

Role of Behavioral Biases in Investment Decisions : A Factor Analysis

* *Meghna Dangi*

** *Bindya Kohli*

Abstract

Purpose : Behavioral finance is a paradigm shift that combines psychological aspects of human behaviour with traditional finance concepts to understand investment decision making process of investors. In the course of such analysis, it brings to light some departures from rational decision making by investors which are termed as biases. In cognitively complex situations, individuals use biases to take the most optimum, but not the most rational decisions. The purpose of creating archetypes of investors is to customize investment advice based on biases exhibited by the individual investor. The benefit of archetypes is that they help in communicating a lot of information without much explanation or analysis. Hence, this is a very practical tool to assist financial service providers to understand the investment decision making process and develop more effective financial products that would help investors in achieving their investment goals.

Design/Methodology : The research was primarily descriptive in nature and quantitative in approach. Survey technique through the use of a questionnaire was used to collect numerical data, which was empirically investigated via statistical computation techniques. An initial inventory of 24 items pertaining to 21 biases was assessed for validity, was subjected to pilot tests, and subsequently to various rounds of modification. The final data were collected from 389 respondents using a questionnaire that captured the biases. The archetypes were created using principal component analysis.

Findings : The research came up with archetypes of investors based on heuristics and biases they exhibited. The archetypes were thus named by us as : The Stereotypical Investor, The Nervous Investor, The Imitator, The Naïve Investor, The Cautious Investor, and The Passive Investor.

Practical Implications : The paper provided a very practical tool not only to investors to understand their own biases, but also to portfolio managers about how investors differ behaviourally. This will give investors a better chance to achieve desired outcomes in the stock market. This will not only result in improving the quality of their advice, but also help them in structuring better asset allocations customised to suit the investor.

Key words : investor archetypes, behavioral finance, biases in investing, factor analysis

JEL Classification : G32, G110, G410

Paper Submission Date : April 15, 2017 ; **Paper sent back for Revision :** January 13, 2018 ; **Paper Acceptance Date :** February 11, 2018

Studies on investment decision making of individual investors have been a topic of intrigue, interest, and importance for academicians and practitioners alike. However, since the advent of behavioral finance, various reasons of departures from laws laid down by traditional finance have been highlighted by its

* *Assistant Professor*, Auro University, Earthspace, Hazira Road, Oppo : ONGC, Surat - 394 510, Gujarat.

E-mail: meghna@aurouniversity.edu.in

** *Associate Professor*, Symbiosis School of Banking and Finance, Symbiosis International University, Gram : Lavale, Taluka : Mulshi, Pune - 411 007, Maharashtra. E-mail: bindyakohli@ssbf.edu.in

proponents. One such departure is from rationality in investment decision making. The limitations to rationality arise due to limitation of time, information, or of cognitive abilities of individual investors. As a result, investment choice becomes largely influenced by behavioural biases. Behavioral finance closely combines individual behavior and market phenomena and uses knowledge taken from both the psychological field and financial theory. It seeks to answer the question: Are individual investors perfectly rational or can cognitive and emotional errors impact their financial decisions? It becomes more important to highlight abundant documented evidence of irrational behaviour, repeated errors in judgment, and shortcuts taken by investors in their investment decision-making process. Behavioral biases come into play in light of such irrational behavior. A bias is a departure from normative, optimal, or rational behavior. In cognitively complex situations, individuals will use biases to take the most optimum but not the rational decision. Investors are influenced by a number of biases like overconfidence, anchoring, herding, and representativeness to name a few. In this paper, we propose to create archetypes of investors based on the behavioural biases exhibited by them.

Motivation of the Study

The purpose of creating archetypes of investors is to customize investment advice based on biases exhibited by the individual investors. For this, it is essential to understand how their biases influence their investment decision-making process. The benefit of archetypes is that they help in communicating a lot of information without much explanation or analysis. Hence, this is a very practical tool to assist financial service providers to not only understand their customers, but also to develop more effective financial products that would help them in achieving their investment goals.

Literature Review

(1) Research on Investor Biases : The evolution of behavioral finance could be traced back to 1912, with Seldon's book titled, *The Psychology of the Stock Market*. The book is based upon the belief that the stock price movements are dependent, to a very considerable degree, on the mental attitude of the individual investors. Kahneman and Riepe (1998) explained the importance of understanding investment decisions as they have both emotional and financial consequences over time. Lovric, Kaymak, and Spronk (2008) stated that the investment process is influenced by a number of interdependent variables and driven by dual mental systems, the interplay of which contributes to bounded rational behavior where investors use various heuristics and may exhibit behavioral biases. Biases can be on account of cognitive limitations, information processing strategies, or heuristics (specific motivations, egocentric principle, affective influences, perceptual organizing principles, and cognitive styles) (Baker & Nofsinger, 2002 ; Kahneman & Tversky, 1974 ; Keren & Teigen, 2004 ; Prast, 2004 ; Pompian, 2006 ; Shefrin, 2002). Biases are the designs of the human mind and are a tool that the mind uses to make sense of the information overload and reach to a decision. Since these biases impact the decision maker's choices and behavior, they need to be further researched, so that integral insights about the decision maker's mind can be revealed (Sahi & Arora, 2012). A number of previous studies (Brown, Chappel, Rosa, & Walter, 2006 ; Campbell & Sharpe, 2009 ; Chandra & Kumar, 2012 ; Chen, Kim, Nofsinger, & Rui, 2007; Fogel & Berry, 2006 ; Glaser & Weber, 2005; Hon - Snir, Kudryavtsev, & Cohen, 2012 ; Kliger & Kudryavtsev, 2010 ; Lim, 2006 ; Lehenkari & Perttunen, 2004 ; Massa & Simonov, 2005 ; Talpsepp, 2011) have investigated behavioral biases that generally occur in decision making of the investors. The findings of such studies clearly indicate that each specific study focused only on one or a few behavioral biases.

Individual investors base their investment decisions on a number of biases like overconfidence, herding and

disposition effect, etc. Overconfidence is a well - established and common bias that makes people too confident about their knowledge and skills and ignore the risk associated with investments (Kumar & Goyal, 2015). Oberlechner and Osler (2009) revealed that investors tend to be overconfident in two dimensions: they underestimate uncertainty and overestimate their own abilities. Overconfident managers overestimate cash flows on some projects, use too much debt, and tend to feel that their stocks are mispriced by the market (Dedu, Turcan, & Turcan, 2012). Singh, Goyal, and Kumar (2016) opined that investors were prone to biases and that the gender effect was found to be statistically significant in case of overconfidence, self attribution, and regret aversion bias.

Herding is another popular bias, which refers to the situation wherein rational people start behaving irrationally by imitating the judgments of others while making decisions (Kumar & Goyal, 2015). Garg and Jindal (2014) investigated the presence of herd behaviour in the Indian stock market during 2000-2012. The results indicated that herd behaviour was not present in the Indian stock market. Garg and Gulati (2014) examined the existence of herd behaviour in the Indian stock market by using daily, weekly, as well as monthly data of the securities listed in CNX 500 during the time period from 2000 - 2013. Hindsight bias is another bias which tends to occur in situations where a person believes that the onset of some past event is predictable and completely obvious ; whereas, in fact, the event could not have been reasonably predicted (Jain, Jain, & Jain, 2015).

Another bias is the anchoring bias, where decisions are made by investors on the basis of limited information, and they fail to take account of more significant information available. According to Campbell and Sharpe (2009), such behavior results in forecasts that underweigh new information and could thus give rise to predictable forecast errors. Raut and Das (2015) stated that social factors like herding and information cascades along with psychological patterns like representativeness ability and anchoring heuristics are the basic key factors that determine individual decisions. Behaviorally biased investors typically make poor decisions about fund style and expenses, trading frequency, and timing, resulting in poor performance. Shanmugsundaram and Balakrishnan (2011) reinforced the fact that demographic factors also influence investor's investment decisions. Therefore, it becomes imperative for financial planners and investment advisors to understand their client's biases and beliefs that affect the client's investment decision making choices, thereby providing suitable advice.

Researchers have distinguished a long list of specific biases, applying over 50 of these to individual investor behavior in recent studies. This research paper undertakes to study biases suggested by Pompian (2006) on biases exhibited by individual investors in the course of investment decision making.

(2) Cognitive Biases

(i) Ambiguity Aversion : Ambiguity aversion refers to a situation where people prefer familiar to unfamiliar (Shefrin, 2007). As a result, investors who feel more competent may trade more frequently than investors who feel less competent. When they feel they do not understand foreign markets, they may not be willing to shift assets overseas (Graham, Harvey, & Huang, 2009).

(ii) Anchoring : While investing, investors start comparing the stock prices with the reference point which generally may be the purchase price to which the investors get anchored to (Benartzi & Thaler, 1995).

(iii) Herding : According to Valence (2001), when investors group together, they inadvertently create a consensus and create an impact to cause markets/stocks/sectors to fall in or out of favour. According to behavioral theorists, herding is a product of emotions like greed and fear (Landberg, 2003) ; or in other words, remorse and pride (Chen et al., 2007).

(iv) Overconfidence: Mahajan (1992) defined overconfidence as an overestimation of the probabilities for a set of

events. Shefrin (2002) clarified further that investors who are overconfident set “overly narrow confidence banks.” This means that they set their high guess too low and low guess too high.

(v) Representativeness: According to Kahneman and Tversky (1974), it is an assessment of the degree of correspondence between the sample and the population, an instance and a category, an act and an actor, or more generally, between an outcome and a model.

(vi) Conservatism : It can be understood as a mental process in which human beings adhere to their past views and do not acknowledge new information (Shefrin, 2007).

(vii) Confirmation: Confirmation bias is the unconscious selectivity either in the acquisition or in the use of information (Nickerson, 1998). Practitioners have noted that investors would rather 'dig in their heels' rather than change their beliefs, particularly when the cost of establishing a belief was high (Olsen, 2008).

(viii) Self - Attribution: This bias refers to the tendency of investors to ascribe their success to innate aspects while blaming failures on outside influences or market forces (Taylor & Brown, 1988).

(ix) Cognitive Dissonance : When human beings are not able to harmonize contradictory cognitions, a state of imbalance occurs ; the response that arises due to such mental discomfort can be defined as cognitive dissonance. When investors realize that they have made a mistake, they experience mental conflict. In such a scenario, individual investors do not change their original decisions ; rather, they start believing that their decision was rational.

(x) Illusion of Control: According to Baker and Nofsinger (2002), people often believe that they have an influence over the outcome of uncontrollable events. The illusion of control bias describes the tendency of human beings to believe that they can control or influence outcomes when, in reality, they cannot (Pompian, 2012).

(xi) Framing: This bias influences how an investor will make decisions depending on what is the context and how the choice is presented or framed before them (Ritter, 2003). Such prominent is the influence of this bias that the decision maker will almost experience an optical illusion. Under its influence, decision makers are found to change their attitude towards gains and losses. That is to say they will make one decision if a problem is framed in terms of losses, but behave differently if the same problem is framed in terms of gains.

(xii) Mental Accounting: Kivetz (1999) opined that mental accounting refers to the set of cognitive operations used by individuals to organize, evaluate, and monitor financial activities. Investors categorize, code, and evaluate economic outcomes by grouping their assets into some form of non - fungible mental accounts even though rationality discourages them to do so.

(xiii) Hindsight: It is the tendency of investors, with the benefit of hindsight following an event, to falsely believe that they predicted the outcome of that event in the beginning (Pompian, 2006).

(xiv) Availability: Under the influence of this bias, investors perceive those possibilities more which are easier to recall, than those which are more vividly described, or those which are emotionally charged than those which are difficult to imagine (Kahnemann & Tversky, 1974).

Recency bias is a behavioral pattern of a human being to recall recent events more prominently than those that have occurred in the past. It is a cognitive bias under the influence of which the investors develop the tendency to react in the short-term while losing the long term view (Pompian, 2006).

(3) Emotional Biases

(i) Regret Aversion : Regret aversion refers to the tendency of the investor to avoid taking decisive actions due to an overhanging fear of loss in whatever course of action they select. Regret aversion can cause investors to be too conservative in their investment choices. As a result of losses in the past, investors may shy away from making new bold decisions and accept only low - risk positions. This behavior can lead to long term underperformance and can endanger investment goals (Pompian, 2006).

(ii) Self-Control : Self-control bias can be defined as a behavioral tendency that causes people to consume today at the expense of saving for tomorrow (Pompian, 2006).

(iii) Status Quo: Having a status - quo bias means that the investors lean toward doing nothing in particular. It is a bias towards inaction due to increased regret (Ritov & Baron, 1992, 1995).

(iv) Endowment : It can be described as a process in which a differential weight is placed on the value of an object and the value depends on one's endowment. In experiments designed to examine endowment bias, it was found that subjects weighed the loss of giving up their initial reference entitlement far more heavily than the foregone gains of not obtaining the alternative entitlement (Knetsch, 1989).

(v) Loss Aversion : Under the influence of this bias, investors will stress more on avoiding loss rather than seek profit and hasten to lock in profits fearing that markets may reverse. Stating in other words, people will feel much more pain for what they lose than pleasure with an equivalent gain (Rabin, 1998).

(vi) Over Optimism : The over-optimism bias can be defined technically as a tendency of investors to adopt an inside view in lieu of the outside view that is more appropriate when making financial decisions (Kahnemann & Lovallo, 1993). An inside view is one that focuses on a current situation and reflects personal involvement ; whereas, an outside view is an assessment of the current situation in the context of results obtained in the past situations.

(4) Research on Investor Segmentation : Bailard, Biehl, and Kaiser (1986) classified investors on the basis of their personalities into five categories. Barnewall (1987) classified investors into active and passive depending on their risk tolerance; whereas, Gunnarson and Wahlund (1997) classified investors on the basis of demographics. These studies were mostly based on demographics, personality, and risk attitudes. Some studies also segmented investors on the basis of psychological factors as detailed in information search (Loibl & Hira, 2009). In other cases, investment choice criteria became the basis of segmentation (Kasilingam & Jayabal, 2010), while there are also studies on investment attitudes and behaviors (Clark-Murphy & Soutar, 2005 ; Warren, Stevens, & McConkey, 1990). In the context of customizing portfolio advisory, Myers - Briggs Type Indicator Personality test and a questionnaire were used to reveal the individual investor biases.

In another study aiming to categorize investors on the basis of investment horizon, confidence, control, risk attitude, and personalization of loss, four main segments of investors were identified, that is, risk tolerant traders,

confident traders, loss averse young traders, and conservative long term investors (Wood & Zaichkowsky, 2004). In further studies, Pompian (2008) developed the behavioral alpha approach which categorized first the biases into either cognitive (driven by faulty reasoning) or emotional (driven by impulses) and then classified the investors into four categories, each having exclusive biases the investor exhibited on the basis of multiple-choice questions.

In the Indian context, studies conducted in the area of investor segmentation have classified investors as aggressive, moderate, and conservative based on their lifestyle (Nagpal & Bodla, 2009) or casual, technical, informed, and cautious based on personality types (Mittal & Vyas, 2008). One of the latest studies conducted on investor segmentation based on behavioural biases classified investors into : the Novice Learner, the Competent Confirmer, the Cautious Anticipator, and the Efficient Planner (Sahi & Arora, 2012). The study collected the final data from 377 respondents, used a questionnaire that captured eight biases, and conducted a cluster analysis to arrive at the aforementioned four categories of investors.

Research Gap

Very few studies have been carried to categorize investors across the world and India as well. Most of the studies have taken demographics, personality traits, risk attitudes, psychological factors, investment choice criteria, and investor behaviour as the criteria for segmentation. One such study that comes closest in the Indian context has captured only eight biases and arrived at four categories. Since it is an established fact that behavioral biases do have an overreaching influence on the investment decision making process, it becomes imperative to have research taking these biases as the underlying criteria for investor segmentation. The present study is unique as it takes into consideration biases as the criteria for segmentation and uses a principal component analysis to create archetypes of investors. Understanding one's own archetype/ segment will help the investor in assessing his/her own limitations in the investment decision making process promptly and objectively. Hence, the objective of the present study is to create archetypes based on behavioural biases exhibited by individual investors.

Proposed Methodology

The research is primarily descriptive in nature and quantitative in approach. Survey technique through the use of a questionnaire was used to collect numerical data, which was empirically investigated via statistical computation techniques. An initial inventory of 24 items pertaining to 21 biases as cited by Pompian (2006) was assessed. This, we believe, has increased the validity for this research. Initially, 500 questionnaires were distributed amongst the prospective respondents. However, we were able to use only 389 responses.

The questionnaires were filled in by the respondents without any influence from us, although they were made aware of various biases with oral examples. Hence, the questionnaires were self-administered in presence of a neutral facilitator (a volunteer for all physical collection of the questionnaires) of the same age group and socioeconomic background. Taking into consideration that a large number of the respondents had English as a second language, the statements were set only in English in a simplified style.

To increase the construct validity of this study, we have used triangulation in order to obtain evidence from multiple sources, that is, from the questionnaire and documentation. The questionnaire consisted of statements which were evaluated on a 5 - point Likert type scale.

The overall sample design is as follows:

↳ **Universe** : Adults above 18 years of age,

- ↪ **Sampling Frame** : List of investing clients from equity brokers in Surat City,
- ↪ **Sampling Unit** : A client investing in equity stocks,
- ↪ **Sampling Technique** : Non-probability convenience sampling method,
- ↪ **Sample Size** : 500, out of which 389 usable questionnaires were considered for data analysis.

Data Analysis and Results

(1) Demographics of the Respondents : The respondents were classified according to their demographics, that is, age, gender, marital status, education, occupation, annual income, and savings. The Table 1 shows the demographic distribution of the respondents.

The data were entered into Microsoft Excel and imported to SPSS and factor analysis supported by principal component analysis and was conducted to develop archetypes of investors based on the heuristics and biases they

Table 1. Demographic Distribution of the Respondents

Distribution of the Sample				
		Gender		Total
		Male 285	Female 104	389
Age	18-24	52	23	75
	25-40	138	52	190
	41-55	64	26	90
	>55	31	3	34
Marital Status	Single	83	39	122
	Married	202	65	267
Educational	Non-Graduate	26	12	38
Qualification	Graduate	110	35	145
	Post Graduate	149	57	206
Occupation	Not employed	31	9	40
	Service	123	66	189
	Professional	68	19	87
	Business	63	10	73
Income p.a.	Upto ₹ 2 lakh	73	46	119
	₹ 2 lakhs to ₹ 5 lakhs	116	28	144
	₹ 5 Lakhs to ₹ 10 lakhs	57	16	73
	More than ₹ 10 lakhs	39	14	53
Savings p.a.	Upto ₹ 1 lakh	160	61	221
	₹ 1 lakhs to ₹ 3 lakhs	77	32	109
	₹ 3 lakhs to ₹ 5 lakhs	23	9	32
	More than ₹ 5 lakhs	25	2	27

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.897
Bartlett's Test of Sphericity	Approx. Chi-Square	2257.816
	Df	276
	Sig.	.000

Table 3. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.408	26.700	26.700	6.408	26.700	26.700	2.395	9.979	9.979
2	1.654	6.893	33.594	1.654	6.893	33.594	2.389	9.956	19.935
3	1.189	4.956	38.550	1.189	4.956	38.550	2.339	9.745	29.679
4	1.148	4.785	43.335	1.148	4.785	43.335	2.069	8.620	38.299
5	1.073	4.473	47.808	1.073	4.473	47.808	1.583	6.595	44.894
6	1.057	4.404	52.211	1.057	4.404	52.211	1.451	6.044	50.938
7	1.010	4.207	56.419	1.010	4.207	56.419	1.315	5.480	56.419
8	.954	3.973	60.392						
9	.858	3.575	63.966						
10	.769	3.202	67.169						
11	.747	3.113	70.282						
12	.719	2.996	73.278						
13	.688	2.866	76.143						
14	.640	2.665	78.808						
15	.619	2.578	81.386						
16	.603	2.511	83.897						
17	.576	2.398	86.295						
18	.540	2.249	88.545						
19	.522	2.177	90.722						
20	.502	2.090	92.811						
21	.484	2.019	94.830						
22	.437	1.819	96.649						
23	.421	1.755	98.404						
24	.383	1.596	100.000						

Extraction Method : Principal Component Analysis

exhibited. The reliability of the measurement scales was determined by way of Cronbach's coefficient alpha technique, which indicates the acceptable internal consistency ($\alpha = 0.871$).

(2) Inferential Statistics : The research has come up with archetypes of investors based on heuristics and biases they exhibited. For this, a factor analysis was performed. After ensuring that the data was approximately multivariate normal through KMO and Bartlett's test and acceptable for factor analysis, we extracted six factors by using the method of principal component analysis and rotation method of varimax with Kaiser normalization

Table 4. Rotated Component Matrix^a

	Component						
	1	2	3	4	5	6	7
Use trend analysis.	.653						
Use of predictive skills to time and outperform.	.644						
Gains should be attributed to your competence.	.633						
Remain informed about fundamentals.	.608						
Treat each investment in portfolio separately.	.534						
Losses attributed to external circumstances.		.673					
Sell shares that increase in value faster.		.653					
Hold investments to avoid pain of loss.		.641					
Loss in last investment was due to bad luck.		.600					
Sell investment if it reaches acquisition price.		.514					
Interested in others' investments.			.730				
Discuss with peers to reduce pressure.			.636				
Previous profits in a stock make it attractive to invest.			.596				
Trading is affected by recent experiences.			.499				
Purchase price is used as a reference point.			.466				
Avoid shares that decrease in value faster.				.757			
Buy hot stocks and avoid poorly performing stocks.				.585			
Follow the trend.				.543			
Achieve goals due to self discipline.					.690		
Hold on to your last investment as prices will revert.					.538		
Rely on gut feelings to trust people.					.491		
Preference for local stocks and indices is more than it is for international stocks and indices.						.820	
Ignore connection between different equity investment possibilities.						.523	
Past history influences present investment decisions.							.744

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

^a Rotation converged in 8 iterations.

criteria of Eigen value more than one.

The KMO measures whether the distribution of values is adequate for conducting factor analysis. The result of KMO is greater than 0.8 (0.897), which depicts that it is meritorious. The Bartlett's test measures the multivariate normality of the data set. The significance value less than 0.05 indicates that the data does not produce an identity matrix and is thus approximately multivariate normal and acceptable for factor analysis.

There are six factors that are extracted by using the method of principal component analysis and rotation method of varimax with Kaiser normalization criteria of Eigen value more than one. The results of factor analysis are shown in total variance explained and rotated component matrix tables (Table 3 and Table 4).

The Table 4 indicates that Factor 1 has a variable related to illusion of control, overconfidence, mental accounting, and representativeness ; Factor 2 has a variable related to regret aversion, cognitive dissonance, overconfidence, loss aversion, and self attribution ; Factor 3 has a variable related to herding, hindsight, and anchoring ; Factor 4 has a variable related to regret aversion, representativeness, and herding ; Factor 5 has a

variable related to self control, regret aversion, and over optimism ; and Factor 6 has a variable related to ambiguity, mental accounting, & representativeness.

The variables thus isolated into specific factors help in categorizing the investors and empirically proving that they are archetypes distinct from each other. Archetypes are generic, idealized models of persons or of concepts. They are patterns of behavior and appearance that serve as moulds for personalities and for understanding (Voss, 2013). Depending upon the variables to which each factor is related, an attempt has been made to give names to these archetypes, which are : The Stereotypical Investor, The Nervous Investor, The Imitator, The Naïve Investor, The Cautious Investor, and The Passive Investor.

(3) Discussion of Archetypes

(i) The Stereotypical Investor : The first archetype are investors who typically believe that all their investment decisions are taken after due analysis of which they are thoroughly capable of ; they are the conventional, clichéd investors who feel that they are in complete control of the outcome of their decisions and are proud and confident about their analysis and calculations. Being highly organized, such investors categorize their financial assets into some form of mental accounts. They are also susceptible to using an instance to represent their investment style (see Table 5).

(ii) The Nervous Investor : This is another typical archetype who, being averse to regret and to losses as well, are very conservative in their investment choices and unlike the above category of investors, are overconfident about their risk averse style of investing. These investors experience a mental conflict, but still are not prepared to change their decisions because they attribute failure to outside influences of market forces.

(iii) The Imitator : Is very different from the first two archetypes as the Imitator follows the herd. If their investment decisions result in a loss, they find consolation in the fact that all investors largely have faced losses. They start comparing the stock price to a reference point and with the benefit of hindsight following an event, they falsely believe that they predicted the outcome of that event in the beginning.

(iv) The Naïve Investor : Investors who fall in this category are averse to regret from their investment decisions and hence do not have their own analyses and style of investing, and would rather follow the herd. They consider themselves to be inexperienced and immature, and make assessments of the degree of correspondence between an outcome and a generalization.

Table 5 . Archetypes of Investors

Factor	Variables	Common Name of the Factor
1	Illusion, overconfidence, mental accounting, & representativeness	The Stereotypical Investor/ hackneyed, humdrum
2	Regret aversion, cognitive dissonance, over confidence, loss aversion, self attribution	The Nervous Investor/ timorous or febrile
3	Herding, hindsight, anchoring	The Imitator/echo, epigone
4	Regret aversion, representativeness, herding	The Naïve Investor/ ingenuos, guileless
5	Self control, regret aversion, over optimism	The Cautious Investor/wary, chary
6	Ambiguity, mental accounting, representativeness	The Passive Investor/submissive, acquiescent

(v) The Cautious Investor : This investor is watchful of the market influences. They are averse to regrets and hence, do not want to lose their money by investing in stocks. They would rather consume today at the expense of saving for today and losing due to a sub - optimal investment decision. They take an inside view that focuses on the current situation and reflects personal involvement and not an outside view in which it is required to make an assessment of the current situation in a larger context. This makes such investors guarded, restrained, and cautious.

(vi) The Passive Investor : These investors prefer familiar to the unfamiliar, are hesitant, and feel they are less competent. They start comparing the stock price to a reference point and start categorizing their financial assets into some form of mental accounts. They want their portfolios to remain inert to the market influences and are ,therefore, found to be inactive in their investment decision making process.

This is the practical application of the statistical results so arrived at. The statistical results have helped in researching for very specific categories of investors and the traits that they exhibit. The number of biases that have been taken into consideration is 21, and the study makes an attempt to cover a majority of aspects of those irrational behaviors of the investors that render their investment decisions sub-optimal.

(4) Reliability Analysis : The Cronbach's alpha is computed to measure the reliability of factors extracted from factor analysis. The results are shown in the Table 6. The Cronbach's alpha helps in measuring the reliability of item loading into six factors. Since the value of Cronbach's alpha is more than 0.500 for the first four factors, it indicates that first four factors are consistent and reliable ; whereas, the value of Cronbach's alpha for fifth and sixth factors is less than 0.500 ; hence, this indicates that they are less consistent and reliable.

Table 6. Reliability Test

Factors	Cronbach's Alpha	No. of items
1	0.712	5
2	0.746	5
3	0.688	5
4	0.600	3
5	0.494	3
6	0.468	2

Research Implications

This research paper is aimed as a recommendation to investors to not only be aware of the biases which they are susceptible to, but also keep a check on them while making financial decisions. Understanding their own archetype/ segment in which they fall will help them in knowing about their own weaknesses in the investment decision making process. This will give investors a better chance to achieve desired outcomes in the stock market. Classifying investors into archetypes/ segments will also help portfolio managers and financial advisors in devising diagnostic tests which they may apply in their client relationships that will result in better outcomes. This will not only result in improving the quality of their advice, but will also help them in structuring better asset allocations customized to suit their clients. The knowledge of the client-archetype along with data on risk preference, financial goals, and asset class preferences of the financial advisors can decide whether to moderate or to adapt to irrational client preferences. Ultimately, this will make way for greater market efficiency.

Limitations of the Study and Scope for Further Research

The research deals with the influence of biases at a behavioral level. The roots of these biases can also be traced at a neurological level. In terms of future research, there is scope to integrate research from multidisciplinary areas like finance, behavioral economics, and neuroeconomics and find out how decisions are made and how the decision making process can be improved. When the neoclassical model of rational decision making is complemented with insights of behavioral economics and neuroeconomics, the model becomes more veracious and accurate. Techniques like confirmatory factor analysis leading to structural equation modeling can be employed to check for a high degree of correlation among the archetypes. The questionnaire survey method, which was the tool employed to gather data, is one of the main limitations of this study, albeit the only practical option to reach real investors. Any study undertaken in this direction with the target audience in mind will provide limitless opportunities to come up with creative experimental premises. Furthermore, methods like game theory and probabilistic logic can be used while setting up the premises for a detailed and more advanced study. The nature of the field promises that a researcher would be presented with many opportunities to be innovative and creative.

References

- Bailard, T.E., Biehl, D.L., & Kaiser, R.W. (1986). *Personal money management* (5th ed.). Chicago, IL : Science Research Associates.
- Baker, H.K., & Nofsinger, J.R. (2002). Psychological biases of investors. *Financial Services Review*, 11 (2), 97 - 116.
- Barnewall, M.M.(1987). Psychological characteristics of the individual investor. In W. Droms (ed.), *Asset allocation for the individual investor*. Charlottesville, VA : The Institute of Chartered Financial Analysts.
- Benartzi, S., & Thaler, R. (1995). Myopic loss aversion and equity premium puzzle. *The Quarterly Journal of Economics*, 110(1), 73 - 92.
- Brown, P., Chappel, N., Rosa, R. D. S., & Walter, T. (2006). The reach of the disposition effect: Large sample evidence across investor classes. *International Review of Finance*, 6 (1/2), 43 - 78.
- Campbell S. D., & Sharpe, S. A. (2009). Anchoring bias in consensus forecasts and its effect on market prices. *Journal of Financial and Quantitative Analysis*, 44 (2), 369 - 390.
- Chandra, A., & Kumar, R. (2012). Factors influencing Indian individual investor behaviour : Survey evidence. *Decision*, 39(3), 141 - 167.
- Chen, G., Kim, K. A., Nofsinger, J. R., & Rui, O. M. (2007). Trading performance, disposition effect, overconfidence, representativeness bias, and experience of emerging market investors. *Journal of Behavioral Decision Making*, 20 (4), 425 - 451.
- Clark-Murphy, M., & Soutar, G. (2005). Individual investor preferences: A segmentation analysis. *The Journal of Behavioral Finance*, 6 (1), 6 -14.
- Dedu, V., Turcan, S., & Turcan, R. (2012). An introduction to behavioral corporate finance. *Annals of the University of Oradea, Economic Science Series*, 21(2), 471 - 476.

- Fogel, S., & Berry, T. (2006). The disposition effect and individual investor decisions: The roles of regret and counterfactual alternatives. *The Journal of Behavioral Finance*, 7(2), 107 - 116.
- Garg, A., & Jindal, K. (2014). Herding behaviour in an emerging stock market: Empirical evidence from India. *The IUP Journal of Applied Finance*, 20(2), 18 - 36.
- Garg, A., & Gulati, R. (2014). Do investors herd in Indian market. *Decision*, 40(3), 181-196.
- Graham, J. R., Harvey, C. R., & Huang, H. (2009). Investor competence, trading frequency, and home bias. *Management Science*, 55(7), 1094 - 1106.
- Glaser, M., & Weber, M. (2005). September 11 and stock return expectations of individual investors. *Review of Finance*, 9(2), 243 - 279.
- Gunnarson, J., & Wahlund, R. (1997). Household financial strategies in Sweden: An exploratory study. *Journal of Economic Psychology*, 18(2), 211 - 233.
- Hon - Snir, S., Kudryavtsev, A., & Cohen, G. (2012). Stock market investors : Who is more rational, and who relies on intuition ? *International Journal of Economics and Finance*, 4(5), 56 - 72.
- Jain, R., Jain, P., & Jain, C. (2015). Behavioral biases in the decision making of individual investors. *IUP Journal of Management Research*, 14(3), 7 - 28.
- Kahneman, D., & Riepe, M.W. (1998). Aspects of investor psychology. *Journal of Portfolio Management*, 24(4), 52 - 65.
- Kahneman, D., & Tversky, A. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124 - 1131.
- Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science*, 39(1), 17 - 31.
- Kasilingam, R., & Jayabal, G. (2010). Segmentation of investors based on choice criteria. *ICFAI Journal of Behavioural Finance*, 7(1/2), 76 - 91.
- Keren, G., & Teigen, K.H. (2004). Yet another look at the heuristics and biases research program. In D. J. Koehler & N. Harvey (eds), *Blackwell handbook of decision making* (pp. 89 - 109). Oxford : Blackwell.
- Kivetz, R. (1999). Advances in research on mental accounting and reason-based choice. *Marketing Letters*, 10(3), 249 - 266.
- Kliger, D., & Kudryavtsev, A. (2010). The availability heuristic and investors' reaction to company - specific events. *Journal of Behavioral Finance*, 11(1), 50 - 65.
- Knetsch, J. L. (1989). The endowment effect and evidence of non - reversible indifference curves. *The American Economic Review*, 79(5), 1277 - 1284.
- Kumar, S., & Goyal, N. (2015). Behavioural biases in investment decision making : A systematic literature review. *Qualitative Research in Financial Markets*, 7(1), 88 - 108.
- Lehenkari, M., & Perttunen, J. (2004). Holding on to losers: Finish evidence. *Journal of Behavioral Finance*, 5(2), 116 - 126.
- Landberg, W. (2003). Fear, greed and madness of markets. *Journal of Accountancy*, 195(4), 79 - 82.

- Lim, S. (2006). Do investors integrate losses and segregate gains ? Mental accounting and investor trading decisions. *Journal of Business*, 79(5), 2539 - 2573.
- Loibl, C., & Hira, T.K. (2009). Investor information search. *Journal of Economic Psychology*, 30(1), 24 - 41.
- Lovric, M., Kaymak, U., & Spronk, J. A. (2008). *Conceptual model of investor behavior* (ERIM Report Series Reference No. ERS-2008-030-FandA). Retrieved from <http://ssrn.com/abstract/41144293>
- Massa, M., & Simonov, A. (2005). Behavioral biases and investment. *Review of Finance*, 9(4), 483 - 507.
- Mahajan, J. (1992). The overconfidence effect in marketing management predictions. *Journal of Marketing Research*, 29, 329 - 342.
- Mittal, M., & Vyas, R.K. (2008). Personality type and investment choice : An empirical study. *ICFAI Journal of Behavioural Finance*, 5(3), 6 - 22.
- Nagpal, S., & Bodla, B.S. (2009). Impact of investors' lifestyle on their investment pattern: An empirical study. *The ICFAI University : Journal of Behavioral Finance*, 6(2), 28 - 51.
- Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, 2(2), 175 - 220.
- Oberlechner, T., & Osler, C. (2009). *Overconfidence in currency markets*. Retrieved from <http://people.brandeis.edu/~cosler/documents/Overconfidence.pdf>
- Olsen, R. A. (2008). Cognitive dissonance: The problem facing behavioral finance. *Journal of Behavioral Finance*, 9(1), 1-4.
- Pompian, M. M. (2006). *Behavioral finance and wealth management: How to build optimal portfolios that account for investor biases*. New York, NY : Wiley Finance.
- Pompian, M.M. (2008). Using behavioral investor types to build better relationships with your clients. *Journal of Financial Planning*, 21(10), 64 - 76.
- Pompian, M. (2012). Behavioral finance and investor types. *Private Wealth Management Feature Articles*, 2012 (1), 1-3.
- Prast, H. (2004). *Investor psychology : A behavioural explanation of six finance puzzles*. Research Series of De Nederlandsche Bank, Amsterdam. Retrieved from https://www.dnb.nl/en/binaries/mebserie2004-03_tcm47-147352.pdf
- Rabin, M. (1998). Psychology and economics. *Journal of Economic Literature*, 36(1), 11- 46.
- Raut, R. K., & Das, N. (2015). Behavioral prospects of individual investor decision making process: A review. *Indian Journal of Finance*, 9(4), 44 - 55. doi:10.17010/ijf/2015/v9i4/71457
- Ritter, J.R. (2003). Behavioral finance. *Pacific-Basin Finance Journal*, 11(4), 429 - 437.
- Ritov, I., & Baron, J. (1992). Status-quo and omission biases. *Journal of Risk and Uncertainty*, 5(1), 49 - 61.
- Ritov, I., & Baron, J. (1995). Outcome knowledge, regret, and omission bias. *Organizational Behavior and Human Decision Processes*, 64(2), 119 - 127.
- Sahi, S. K., & Arora, P. (2012). Individual investor biases: A segmentation analysis. *Qualitative Research in Financial Markets*, 4(1), 6 - 25.

- Shanmugsundaram, V., & Balakrishnan, V. (2011). Investment decisions - Influence of behavioural factors. *Indian Journal of Finance*, 5 (9), 25 - 34.
- Shefrin, H. (2002). *Beyond greed and fear : Understanding behavioral finance and the psychology of investing*. Boston, MA : Harvard Business School Press.
- Shefrin, H. (2007). *Behavioral corporate finance: Decisions that create value*. Boston : McGraw-Hill/Irwin.
- Singh, H. P., Goyal, N., & Kumar, S. (2016). Behavioural biases in investment decisions: An exploration of the role of gender. *Indian Journal of Finance*, 10 (6), 51 - 62. doi:10.17010/ijf/2016/v10i6/94879
- Talpsepp, T. (2011). Reverse disposition effect of foreign investors. *Journal of Behavioral Finance*, 12 (4), 183 - 200.
- Taylor, S. E., & Brown, J. D. (1998). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, 103 (2), 193-210.
- Valence, N. (2001). Bright minds, big theories. *CFO*, 17, 64 - 70.
- Voss, J. A. (2013). Investment archetypes. *Journal of Behavioral Finance*, 14(1), 79 - 81.
- Warren, W.E., Stevens, R.E., & Mc Conkey, C.W. (1990). Using demographic and lifestyle analysis to segment individual investors. *Financial Analysts Journal*, 46 (2), 74 - 77.
- Wood, R., & Zaichkowsky, J.L. (2004). Attitudes and trading behaviour of stock market investors: a segmentation approach. *The Journal of Behavioral Finance*, 5 (3), 170 - 179.

About the Authors

Dr. Meghna Dangi is presently working as an Assistant Professor at AURO University and has over 16 years of experience out of which 10 years have been in academics. Being intrigued academically by Psychological Aspects of Investor Behavior, she has published research papers in the field of Biases in Investment Decisions in leading international and national journals as well as has made presentations in academic conferences.

With over 14 years of academic experience, Dr. Bindya Kohli is currently working with Symbiosis School of Banking and Finance as an Associate Professor. She has authored papers in the areas of Behavioral Finance, Banking, and Finance, which have been published in indexed (Scopus) and other refereed journals and edited books. She has also presented papers at various international and national conferences.