The Study of Relationship Between Personality Type of Investors with Perceptual-Cognitive and Perceptual-Feeling Errors in their Investments (Case Study: Hamedan Stock Exchange)

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Abstract: Conceptual errors are divided into cognitive and feeling categories which have significant effects on investor's decisions in the financial field. On the other hand, investors have also different personality and due to personality differences move toward the specific types of cognitive errors. The purpose of this study is to examine the relationship between personality type of investors and their conceptual errors in investments. For this purpose, 384 active investors with trading code on Hamedan Stock Exchange were selected as sample and data was collected through a questionnaire by random sampling. To determine the validity of the hypothesis, Correlation tests or ETA coefficient (h2), Hotelling rule, One-Way Analysis of Variance (ANOVA), Tukey' Multiple Comparison test (HSD) and the Least Significant Difference test (LSD) was used. Obtained Eta coefficient for the first and second hypotheses indicate the relationship between the variables. Also, significant level is <0.05 in both hypotheses and this approves the significant differences between personality's types in cognitive and feelingperceptual errors. Obtained Eta coefficient is more in feeling perceptual errors compared to cognitive perceptual errors; therefore, influence of these errors was evaluated on personality of higher investors.

Key words: Behavioral finance, personality type, cognitive error, feeling error, investment

INTRODUCTION

Studies in the field of behavioral finance show that human decision making is not a perfectly rational process but the decision maker uses mental shortcuts in the process that may lead to non-optimal decisions (Mostafaei, 2011).

Evolution of financial theory can be examined in three parts. The first partis traditional financial and financial statements were discussed in order toinvestment and making decisions. In the second part, the modern financial theories were mentioned based on rational decisions of investors and efficiency of capitalmarket, this means that the decision-maker to evaluate the holistic problem-solving methods and finally take the best decision possible. This decision is taken during in a market called efficient market, where price determines and reflects total data of market and allows investors to ensure that they all have the same information.

Price is unpredictable in this market. Investors in the capital market in order to gain efficiency and profit should select between different investment options; they make some errors during the decision making but errors are part of the learning process. Some of these errors are systematic affect the structure of the human mind and leads to wrong decisions and bias of reality.

On the other hand, some people are more profitable than others in the market capital (Kakeh, 2013). Following these imbalances, a topic called behavioral finance was introduced which is important in both micro and macro levels. Behavioral finance have shown the role of psychological factors in the financial environment and the behavior of economic actors that are influenced people in the real world of emotions and behavior by behavioral errors will have less than optimal values of the classical theories of economic and financial theory of rational economic (Mahzoon, 2009).

At the micro level, the assumption of traditional finance perfect rationality is undermined and the question is whether investors behave rational or cognitive errors can affect their financial decisions?

At the macro level, the financial markets and its characteristics are examined and include behavioral finance confrontation with classical financial theory, especially the theory of efficient capital market (Saadi et al., 2010).

In the behavioral finance literature, the explained errors are called perceptual errors (Pampin, 2009). In this

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study, ten cases if cognitive and feeling perceptual errors in two categories has been discussed (Otuteye and Siddiquee, 2015). Most of the financial and economic theories assume that investors act rationally when making decisions but sometimes cause irrational behavior andaffect their decisions due to the inefficiency of financial markets (Filbeck *et al.*, 2005).

So, insufficient information leads to behavioral biases. In summary, behavioral biases have been defined as systematic errors in judgment (Otuteye and Siddiquee, 2015). Some scholars classified these biases (desires) in two categories of cognitive perceptualand feeling perceptual (Baker and Wurgler, 2007). Cognitive perceptual errors mean the distortion of perception, bad judgment or illogical reasoning that the origin is incorrect arguments.

On the other hand, feeling perceptual errors caused by feelings such as fear, pride, arrogance and regret that comes from intuition or motivation (Durand *et al.*, 2013). In this study, we examine ten cases of these perceptual errors in form of two groups with five components. Cognitive perceptual errors are as follows.

Over confidence bias: This is a baseless belief about cognitive abilities, judgment and intuitive reasoning of person.

Self-enhancing bias: Thisbias refers to the tendency of people to attribute their success to their innate characteristics such as talent or insight.

Ambiguity aversion bias: People escape uncertain conditions morethan risky conditions. Most people make their own decisions based on subjective probabilities. Generally, people are in doubt and ambiguity in ambiguity situations and atrend is shaped called ambiguity aversion.

Conservatism bias: Conservatismisa mental process that causes people to hold views or their own previous forecasts and ignore new information.

Availability bias: This causes people toestimate the probability of an outcome based on the incidence or prevalence in their life and experience. Feeling conceptual errors are discussed below.

Endowment bias: When people have property rights of an asset, make it valuable compared to when they are not holding the property.

Short review bias: This is a feeling-behavioral tendency in humans that prompts people to save rather than tomorrow, today to spend.

Change aversion bias: This isseen in people who prefer things remained relatively stable and do not change.

Regret aversion bias: The principle of this bias is for the prevention of suffering from poor decisions.

Loss aversion bias: This bias is based on people's willingness to prevent harm, rather than pull them to profit. Psychologically, the possibility of losses as a stimulant, on averageis effective more on people decision (Pampin, 2009).

Influential factors and their impact on the errors have been discussed in behavioral finance less (Asadi *et al.*, 2012). Personality is one of psychological factors in all human with certain behavior and role in human and is a fundamental factor in determining career people inresource management (Durand *et al.*, 2013). This study concentrated on small behavioral finance, investor behavior and to investigate the existence of a significant relationship between individual personality types and perceptual errors.

Personality and personality type: Personality is defined as certain patterns of thought, emotion and behavior that a person has in dealing with the social and material environment (Asadi *et al.*, 2012). Gordon Allport has provided the best definition of personality, he states that the personality is dynamics organized within the individual, including those psycho-physical system that determines his thinking and behavior (Siasi, 1995). But, personality types are general frame works and some traits are hidden in them (Asadi *et al.*, 2012).

Many personality theories and models have been proposed by different scientists. These theories aredivided in two cognitive and psychological parts (Durand *et al.*, 2013). Of the most important cognitive theories is George Kelly Cognitive theory. The basic criterion in this theory is that the person should be judged based on its own characteristics. The concept of this theory ispersonal structure means that all individuals interpret all social and physical objects that around the world to make a pattern (Karimi, 2012).

Psychoanalytic theories of Personality are Freud and Yang's theory. Freud's psychological theory emphasizes on conflicts to explain behavior and personality. From the perspective of Sigmund Freud, human behavior is not conscious of conflicts on the basis of sex and aggression. Throughout childhood experiences affects on behavior in the non-conscious impulses in everyday life, dreams, memories and slips of the tongue.

Table 1: Combined dimensions personality according with model sixteen personality types briggs

Types	Names	Brief explanation of potential Strengths and weaknesses of each type
INTJ	Introverted Intuitive Thinking Judging	Independent creative-Critic
ISTJ	Introverted sensory thinking judgment	Regular-Loyal-Pessimistic
ISFJ	Introverted sensory feeling judgment	Prudent-Modest-About
ESTP	Extroverted sensory thinking perceptual	Energetic-Independent-Disorderly
ESFP	Extroverted sensory feeling perceptual	Social-Exciting-Unpredictable
INFJ	Introverted Intuition Feeling Judgment	Perfectionist - Patient-Seeking Confirmation
ENTP	Extroverted intuition thinking perceptual	Creative-Hard Working-Quest For diversity
INFP	Introverted intuition feeling perceptual	Quiet-Conservative-Expected
ISTP	Introverted sensory thinking perceptual	Curious-Risk Takers-Low Tolerance
INTP	Introverted intuition thinking perceptual	Independent-Accurate-Self-Portrait
ESTJ	Extroverted sensory thinking judgment	Committed-Honest-Low Tolerance
ENTJ	Extroverted intuition thinking judgment	Responsible-Far-Sighted-Aggressive
ISFP	Introverted sensory feeling perceptual	Intimate-Generous-Uncertainty
ENFP	Extroverted intuition feeling perceptual	Creative-Optimistic-Disorderly
ESFJ	Extroverted sensory feeling judgment	Genial-Traditional-Aggressive
ENFJ	Extroverted intuition feeling judgment	Hardworking-Optimistic-Hasty

Yang believed that people living in the conflict finally find the perfect way to progress and excellence. Freud sees an important role for the early years of life and knows personality affected by it until death (Siasi, 1995) but Yang also knows the past and the future potential and contingent on the formation and evolution of personality.

Widder provided extroversion and introversion assuming that personality is based on competitive forces and structures in which people should be in equilibrium, if mental energy of person is usually flow to outside he is a extrovert and if the energy of a person flow inward is introvert (Gholizdeh, 1997).

Yang believed that the relationship with the surrounding environment or people is extroverted or introverted. According to information from the surroundings is sensing or intuition. For decision aspect are thinking or feeling and from structural order are then perceiving or judging (Siasi, 1995).

There are other theories and modelsabout personality, such as the three dimensions of Eysenck Personality theory, this English psychologist explained a model for the personality based on three characteristics of introversion-extraversion, stability-oriented emotion and psychosis (Doan, 2013). Five-factor personality modelwas proposedby Lewis Goldberg. This model includes three dimensions of neuroticism, extraversion and openness. Then both conscientiousness and agreeableness were added (Claude, 1998).

Other models is five-way model of BB and five-way model includessome the principles of Buren Wall model but this model is based on the classification of personality of investor confidence level and method of operation is more complete than the previous model. The BB and K models like the Wall Buren is applied in some investors and generally explain why one person develops certain behavioral tendencies. Both BB and K and Baron Wallmodels were introduced in the mid-1980s. Since then, significant change has occurred in the personality of investors.

This development is moving towards identifying specific personality types ofinvestor (Pampin, 2009) Model of personality types with 16 elements based on the Myersand Briggsis derived of Yong's personality model which is used in this study. The theory of Myers-Briggs is as following.

People "interact" with the world are Extrovert (E) or introvert (I) and "to get information" from around the world are Sensory (S) or Intuition (N) in the "decision making" are Feeling (F) or Thinking (T) and the people in the "discipline and structure to their own lives" are Perceiving (P) or Judgment (J). Human personality in this theory is divided in four categories. In each division there are two dimensions (Shamloo, 2003). Myers and Briggs combined this dimensions accordingly with Model sixteen personality types in the following categories (Table 1). According to the desired model, our the hypothesis in this study is as follows.

H_1: there is a significant relationship between personality types of investors and perceptual-cognitive errors in their investments

H_2: there is a significant relationship between personality type of investors and perceptual-cognitive errors in investments

MATERIALS AND METHODS

This is an applied study and descriptive and inferential to collect data. Statistical society consists of all active individual investors with the trading code (A fixed code in which the investor is identified in the exchange system and is based on personal characteristics of investor) of Hamedan Stock Exchange. According to

studies, the statistical society was estimated to be unlimited. Sample volume was 384 objects using simple random sampling according to Morgan table with a margin of error of 5%. Data collection tool was a questionnaire.

Myers and Briggs personality type questionnaire includes 87 questions and cognitive errors questionnaire (cognitive, feeling) is composed of 20 questions. For the personality section, of Myers and Briggs personality questionnaire with 87 questions wereselected. Questions 1-25 determines the dimensions of introspection and extroversion, questions 26 and 44 to determine the sensory dimension, Questions 45-68 to determine the feeling and intellectual aspects of the questions 69 and 87 to determine the dimensions of judgment.

In section of conceptual error, a questionnaire with 20 questions was designed that the questions 1-10 to determine the cognitive and perceptual errors and questions 10-20 were designed to determine the errors of perceptual-cognitive. In order to test the validity of the questionnaire, another questionnaire based on the Waltz and Bausell based on test content validity index, with a range of multiple choice questions was designed to test the clarity, relevance and simplicity and were distributed among ten behavioral and financial experts.

Waltz and Bausell content validity of for both questionnaires was 9.0 which indicates the validity of the questionnaire. To determine the reliability of cognitive errors Cronbach's alpha was used and the reliability was 0.79. Also, Iter-Rater reliability was used to determine the reliability of 16 type personality questionnaire and the amount was 0.895, both resulting amount can be considered reliable.

In order to analyze the data, descriptive statistics in frequency tables and to test hypotheses, test, test correlation coefficient ETA (h2), Hotelling rule, One-way Analysis of Variance (ANOVA) with Tukey's Multiple Comparison test (HSD) and the Least Significant Difference test (LSD) was used.

RESULTS AND DISCUSSION

Eta correlation coefficients for the first and second were 0.393 and 0.479 and this shows a relationship between personality types and cognitive and feeling perceptual errors. In order to determine the significance of this relationship using one-way ANOVA test showed a significant relationship in both hypotheses were confirmed. However, in order to understand the average errors of any type of personality with any other personality types there is a significant difference, Tukey's Multiple Comparison test (HSD) and Least Significant Difference test (LSD) have been used.

ETA for the first hypothesis of the correlation coefficient obtained 0.393 indicating the relationship between cognitive and perceptual errors and personality types with 16 components. This correlation value is obtained based on the Hotelling rule is weak. The results of analysis of variance showed a significant level because smaller amounts of a given quantity 0.05, Assuming the same average variable cognitive perceptual errors and significant differences in personality types with 16 components is rejected in cognitive perceptual errors mean personality types is confirmed.

Tests results Tukey HSD (HSD) and Least Significant Difference test (LCD) as follows, show that investors in the cognitive perceptual errors with different personality types there is a significant difference and the difference in components and for the binary in Table 2 and 3.

The correlation coefficient for the second hypothesis of ETA is 0.476 indicating the relationship between cognitive perceptual error and personality types with 16 components. This correlation value is obtained based on the Hotelling rule is weak. The results of analysis of variance showed a significant level <0.05, assuming the same average variable errors in the perceptual-cognitive and personality types is rejected and a significant difference in the average of perceptual-cognitive personality types is confirmed.

Test results Tukey HSD (HSD) showed no significant differences in the perceptual-cognitive a personality type with average errors for pairwise comparisons showed no other personality types, therefore, Least Significant Difference test (LSD) is important and the results are as follows (Table 4).

Table 2: Tukey's Multiple Comparison test (HSD) in cognitive perceptual errors in the different personality types

Variables	Sig. level	Difference average	Paired comparison of personality type	
			1	2
Perceptual	0.005	0.61	ENTP	ISTJ
cognitive errors	0.008	0.77	INTP	
	0.000	0.54	ENTJ	
	0.005	-0.61	ISTJ	ENTP
	0.008	-0.62	ESTJ	
	0.048	-0.56	ENFJ	
	0.008	-0.77	ISTJ	INTP
	0.011	-0.78	ESTJ	
	0.040	-0.72	ENFJ	
	0.008	0.62	ENTP	ESTJ
	0.011	0.78	INTP	
	0.001	0.55	ENTJ	
	0.000	-0.54	ISTJ	ENTJ
	0.001	-0.55	ESTJ	
	0.019	-0.49	ENFJ	
	0.048	0.56	ENTP	ENFJ
	0.040	0.72	INTP	
	0.019	0.49	ENTJ	

Table 3: Test the Least Significant Difference (LSD) in cognitive perceptual errors in the different personality types

Variables	Sig. level	Difference average	Paired comparison of personality type	
			1	2
Perceptual cognitive errors	0.001	0.98	ESFP	ISTJ
	0.000	0.61	ENTP	
	0.003	0.39	ENFP	
	0.002	0.56	ISTP	
	0.000	0.77	INTP	
	0.000	0.54	ENTJ	
	0.029	0.70	ESFP	ESTP
	0.031	0.49	INTP	
	0.001	0.98	ISTJ	ESFP
	0.029	-0.70	ESTP	
	0.005	-0.83	INTJ	
	0.001	-0.98	ESTJ	
	0.008	-0.84	ISFP	
	0.040	-0.96	INFP	
	0.012	-0.79	ESFJ	
	0.002	-0.93	ENFJ	
	0.005	0.85	ESFP	INTJ
	0.003	0.49	ENTP	
	0.022	0.44	ISTP	
	0.002	0.65	INTP	
	0.001	0.42	ENTJ	
	0.000	0.61	ISTJ	ENTP
	0.003	-0.49	INTJ	
	0.000	-0.62	ESTJ	
	0.009	-0.47	ISFP	
	0.019	-0.42	ESFJ	
	0.001	-0.56	ENFJ	
	0.003	-0.39	ISTJ	ENFP
	0.004	-0.39	ESTJ	
	0.020	-0.34	ENFJ	
	0.002	-0.56	ISTJ	ISTP
	0.022	-0.44	INTJ	
	0.002	-0.57	ESTJ	
	0.041	-0.43	ISFP	
	0.008	0.-51	ENFJ	
	0.000	-0.77	ISTJ	INTP
	0.031	-0.49	ESTP	
	0.002	-0.65	INTJ	
	0.000	-0.78	ESTJ	
	0.004	-0.63	ISFP	
	0.008	-0.58	ESFJ	
	0.001	-0.72	ENFJ	
	0.001	0.98	ESFP	ESTJ
	0.000	0.62	ENTP	
	0.004	0.39	ENFP	
	0.002	0.57	ISTP	
	0.000	0.77	INTP	
	0.000	0.54	ENTJ	
	0.000	-0.54	ISTJ	ENTJ
	0.001	-0.42	INTJ	
	0.000	-0.55	ESTJ	
	0.009	-0.40	ISFP	
	0.021	-0.35	ESFJ	
	0.000	-0.49	ENFJ	
	0.008	0.84	ESFP	ISFP
	0.009	0.47	ENTP	
	0.041	0.43	ISTP	
	0.004	0.63	INTP	
	0.009	0.40	ENTJ	
	0.040	0.69	ESFP	INFP
	0.012	0.79	ESFP	ESFJ
	0.019	0.42	ENTP	

Table 3: Continue

Variables	Sig. level	Difference average	Paired comparison of personality type	
			1	2
	0.008	0.58	INTP	
	0.021	0.35	ENTJ	
	0.002	0.93	ESFP	ENFJ
	0.001	0.56	ENTP	
	0.020	0.34	ENFP	
	0.008	0.51	ISTP	
	0.001	0.72	INTP	
	0.000	0.49	ENTJ	

Table 4: Tukey's Multiple Comparison test (HSD) in cognitive perceptual errors in the different personality types

Variables	Sig. level	Difference average	Paired comparison of personality type	
			1	2
Perceptual feeling errors	0.035	-1.21	INFJ	ISTJ
	0.012	0.38	ESTJ	
	0.018	0.47	ISFP	
	0.002	0.52	ENFJ	
	0.019	-1.04	ESFP	ESTP
	0.013	-1.49	INFJ	
	0.026	-0.71	INTP	
	0.019	1.04	ESTP	ESFP
	0.027	0.94	INTJ	
	0.031	0.96	ENTP	
	0.006	1.14	ESTJ	
	0.005	1.23	ISFP	
	0.047	0.93	INFP	
	0.003	1.28	ENFJ	
	0.027	-0.94	ESFP	INTJ
	0.017	-1.39	INFJ	
	0.035	-0.59	INTP	
	0.035	1.21	ISTJ	INFJ
	0.013	1.49	ESTP	
	0.017	1.39	INTJ	
	0.019	1.41	ENTP	
	0.048	1.17	ENFP	
	0.006	1.59	ESTJ	
	0.005	1.68	ISFP	
	0.026	1.38	INFP	
	0.044	1.20	ESFJ	
	0.003	1.73	ENFJ	
	0.031	-0.96	ESFP	ENTP
	0.019	-1.41	INFJ	
	0.049	-0.62	INTP	
	0.048	-1.17	INFJ	ENFP
	0.025	0.43	ESTJ	
	0.024	0.52	ISFP	
	0.005	0.57	ENFJ	
	0.024	0.61	ENFJ	ISTP
	0.026	0.71	ESTP	INTP
	0.035	0.60	INTJ	
	0.049	0.82	ENTP	
	0.004	0.81	ESTJ	
	0.004	0.89	ISFP	
	0.001	0.94	ENFJ	
	0.012	-0.38	ISTJ	ESTJ
	0.006	-1.14	ESFP	
	0.006	-1.59	INFJ	
	0.025	-0.43	ENFP	
	0.004	-0.81	INTP	
	0.007	-0.46	ENTJ	
	0.007	0.46	ESTJ	ENTJ
	0.010	0.55	ISFP	

Table 4: Continue

Variables	Sig. level	Difference average	Paired comparison of personality type	
			1	2
	0.001	0.60	ENFJ	
	0.018	-0.47	ISTJ	ISFP
	0.005	-1.23	ESFP	
	0.005	-1.68	INFJ	
	0.024	-0.52	ENFP	
	0.004	-0.89	INTP	
	0.010	-0.55	ENTJ	
	0.043	-0.49	ESFJ	
	0.047	-0.93	ESFP	INFP
	0.026	-1.38	INFJ	
	0.044	-1.19	INFJ	ESFJ
	0.043	0.49	ISFP	
	0.013	0.54	ENFJ	
	0.002	-0.52	ISTJ	ENFJ
	0.003	-1.28	ESFP	
	0.003	-1.73	INFJ	
	0.005	-0.57	ENFP	
	0.024	-0.61	ISTP	
	0.001	-0.94	INTP	
	0.001	-0.60	ENTJ	
	0.013	-0.54	ESFJ	

It can be concluded that there is significant difference between the perceptual-cognitive errors of investors with different personality types the difference in components and for the binary are in Table 4.

CONCLUSION

In general, the results of the above hypothesis show a significant relationship between personality type of investors and their perceptual errors including cognitive and feeling at Hamadan Stock Exchange. Both hypotheses were confirmed. The results of this study are consistent to the results of Mahzoon (2009) that represents a significant impact of personality type on some systematic errors.

Also, this study is consistent to the result of research by Mostafaei (2011) based the relationship between personality type andpeople with error of constant delay accepting and there is significant relationship between personality types and incompatible short review error. The results of the study are consistent to the results obtained by Kakeh (2013) based on significant correlation between personality types and perceptual errors of investors.

The first hypothesis testing showed that the personality types of investors and their cognitive perceptual errors are correlated significantly. Also, there is significant difference between cognitive perceptual errors and personality types. Hence, it is proposed to reduce these errors while identifying the personality type of Investors at Stock Exchange and recognize and fix their cognitive bias given the necessary advice.

Statistical test for second hypothesis tests to confirm this hypothesis showed significant relationship between personality type of investors and their perceptual-cognitive errors. In average errors of perceptual-cognitive and other type of personality and personality types there was no significant difference in the first test but in the second and complementary tests, any significant difference in mean those errors were identified in personality types with 16 components and these differences are very noticeable.

Since of the larger Eta coefficient obtained for the perceptual-cognitive errors than cognitive perceptual errors there is a stronger association between personality types with 16 components and perceptual-cognitive errors, therefore it is recommended that determine the personality type of investors on the stock exchange, more attention to their feeling and cognitive errors in these instructions and targeted advice in order to fix these errors.

RECOMMENDATIONS

According to the results this study and measurement of perceptual errors future researchers recommend the following:

- It is recommended that this research be done in other regional stock exchange
- Future researchers suggest measuring the association between other models of personality or personality dimensions measured with perceptual errors
- It is recommended to measure, the relationship between values and attitudes of investors with their perceptual errors
- It is recommended to measure, the relationship between culture and regional specific cognitive biases for future researchers

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