



Generational theory of behavioral biases in investment behavior

Hadiya Altaf*, Anisa Jan

Department of Management Studies, Islamic University of Science & Technology, 1, University Avenue, Awantipora-192122, J&K, India

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Abstract

This paper proposes that millennials' investing behavior is driven by generational biases—investment-related biases that millennials share. The results of an online survey of 516 millennial investors revealed that generational biases—fear of missing out, socially responsible investing, overconfidence, and herding—positively influence their investing intention. This paper makes a novel contribution to the literature on financial psychology by proposing a generational theory of behavioral biases among a key investor segment. The generational theory of behavioral biases enables investment managers to understand financial anomalies at a collective level. This work suggests that managers must provide investing avenues that enable millennials to overcome the threat of missed opportunities. Moreover, managers must build a responsible corporate image to appeal to millennials' socially responsible investing behavior. Investment managers must also launch intervention campaigns that seek to increase the financial competence of millennials.

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1. Introduction

Financial markets are often segmented into various investor groups that share similar characteristics associated with their financial behavior (Pompain, 2008; Kalra Sahi & Pratap Arora, 2012). Investment managers attempt to target these groups to achieve certain marketplace objectives (Toma, 2015). Group-based segmentation enables managers to generalize investing patterns (Kalra Sahi & Pratap Arora, 2012), design investment products at an aggregate level (Greenberg & Hershfield, 2018), and standardize financial intervention campaigns (Bakar & Yi, 2016; Dickason & Ferreira, 2018; Toma, 2015). To achieve these marketplace goals, managers segment investors based on various financially-relevant dimensions, including income, gender, profession, and social class (Schewe & Noble, 2000).

These segmentation bases have been the dominant profiling methods among investment managers. The managerial focus on these investor groups can be substantially attributed to the significance of demographic variables in designing investment products. Thus, academic researchers have made significant contributions to our understanding of the psychology of these demographic groups (e.g., Greenberg & Hershfield, 2018; Grinblatt & Keloharju, 2009). Despite the significance of demographic investor segments, an important yet often overlooked demographic investor group of relevance to both financial psychologists and investment managers is the generation to which an investor belongs. This rare attention to investor generations is surprising as generations represent important investor segments that drive key marketplace outcomes for global financial markets (Kalra Sahi & Pratap Arora, 2012).

An important investor generation for global financial markets is the millennial generation. Millennial investors represent a key investor group for various investment products, including equity shares, preference shares, bonds, and debentures (Anderson et al., 2015). Research suggests that the millennial

* Corresponding author.

E-mail addresses: hadiya.altaf@islamicuniversity.edu.in (H. Altaf), anisa.jan@islamicuniversity.edu.in (A. Jan).

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generation exhibits a unique financial behavior that has resulted in significant changes in global macroeconomic outcomes (Kurz et al., 2019; Larson et al., 2016). Behavioral theorists maintain that the investing behavior of this demographic cohort significantly differs from that of earlier generations (Anderson et al., 2015; Grinblatt & Keloharju, 2009; Sahi et al., 2013). For instance, the global financial crisis that emerged in 2007 left a lasting impression on the financial behavior of millennials. Therefore, it is plausible to argue that millennial investors may be susceptible to a unique set of behavioral biases in their decision-making (Lusardi, 2019; Yanto et al., 2021). For instance, previous studies have consistently reported the prevalence of cognitive and emotional deviations in millennials' investing behavior (Daniel et al., 2002). Therefore, this generation's unique tastes and preferences warrant that investment managers pay serious attention to understanding their investment patterns and behavior (e.g., Kurz et al., 2019).

Financial psychologists have largely overlooked the role that generations play in determining unique investing patterns of key investor segments. Research has undermined the notion that generational influences can drive irrationality, especially among the millennial generational cohort. Although behavioral scholars have adopted various group-based perspectives to propose investor cohorts, such as ethnic cohorts (e.g., Dickason & Ferreira, 2018), student cohorts (e.g., Gutter & Copur, 2011), and national cohorts (e.g., Brosdahl & Carpenter, 2011), attempts to theorize investors as generational cohorts are scarce. Although various studies have attempted to examine investing patterns and behavioral biases among investor generations (e.g., Philippas & Avdoulas, 2020), they rarely examine the behavioral biases of the millennial generation.

In response to this research gap, this work draws on the demographic view of generations to propose a generational theory of behavioral biases among millennial investors. We draw on the generational cohort theory to argue that generations represent important investor groups, and understanding their unique generational biases can potentially improve our understanding of financial psychology. The theory of generational biases fits well with previous research that has demonstrated the role of generational influences in determining millennials' choices of education (Yanto et al., 2021) and workplace behavior (Lyons & Kuron, 2014). From a financial behavior perspective, generational influences have been found to predict millennials' saving behavior (Kalra Sahi & Pratap Arora, 2012) and retirement planning (Walsh & Lim, 2020). The present study seeks to extend this generational view of millennials' behavior in general and financial behavior in particular to a novel research domain—behavioral biases.

How might generational biases affect millennials' investing behavior? The theory of generational biases is based on the assumption that generations represent important birth cohorts who are born in the same time interval (Ryder, 1985). These investor generations are largely influenced by a common placement in a birth period (Chaney et al., 2017). The generational theory builds on the notion that generational cohorts

represent groups of individuals who are born in the same birth period and travel life together (Williams & Page, 2011). As people within a generation are born in a common period, different generations are unique from another (Jackson et al., 2011). Like individuals, generations also exhibit a personality of their own (Schewe & Noble, 2000). It is reasonable to argue that these unique personality traits also reflect in the investing behavior of each generation. Thus, our theorizing adopts a group-based perspective of investor biases as against previous research, which mainly adopted an intra-individual perspective to predict investing behavior.

The generational theory is expected to have certain meaningful implications for investment managers. First, generational cohorts represent important investor segments, and understanding their shared biases is imperative for predicting investing behavior at a collective level. When investing behavior and its associated anomalies are predicted and generalized at an aggregate level, investment managers can launch intervention campaigns targeting investors at a group level. Because generations share similar investing patterns (Schewe & Noble, 2000), such generation-level campaigns are expected to elicit similar responses from investors. Moreover, because these campaigns tend to be standardized, they are expected to save advertising costs for companies. Finally, as the success of communication programs targeted at minimizing investor irrationality is based on an examination of psychological influences in investment decisions (Bakar & Yi, 2016), this study is expected to help investment managers, regulators, and policy-makers in their pursuit to direct investors toward rationality.

2. Theoretical background

2.1. Generational cohort theory

The generational cohort theory postulates that generations are social groups who share a common birth period (Schewe & Noble, 2000). Demographers refer to generations as a group of individuals who are born in a particular period (Alwin and McCammon, 2007). Demographic perspective, also referred to as cohort perspective, was first proposed by Ryder (1965), who viewed generations as a temporal phenomenon. Thus, age is a key factor in defining generations. The succession of people from one period to another—the younger replacing the older—results in the formation of generations (Kertzer, 1983). The common placement in time is a necessary condition for generational membership (Ryder, 1965). Thus, generational cohorts refer to the social aggregates who are born in the same time interval and age together (Ryder, 1985). This study views generations as a group of individuals who are born in a particular period and share the same years of birth (Schewe & Noble, 2000).

2.2. Investors as generational groups

Investors are often viewed as individuals who are influenced by their idiosyncratic beliefs and attitudes in decision-making

(Bakar et al., 2019). This intra-individual perspective has been the dominant narrative among behavioral theorists. Although such an individual-level perspective has contributed to our understanding of psychological biases, it overlooks the role of generational influences underlying these biases. Therefore, behavioral theorists have conceptualized investors as social groups, including ethnic and national groups (e.g., Alt, 2015; Yanto et al., 2021). Nonetheless, investors are consumers, and consumers belong to different generations (Schewe & Meredith, 2004). From a demographic perspective of generations, investors can be referred to as generational groups who share a common birth period, resulting in unique investing patterns and behaviors (e.g., Alwin & McCammon, 2007; Mannheim, 1952). We draw on the demographic view of generations to argue that generations represent important investor segments whose investment choices are likely to be determined by a common birth period that results in shared investment patterns (e.g., Ryder, 1965).

2.3. Conceptualization of generational biases

Behavioral theorists often draw on the generational theory to examine unique factors underlying the behavior in question (e.g., Barry & Wong, 2020). From a demographic perspective, these beliefs represent generational determinants that guide the individual behavior of generational members. In the context of investing behavior, we propose generational biases as the determinants of investment behavior that are collectively shared at a generational level. Our conceptualization of generational biases is based on the assumption that age-related commonalities guide a generation's behavior (albeit irrational) (e.g., Noble & Schewe, 2003). Thus, generational biases among

millennial investors can be conceptualized as shared investment-related biases that guide their investing behavior. Fig. 1 depicts the proposed research model that examines the role of generational biases in millennials' investing behavior.

3. Generational biases and investment intention

3.1. Fear of missing out

People generally feel regret about the opportunities that they could not pursue (Collins, 2016). This sense of incompleteness is based on the distorted perception that opportunities forgone are more valuable than opportunities pursued (Collins, 2017). The anxiety and psychological threat that arises from missed opportunities is referred to as the fear of missing out (Zhang et al., 2020). It is a feeling that people are unable to attain the rewarding experiences that their social groups are enjoying. It also reflects a sense of social exclusion that people experience from their absence at social events and experiences (Zhang et al., 2020). Fear of missing out reflects the tendency of individuals to stay connected and informed about the experiences of their social circles. For instance, people constantly visit social media platforms to avoid being left out of potentially satisfying experiences (Barry & Wong, 2020). Thus, the fear of missing out is a social emotion that is linked to social comparison and evaluation of the public self.

Behavioral scientists have attempted to examine this bias from a generational perspective. For instance, Barry and Wong (2020) theorized fear of missing out as a generational phenomenon that affects younger generations more than older ones. The conceptualization of the fear of missing out as a generational bias is plausible as younger generations are

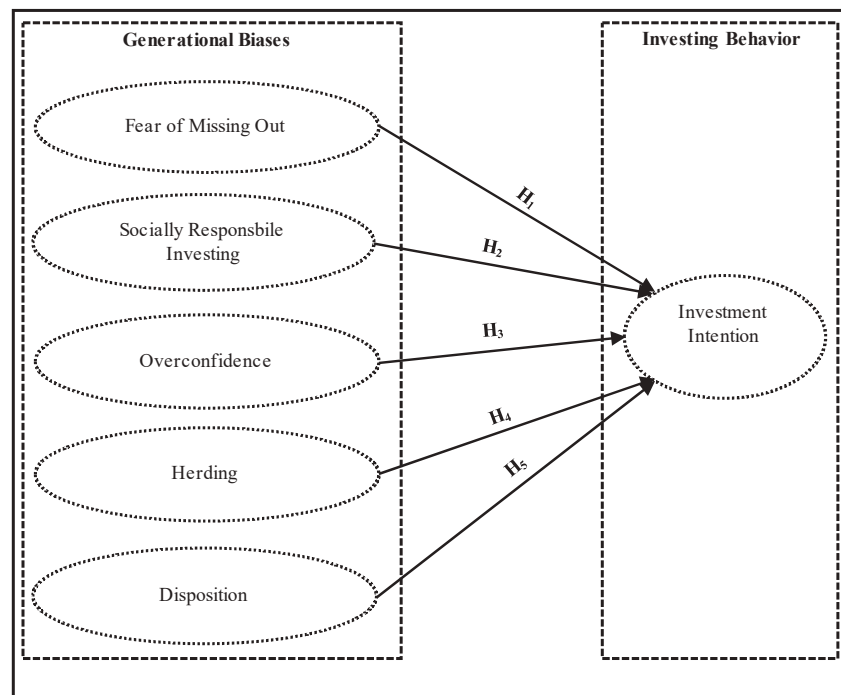


Fig. 1. Research model.

frequent users of social media (Barry & Wong, 2020). Thus, the tendency to connect and compare with other generational members may result in the fear of missing out among millennials. Notably, millennials are an inquisitive generation (Rahulan et al., 2013) that is always interested in seeking new information and novel sensory stimulation (Brailovskaia and Bierhoff, 2020). They are also keen to learn what others are doing. Being a postmodern generation (Berger, 2018), millennials reject monotony and continuously seek novel experiences (Brailovskaia and Bierhoff, 2020). For instance, millennials' pursuit of novelty drives them toward technological innovation (Batat, 2019) and adventure sports (Casidy et al., 2015). In summary, millennials are likely to be worried about losing or missing out on new consumption opportunities. More importantly, millennials' tendency to follow others instigates a sense of fear of losing opportunities. Thus, when millennials perceive that they are losing out on investment opportunities that their peers have, they would pursue such investment opportunities. Therefore, we propose the following.

H1. Fear of missing out positively influences the investment intention of millennials.

3.2. Socially responsible investing

Corporate social responsibility refers to an organization's performance in its perceived societal obligations (Brown & Dacin, 1997). The literature on corporate social responsibility highlights the link between a company's performance in societal responsibilities and its financial performance (Hill et al., 2007). One important dimension of such improved financial performance is investors' preference for socially responsible investing (Berry and Junkus, 2013). Investors are increasingly becoming conscious of the societal impact of their investment choices. They are demonstrating an increased preference to invest in companies that are perceived as socially responsible (Berry and Junkus, 2013). Socially responsible investing enables investors to combine their social values with their financial objectives (Munoz-Torres et al., 2004). Millennials are the most sensitive generation to socially responsible consumption (Johnson and Chattaraman, 2017). Their concern and care for society drive them toward responsible consumption choices (Khan et al., 2022), sustainable products (Pantano & Stylos, 2020), and collaborative consumption (Hwang & Griffiths, 2017). From a corporate branding perspective, investors tend to punish companies that are perceived as socially irresponsible (Hwang & Griffiths, 2017). For instance, investors may choose not to invest or divest their funds from companies involved in controversial businesses, such as gambling and nuclear arms (Kempf & Osthoff, 2007). These investor sentiments are acknowledged by the Social Investment Forum, which deems companies involved in tobacco and alcohol as socially irresponsible (Berry and Junkus, 2013). Moreover, companies that value sustainability and responsibility in their business activities are likely to be rewarded by investors (Berry and Junkus, 2013). Such rewards may include buying more stocks, referring the company's stocks to

others, and maintaining a portfolio of socially responsible funds (Revelli & Viviani, 2015). From the financial markets perspective, millennials are likely to reward socially responsible companies by investing in their stocks and shares. Socially responsible investing is theorized as a generational belief that guides millennials' investment decisions. Thus, the following is proposed.

H2. Socially responsible investing positively influences the investment intention of millennials.

3.3. Overconfidence

It is always desirable for investors to have a fair amount of confidence in their investing skills and abilities (Greenberg & Hershfield, 2018). However, such confidence may not reflect actual investing skills but a positive and inflated perception of one's abilities (Tekçe & Yilmaz, 2015). For instance, investors often have exaggerated perceptions and beliefs about their ability to make sound investment decisions (Sahi, 2017). Overconfident investors rely more on their own information than the information generated from the market (Zahera & Bansal, 2018). They feel that they are familiar with best investment practices (Tekçe et al., 2016) and possess precise information about investment options (Schönbohm & Zahn, 2016). Overconfidence may lead investors to have excessive certainty of the accuracy of their own beliefs (e.g., Moore & Healy, 2008). More importantly, overconfidence leads investors to underestimate their perceptions of risk (Schönbohm & Zahn, 2016; Abbes, 2013), suggesting that overconfident investors may be willing to assume greater investment risks (Tekçe & Yilmaz, 2015). For instance, due to their underestimation of risk, overconfident investors may hold riskier portfolios than they should tolerate (Tekçe & Yilmaz, 2015). Moreover, these investors often engage in excessive trading (Barber & Odean, 2000). Overconfident investors exhibit unrealistic optimism about the potential outcomes of their investment decisions (Tekçe & Yilmaz, 2015). However, overconfidence decreases with age (Tekçe & Yilmaz, 2015), suggesting that younger investors may be more susceptible to overconfidence. Interestingly, millennials perceive that they are capable and efficient in making sound investment decisions (Yanto et al., 2021). They tend to have a high-risk attitude (Batat, 2019) and be optimistic about their future (Brailovskaia and Bierhoff, 2020). Given the above background, we expect overconfidence among millennials to drive their investment decisions. Thus, we propose the following.

H3. Overconfidence positively influences the investment intention of millennials.

3.4. Herding

Risk is an inherent component of investment decisions (Pompain, 2008), and investors seek avenues to reduce risk (Bouteska & Regaieg, 2018). Investors can reduce risk via an objective assessment of investment opportunities (Anderson et al., 2015). However, to mitigate risks, investors often rely

on the collective decisions of others and avoid making isolated investment choices (Bakar & Yi, 2016; Zahera & Bansal, 2018). This results in herd behavior, where investors suppress their own beliefs in favor of market consensus (Christie & Huang, 1995). Herd behavior manifests in the form of group buying, where a group of investors buys and sells certain stocks at the same time (Chen et al., 2003). Thus, group influences are an important dimension of investor herding.

From a generational perspective, millennials are likely to make investment decisions by following the investing behavior of their generational members. This is because millennials often follow their peers in their purchase decisions (Lusardi, 2019), and financial decisions are no exception (Ciccotello & Yakoboski, 2014). Thus, herding behavior can be defined as millennials' tendency to buy or sell stocks when other millennials are also buying or selling the same stocks. It is important to highlight the conceptual distinction between herding and fear of missing out. While herding reflects the tendency to imitate the behavior of others (Bakar & Yi, 2016), the fear of missing out is characterized by the desire to stay continually connected with what others are doing (Przybylski et al., 2013). Herding reflects a normative tendency to follow other investors. However, the fear of missing out reflects social anxiety that arises when investors feel that others are having more rewarding experiences (Przybylski et al., 2013). Our theorizing is in line with the assertion that millennials are susceptible to normative influences. For instance, previous studies have pointed out that millennials make their decisions based on the opinions of their peers and reference groups. Therefore, when millennials perceive that their generational members are making investment decisions, they are more likely to follow them. Thus, we propose the following.

H4. Herding positively influences the investment intention of millennials.

3.5. Disposition

Often, investors are keen to realize potential gains in their investments. They also defer the realization of losses from their investments. The tendency of investors to sell stocks that have appreciated and hold stocks that have depreciated is referred to as disposition (Dhar and Zhu, 2006). This reflects a unique psychological aspect in which investors exhibit risk aversion in gains and risk seeker in losses (Barberis and Xiong, 2009; Verma & Verma, 2018). Investors who exhibit disposition do not want to lose out on potential gains and are keen to sell winning stocks (Dhar and Zhu, 2006). Conversely, these investors are willing to hold the losers with the confidence that they will bounce back in the future (Bouteska & Regaieg, 2018). The disposition effect can be partly attributed to an individual's self-perception of being a "smart investor" such that realizing gains and deferring losses is perceived as a smart investment choice. For instance, investors often boast of their smart investment decisions to realize gains and defer losses (Bouteska & Regaieg, 2018). This pride-seeking behavior may reflect investors' exaggerated perceptions of their investing

skills and their ability to predict future outcomes. Moreover, investors seek to maintain their self-image by exhibiting their willingness to assume the risk of holding losing stocks (Bouteska & Regaieg, 2018).

Millennials often display a "smart" consumption behavior by utilizing their marketplace information to make sound investment decisions (e.g., Bakewell & Mitchell, 2003; Noble et al., 2009). This marketplace information may drive their decisions to sell winning stocks and their ability to predict the positive outcomes of existing losers (Bouteska & Regaieg, 2018). Thus, from a disposition perspective, "smart" investment decisions are conceptualized as decisions that result in the realization of gains and deferment of losses. Millennials are also willing to take high risks in their behavioral choices (Brailovskaia and Bierhoff, 2020). They may be willing to assume financial risks by holding onto losing stocks, thereby being risk seekers in losses (Verma & Verma, 2018). Therefore, "smart investing" is a combination of risk aversion in gains and risk-taking in losses. In summary, we argue that millennial investors may be susceptible to disposition. Therefore, we propose the following.

H5. Disposition positively influences the investment intention of millennials.

4. Methodology

4.1. Sample and procedure

This study proposes a generational theory of behavioral biases among millennial investors based on the demographic perspective. Thus, the present theorizes based on a sample of a specific birth cohort—millennials born from 1980 to 2000 (Gurău, 2012). The survey was conducted on a sample of 674 participants with at least one year of investment experience. The questionnaire, which was jointly designed by the authors, was structured into four sections. Section 1 presented an overview of the purpose of the study to the participants. To reveal the true purpose of the study, the participants were informed that the study was conducted to assess their beliefs and preferences for investments made in the stock market. The participants were informed that the results of the survey would enable financial managers to improve their product offerings. Although behavioral biases manifest in various investment choices, this study examines investor irrationality in the context of equity investments. Such a focused examination allows us to have a robust understanding of millennial investors' differential biased behavior.

Participants with an active equity trading account were eligible to participate in the study. The survey was conducted online, and the link was shared with the participants using various platforms such as Facebook, Twitter, and LinkedIn. Some participants were also recruited via email. The participants were informed that there are no right or wrong answers and their responses would be kept confidential. These techniques were adopted to avoid potential common method biases that are often associated with cross-sectional surveys

(Podsakoff et al., 2003). The next section captures participants' investment experience. To assess the participants' eligibility to participate in the study, they were asked to respond to a filter question: "Do you have an active equity trading account?" ("0 = No" and "1 = Yes"). Participants who responded in the affirmative (n = 516) were asked to provide information about their previously invested instruments and investment experience. The third section assessed their responses to the independent variables (generational biases) and the dependent variable (investment intention). Finally, the fourth section captured the participants' demographic information, including age, gender, income, educational qualification, nature of employment, and profession. The participants included managers, bankers, doctors, academicians, government officials, self-employed individuals, chartered accountants, and lawyers. There was no compensation paid for participating in the study.

4.2. Study measures

This study uses established measures from the extant literature to assess the variables of interest (see Table 1). All the variables were measured on a five-point Likert scale ("0 = strongly disagree" and "5 = strongly agree"). We adapted the fear of missing out scale proposed by Przybylski et al. (2013) to measure millennials' susceptibility to the fear of missing out. We assessed socially responsible investing using the three-item scale proposed by Sahi et al. (2013). Overconfidence was measured using three items adapted from the studies by Jain et al. (2020) and Glaser and Weber (2007). Herding behavior was measured using three items adapted from the studies by Baker et al. (2021), Shusha and Touny (2016), and Baker and Puttonen (2017). We assessed disposition using

the measure adapted from the studies by Baker and Puttonen (2017) and Goo et al. (2015). Finally, millennials' investment intention was assessed using three items adapted from the studies by Dodds et al. (1991) and Beck and Ajzen (1991).

5. Results and discussion

5.1. Common method variance

Surveys are prone to common method biases that arise because of the measurement method (Bagozzi et al., 1991; Podsakoff et al., 2003). To control for common method variance, we adopted various procedural methods in the design of the study (MacKenzie & Podsakoff, 2012). For instance, the participants were assured of the confidentiality of their responses and were encouraged to provide honest opinions (Podsakoff et al., 2003). However, it is important to statistically test the data for common method bias. Thus, the data were analyzed for common method variance using Harman's single factor post hoc test. All the factors were constrained to load on a single factor using unrotated principal component factor analysis. If a single factor emerges or a majority of the variance can be attributed to one factor, the data may suffer from method variance (Podsakoff et al., 2003). The results revealed six factors, and a single factor accounted for only 20.882% of the variance. These results suggest that the data do not have common method variance.

5.2. Confirmatory factor analysis

We first assessed the reliability of the constructs using Cronbach's alpha. Table 1 reveals that all the constructs have

Table 1
Construct measures.

Constructs	Items	Sources	Cronbach's Alpha
Fear of missing out			0.866
FMO1	I fear my friends have more rewarding experiences of the stock market than me.	Przybylski et al. (2013)	
FMO2	I get worried when my friends invest in the stock market without my knowledge.		
FMO3	When I earn a good return, it is important for me to share the details online.		
Socially responsible investing			0.843
SRI1	I would invest in companies that are stakeholders friendly.	Sahi et al. (2013)	
SRI2	I would invest in companies that have socially responsible activities on going.		
SRI3	Companies that follow ethical practices are more attractive to me.		
Overconfidence			0.870
OCF1	I have complete knowledge of various types of investments.	Ritika and Kishor (2022), Jain et al., (2019), Glaser and Weber (2007)	
OCF2	I believe that my investing skills help me to outperform the market.		
OCF3	I can predict the future prices of my investments better than others.		
Herding			0.891
HDG1	I follow others in all my investment decisions.	Baker et al. (2021), Shusha and Touny (2016), Baker and Puttonen (2017)	
HDG2	I prefer to invest in the assets that other investors are buying.		
HDG3	I follow social blogs and forums before making an investment decision.		
Disposition			0.863
DSP1	I am often reluctant to realize losses.	Baker et al. (2018), Goo et al. (2015)	
DSP2	I prefer to sell stocks whose prices have recently increased.		
DSP3	I sell profitable stocks because I am afraid that the stock price would fall again.		
Investment intention			0.924
INT1	I may invest in the stock market in the future.	Dodds et al. (1991), Beck and Ajzen (1991)	
INT2	I would most probably invest in the stock market.		
INT3	I am quite willing to invest in the stock market.		

Table 2
Convergent validity of the constructs.

Constructs	Factor loadings	Composite reliability	Average variance extracted
Fear of missing out		0.872	0.697
FMO1	0.707		
FMO2	0.921		
FMO3	0.862		
Socially responsible investing		0.845	0.645
SR11	0.829		
SR12	0.740		
SR13	0.837		
Overconfidence		0.871	0.693
OCF1	0.786		
OCF2	0.859		
OCF3	0.851		
Herding		0.893	0.736
HDG1	0.800		
HDG2	0.921		
HDG3	0.849		
Disposition		0.864	0.679
DSP1	0.812		
DSP2	0.856		
DSP3	0.803		
Investment intention		0.925	0.805
INT1	0.867		
INT2	0.930		
INT3	0.893		

an alpha of more than 0.70 (Kline, 2011). Next, to assess the validity of the constructs, we conducted a confirmatory factor analysis (Hair et al., 2019) using the maximum likelihood estimation method in Amos 22. The results revealed that the six-factor structure fit the data well (χ^2 (120) = 251.040; χ^2/df = 2.092; CFI = 0.975; TLI = 0.968; RMSEA = 0.046; SRMR = 0.0314) (Browne & Cudeck, 1992; Steiger, 2007). The convergent validity of the measurement model was assessed using factor loadings, composite reliability, and average variance extracted (Campbell and Fiske, 1959). The factor loadings of all the items were above the recommended level of 0.70 (Kline, 2011). Table 2 presents the results. Moreover, the composite reliability of each construct was more than 0.60 (Bagozzi & Yi, 1988). All the constructs reported an average variance extracted of more than 0.50, indicating that the variance explained by the construct is larger than the variance explained by the measurement error (Fornell & Larcker, 1981). These results suggest that the convergent validity of the measurement model is established. The study followed the criterion recommended by Fornell and Larcker

Table 3
Discriminant validity of the constructs.

Constructs	Mean	SD	FMO	SRI	OCF	HDG	DSP	INI
FMO	3.31	1.04	0.835					
SRI	2.60	1.14	0.213	0.803				
OCF	3.88	.91	0.130	0.257	0.833			
HDG	3.34	1.10	0.080	0.104	0.091	0.858		
DSP	3.13	1.15	0.194	0.104	0.014	-0.037	0.824	
INI	3.72	1.22	0.135	0.156	0.156	0.135	0.047	0.897

The values on the diagonal indicate squared AVEs; off-diagonal values indicate inter-construct correlations.

(1981) to assess the discriminant validity of the model. As presented in Table 3, the square root of the average variance extracted from each construct is more than the inter-construct correlations. These results establish the discriminant validity of the measurement model (Fornell & Larcker, 1981).

We also tested the data for collinearity and multicollinearity. If a variable is explained by another variable such that one of them becomes redundant, there is collinearity (Hair et al., 2019). If a variable is explained by more than two variables, there is multicollinearity. To assess collinearity, we examined the inter-construct correlation among each pair of latent variables. Table 3 indicates that all the inter-construct correlations are below the recommended threshold of 0.90, suggesting a lack of collinearity among each pair of latent variables (Hair et al., 2019). Moreover, multicollinearity was assessed using tolerance level and variance inflation factor. We regressed each variable on a set of all the other independent variables. The results revealed that the tolerance level was in the range of 0.914–0.989 and the variance inflation factor was in the range of 1.011–1.09, suggesting a lack of multicollinearity (Hair et al., 2019).

5.3. Path analysis

The results revealed that the six-factor structure fit the data well (χ^2 (130) = 324.856; χ^2/df = 2.499; CFI = 0.963; TLI = 0.957; RMSEA = 0.054; SRMR = 0.0790) (Browne & Cudeck, 1992; Steiger, 2007). The results of path analysis (Table 4) revealed that fear of missing out positively influences the investment intention of millennials (H_1 : β = 0.093, p < 0.05). These findings suggest that millennials may feel discomfort about the investment opportunities that they are unable to pursue (Collins, 2017). Moreover, the fear of missing out may also signal millennials' tendency to stay connected with their peers online. These findings are consistent with previous studies that have found younger generations, especially millennials, to exhibit fear of missing out due to their significant social media usage (Barry & Wong, 2020). Further, as expected, socially responsible investing positively predicts millennials' investment intention (H_2 : β = 0.100, p < 0.05). These findings are not surprising as millennials are particularly sensitive to the societal and environmental impact of their

Table 4
Path results.

Path	Standardized estimates	p-values	Results
H_1 : Fear of missing out \rightarrow Investment intention	0.093*	0.050	Supported
H_2 : Socially responsible investing \rightarrow Investment intention	0.100*	0.039	Supported
H_3 : Overconfidence \rightarrow Investment intention	0.114*	0.018	Supported
H_4 : Herding \rightarrow Investment intention	0.113*	0.017	Supported
H_5 : Disposition \rightarrow Investment intention	0.024*	0.619	Not Supported

Note: * significant at 0.05 level.

consumption choices (Johnson and Chattaraman, 2017). The present findings add to a growing body of evidence which suggests that investors are increasingly making their investment choices based on a company's reputation in socially responsible business practices (Berry and Junkus, 2013).

Further, overconfidence bias among millennial investors is a significant predictor of investment intention (H_3 : $\beta = 0.114$, $p < 0.05$). These findings suggest that millennial investors may have exaggerated certainty about the accuracy of their own investing skills (e.g., Moore & Healy, 2008). It also suggests that millennials may hold riskier portfolios than they should because of their investing ability (Tekçe & Yılmaz, 2015). These findings are consistent with previous studies which have found that younger investors have greater levels of overconfidence (Tekçe & Yılmaz, 2015). Further, herding positively predicts the investment intention of millennials (H_4 : $\beta = 0.113$, $p < 0.050$). These findings suggest that millennials may base their investment decisions on the collective decisions of their peers. Finally, contrary to our expectations, disposition does not determine the investment intention of millennials (H_5 : $\beta = 0.024$, $p > 0.050$). These findings suggest that millennial investors are not inclined to selling winning stocks and holding losing stocks.

6. Implications

6.1. Theoretical implications

This study makes some important theoretical contributions. The present study adopts a group-based perspective of investment buying behavior to propose a generational theory of investment biases. Behavioral scientists often adopt an individual perspective to argue that behavioral biases are the outcome of an investor's unique personality traits (e.g., Baker et al., 2021; Bouteska & Regaieg, 2018; Dickason & Ferreira, 2018). Although these studies have significantly contributed to our understanding of financial psychology, they often overlook the role of group influences in shaping investor irrationality. This work adds to the financial psychology research by demonstrating that apart from individual differences, group influences such as generational influences also determine the behavioral aspects of financial decision-making.

To propose a generational theory of behavioral biases, this study builds on the theoretical underpinnings of the generational cohort theory (e.g., Mannheim, 1952). The study argues that generations represent important investor groups; thus, examining behavioral biases among investor generations is a financial imperative. More importantly, the study draws on the demographic perspective of generations to propose generational biases as shared behavioral anomalies among millennial investors (Khan et al., 2021). The study conceptualizes generational biases as shared patterns of investment among the millennial generation. In doing so, the study extends the demographic perspective of generations to a managerially relevant research field—investor psychology.

Finally, this study also contributes to the literature on millennial consumer behavior (e.g., Wolburg &

Pokrywczynski, 2001; Noble et al., 2009), especially millennial financial behavior (e.g., Walsh & Lim, 2020). Millennials are considered a key consumer generation that represents an important market for various products and services (Batat, 2019). Therefore, their unique consumption patterns often shape the marketplace outcomes for various industries (Berger, 2018, pp. 1–10). This has resulted in a rich and growing body of academic literature that seeks to provide insights into the decision-making of millennial consumers (e.g., Bakewell & Mitchell, 2003). The present study adds to this body of knowledge by providing novel insights into the financial decision-making of this important investor generation.

6.2. Managerial implications

First, our findings reveal that millennials' investment decisions are driven by their tendency to face the psychological threat of the loss of investment opportunities (e.g., Collins, 2016). These findings suggest that millennials may consider the investments they hold as less valuable than the investments they do not pursue. Therefore, managers must launch intervention campaigns that assure millennials about the rewards and value of their existing portfolio. In the absence of such self-assuring communication, millennials may pursue less valuable opportunities to avoid psychological threats. Millennials may also compare their investment options with those of their peers. These evaluative comparisons can make them believe that their social groups are attaining more rewarding investment experiences. This is especially the case when millennials announce their new investment decisions on social media. Therefore, through social media, managers must launch campaigns that provide millennials with a sense of reinforcement about the validity of their existing investment choices.

Second, the findings of this study suggest that millennial investors are inclined to invest in companies that are perceived as good corporate citizens. These findings suggest that firms that engage in socially responsible business activities may be able to gain a marketplace advantage by attracting more investments (e.g., Berry and Junkus, 2013). For instance, concern for the environmental, societal, and human impact of business practices can appeal to a key investor generation, that is, millennials. Therefore, managers must seek to build a favorable corporate image by associating with social causes and dissociating from irresponsible and unsustainable business practices. For instance, managers must communicate sustainability and social responsibility as their core values.

Third, the findings of this study suggest that millennial investors may have inflated perceptions of their investment abilities and skills. This assumption is based on a positive relationship between overconfidence and the investment intention of millennials. As millennials are early adopters of technology, they consume more online content than previous generations (Batat, 2019). Financial companies often provide financial education and engage investors in online discussions (Ciccotello & Yakoboski, 2014). Due to improved financial literacy, millennials tend to be overconfident in their expectations of favorable outcomes. Millennials exhibit a greater

tendency and willingness to adopt the latest communication tools. Therefore, financial managers must use technological sources such as social media to disseminate information and advice to millennials (Ciccotello & Yakoboski, 2014).

Finally, our findings reveal that herding drives the investment intention of millennials. This suggests that millennials follow their peers in their investment decisions. More importantly, these findings point out that millennial investors engage in group buying (e.g., Chen et al., 2003). Therefore, financial managers must promote group-based buying of stocks among investors.

7. Limitations and future research

The findings of this study must be interpreted in light of certain limitations that may also guide future research activity on millennial investor psychology. First, the present study treats millennials as a single cohort, whereas various authors have suggested that the millennial generation has subcohorts, and their consumption behavior may be characterized by some key variations (Kapferer & Michaut-Denizeau, 2019). Therefore, future studies must examine the potential variations in the generational biases of millennial subgroups, such as late millennials and old millennials. Further, this study attempted to theorize generational biases affecting millennial investors' behavior. However, these biases may not be restricted to the millennial generation alone but may be exhibited by other generations as well. In this regard, the present study did not attempt to conduct a cross-generational examination of generational biases to rule out alternative explanations. Therefore, future studies must incorporate experimental designs to conduct an inter-generational examination of behavioral biases. Finally, this study referred to the millennial consumer behavior literature (e.g., Noble et al., 2009; Bakewell & Mitchell, 2003) and behavioral biases literature (e.g., Walsh & Lim, 2020; Yanto et al., 2021) to examine key generational biases affecting millennial investors. However, we do not claim that these biases provide an overarching explanation of millennial investor psychology. As other biases may also affect the investment decision-making of millennials, future research must examine other generational biases that may interfere with the rational decision-making of millennial investors.

Declaration of competing interest

None.

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