The Relationship Between Personality Characteristics and Perceptual Illusions in Regional Stock Exchange in Selected Cities (Zahedan, Mashhad and Zanjan)

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Abstract: One of the main factors in financial decisions of stockholders is perceptual illusion which affects their decision-making when trading stocks. The purpose of this study is to investigate the common perceptual illusion among stockholders and their relation to the stockholder' characters. To conduct this study, 200 stockholders from regional stock exchange of the selected cities were selected randomly because the population was not limited and the required data were collected through questionnaires. The research method was descriptive-correlational. Pearson's product-moment correlation coefficient and linear regression were used as the statistical tests and the data were analyzed through SPSS Software, Version 18. The results of pearson's correlation coefficient between the research variables shows the following results: a positive relationship between conscientiousness with overconfidence and self-attribution; a negative relationship between agreeableness and cognitive-dissonance; a positive relationship between neuroticism and cognitive-dissonance; a positive relationship between openness to experience with over-confidence, conservatism, self-attribution, availability, cognitive-dissonance, herd behavior and total scores of perceptual illusion. The results of linear regression test showed that conscientiousness could explain 9.5% of the variance for overconfidence and 9% of the variance in self-attribution. The extraversion variable could not predict any of the subscales of perceptual illusion and its total scores. The results also showed that neuroticism and agreeableness could explain 12.5 and 12.9% of the variance in consistency respectively. Finally, the linear regression results showed that openness to experience could explain 17.3% of the variance in overconfidence, 7.8% of the variance in conservatism, 9.5% of the variance in self-attribution, 16.2% of the variance in availability, 10.7% of the variance in consistency, 12.6% of the variance in herd behavior, 13.2% of the variance in unison and 87.3% of the total scores of the perceptual illusion.

Key words: Investment decisions, perceptual illusion, stock exchange, personality, characteristics

INTRODUCTION

The emerging field of behavioral science in financial issues is a new approach to the study of financial markets. Unlike standard financial topics and theories, this approach holds that behavioral and cognitive tendencies can affect the prices of financial assets. Unlike Sharpe and Markowitz's theories and approaches, behavioral finance and investment issues are related to people and the ways information is collected and used. This aspect of financial and investment decisions follows understanding and prediction of the intervention and effect of psychological decisions in the financial markets. Roughly speaking, the history of behavioral finance goes back to the early seventies.

This combined branch of financial sciences which in fact includes psychology and social sciences employed for a better analysis of issues of the financial markets, usually studies the decision-making process of investors and their reactions in different conditions of financial markets. It mostly emphasizes on the influence of personality, culture and judgments of investors on investment decisions. Due to the specific cultural structures in Iran and their influence on individual and herd behaviors of people, it is necessary for those engaged in the market to have a proper understanding of analytic and cognitive theories and models of behavioral finance. The fact that sometimes we observe that instead of having bilateral demand, the market is facing unilateral demand and people are lined up for either buying or selling, is undoubtedly one of the examples of specific behavioral patterns prevailing in the market. Behavioral Finance helps us that with formulating behavioral models we can better understand our capital market and have a better performance in removing some of the setbacks resulting from our behavioral patterns.

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Statement of the problem: The prediction of the behavior of the stock market is a challenging and crucial financial issue. Predictive models are needed by both legislators and investors that aim to maximize profits. Development of these models is challenged for several reasons (Robin and Bierlaire, 2012). Many of these models and financial theories are based on this view that investors act perfectly rational and they take into account all available information in their decision-making process (Thomas and Rajendran, 2012); particularly, the investors who through using various combinations of risk and return, try to maximize their utility. According to the theory of rational economic man, individuals consider all aspects at the time of investment decisions and make the most rational decisions. But, the emergence of phenomena such as speculative bubbles in the stock market, excessive fluctuations in stock prices and unilateral demand in the market is against to the assumption that investors are rational and indicates that there are some factors which cause irrational behavior and affect the decisions making which is the result of the inefficiency of financial markets (Thomas, 2003). According to Daniel Kahneman's theory, due to the complexity of real-world decision-making process and limited cognitive capacity, people do not act rationally with rational economics theory (Thomas and Rajendran, 2012). On the other hand, we can help investors achieve long-term financial objectives by identifying their personality traits and behavioral deviations and providing them with programs that reduce the extent of deviation from the long-term decisions (Pompian and Longo, 2004). Therefore, according to the importance of the capital market of Iran and its role in attracting retail investors, we aim to study the relationship between personality characteristics of the investors and the perceptual illusions they cause.

Research objectives: Given the importance of behavioral finance issues in the financial markets, the aim of this study is to determine the relationship between personality characteristics of the investors and the perceptual illusions identified in the behavioral finance literature and also to recognize the importance of the behavioral factors that influence individuals' decision-making in the stock Exchange and a result to reduce illusions among investors.

Research questions:
- Is there any significant relationship between conscientiousness and perceptual illusions of investors in the regional stock exchange in Iran?
- Is there any significant relationship between extraversion and perceptual illusions of investors in the regional stock exchange in Iran?
- Is there any significant relationship between agreeableness and perceptual illusions of investors in the regional stock exchange in Iran?
- Is there any significant relationship between neuroticism and perceptual illusions of investors in the regional stock exchange in Iran?
- Is there a significant relationship between openness to experience and perceptual illusions of investors in the regional stock exchange in Iran?

Theoretical framework of the research: In addition to rational expectations, it is necessary to elaborate on the new factors explaining stock returns in the financial markets. Behavioral finance paradigm explains how the investors behave and how their behavior can affect the financial markets (Kim and Nofsinger, 2008) It also helps the investors learn how to act rationally (Bhatta, 2009). Behavioral finance assesses the subtle aspects and interactions of the human brain in facing the uncertainty in financial decisions. Accordingly, this subject studies the effect of social, emotional, and cognitive factors upon financial investment decisions and its consequences for interest and allocation of resources (Guzavicius *et al.*, 2014). The review of literature shows how personality traits of retail investors affect their investment decisions. A common theme in the research literature suggests that personality traits influence investors' perception of risk.

In turn, risk perception represents the behavior of retail investors (Thomas and Rajendran, 2012). Since the activities and decisions of the investors in the market greatly influence their success and failure, the assessment of the psychology of the investors in the market is very important. Keynes (1936) was the first person who observed the investors' overreaction in the stock markets through analysis of the daily fluctuations of the investment returns. Akerlof and Shiller (2009) replaced rationality hypothesis with the behavior of the investors to explain the fluctuations in the market interest. They attributed economic problems specifically with what they called animal spirit and expanded the general theory developed by Keynes (1936). Then, they defined the animal spirit as "the need for involuntary action than inaction". They also observed that many economic activities with rational economic motivations and the people who have non-economic reasons are governed by animal spirit. According to this view, they stated that it is necessary to combine the animal spirit with macroeconomic theory in order to understand how the economy works. Expanding the Keynesian view, they referred the animal spirit of investors to irrational behavior. In the modern economy, the animal spirit has been introduced as an economic term that refers to restlessness and contradictions existing in today's economy.

Table 1: Five-factor model of personality

Openness (vs. closedness) to experience	Conscientiousness (vs. lack of direction)	Extraversion (vs. introversion)	Agreeableness (vs. antagonism)	Neuroticism (vs. emotional stability)
Fantasy	Competence	Warmth	Trust	Anxiety
Aesthetics	Order	Gregariousness	Straightforwardness	Hostility
Feelings	Dutifulness	Assertiveness	Altruism	Depression
Actions	Achievement striving	Activity	compliance	Self-consciousness
Ideas	Self-discipline	Excitement seeking	Modesty	Impulsiveness
Values	Deliberation	Positive emotion	Tendermindedness	Vulnerability to stress

Costa and mac care, 1992

Kahneman and Tversky (1979) also stated that the individual's behavior varies in theory and practice and that general financial models fail to explain and predict all financial decisions. Itter (2003) stated that behavioral finance is trying to complete the financial standard theories through the introduction of behavioral and psychological dimension in the investment process. On the other hand Levy and Post introduced behavioral finance as a theory that is able to explain the inefficiency and disorder in the market. Chang and Luo in their study, investigated the mistakes made by investors in the stock pricing and their effect on the future stock returns. According to them, the illusions in pricing stocks by investors have a greater power in connection with future stock returns in comparison to factors such as firm size and the ratio of the book value to the market value of equity. Their evidence is consistent with the investors' overreaction. In another research, Bailey *et al.* (2010) studied behavioral biases of the investors of mutual fund. The results of their study showed that the investors who have behavioral biases usually adopt a weaker investment decision in comparison to the other investors. Babajide and Adetiloye (2012) studied the behavioral biases of the investors in the stock market in Nigeria. The results showed a strong evidence about the existence of the behavioral biases in the stock market in Nigeria. But it is not dominant in this market, because there is a weak negative relationship between the behavioral biases and performance of the stock market in Nigeria. With the publication and the initiative of NEO Five-Factor tests, Mc Care and Costa introduced the five dimensional model of personality. This model primarily had three dimensions: neuroticism, extraversion, and openness. And then, the two dimensions of conscientiousness and agreeableness were added. In Table 1, a brief description of each of the dimensions of this model is presented as in follows:

In this study, the dimensions of five-factor model function as the independent variables. On the other hand, since the relationship between personality traits and perceptual illusions has not been studied in regional forums, the relationship between personality characteristics and perceptual illusions is investigated in three regional forums of Zanjan, Zahedan and Mashhad. As such, the investors' perceptional illusions which

constitute a total of seven illusions of overconfidence, self-attribution, availability, consistency, conservatism, unison and herd behavior are taken as the dependent variables. In the following a brief explanation of each perceptual illusion is presented.

Overconfidence bias: Overconfidence causes in person's overestimating of his knowledge and skills, underestimating the risks and feeling that he has everything under the control. While it may not be the case, indeed (Pompain, 2006).

Availability bias: it can serve as a constructive stimulus in decisions related to the investment portfolio (Kim and Nofsinger, 2008). Availability bias indicates the person's tendency to make decisions and judgments based on the information which is ready and available (Kahneman and Tversky, 1979).

Self-attribution bias: One of the theories in psychology is the "theory of relativity". According to this theory, people try to ascribe their success to their own abilities and their failure to bad luck or they may blame others for their failures (Daniel *et al.*, 2002). This behavior can lead to excessive risk (Pompain, 2006).

Herd behavior bias: Herd behavior is one of those behaviors that lead investors in the market to ignore their own predictions and opinions in relation to the stock price and to adopt investment decisions only on the basis of the general behavior of the market and it's a form of blind imitation of one another (Devenow and Stickland, 1996).

Consistency bias: It is a response in the form of conflict and struggle to catch up conflicts and thus to overcome mental distress. Psychologists believe that people often resort to inaccessible justification and rationalization in order to make it consistent through their perception and understanding, in order to maintain their psychological stability. In this process, they make some modifications which are not always in their favor logically (Pompain, 2006).

Conservatism bias: This bias is a mental process that causes people to seize upon their past views or predictions and to ignore new information or to respond to them less than necessary (Pompain, 2006).
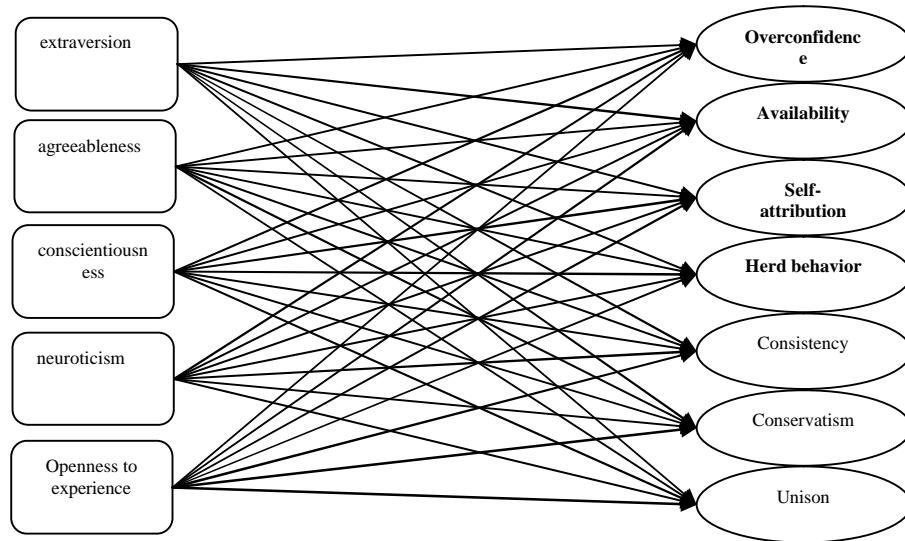
Fig. 1: Conceptual model

Unison bias: The specific situation of each individual can affect his judgment and evaluation. For example, classical music fans, probably overestimate the number of people interested in classical music. In other words, people generally prefer investments that they feel are consistent with their personality (Pompain, 2006).

These illusions cause many investors to pay special attention to their funds for investment. Since, investors invest most of their funds in the stock market, these illusions play a role in their ways of investing in their assets and funds (Downs, 2004). Accordingly, the aim of this research is to reduce the amount of illusions in investment. Understanding these types of illusions as investors' perceptual illusions and taking appropriate action to resolve them make it possible to reduce their effect on investors' decisions and potentially lead to improved investment results. Finally, the conceptual model of the research is presented in Fig. 1.

MATERIALS AND METHODS

The objective of the present research is practical and in terms of data collection, it's descriptive-correlational. The research population consists of all investors, experts and specialists of investment institutions, pension funds, financing institutions, stock exchange brokers, mutual funds in regional stock exchange in Mashhad, Zanjan, and Zahedan. The research sample is based on the random sampling type, given the infinity of the research population. Accordingly, 200 subjects were selected as the sample. For data collection, two questionnaires were used with a total of 76 questions. And their reliability was tested by Cronbach's alpha. Finally, the correlation method was used to analyze the data.

RESULTS AND DISCUSSION

In any research, the analysis of the data is of special important in order to answer the research questions. In order to analyze the data collected and to examine the relationships between variables pearson's product-moment correlation coefficient was used. And then linear regression analysis was used. The studied sample consisted of 57 males and 143 famales. Also 40% of the subjects were under 30 years of age, 37.5% aged 30-40 years, 16% aged 40-50 years and finally 6.5% were higher than 50 years of age. Of this number, 44.5 percent had less than a year experience and the rest had experience of more than a year in the market. The respondents to questions reveal their demographic aspects and investment models. Questionnaire was used to collect the initial data. Respondents were asked to respond to each question according to Likert scale. The profile of the respondents is presented in Table 2.

Consequently, in order to analyze the relationship between dependent and independent variables, the Pearson correlation coefficient was used. The results of the analysis and the answers to research questions are presented in Table 3.

The results of correlation test indicate significant relationship (at significance level of 0.01) between conscientiousness and self-attribution (correlation coefficient 0.198), agreeableness and consistency (correlation coefficient-0.213), Neuroticism and consistency (correlation coefficient 0.205), openness to experience and overconfidence (correlation coefficient 0.310), openness to experience conservatism (correlation

coefficient 0.239), openness to experience and self-attribution (correlation coefficient 0.203), openness to experience and availability (correlation coefficient 0.234), openness to experience and consistency (correlation coefficient 0.222), openness to experience and herd behavior (correlation coefficient 0.302), openness to experience and unison (correlation coefficient 0.358) and openness to experience and total scores of perceptual illusion (correlation coefficient 0.423). Finally, in order to predict the subscales of perceptual illusions linear regression was used. The results are presented in Table 4.

The results of linear regression test showed that conscientiousness could explain 9.5% of the variance for overconfidence and 9% of the variance in self-attribution. The extraversion variable could not predict any of the subscales of perceptual illusion and its total scores. The results also showed that neuroticism and agreeableness could explain 12.5% and 12.9% of the variance in consistency respectively. Finally, the linear regression results showed that openness to experience could explain

17.3% of the variance in overconfidence, 7.8% of the variance in conservatism, 9.5% of the variance in self-attribution, 16.2% of the variance in availability, 10.7% of

Table 2: Investors profile

Demographic factors	Frequency	Frequency (%)
Sex		
Male	57	28.5
Female	143	71.5
Age		
Under 30 years	80	40.0
Between 30 and 39 years	75	37.5
Between 40 and 50 years	32	16.0
Over 50 years	13	6.5
Education		
Diploma	45	22.5
Associate Degree	33	16.5
bachelors	76	38.0
masters	45	22.5
Ph.D	1	0.5
Record attendance at stock exchange		
Less than 1 year	89	44.5
Between 1 and 4 years	56	28.0
Between 5 and 10 years	45	22.5
More than 10 years	10	5.0

Table 3: The results of correlation test

Test	Overconfidence	Conservatism	Self-attribution	Availability	Consistency	Herd behavior	Unison	Total scores of Pearson perceptual illusion
Conscientiousness								
Coefficient	0.180	0.001	0.198**	0.003	-0.101	0.093	0.112	0.11
significance level	0.011	0.986	0.005	0.967	0.156	0.191	0.131	0.12
Extraversion								
Coefficient	0.122	-0.016	0.082	0.012	0.07	0.067	0.064	0.094
Significance level	0.068	0.825	0.247	0.868	0.324	0.345	0.37	0.183
Agreeableness								
Coefficient	0.112	-0.047	0.089	-0.019	-0.213**	0.037	-0.024	-0.010
Significance level	0.113	0.509	0.212	0.793	0.002	0.604	0.733	0.891
Neuroticism								
Coefficient	-0.097	0.000	-0.089	0.134	0.205**	0.046	0.099	-0.038
Significance level	0.173	0.999	0.210	0.059	0.004	0.518	0.164	0.591
Openness to experience								
Coefficient	0.310**	0.239**	0.203**	0.234**	0.222**	0.302**	0.358**	0.423**
Significance level	0.000	0.001	0.004	0.001	0.002	0	0	0

*$p<0.05$; $p<0.01$**

Table 4: The results of linear regression test

Five-factor model of personality variables	Perceptual illusions	The regression coefficient	Beta	t-test	The significance level
Conscientiousness	Overconfidence	0.095	0.144	2.047	0.042*
	Conservatism	-0.010	-0.025	-0.358	0.721
	Self-attribution	0.090	0.163	2.324	0.032*
	Availability	0.008	0.100	0.137	0.891
	Consistency	-0.046	-0.081	-1.146	0.253
	Herd behavior	0.042	0.084	1.190	0.236
	Unison	0.042	0.097	1.375	0.171
	Total scores of perceptual illusion	0.231	0.091	1.282	0.201
Extraversion	Overconfidence	0.078	0.123	1.725	0.086
	Conservatism	-0.006	-0.016	-0.221	0.825
	Self-attribution	0.044	0.082	1.161	0.247
	Availability	0.009	0.012	0.167	0.868
	Consistency	0.049	0.070	0.990	0.324
	Herd behavior	0.032	0.067	947.000	0.345
	Unison	0.027	0.064	0.898	0.370
	total scores of perceptual illusion	0.223	0.094	1.336	0.183

Table 4: Continue

Five-factor model of personality variables	Perceptual illusions	The regression coefficient	Beta	t-test	The significance level
Agreeableness	Overconfidence	0.0790	0.112	1.593	0.1130
	Conservatism	-0.0190	-0.047	-0.661	0.0509
	Self-attribution	0.0520	0.019	1.253	0.2120
	Availability	-0.0160	-0.019	-0.262	0.0793
	Consistency	-0.1290	-0.213	-3.073	0.0020**
	Herd behavior	0.0190	0.037	0.517	0.6060
	Unison	-0.0110	-0.024	-0.342	0.7330
	total scores of perceptual illusion	-0.0250	-0.010	-0.138	0.0891
Neuroticism	Overconfidence	0.0680	-0.097	-1.367	0.1730
	Conservatism	3.4270	0.000	0.001	0.9990
	Self-attribution	-0.0520	-0.089	-1.257	0.2100
	Availability	0.1170	0.134	1.902	0.0590
	Consistency	0.1250	0.205	3.95	0.0040**
	Herd behavior	0.0240	0.046	0.648	0.5180
	Unison	-0.0460	-0.099	-1.398	0.1640
	Total scores of perceptual illusion	0.0990	0.038	0.538	0.5910
Openness to experience	Overconfidence	0.1730	0.173	4.584	0.0000**
	Conservatism	0.0780	0.239	3.463	0.0010**
	Self-attribution	0.0950	0.203	2.910	0.0040**
	Availability	0.1620	0.234	3.382	0.0010**
	Consistency	0.0107	0.222	3.209	0.0020**
	Herd behavior	0.1260	0.302	4.461	0.0000**
	Unison	0.132	0.358	5.403	0.000**
	total scores of perceptual illusion	0.873	0.423	6.578	0.000**

*p<0.05; **p<0.01

the variance in consistency, 12.6% of the variance in herd behavior, 13.2% of the variance in unison and 87.3% of the total scores of the perceptual illusion.

Many internal and external factors can affect people's buying process. for external factors one can refer to economic, political and cultural ones but what this research has analyzed are internal (psychological) factors. Psychological factors have significant effect on investment decisions and these psychological factors distinguish individuals from each other. Based on the results of this study, it can be concluded there is a significant correlation between personality and perceptual illusions of investors.

CONCLUSION

The results of the research show that there is a significant positive relationship between conscientiousness and self-attribution and over confidence illusions. Thus, the investors are recommended to separate the good decisions from the bad ones through post-event analysis, so that they can make the best decision. Also, investment advisors are recommended to strengthen these people's realistic sense so that they can reduce these illusions. In addition, the results showed no significant relationship between extraversion and perceptual illusions. On the other hand, there is a negative and significant relationship between

agreeableness and consistency illusion. Therefore, the investors are recommended to reduce agreeableness illusions through changing beliefs. The advisors are also recommended to strengthen the investors' sense of consistency in people by necessary training. The other results of the study show that there is a significant positive relationship between neuroticism and agreeableness. Accordingly, the investors are advised to justify rationally any action that is inconsistent with their beliefs and adopt the most rational decision. Investment advisors are also recommended to try to overcome the investors' anxiety and stress through necessary training. Finally, the results indicate a significant positive relationship between openness to experience and illusions of overconfidence, conservatism, self-attribution, availability, herd behavior, unison, agreeableness and total scores of perceptual illusion. Thus, investors should analyze their decisions and try to improve their position if their decisions are found to be wrong and as such, become a superior investor in the long term. Also, they should use the information systems which simplify access to information in order to reduce availability bias.

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