paper type** Research paper

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Our guidelines make it clear that anyone who made a significant contribution to the paper must be included as an author at submission.

B.C.M. Patnaik, Ipseeta Satpathy, and Suresh Kumar Sahoo have been included as authors in the online version of this paper.

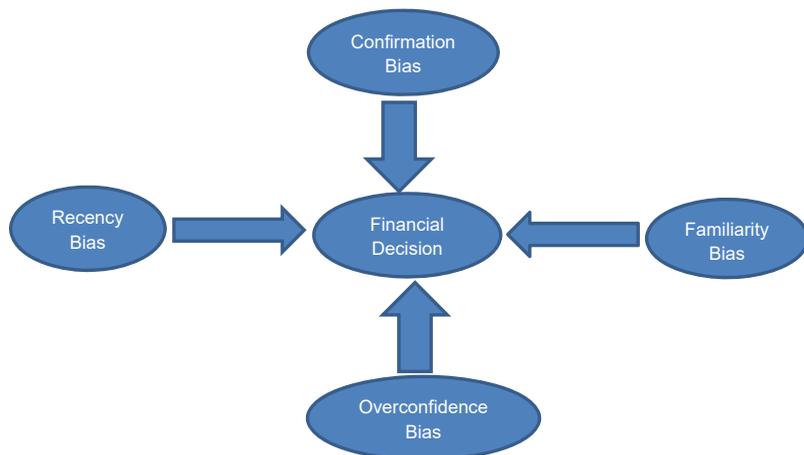


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## 1. Introduction

Investors scout for opportunities in various sectors to construct optimal portfolios. Therefore, they tend to be careful and invest in a planned manner to earn decent profits in competitive markets. Their behavior towards investment is either rational or irrational, depending on the different school of thought followed. Financial theories cannot explain investors' aberrations when making investment decisions (Chang, 2008). Hence, equal attention may be paid to behavioral finance. This explains how cognitive bias influences investors' decision-making processes. Cognitive biases profoundly impact financial behavior and decisions (Chaudhary, 2013). This study examines the influence of selected cognitive biases on investors' financial decisions, namely recency, familiarity, confirmation, and overconfidence. Recency bias leads investors to make financial decisions based on recent occurrences rather than historical ones. This occurs when information about the immediately occurring stimuli forms the premise of the expected outcome of the next stimuli (Kalm & Norris, 2018). Investors affected by familiarity bias make financial decisions about how a particular investment choice is known to them. It determines the penchant of investors to make secured investments with hard-earned money (Speidell, 2009). Confirmation bias is the search for data that supports an individual's preconceived notions and beliefs (Nickerson, 1998). Overconfidence bias leads to the consideration of deceptive data and makes investors believe that they are better than others, leading them to overestimate their capabilities and success quotient (Čuláková, Kotrus, Uhlířová, & Jirásek, 2017). Covid-19 has made the situation around us more uncertain. Hence, this study attempts to explore cognitive biases and financial decisions within the limits of Covid-19 (see Figure 1).

The data collected for this study has been utilized to investigate whether the above-mentioned biases share a significant relationship with financial decisions taken by investors in India during Covid-19. The motivation of this study is based on the fact that despite of several pioneering research work on behavioral finance in the world, the focus in India has always mostly remained on traditional finance and its theories which are relevant but do not capture the whole essence of investor behavior. The work on literature review suggests behavioral finance in India has majorly been examined in the pre-Covid period and work in the post-Covid period is limited. These works also do not highlight the need for a deeper investigation of behavioral finance and cognitive biases. Thus, academicians, scholars, practitioners, financial analysts, policymakers, investment firms, and banks do not



**Figure 1.**  
Conceptual framework

**Source(s):** Authors' Work

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appreciate the significance of behavioral finance and the gain/loss they incur by not customizing portfolios for clients based on their mindset. It is contended that investors and firms that implement behavioral finance theories are more likely to stay relevant in the field of investment. This study is therefore, expected to contribute a new perspective to the existing literature with the purpose of identifying, examining, and presenting an empirical research design of behavioral finance of potential investors during Covid-19. It is divided into five sections. [Section 1](#) is the introduction and [section 2](#) elaborately explains the existing literature, conceptual framework, and hypotheses development on this subject matter. [Section 3](#) explores the research methodology inculcates in analyzing the data collected for the study. [Section 4](#) discusses the data analysis and results of the study. Finally, [section 5](#) depicts the conclusions, implications, limitations and suggestions for future research.

## 2. Significance of the study

Investors are indecisive about their financial choices because of several cognitive biases. This study will be immensely helpful to individual investors as well as financial institutions such as brokerage firms, banks, and retail investors. It also aims to study the behavior of future investors, which will aid analysts in constructing a robust portfolio for their clients.

## 3. Research objective

To examine the influence of cognitive biases on investors' financial decisions during Covid-19.

## 4. Literature review, theoretical framework, and hypotheses development

The decision-making process is complex and influenced by many internal and external factors. Behavioral factors contribute to the choice of multi-baggers in the Indian securities market ([Chauhan, Gupta, & Gupta, 2022](#)). Indian investors prioritize ESG factors that influence their investing decisions ([Sood et al., 2023](#)). Halal standard implementation in the Palestinian food sector is a major driver of its financial and stock market performance ([Amer, 2023](#)). Review work conducted on existing literature indicated diverse opinions on the kind of relationship recency, familiarity, confirmation, and overconfidence bias shared with financial decision-making.

Behavioral biases including recency bias significantly influence Indian investors' financial decision-making process ([Jain & Kesari, 2022](#)). Recency bias overpowers experience and complexity while making financial decisions ([Arnold, Collier, Leech, & Sutton, 2002](#)). Recency bias is proven to have a profound effect on investment decision-making ([Sulistiawan & Wijaya, 2015](#)).

South African investors prominently showcase familiarity bias while choosing companies for investment purposes ([Vries, Erasmus, & Gerber, 2017](#)). Familiarity bias significantly negatively impacts investors' portfolio diversification decisions ([Nurcahya & Dewi, 2021](#)). Investment decision-making is significantly influenced by familiarity bias among investors ([Rosyidah and Pratikto, 2022](#)).

Confirmation bias has a statistically significant but deleterious impact on the development of behavioral biases during financial decision-making ([Weixiang, Qamruzzaman, Rui, & Kler, 2022](#)). It is the most recurrent bias among professionals while making an investment choice ([Berthet, 2022](#)). The financial decisions of investors have a negligible but significant effect by confirmation bias ([Sharma & Kumar, 2022](#)).

Investors are overconfident about their investment decisions, skills, knowledge, ability to choose stocks, control of the portfolio, future investment plans, and stock market information for which they require multiple approaches ([Trehan, 2016](#)). Overconfidence bias has a significant positive influence on the investment decisions of Pakistani investors ([Riyaz & Iqbal, 2015](#)). There is a positive relationship between overconfidence bias with a mediating role of risk tolerance corresponding to financial decision-making ([Mallik, Hanif, & Azhar, 2019](#)).

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The authors attempt to study the available literature holistically and cover the existing work related to recency, confirmation, familiarity, and overconfidence bias (Trehan & Sinha, 2021; Trehan, 2016).

#### *4.1 Theoretical framework and hypotheses development*

Decision Theory describes the freedom with which a person takes a decision. It deals with the behavior that leads to choosing one option over the other and achieving one's pre-determined goal. There are two types of decision theories namely, normative and descriptive. Normative decision theory explains how a decision should be made, and descriptive decision theory emphasizes various factors that contribute to decision-making (Hansen, 1994). Behavioral and psychological theories also influence the human decision-making process. Behavioral reasoning theory (BRT) is an innovative theory that explains how beliefs, reasons, motives, intentions, and behavior determine the decisions of an individual (Sahu, Padhy, & Dhir, 2020). Behavioral finance is an extensive branch of finance that studies the influence of human behavior on finance and financial decision-making. It analyzes the psychological and sociological impact on human beings based on their behavior and mind (Bikas, Jureviciene, Dubinskas, & Novickytė, 2013). It integrates cognitive psychology with finance and restricts traditional finance theories to determine the irrational financial decision-making of an individual (Chauhan *et al.*, 2014). Individuals use shortcuts called Heuristics to make decisions in complex and uncertain situations (van Noordt & Misuraca, 2022). Cognitive and psychological biases affect all human beings' behavior and decisions, including investors (Ady, 2018). This led the researchers to investigate the behavior of investors in investing regarding cognitive and psychological biases.

*4.1.1 Financial decision and recency bias.* Belief-adjustment theory examines the sequence in which information is presented to determine the existence of recency bias in the decision-making process of an investor. It indicates a mix of good and bad news when presented in sequence, leading to recency bias in an investor's financial decisions (Hogarth & Einhorn, 1992). Recency bias occurs when investors change their initial beliefs and make subsequent decisions based on new information at their disposal (Hogarth & Einhorn, 1992). This is the change in the financial behavior and decisions of an investor when the initial belief is changed by new information (Hartono, 2004). Recency bias attracts investors' attention to the latest information (Nasution & Supriyadi, 2017). The sequential presentation of information leads to recency bias among investors and affects their financial decisions (Aprayuda, Misra, & Kartika, 2021). Recency bias is more effective among female investors than male investors (Onsomu, 2014). Investors showcase changes in behavior and financial decisions based on the training and knowledge they obtain. Behavioral changes have been observed in knowledgeable and trained investors (Dilla & Steinbart, 2005). It exists in financial markets and is highly influential on investors' decision-making processes (Alvia & Sulistiawan, 2010). It has the highest impact on investors' financial decisions (Bashir, Ilyas, & Farrukh, 2009). Investors have a strong inclination to be prone to recency bias, which has a high impact on their behavior and financial decisions (Lathe, Jain, & Anand, 2020). It has a substantial impact on investors' financial decision-making processes (Zahera & Bansal, 2018). Recency bias exists among Indian investors if there is any change in the shareholding pattern of a stock (Singh, Bala, Dey, & Filieri, 2022). It plays a prominent role in investment decision-making as investors react based on the latest published research articles on capital markets and stocks (Bihari, Dash, Kar, Muduli, Kumar, & Luthra, 2022). Psychological biases like recency bias have a crucial influence on investors' investment decisions in the state of Maharashtra, India (Tupe & Lokhande, 2021). Indonesian investors exhibit recency bias upon receiving any important capital markets or stock-related pieces of information in the middle of the trading process (Armansyah *et al.*, 2022). Arab investors are significantly affected by recency bias while deciding on an asset allocation that impacts the ability of a portfolio to generate long-term returns (Pradhan, 2021). Recency bias based on accounting information,

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firm-image co-incidence, and neutral information impacts the investment decisions of Indian investors (Sachdeva, Lehal, Gupta, & Garg, 2022). Investor Cognitive Psychology, Market Information, and Stock Characteristics lead to recency bias resulting in massive herding among investors in India (Sachdeva, Lehal, Gupta, & Gupta, 2023).

Reviewing the above-related literature, the authors found a gap in justifying the impact of recency bias on investors' financial decisions. Hence, we propose the hypothesis:

*Ha1.* Recency bias has a significant impact on investors' financial decisions during Covid-19.

*4.1.2 Financial decision and familiarity bias.* Investors exhibit familiarity bias when they choose stocks of acquainted companies (Vries *et al.*, 2017). It exists among investors and affects their financial decisions when buying stocks in the market (Bashir & Maqsood, 2018). It is prevalent among investors and influences their financial decision-making processes, as evidence indicates that familiar investments are preferred by them (Cao, Han, Hirshleifer, & Zhang, 2011). Geographical location and gender also lead to familiarity bias and its impact on investors' financial decisions. It is highest in the USA and lowest in Asia (Levy, Frethey-Bentham, & Cheung, 2020). Authors found financial decision familiarity bias among American investors and U. S-grown companies (McAndrews, 2017). The authors identified that familiarity bias significantly affects investors' financial decisions in Egyptian markets (Metawa, Hassan, Metawa, & Safa, 2019). Familiarity bias has a negligible impact on the decision-making process of investors in European capital markets (Baker & Ricciardi, 2014). Familiarity bias has a substantial impact on the financial behavior and decisions of investors in the US and Canadian capital markets (Baker & Nofsinger, 2002). Familiarity bias is found among employees in the financial service sector and positively affects their investment decisions (Patni & Choubey, 2019). Familiarity bias leads to employees prioritizing their own company or sector while making financial decisions (McAndrews, 2017). Financial literacy and familiarity bias are not significantly associated with each other and therefore, do not impact the investment decision-making of investors in India (Baker, Kumar, Goyal, & Gaur, 2019; Chowdhary, 2020). It shares a significant positive relationship with home bias and that impacts the financial decisions of Indian investors (Jain, Jain, & Jain, 2015). Mutual fund investors in India have a tendency of investing in schemes they are familiar with. This affects their returns on a long-term basis (Ranjan & Sivaraman, 2021).

Thus, we frame the hypothesis:

*Ha2.* Familiarity bias substantially influences investors' financial decision-making process during Covid-19.

*4.1.3 Financial decision and confirmation bias.* Investors' financial and trading decisions are affected by the information received from virtual communities, which influences their existing beliefs. Confirmation bias hurts the decision-making process (Park, Konana, Gu, Kumar, & Raghunathan, 2010). It is present among investors and influences their financial decisions, despite the support of decision systems (Huang, Hsu, & Ku, 2012). Confirmation bias and its impact on financial decisions are prominent in men (Nelson, 2014). An epistemic authority is present among investors but is limited by the existence of confirmation bias (Zaleskiewicz & Gasiorowska, 2021). This is observed among investors in online chat rooms (Mohamed & Sinha, 2022). Confirmation bias exists among investors and works against their beliefs about psychological distance, which affects their financial decisions (Baack, Dow, Parente, & Bacon, 2015). Entrepreneurial investors commonly check their existing beliefs while making financial decisions (Von Bergen and Bressler, 2018). Confirmation bias is observed among investors and influences their decision-making process, which helps maintain the status quo (Chen, Cheng, Du, Xu, Jiang, & Wang, 2021). High-income Gujrati investors in India share a significant positive relationship with confirmation bias while investing (Soni & Desai, 2019). Indian investors identify behavioral biases including

confirmation bias and take corrective measures to ensure the maximization of their returns (Dey, Stamenova, Turner, Black, & Levine, 2016). Confirmation bias is insignificant with respect to age and investment experience. Thus, it does not affect the financial decision-making process of investors in India (Sujesh & Dhanya, 2019).

Thus, we propose the hypothesis:

*Ha3.* Confirmation bias positively affects investors' decisions during the Covid-19 phase.

**4.1.4 Financial decision and overconfidence bias.** Overconfidence bias has a significant effect on investors' financial decisions in Egyptian financial markets, although its impact is determined by age, gender, level of education, and experience (Metawa *et al.*, 2019). It has a significant effect on the financial decision-making process of investors in Tehran financial markets but is limited by hindsight bias (Sadi, Asl, Rostami, Gholipour, & Gholipour, 2011). It has a substantial negative impact on Pakistani investors' financial decisions on the Islamabad Stock Exchange and is exacerbated by over-optimism bias (Kafayat, 2014). Pakistani investors in Karachi City are highly influenced by the overconfidence bias (Qasim, Hussain, Mehboob, & Arshad, 2019). Investors at the PSX are significantly affected by overconfidence bias, with moderating effects of financial literacy and mediating effects of risk perception (Ahmad & Shah, 2020). Overtrading and overconfidence determine investor behavior and financial decisions in U.S. capital markets (Bates, 2020). Only overconfidence bias has a positive effect on investors' financial decision-making in Abu Dhabi (Shah, Alshurideh, Dmour, & Al-Dmour, 2021). The presence of an overconfidence bias is responsible for panic selling, which has caused the biggest market crash ever in the history of Indian capital markets (Kwatra, 2020, Bhoj, 2019). It has a moderate influence on investor behavior (Luu, 2014). This substantially affects investors' financial decisions (Bansal, 2020). Overconfidence has a significant positive effect on investors' decision-making processes (Qadri & Shabbir, 2004; Dungarwal & Tollawala, 2022; Salehi *et al.*, 2023). Overconfidence is relevant among investors and affects their financial behavior (Związek, Korzo, Przybyłowicz, Górny, & Kożuchowski, 2015). It affects investors' financial decisions both positively and negatively based on their market situation (Putri, Xu, & Akkweteh, 2020). Overconfidence and other heuristic factors assist in structuring guidelines and investment thumb rules for investors by highlighting potential mental errors (Vaid & Chaudhary, 2022). Pakistani investors' decisions are highly influenced by overconfidence bias which results in losses in many instances (Qasim *et al.*, 2019). Investment decision-making of individual equity investors in Punjab, India has the highest influence of overconfidence bias (Jain, Walia, & Gupta, 2019).

Thus, we suggest the below mentioned hypothesis:

*Ha4.* Overconfidence bias significantly affects investors' financial decisions amid Covid-19.

## 5. Research methodology

### 5.1 Sample and procedure

The study used a convenience sampling method for conducting the survey to examine the influence of cognitive factors on the financial decisions of investors in India. Individual practicing investors in Bhubaneswar, Kolkata, Mumbai, Ahmedabad, and Delhi were considered as the unit of analysis for the study. The research participants are believed to have given accurate responses to the questions asked in this context. A sample questionnaire was designed to fulfill the requirements of the study for the collection of data from primary sources. Out of 250 questionnaires circulated, 230 were found completed, amounting to approximately 92% of the total number of questionnaires. After thorough scrutiny of the filled-up questionnaires, 30 questionnaires were found to be incomplete, either concerning demographics or any specific question. The final sample size was 200 participants.

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### 5.2 Measurement

Based on a review of the literature and identified research gap, a well-structured closed-ended questionnaire was designed and circulated among the respondents to tap into the different dimensions of 'cognitive factors affecting investors' financial decisions during the Covid-19. After a thorough discussion of the available literature regarding cognitive biases and investors' financial decisions, we considered four independent variables (mental accounting, herd behavior, anchoring, and framing effects) and one dependent variable (financial decision). The questionnaire was divided into two parts. The first section of the questionnaire consisted of the demographic profile of the research participants and the second section consisted of the variables. It contained 24 questions related to the 4 constructs. Each construct had 6 questions. A Likert scale ranging from 5 (represents "Strongly Agree") to 1 (represents "Strongly Disagree") was used. The scale was previously used by (Kamselem, Nuhu, & Liman, 2020; Ahmed, Noreen, Ramakrishnan, & Abdullah, 2021). The pilot study was used to test the validity and reliability of the research instruments. The relevance of all the items, coherence, clarification, and themes was determined by the content validity.

### 5.3 Data analysis techniques

The authors have used the Statistical Package for Social Science (SPSS) 27.0 for conducting Cronbach's Alpha test to assess the reliability of the variables (both independent and dependent), Goodness of Fit to determine the effectiveness of the model structure with respect to the data used, multiple regression and discriminant function analysis to evaluate the hypothesis of the study. This research model was previously used by (Brett & Abramowitz, 2008; Alayande & Bashiru, 2015; Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014).

## 6. Data analysis

The authors attempted to provide details on the respondents' profiles. The influence of selected cognitive biases on individual investors' financial decisions was studied through an empirical analysis.

It is evident from the above, [Table 1](#), that the majority of investors are males (74.00%), followed by females (26.00%). The majority of investors fall under the age group of 31-40 years (48.00%) followed by 21-30 years (39.00%). 87% of the respondents were undergraduates, followed by postgraduates. It is found that investors with work experience of 0-5 years focus their attention more on investment, whereas investors with work experience of more than 20 years have negligible importance. It has also been identified that the majority of investors invest every month, and a negligible number of investors choose to invest according to their convenience.

[Table 2](#) shows the reliability test for the cognitive factors studied by calculating Cronbach's alpha. Cronbach's alphas for recency bias, familiarity bias is 0.81, confirmation bias were 0.84, 0.81, 0.87, and overconfidence bias is 0.60, respectively. Therefore, every variable is steady, except for the overconfidence bias, whose reliability is poor. Hence, its consistency is questionable, and it can vary from study to study, depending on demographics.

It is evident from [Table 3](#) that the beta values for recency, familiarity, confirmation, and overconfidence bias were 0.71, 0.75, 0.69, and 0.12, respectively. The  $p$ -value for all the selected biases is 0.00, except for overconfidence, which has a  $p$ -value of 0.13 ( $p > 0.05$ ). This proves that the relationship is significant for each of them but not overconfidence bias. If we compare the path coefficients of these behavioral biases, the relationship between familiarity and financial decisions is stronger than that of the others. This clarifies that familiarity bias plays a defining role in investors' financial decision-making processes. Simultaneously, recency and confirmation biases also play a substantial role in the financial decision-making process.

Model fit is achieved from the standardized difference between observed correlation and predicted correlation. [Table 4](#) showcases that the calculated chi-square is 4.42, RMSEA is

Demographic features		Frequency	Percentage
Sex	Male	170	74.00%
	Female	60	26.00%
Age	21-30	90	39.00%
	31-40	110	48.00%
	41-50	20	8.70%
	51-60	10	4.30%
Marital Status	Married	190	83.00%
	Single	40	17.00%
Educational Status	Under-graduate	200	87.00%
	Post-graduate	30	13.00%
Job Experience	0-5 years	70	30.43%
	6-10 years	60	26.08%
	11-15 years	50	21.73%
	15-20 years	37	16.08%
	21+	13	5.65%
Monthly Income	< 50,000 INR	30	13.04%
	> 50,000 INR	200	86.95%
Investment Control Frequency	Everyday	40	17.39%
	Weekly	50	21.73%
	Monthly	65	28.26%
	Quarterly	60	26.08%
	Unspecified time	15	6.52%

**Table 1.**  
Description of  
respondents

**Source(s):** Authors' work

Independent variable	Dependent variable	Path coefficient	Std. error	<i>p</i> -value
Recency	Financial Decision	0.71	0.05	0.00
Familiarity	Financial Decision	0.75	0.08	0.00
Confirmation	Financial Decision	0.69	0.06	0.00
Overconfidence	Financial Decision	0.12	0.03	0.13

**Table 2.**  
Results of overall  
relationship of  
variables

**Source(s):** Authors' work

Model	Normed chi-square	<i>p</i> -value	GFI	AGFI	NFI	CFI	RMSEA
Study model	4.42	0.00	0.94	0.91	0.92	0.93	0.08
Recommended value	</ = 5	</ = 0.05	>/ = 0.90	>/ = 0.90	>/ = 0.90	>/ = 0.90	</ = 1

**Table 3.**  
Model summary

**Source(s):** Authors' work

Function	Eigen value	% Of variance	Cumulative %	Canonical correlation
1	1.05	53.10	53.10	0.72
2	0.82	42.50	98.00	0.65
3	0.21	1.00	100.00	0.13

**Table 4.**  
Eigenvalue

**Source(s):** Authors' work

0.08, GFI is 0.94, AGFI is 0.91, NFI is 0.92 and CFI is 0.93. All values adhere to the respective recommended values. This verifies that the studied data are a perfect fit for the designed model in the research work (Henseler, Ringle, & Sarstedt, 2015).

For each discriminant function, the eigenvalue is the ratio of the between-group to the within-group sum of squares. Large eigenvalues imply superior functionality. As per Table 5, function 1 has an eigenvalue greater than 1. Hence, this indicates that function one highly influences investors' financial decisions. The canonical correlation of the same is 0.72 or 72%, which means that function one and behavioral biases are strongly correlated.

From Table 6 above, function one has a low Wilks' lambda. Hence, function one highly defines the financial decisions of investors. The significance value for each function is 0.00. Therefore, these three functions were statistically significant.

A structural matrix can be defined as a tool to describe the relationship between independent factors (behavioral biases in this case) with relevant discriminant functions. As can be seen in Table 7, while recency and familiarity are strongly correlated with function one, confirmation and overconfidence correlate with functions two and three, respectively. The equation used is as follows:

$$Z1 = (0.81)*Recency + (0.80)*Familiarity$$

$$Z2 = (0.38)*Confirmation \text{ and } Z3 = (0.31)*Overconfidence$$

On an aggregate basis, the structure matrix explains that recency and familiarity determine the financial decisions of participating individual investors.

Test of Function(s)	Wilks' lambda	Chi-square	Degree of freedom	Significant values
1 through 3	0.27	1000.81	18	0.00
2 through 3	0.58	465.43	11	0.00
3	0.94	13.98	3	0.00

Source(s): Authors' work

Table 5.  
Wilks' lambda

Behavioral biases	Function 1	Function 2	Function 3
Recency	0.81	0.31	-2.52
Familiarity	0.80	-0.47	0.32
Confirmation	0.37	0.38	0.18
Overconfidence	0.08	0.24	0.31

Source(s): Authors' work

Table 6.  
Structure matrix

Variables	Dependent variable	Hypothesis support
Independent variables		
Recency bias	Financial decision	Ha1 is accepted
Familiarity bias	Financial decision	Ha2 is accepted
Confirmation bias	Financial decision	Ha3 is accepted
Overconfidence bias	Financial decision	Ha4 is rejected

Source(s): Authors' work

Table 7.  
Hypotheses tests from  
data analysis

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## 7. Conclusion and suggestions

Behavioral biases play a crucial role in determining investors' financial decisions globally. This study examines certain behavioral biases that were either unidentified or identified and not extensively studied, including their impact on investors' financial behavior during the ongoing Covid-19 pandemic. The structure matrix findings prove that recency and familiarity bias are more influential in this case than confirmation and overconfidence bias. Wilks' lambda analysis is used to determine the impact of functions on investors' financial decisions, and it concludes that function one affects decisions taken by investors' decisions the most. The necessity of financial knowledge for an investor before making any financial decision is found to be essential for reducing the chances of being manipulated or cheated by a third party or influenced by any external factor. These findings establish the significance of cognitive bias. Therefore, investors do not always make rational financial decisions. Institutions should conduct workshops to help employees make sound financial decisions. Policymakers need to implement a proper strategy along with these institutions to improve financial knowledge to reduce the impact of such factors on the psyche of an investor. The government should set up proper brokerage firms to create awareness among individual investors. Investors should realize that a proper understanding of capital markets and investments is a prerequisite for making profitable financial decisions.

## 8. Implications

This work makes theoretical and practical contributions to behavioral finance subject matter and provides academicians, scholars, practitioners, analysts, policymakers, and firms with a new dimension that significantly influences financial decisions. Behavioral finance explains and demonstrates investment from a psychological perspective. This field of study examines and explains various activities in the capital markets. e.g.: The Adani Group fiasco in 2023. Still behavioral finance is a contentious field as it is a novel concept that is developing and refining itself. The findings of the study will expand the existing literature on behavioral finance in rapidly growing economies like India. Hence, the paper tries to provide a considerable perspective on cognitive factors influencing the financial decision-making process of investors.

Financial analysts will be able to manage their investors better (Gupta, 1991) and provide clients with higher returns on their investments by overcoming cognitive errors (Iyer & Bhaskar, 2002). It will also help asset management companies and retail investors in the market by providing fund managers with a systematic framework to cater to their customers' requirements. Company managers can also analyze stock performance in the capital markets by identifying investors' behavior and framing policies and strategies accordingly. Practitioners can learn from behavioral finance theories and manage their investments by selecting accurate stocks available in the markets. Academicians and scholars can get revised literature on behavioral finance and learn new theories and their applications. Policymakers will be able to investigate market trends in depth and formulate rules and regulations based on it.

## 9. Limitations and future prospects

This paper is based on a few cognitive biases and their effects on investors' financial decisions, which have not been extensively studied during the Covid-19. It is a temporary phase, and investors' financial behavior may change when the situation normalizes. The respondents of this study might be cautious of their behavior while replying to the questionnaire provided to them. Future researchers can focus on other major psychological factors affecting the psyche of investors in the market that define their financial behavior,

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which makes this a promising area for future research related to this topic. They can also increase the number of cities covered, sample size studied, and use better statistical tools for a more sophisticated analysis of the collected data and then acquire more specific results that will have more pervasive implications for the financial markets and their stakeholders.

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## References

- Ady, S. (2018). The cognitive and psychological bias in investment decision-making behavior: (Evidence from Indonesian investor's behavior). *Journal of Economics and Behavioral Studies*.
- Ahmad, M., & Shah, S. Z. A. (2020). Overconfidence heuristic-driven bias in investment decision-making and performance: Mediating effects of risk perception and moderating effects of financial literacy. *Journal of Economic and Administrative Sciences*.
- Ahmed, Z., Noreen, U., Ramakrishnan, S. A., & Abdullah, D. F. B. (2021). What explains the investment decision-making behaviour? The role of financial literacy and financial risk tolerance. *Afro-Asian Journal of Finance and Accounting*, 11(1), 1–19.
- Alayande, S., & Bashiru, K. (2015). An overview and application of discriminant analysis in data analysis. *IOSR Journal of Mathematics (IOSR-JM)*, 11(1), 12–15.
- Alvia, L., & Sulistiawan, S. (2010). The examination of recency and knowledge effect in investment decision making: An experimental study. *Indonesian Journal of Accounting Research*, 13(1), 45–58.
- Amer, M. (2023). Halal standards' implementation in Palestinian food sector: Its drivers and impact on performance. *Arab Gulf Journal of Scientific Research*.
- Aprayuda, R., Misra, F., & Kartika, R. (2021). Does the order of information affect investors' investment decisions?. *Experimental Investigation, Journal of Accounting and Investment*, 22(1).
- Armansyah, I., Susanti, H., James, K., Lovell, K., Idaiani, S., Imah, S., . . . Brooks, H. (2022). Civic engagement and mental health system strengthening in Indonesia: A qualitative examination of the views of health professionals and national key stakeholders. *BMC Psychiatry*, 20(1), 1–15.
- Arnold, V., Collier, P., Leech, S., & Sutton, S. (2002). The effect of experience and complexity on order and recency bias in decision making by professional accountants. *Accounting & Finance*, 40, 109–134.
- Baack, D. W., Dow, D., Parente, R., & Bacon, D. R. (2015). Confirmation bias in individual-level perceptions of psychic distance: An experimental investigation. *Journal of International Business Studies*, 46(8), 938–959.
- Baker, H. K., & Nofsinger, J. R. (2002). Psychological biases of investors. *Financial Services Review*, 11(2), 97.
- Baker, H. K., & Ricciardi, V. (2014). How biases affect investor behavior. *The European Financial Review*, 7–10.
- Baker, H. K., Kumar, S., Goyal, N., & Gaur, V. (2019). How financial literacy and demographic variables relate to behavioral biases. *Managerial Finance*, 45(1), 124–146.
- Bansal, T. (2020). *Behavioral finance and COVID-19: Cognitive errors that determine the financial future*. SSRN.
- Bashir, T., Ilyas, M., & Farrukh, A. (2009). Testing the weak-form efficiency of Pakistani stock markets-an empirical study in the banking sector. *European Journal of Economics, Finance and Administrative Sciences*.
- Bashir, T. & Maqsood, M. (2018). Impact of behavioral biases on investors decision making: Male vs female.
- Bates, A. N. (2020). *Investor behavior in the midst of a global pandemic*. SSRN.
- Berthet, V. (2022). The impact of cognitive biases on professionals' decision-making: A review of four occupational areas. *Frontiers of Psychology*, 12(1).

- Bhoj, J. (2019). A study of origin and history of behaviour finance with special reference to India.
- Bihari, A., Dash, M., Kar, S. K., Muduli, K., Kumar, A., & Luthra, S. (2022). Exploring behavioural bias affecting investment decision-making: A network cluster based conceptual analysis for future research. *International Journal of Industrial Engineering and Operations Management*, 4(1/2), 19–43.
- Bikas, E., Jureviciene, D., Dubinskas, P., & Novickytė, L. (2013). Behavioural finance: the emergence and development trends. *Procedia - Social and Behavioral Sciences*, 82, 870–876. doi:10.1016/j.sbspro.2013.06.363.
- Brett, D., & Abramowitz, J. S. (2008). Is hypochondriasis related to obsessive-compulsive disorder, panic disorder, or both? An empirical evaluation. *Journal of Cognitive Psychotherapy*, 22(2), 115–127.
- Cao, H. H., Han, B., Hirshleifer, S., & Zhang, H. H. (2011). Fear of the unknown: Familiarity and economic decisions. *Review of Finance*, 15(1), 173–206.
- Chang, C.-H. (2008). The impact of behavioral pitfalls on investors' decisions: The disposition effect in the Taiwanese warrant market. *Social Behavior and Personality: An International Journal*, 36(5), 617–634.
- Chaudhary, A. K. (2013). Impact of behavioral finance in investment decisions and strategies—a fresh approach. *International Journal of Management Research and Business Strategy*, 2(2), 85–92.
- Chauhan, A., Gupta, S., & Gupta, S. (2022). An ISM and MICMAC approach for modelling the contributors of multibagger stocks. *Asia-Pac Finance Markets*.
- Chauhan, S. S., Dayyeh, B. K. A., Bhat, Y. M., Gottlieb, K. T., Hwang, J. H., Komanduri, S., . . . Wallace, M. B. (2014). Confocal laser endomicroscopy. *Gastrointestinal Endoscopy*, 80(6), 928–938.
- Chen, M., Cheng, H., Du, Y., Xu, M., Jiang, W., & Wang, C. (2021). Two wrongs don't make a right: Combating confirmation bias in learning with label noise.
- Chowdhary, M. (2020). Financial literacy and its interaction with altered investment behaviour: An analysis of the familiarity bias.
- Čuláková, T., Kotrus, P., Uhlířová, A., & Jirásek, M. (2017). The overconfidence bias and CEO: A literature overview.
- Dey, A. K., Stamenova, V., Turner, G., Black, S. E., & Levine, B. (2016). Pathoconnectomics of cognitive impairment in small vessel disease: A systematic review. *Alzheimer's and Dementia*, 12(7), 831–845.
- Dilla, W., & Steinbart, P. (2005). Relative weighting of common and unique balanced scorecard measures by knowledgeable decision makers. *Behavioral Research in Accounting*, 17(1).
- Dungarwal, H., & Tollawala, N. (2022). A study on impact of behavioral biases on investment decision. *International Journal of Research Publication and Reviews*, 3(4), 697–703.
- Gupta, R. (1991). "Portfolio management: The process and its dynamics", Working Paper No. 923, (JanMar), the Indian Institute of Management, Ahmadabad.
- Hair, J. F., Jr, Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), 106–121.
- Hansen, E. (1994). *Issues concerning the familiarity of researchers with the research setting*. Wiley Online Library.
- Hartono, J. (2004). The recency effect of accounting information. *Gadjah Mada International Journal of Business*, 6(1), 85–116.
- Hogarth, R. M., & Einhorn, H. J. (1992). Order effects in belief updating: The belief-adjustment model. *Cognitive Psychology*, 24(1), 1–55.

- Huang, H. H., Hsu, J., & Ku, C. Y. (2012). Understanding the role of computer-mediated counter-argument in countering confirmation bias. *Decision Support Systems*, 53(3), 438–447.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
- Iyer, S. B., & Bhaskar, R. K. (2002). *Investor's psychology: A study of investor behavior in the Indian, Capital Market Finance India*, (4), 1357–1375.
- Jain, J., Walia, N., & Gupta, S. (2019). Evaluation of behavioral biases affecting investment decision making of individual equity investors by fuzzy analytic hierarchy process. *Review of Behavioral Finance*, 12(3), 297–314.
- Jain, N., & Kesari, B. (2022). The impact of behavioral biases on financial risk tolerance of investors and their decision making.
- Jain, R., Jain, P., & Jain, C. (2015). Behavioral biases in the decision making of individual investors. *IUP Journal of Knowledge Management*, 13(3).
- Kafayat, A. (2014). Interrelationship of biases: Effect investment decisions ultimately, theoretical and applied economics. *Asociatia Generala a Economistilor Din Romania - AGER*, 0(6(595)), 85–110.
- Kalm, K., & Norris, D. (2018). Visual recency bias is explained by a mixture model of internal representations. *Journal of Vision*, 18(7), 1.
- Kamselem, K. M., Nuhu, S. M., Liman, L. M. (2020). Employee empowerment and service quality delivery: Moderating role of organizational commitment among nursing staff of Nigerian public hospitals. *International Journal of Business and Techmopreneurship*, 10(3), Oct 2020, 309-322.
- Kwatra (2020). Behavioral finance and stock performance: Biases influencing the market. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 25(7), 66–69, Series 3.
- Lathe, A. S., Jain, S., & Anand, S. (2020). An empirical examination of the impact of locus of control on investor behavioral biases. *International Journal of Management (IJM)*, 11(1), 98–107.
- Levy, D. S., Frethey-Bentham, C., & Cheung, W. K. S. (2020). Asymmetric framing effects and market familiarity: Experimental evidence from the real estate market. *Journal of Property Research*, 37(1), 85–104.
- Luu, T. B. (2014). Behavior pattern of individual investors in stock market. *International Journal of Business and Management*, 9(1), 1–16.
- Mallik, Hanif, & Azhar. (2019). The impact of overconfidence bias on investment.
- McAndrews (2017). *How familiarity bias may impact your investment decision-making*. WrapManager.
- Metawa, N., Hassan, M. K., Metawa, S., & Safa, M. F. (2019). Impact of behavioral factors on investors' financial decisions: Case of the Egyptian stock market. *International Journal of Islamic and Middle Eastern Finance and Management*.
- Mohamed, R., & Sinha, N. (2022). Am i getting it right? : A framework for attributing style factor exposures.
- Nasution, & Supriyadi (2017). Effect of evidence order, the cognitive style and personality of the revision process confidence. *Accounting National Symposium X*.
- Nelson, J. A. (2014). The power of stereotyping and confirmation bias to overwhelm accurate assessment: The case of economics, gender, and risk aversion. *Journal of Economic Methodology*, 21(3), 211–231.
- Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, 2(2), 175–220.
- Nurchahya, M. A., & Dewi, D. A. (2021). Implementasi Nilai Dasar Pancasila Dalam Upaya Mewujudkan Tujuan Negara di Kehidupan Sehari-Hari. *Edukatif: Jurnal Ilmu Pendidikan*, 3(3), 631–639.
- Onsomu, Z. N. (2014). The impact of Behavioral biases on investor decisions in Kenya: Male vs Female. *Impact Journals*, 2(6), 87–92.

- 
- Park, J., Konana, P., Gu, B., Kumar, A., & Raghunathan, R. (2010). Confirmation bias, overconfidence, and investment performance: Evidence from stock message boards. *McCombs Research Paper Series*, 07(10).
- Patni, I., & Choubey, S. (2019). Behavioral traits and investment decisions: An optimism bias on investors decision making; evidence from developing markets, *Research Journal of Finance and Accounting*, 6(11).
- Pradhan, A. (2021). Quantitative model for impact of behavioral biases on asset allocation decisions: A case study of investors in UAE. *Journal of Asset Management*, 22, 573–580.
- Putri, M. D. P. W., Xu, C., & Akkeweteh, L. N. (2020). Financial behavior during COVID-19: Cognitive errors that can define financial future. *Open Journal of Social Sciences*, 8, 259.
- Qadri, S. U., & Shabbir, M. (2004). An empirical study of overconfidence and illusion of control biases impact on investor's decision making: An evidence from ISE. *European Journal of Business and Management*, 6(14), 38–44.
- Qasim, M., Hussain, R., Mehboob, I., & Arshad, M. (2019). Impact of herding behavior and overconfidence bias on investors' decision-making in Pakistan. *Accounting*, 5, 81–90. doi:10.5267/j.ac.2018.7.001.
- Ranjan, S., & Sivaraman, A. K. (2021). *Intelligent currency trade value prediction*.
- Riyaz, T., & Iqbal, H. (2015). Impact of overconfidence, illusion of control. *Self-Control and*.
- Rosyidah, U., & Pratikto, H. (2022). The role of behavioral bias on financial decision making: A.
- Sachdeva, M., Lehal, R., Gupta, S., & Garg, A. (2022). What make investors herd while investing in the Indian stock market? A hybrid approach. *Review of Behavioral Finance*, 15(1), 19–37.
- Sachdeva, M., Lehal, R., Gupta, S., & Gupta, S. (2023). Influence of contextual factors on investment decision-making: A fuzzy-AHP approach. *Journal of Asia Business Studies*, 17(1), 108–128.
- Sadi, R., Asl, H. G., Rostami, M. R., Gholipour, A., & Gholipour, F. (2011). Behavioral finance: The explanation of investors' personality and perceptual biases effects on financial decisions. *International Journal of Economics and Finance*, 3(5), 234–241.
- Sahu, A. K., Padhy, R. K., & Dhir, A. (2020). Envisioning the future of behavioral decision-making: A systematic literature review of behavioral reasoning theory. *Australasian Marketing Journal*, 28(4), 145–159.
- Salehi, M., Dalwai, T., & Arianpoor, A. (2023). The impact of narcissism, self-confidence and auditor's characteristics on audit report readability. *Arab Gulf Journal of Scientific Research*, 41(2), 202–223.
- Shah, S.F., Alshurideh, M., Dmour, A., & Al-Dmour, R. (2021). Understanding the influences of cognitive biases on financial decision making during normal and COVID-19 pandemic situation in the United Arab Emirates.
- Sharma, V., & Kumar, R. (2022). Examining the role of behavioural biases in financial decisions: A literature review. *Journal of Positive School Psychology*, 6(3), 6685–6697.
- Singh, P., Bala, H., Dey, B. L., & Filieri, R. (2022). Enforced remote working: The impact of digital platform-induced stress and remote working experience on technology exhaustion and subjective wellbeing. *Journal of Business Research*, 151, 269–286.
- Soni, K., & Desai, D. M. (2019). A study on different behavioral biases and its impact on investor's decision making.
- Sood, K., Pathak, P., Jain, J., & Gupta, S. (2023). How does an investor prioritize ESG factors in India? An assessment based on fuzzy AHP. *Managerial Finance*, 49(1), 66–87.
- Speidell, L. S. (2009). Investing in the unknown and the unknowable—behavioral finance in frontier markets. *The Journal of Behavioral Finance*, 10(1), 1–8.
- Sujesh, C. P., & Dhanya, K. S. (2019). Influence of age and investment experience on behavioural biases of equity investors. *International Journal of Creative Research Thoughts (IJCRT)*, 9(3), ISSN: 2320-2882, 5409–5423.

- 
- Sulistiawan, D., & Wijaya, R. (2015). The role of an expert recommendation in group discussion to minimize recency bias: An experimental study in investing decision. *International Journal of Applied Business and Economic Research*, 13, 4933–4943.
- Trehan (2016). A study of existence of overconfidence biases among investors and its impact on investment decision.
- Trehan, T., & Sinha, A. K. (2021). A study of confirmation bias among online investors in virtual communities. *International Journal of Electronic Finance*, 10(3), 159–179.
- Tupe, V. A., & Lokhande, M. A. (2021). A study of impact of behavioural biases on investor's investment decision.
- Vaid, A., & Chaudhary, R. (2022). Review paper on impact of behavioral biases in financial decision-making. *World Journal of Advanced Research and Reviews*, 16, 989–997.
- van Noordt, C., & Misuraca, G. (2022). Artificial intelligence for the public sector: Results of landscaping the use of AI in government across the European Union. *Government Information Quarterly*, 39(3), 101714.
- Von Bergen, C. W., & Bressler (2018). Confirmation bias in entrepreneurship. *Journal of Management Policy and Practice*, 19(3), 74–84.
- Vries, A. D., Erasmus, P. D., & Gerber, C. (2017). The familiar versus the unfamiliar: Familiarity bias amongst individual investors. *Acta Commercii*, 17(1), 1–10.
- Weixiang, S., Qamruzzaman, M., Rui, W., & Kler, R. (2022). An empirical assessment of financial literacy and behavioral biases on investment decision: Fresh evidence from small investor perception. *Frontiers in Psychology*, 13, 977444.
- Zahera, S. A., & Bansal, R. (2018). Do investors exhibit behavioral biases in investment decision making? A systematic review. *Qualitative Research in Financial Markets*, 10(2).
- Zaleskiewicz, T., & Gasiorowska, A. (2021). Evaluating experts may serve psychological needs: Self-esteem, bias blind spot, and processing fluency explain confirmation effect in assessing financial advisors' authority. *Journal of Experimental Psychology: Applied*, 27(1), 27–45.
- Związek, T., Korzo, M. A. E., Przybyłowicz, O. M., Górny, M., & Kożuchowski, A. (2015). Acta Poloniae Historica. T. 111 (2015), Reviews. *Acta Poloniae Historica*, 111, 179-210.

### Further reading

- Authorone Decisions: Mediating Role of Risk Tolerance. *International Journal of Research and Innovation in Social Science*, 3(8).
- authorthree Systematic literature review and future research agenda. *Journal of Enterprise and Development (JED)*, 4(1), 157–179.
- authortwo Empirical Study on Executives of Financial Service Sector. *International Journal of Recent Technology and Engineering*, 7.
- Bashir, T., Rasheed, S., Raftar, S., Fatima, S., & Maqsood, S. (2013). Impact of behavioral biases on investor decision making: Male vs female. *Journal of Business and Management*, 10(3), 60–68.
- Bashir, T., Mehmood, F., & Khan, A. (2019). Comforting investments are rarely profitable: Impediments in investor decision making. *Global Social Sciences Review*.
- Corzo, T., & Prat, M. (2014). Vaquero E, behavioral finance in joseph de la Vega's confusion de Confusiones. *Journal of Behavioral Finance, Journal of Behavioural Finance*, 15(4), 341–350.
- Deacon, B., & Abramowitz, J. (2022). Is hypochondriasis related to obsessive-compulsive disorder, panic disorder, or both? An empirical evaluation. *Journal of Cognitive Psychotherapy*, 22(2).
- Faisal, S., Shurideh, A., Dmour, A. S., & Al-Dmour, R. (2021). Understanding the influences of cognitive biases on financial decision making during normal and COVID-19 pandemic situation in the United Arab Emirates.

- Jain, J., Walia, N., & Gupta, S. (2020). Evaluation of behavioral biases affecting investment decision making of individual equity investors by fuzzy analytic hierarchy process. *Review of Behavioral Finance*, 12(3), 297–314.
- Jain, J., Walia, N., Gupta, S., Aggarwal, K., & Singh, S. (2022). A fuzzy analytical hierarchy process framework for stock selection in the Indian stock market. *Journal of Public Affairs*, 22(4).
- Mohanty, S., Patnaik, B. C. M., Satpathy, I., & Sahoo, S. K. (2022). A study on cognitive factors affecting decision-making of investors during covid-19.
- Sahoo, S. K., & Panda, J. (2017). Impact of corporate disclosure on investors' attractiveness. *Amity Business Journal*, 6(2), 15–19.
- Singh, R., Deb, S., & Agarwal, S. (2022). Exhibition of familiarity bias among mutual fund investors: A study on bank employees. *ABS International Journal*, 9(2), 44–48.
- Zaleskiewicz, T., Gasiorowska, A., Stasiuk, K., Maksymiuk, R., & Bar-Tal, Y. (2017). Lay evaluation of financial experts: The action advice effect and confirmation bias. *Frontiers in Psychology*, 7, 1476.

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