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RESEARCH ARTICLE **Open Access**

Neurotransmitters, Emotional Intelligence, Personality Traits, and the Behavior and Decisions of Individual Investors

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Abstract

Purpose: Neurotransmitters, emotional intelligence, and personality traits are the key factors that affect the behavior and decisions of individual investors. This study aimed to investigate the effects of neurotransmitters, emotional intelligence, and personality traits on the behavior and decisions of individual investors simultaneously, in the Tehran stock exchange.

Design/methodology/approach: In terms of purpose, the current research was practical. In terms of method, it was a descriptive survey research. In terms of time, it was a cross-sectional research. The research data were collected through a questionnaire and convenience sampling method. The sample size was 212 individual investors. Composite reliability, average variance extracted, convergent validity and divergent validity were used to measure the validity and reliability of the questionnaire. Data were analyzed using structural equation modeling.

Findings: This study includes 19 constructs (variables). These constructs include dopamine, serotonin, norepinephrine, and epinephrine (neurotransmitters); Self-appraisal of emotions, other's emotion appraisal, use of emotion and regulation of emotion (emotional intelligence); extraversion, neuroticism, openness, conscientiousness, and agreeableness (personality traits); investment horizon, risk attitude, personalization of loss, confidence, and control (investors' behavior); and investors' decisions. The current study includes six main hypotheses and 78 sub-hypotheses. The research findings showed that neurotransmitters, emotional intelligence, and personality traits affect the investors' behavior and decisions.

Originality/value: The findings of this study showed that the neurofinance and behavioral finance have a key role in decision making of policymakers and investors. Finally, the findings of this study would provide new horizons in neurofinance and behavioral finance.

Keywords: *Neurotransmitters, Emotional Intelligence, Personality Traits, Individual Investors, Tehran Stock Exchange*

Introduction

Investment is an integral part of a person's life. People always try to use investment opportunities according to their interests (Dhiman & Raheja, 2018). Today's capital markets are complex and competitive, thus the direct entry of those who have little financial literacy into such markets may have many negative consequences for them. Nowadays, investment in capital markets is generally based on traditional financial models. These models do not include the neuro-financial (e.g., neurotransmitters), behavioral psychology (e.g., emotional intelligence), and the personality of investors (Ahmad, 2018). Therefore, these models mislead individual investors and hinder them for making a correct decision.

The behavior of investors is an integral part of a financial system and plays a crucial role in its prosperity. If feelings and emotions are quantifiable, then factors such as neurotransmitters, emotional intelligence, personality traits, and self-control methods is

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considered effective. Therefore, the current research investigated the effect of neurotransmitters, emotional intelligence, and personality traits on the behavior and decisions of individual investors.

Issues such as modern financial systems and income-oriented investments make neurofinance (e.g., neurotransmitters) to become more important. Neurotransmitters are chemical messengers in the human brain that transmit signals from one neuron to another (Rizo, 2018). Neurotransmitters are essential in working and daily life (Snyder, 2017). Neurotransmitters include dopamine, serotonin, epinephrine, and norepinephrine, which may be related to investors' behavior. Dopamine, serotonin, and norepinephrine play a role in signaling and include the investors' behavior (Harlow & Brown, 1990).

Dopamine affects the behavioral aspects of investors (e.g., optimism, overconfidence, and risk aversion). Low serotonin can cause this situation (Pompian, 2006). People have different reactions to risk. Dopamine is also related to risk return (Preuschoff et al. 2006). According to Kuhnen & Chiao (2009), dopamine and serotonin affect the investors' risk-taking. Furthermore, these neurotransmitters are effective for data processing associated with the rewards and risks.

Emotional intelligence indicates attitude, thought, and logic (Mayer, et al. 2000). Emotional intelligence plays an essential role in making decisions (Cherniss, 2000). According to Ameriks et al. (2009), there is a relationship between emotional intelligence and investment behavior. Emotional intelligence could influence investors' behavior by playing a role in predicting investment motives (Rubaltelli et al. 2015). According to Salovey (2013), emotional intelligence includes the behavioral characteristics of investors, such as loss aversion, endowment effect[2], and status quo bias. In general, Emotional intelligence and personality traits are defense mechanisms that affect investors' decisions (Lubis et al. 2015).

Psychological variables (e.g., personality traits and behavior of investors) influence the stock market performance. Investors could make efficient decisions due to easy access to information and integrated financial systems. There are different views about personality (John et al. 1991). According to Durand et al. (2013), there is a relationship between personality traits with trust and the overreaction of individual investors. Mallick (2015) showed that personality traits have a direct and significant relationship with various behavioral aspects of individual investors. According to Rizvi & Fatima (2015), there is a substantial relationship between the five-factor model of personality[3] and the behavior of individual investors.

The behavior of investors is one of the crucial elements of the capital market, which plays a vital role in the development of society. The investors' behavioral traits may include risk attitude, loss aversion, investment horizon, trust, and control (Wood & Zaichkowsky, 2004). According to Ghun & Mimg (2009), the behavioral traits of investors include overconfidence, trust in historical information, loss aversion, and control. Factors such as regret, self-confidence, belief, fear, and anxiety affect the behavior of investors (Chin, 2012). According to Thapa (2014), factors influencing investors' behavior involve overconfidence, optimism, risk attitude, and participation. According to previous studies [e.g. Tedongap (2015) and Alaoui et al. (2015)] investment horizon is affected by the investors' expected dividends. According to Dangel et al. (2015), loss-averse investors usually consider low-return and guaranteed investments. Sheikh and Riaz (2012) demonstrated that overconfidence correlates with dividends, volatility, and trading volume.

Emotional intelligence and psychological aspects of investors' behavior impact the capital market (Ameriks et al. 2009).

2. The endowment effect causes investors to undervalue their assets because of ownership

3. extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness

According to Akhtar et al. (2015), Personality traits affect people's risk-taking and investment plans. Kuhnen et al. (2013) could not find a significant relationship between neurotransmitters and financial choices. Therefore, they suggested that future studies investigate the effect of nerves or hormones on investors' decisions in a larger sample size. According to Mosher & Rudebeck (2015), capital market researchers should conduct more research on rewarding neurons related to cognitive functions.

Neurofinance is an interdisciplinary field that aims to establish a connection between neuroscience and financial markets. On the other hand, behavioral finance is a field that includes behavioral psychology and capital market players. Therefore, neurofinance is a relatively new field whose purpose is to use the capabilities of neuroscience and psychology in finance (Miendlarzewska et al. 2019). According to Kumar & Sireesha (2017) neurofinance makes a relationship between the human mind and investment decisions. According to Diacogiannis & Bratis (2013), neuroscience uses the capacity of brain science and behavioral finance. Moreover, the findings of these researchers showed that neurofinance affects financial and investment choices.

Emotional intelligence is one's ability to recognize and understand emotions and use them in interaction with others (Pizzani, 2017). According to Akhtar et al. (2015), personality traits affect people's risk-taking and investment plans. Investment decisions are influenced by trust and performing financial obligations. Overall, success in the stock market is affected by knowledge and wisdom (Qureshi, 2018).

Nowadays, financial markets are mainly knowledge-based, and thus, understanding the role of neurotransmitters in finance and investment is essential. Neurotransmitters affect the behavioral aspects significantly (Harden & Klump, 2015). According to Shao et al. (2015), neural networks play a crucial role in investment and expected return. Dornelles et al. (2007) showed that epinephrine (as a neurotransmitter) influences the recall process through psychological incentives. According to Conway & Slavich (2017) dopamine and serotonin affect the investors' behavior. Efremidze et al. (2017) explored that dopamine has different effects on the human mind and body and may increase focus on the latest news with positive consequences.

Since the behavior and decisions of individual investors have been paid little attention from the perspective of neuroscience, the current research investigated this issue along with two other components (i.e., emotional intelligence and personality traits). Therefore, this study aimed to examine the effect of neurotransmitters, emotional intelligence, and personality traits on the behavior of investors and their investment decisions. The findings of this study could strengthen the research literature and may also be used by individual investors, financial institutions, and decision-makers. Finally, the main goal of the current research is to help investors make more rational and informed decisions through conscious control over their emotions and feelings.

Literature Review

After introducing the neurofinance branch (Kuhnen & Knutson, 2005), the capital market was one of the sectors that paid special attention to this new finance branch. On the other hand, emotional intelligence and personality traits are among the factors influencing the behavior of investors. Therefore, knowing and understanding better the effects of neurofinance on the investors' decisions would be important in the capital market development. Investors are the central pillar of a capital market.

The studies related to neurotransmitters and behavioral factors are mainly done in the developed countries. Therefore, these issues require further investigation in developing countries like Iran. Moreover, there is a little literature about the relationship between neurotransmitters (e.g., dopamine and serotonin) and stock trading, thus this topic needs more investigation. Furthermore, little

research has been done on the relationship between emotional intelligence and investors' behavior. Therefore, this issue also needs further investigation, especially in developing countries like Iran.

After introducing the theory of investment behavior by Klein (1951), a number of studies have been done about the behavior of investors. According to Wood & Zaichkowsky (2004), investors' behavior comprises investment horizon, risk attitude, confidence, control, and personalization of loss. Chun and Ming (2009) showed that investors' behavior contains overconfidence, trust in historical information, control, and loss aversion. Chin (2012) exhibited that investors' behavior consists of belief, investment decisions, and psychological concepts such as regret and self-confidence. According to Thapa (2014), investors' behavior is influenced by overconfidence, optimism, risk attitude, and participation.

After Kuhnen & Knutson's research (2005) that showed a relationship between neurotransmitters and investors' behavior, this topic is investigated by some researchers. According to Ahmad (2018) neurotransmitters make a communication between the innermost structures of the body, through sending signals. Emotional intelligence is another factor influencing the behavior of investors. According to Mayer et al. (2004), emotional intelligence is a person's ability to use feelings and emotions to calm a situation. In other words, emotional intelligence is the ability to recognize and understand emotions. Moreover, emotional intelligence may strengthen your logical thinking skills and the ability of regulating emotions. In general, the emotional intelligence aims to improve individual skills (Carolyn et al. 2014).

Personality is a trait that make human beings unique (Jafari et al., 2023). This trait includes qualities, desires, intentions, and social behaviors (Storm & De-Vries, 2006). Since the introduction of Allport & Allport's work (1921) much research has been done on personality traits. Personality is a dynamic and inherent trait, showing the relationship between human mind and body. Moreover, personality affects the performance, decisions, and thought of people (McCrae & Jr, 1997). Parashar (2010) explored that financial institutions may advise the clients effectively by understanding their personality traits. Personality traits could help understand the self-confidence, preferences, and risk-taking of investors. According to Kourtidis et al. (2011), there is a positive relationship between personality traits (e.g., openness to experience and extroversion) and behavioral traits (e.g., hindsight, neuroticism, and overconfidence). On the other hand, there is a negative relationship between openness to experience (as a personality trait) and availability (as a behavioral trait). According to Kourtidis et al. (2016) personality traits (e.g., overconfidence and loss aversion) affect the behavior of investors.

Previous studies such as Dhochak & Sharma (2016), Salmani Danglani et al. (2019), and Goshtasbi Maharlooi et al. (2022) demonstrated that personality traits affect investors' decisions. Tauni et al. (2017) found that people with openness to experience, neuroticism, extroversion, and conscientiousness have poor concentration on buying and selling stocks. According to Raheja & Dhiman (2020) there is a significant relationship between personality traits and investment decisions. These researchers believe that investors should ask themselves what, where, why, how, and when while facing investment opportunities. According to Kaur (2017), personality traits influence the behavioral aspects of investment decisions.

According to Dhiman & Raheja (2018), the behavioral characteristics of investors are affected by their emotional intelligence and personality traits. Lazer et al. (2017) investigated the connection between Cloninger's model of personality and neuropsychological aspects of individuals. They found a significant relationship between neurotransmitters and risk attitude. Furthermore, this research exhibited a significant association between personality dimensions and investors' decisions.

Previous studies, such as Lang et al. (2017) and Mamula & Blazanin (2017), investigated the relationship between neurotransmitters and investment decisions. According to Singh et al. (2017), there is a connection between neurotransmitters (e.g., dopamine, serotonin, and norepinephrine) and investors' decisions. Fineberg et al. (2017) revealed that there is a relationship between neurotransmitters and investment decisions. Wang et al. (2017) found that dopamine has a significant effect on investment behavior by examining the impact of dopamine on income-oriented decisions. Neurotransmitters could benefit society by supporting financial decisions (Ty et al. 2017). According to Pertl et al. (2017), there is a relationship between neurotransmitters and saving-based investment decisions.

Ingram et al. (2017) displayed a significant relationship between different aspects of emotional intelligence and investors' decisions. According to Nakamura et al. (2017), there is an association between investment decisions and various aspects of emotional intelligence. Vakola et al. (2017) found a relationship between long-term investment decisions and different aspects of emotional intelligence. Reid (2017) showed that non-natural intelligence of emotions may improve investment decisions. Emotional intelligence would influence investment decisions as a kind of wisdom and talent (Corea, 2017).

The Model and Hypotheses of the Research

Based on the existing literature, especially Ahmad (2018), the conceptual model and research hypotheses are as follows.

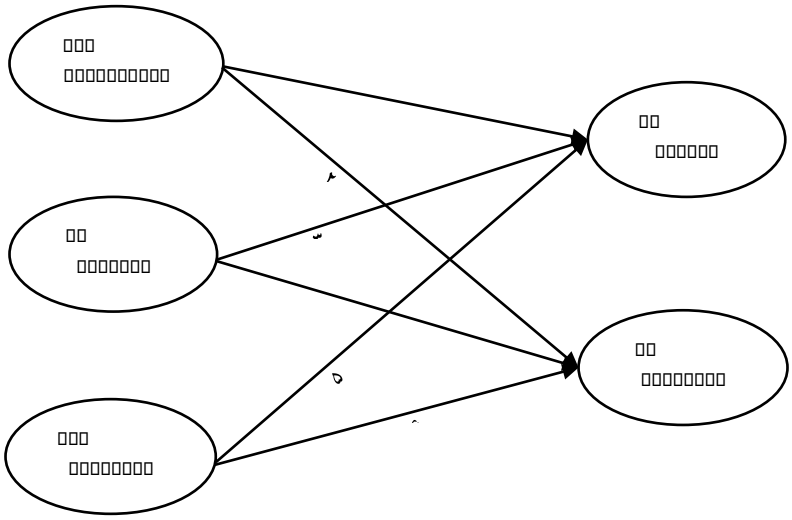

Figure 1. *The Conceptual Model*

Hypotheses:

H1: Neurotransmitters have a significant influence on investor behavior

H2: Neurotransmitters have a significant influence on investment decisions

H3: Emotional Intelligence has a significant influence on investor behavior

H4: Emotional Intelligence has a significant influence on investment decisions

H5: Personality has a significant influence on investor behavior

H6: Personality has a significant influence on investment decisions

Methodology

In terms of purpose, the current research was practical. In terms of method, it was a descriptive survey research. In terms of time, it was a cross-sectional research. The purpose of the present study was to investigate the effects of neurotransmitters on the personality traits and emotional intelligence of the people involved in the capital market

participants, thus, the individual investors were selected as statistical population. The population of this research was the individual investors of the Tehran Stock Exchange. Since the researchers are not directly involved in the data collection process, the possibility of the attraction effect[4] increases. Therefore, using the convenience sampling method would be useful. The research objectives were explained well to the respondents. This was done because of encouraging them to participate actively. The research population was large and unknown. Therefore, the following formula was used to determine the sample size.

$$n = \frac{(Z_{1+\alpha_2})2 * p * q}{d^2} = \frac{(1.96)^2 * .5 * .5}{.05^2} = 384$$

Describing the above formula

$Z_{1+\alpha_2}$	the value for the selected alpha level (confidence level)
p	the estimated proportion of an attribute that is present in the population
q	1-p
e	the acceptable margin of error for the proportion being estimated (the confidence interval)

Based on the above formula, the sample size was 384 people. A questionnaire was used to collect the research data. The period of this study was the first three months of 2024. The questionnaires were distributed online. In this regard, the survey link was sent to many individual investors directly. Moreover, the link was sent to the managers of some virtual networks related to the capital market. These managers were asked to post survey links on the channel and invite their members to cooperate. A total of 225 surveys were collected during three months. Of these, 212 were usable. The overall response rate was 55%, higher than the threshold rate (33%) (Pennings et al. 2002). Before data analysis, the score of the negative items reversed and outliers' data were identified and discarded. The skewness and kurtosis of the items were less than 2, which indicates their normality. Structural equation modeling was used to test hypotheses. For this purpose, SPSS version 26 and Amos version 24 software were used.

Measurements of Variables

In addition to laboratory settings, several methods exist to measure neurotransmitters (Peterson, 2014). For example, we could refer to surveys and personality tests (e.g., NEO[5] and psychometric instruments). Song et al. (2010) used the symptom scale of the neurotransmitter deficiency in their research, which included 111 items. Similarly, Ge & Lui (2015) used a 111-item questionnaire to measure five aspects of neurotransmitters in their study.

Therefore, based on the research literature, the questionnaire would be an effective tool to measure neurotransmitters. Recognizing the weaknesses of previous questionnaires may prevent them from happening again (Aupperle et al., 1985). According to Stone (1978), the questionnaire is a frequent method for collecting data in field research. The research constructs are shown in table 1.

4. The high probability of choosing inappropriate options of the respondents

5. a tool for measuring the five big personality factors

Table 1.
Information on the research constructs

Main construct	Sub-construct	Numbers of questions	Sources
Neurotransmitters (NT)	Dopamine (Dop)	6	Khan & Mubarik (2022)
	Serotonin (Ser)	6	
	Norepinephrine (Nepi)	6	
	Epinephrine (Epi)	6	
Personality traits (PT)	Extraversion (Ext)	4	Goldberg (1990)
	Neuroticism (Neu)	4	
	openness to experience (Ope)	4	
	Conscientiousness (Cons)	4	
	Agreeableness (Agr)	4	
Emotional Intelligence (EI)	Self-Appraisal of Emotions (SAE)	4	Wong & Law (2002)
	Regulation of Emotion (ROE)	4	
	Use of Emotion (UOE)	4	
	Other's Emotion Appraisal (OEA)	4	
Investors Behavior (IB)	Investment Horizon (IH)	5	Wood & Zaichkowsky (2004)
	Confidence (Conf)	5	
	Control (Cont)	5	
	Personalization of Loss (PL)	2	
	Risk Attitude (RA)	2	
Investors Decisions (ID)	-	14	Pasewark & Riley (2010)

Note: Fourteen items removed because their factor loads were less than 0.4. These included neurotransmitters (eight items), investors behavior (two items), and investors decisions (four items).

Findings

Normality is the underlying assumption to analyze data. Based on the central limit theorem, if the sample size is more than 200, it has a normal distribution (Demir, 2022). Since the sample size of this study is 212, the data are assumed to be normal. In this research, composite reliability (CR) and average variance extracted (AVE) indices were used to measure reliability and validity (table 2).

Table 2.
The indices of reliability and validity

variable	CR	AVE	variable	CR	AVE
Dop	0.890	0.574	Ope	0.821	0.534
Ser	0.907	0.619	Cons	0.820	0.533
Nepi	0.882	0.555	Agr	0.824	0.542
Epi	0.882	0.556	InH	0.852	0.536
SEA	0.846	0.580	RiA	0.755	0.610
UOE	0.845	0.577	Rerl	0.727	0.572
OEA	0.866	0.618	Conf	0.885	0.608
ROE	0.830	0.553	Cont	0.856	0.544
Ext	0.847	0.584	ID	0.910	0.505
Neu	0.842	0.571			

The CR and AVE of all variables are more than 0.70 and 0.50, respectively. In addition, AVE is smaller than CR. Thus, the questionnaire is reliable and valid.

Findings showed that 70 percent of the respondents were male, and 30 percent were female. According to the findings, the education of most respondents (37 percent) was Bachelor's degree. In addition, the age of most participants (81 percent) was between 25 and 50 years old.

Mahalanobis distance was used to detect outliers' data (Hodge & Austin, 2004). Since sample size was adequate, the exploratory

factor analysis was used to assess the reliability of latent constructs (Williams et al. 2010). Then, structural equation modeling was used to test the research model through Amos software version 24 (Becker et al. 2012).

In this research, independent variables included neurotransmitters, emotional intelligence, and personality traits, and dependent variables included investors' behavior and decisions. The results of the model and research hypotheses test are as follows.

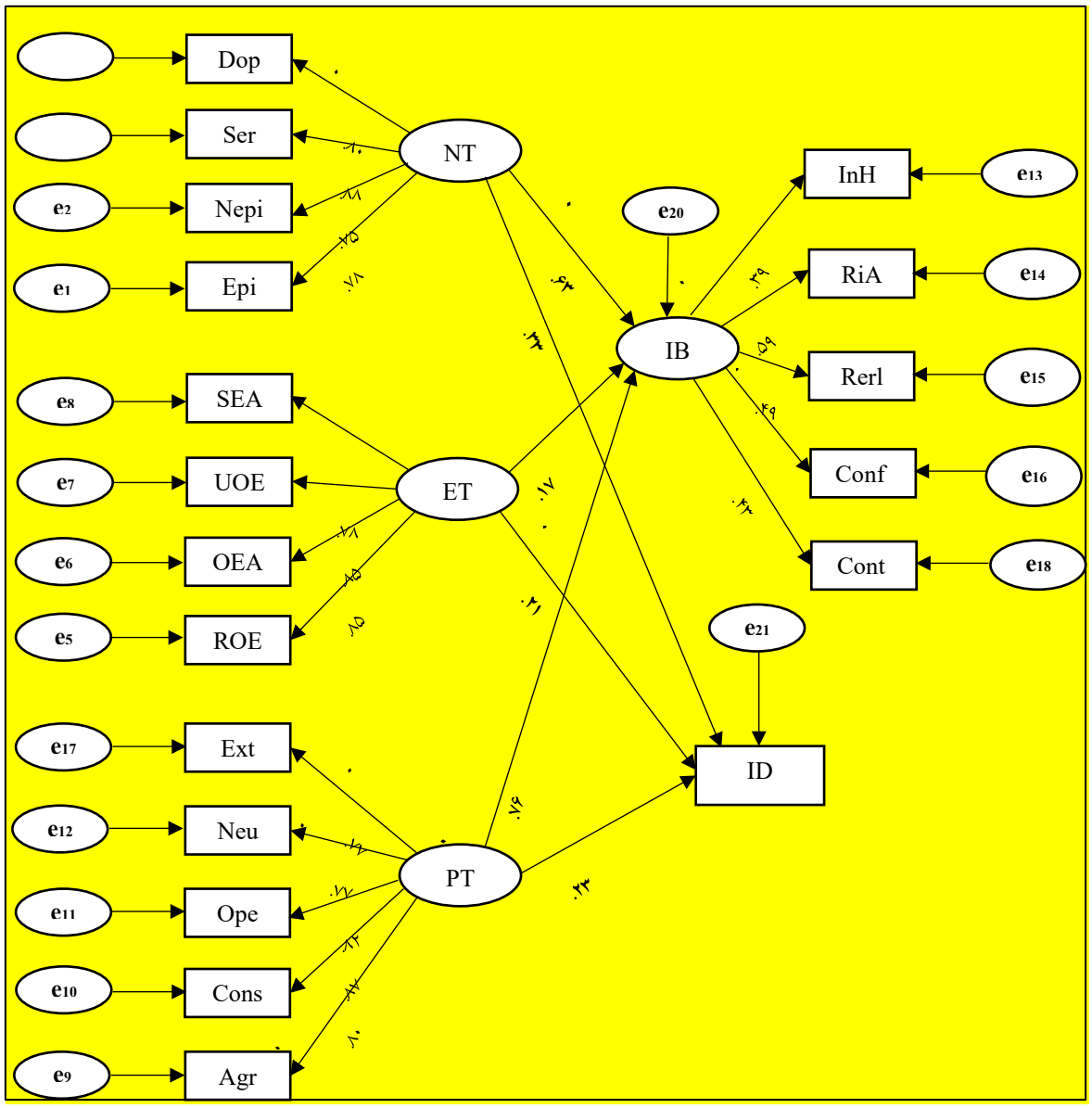

Figure 2. *The research structural model*

Table 3.
The results of testing the research hypotheses

Relationship			(B)	(Beta)	(CR)	P-value
NT	→	IB	0.291	0.602	5.003	0.000
NT	→	ID	0.336	0.329	4.813	0.000
EI	→	IB	0.083	0.168	2.441	0.015
EI	→	ID	0.219	0.208	3.133	0.002
PT	→	IB	0.399	0.760	5.331	0.000
PT	→	ID	0.259	0.233	3.518	0.001

B = Unstandardized coefficients; Beta = Standardized coefficients; CR = Critical ratio

As can be seen from table 3, all hypotheses were confirmed at the confidence level of 95%, because their critical ratio were more than 1.96. The effects of independent variables were tested on dependent variables simultaneously by using structural equation modeling (figure 2). The slope of the line between independent and dependent variables indicates unstandardized coefficients. This coefficient shows a change in the dependent variable because of a one-unit change in the independent variables, assuming that other conditions are constant. Therefore, table 3 indicates that a one-unit change in neurotransmitters causes 0.291 and 0.336 units of change in the investors' behavior and decisions, respectively. Moreover, a one-unit change in emotional intelligence causes 0.083 and 0.219 units of change in the investors' behavior and decisions, respectively. Finally, a one-unit change in personality traits generates 0.399 and 0.259 units of change in the investors' behavior and decisions, respectively. Standard coefficients are the path coefficients (correlation) between independent and dependent variables. For example, the path coefficient between neurotransmitters and investors' behavior is 0.602.

In this research, each independent and dependent variable has several sub-constructs. Tables 4, 5, and 6 show the relationship between the sub-constructs of independent and dependent variables. The number of these relationships is 78. In other words, this research has 78 sub-hypotheses.

Table 4.
Sub-hypotheses related to the first and second main hypotheses

Relationship	β	Sig.	Relationship	β	Sig.
Dop → InH	0.195	0.002	Nepi → InH	0.119	0.138
Dop → RiA	0.120	0.025	Nepi → RiA	0.152	0.029
Dop → Rerl	0.190	0.002	Nepi → Rerl	0.167	0.012
Dop → Conf	0.176	0.005	Nepi → Conf	0.137	0.087
Dop → Cont	0.079	0.145	Nepi → Cont	0.145	0.042
Dop → ID	0.229	0.000	Nepi → ID	0.221	0.004
Ser → InH	0.149	0.034	Epi → InH	0.143	0.120
Ser → RiA	0.143	0.019	Epi → RiA	0.435	0.000
Ser → Rerl	0.076	0.119	Epi → Rerl	0.049	0.418
Ser → Conf	0.214	0.003	Epi → Conf	0.336	0.000
Ser → Cont	0.159	0.011	Epi → Cont	0.208	0.013
Ser → ID	0.142	0.032	Epi → ID	0.150	0.083

Table 4 includes 24 hypotheses, which 17 hypotheses confirmed and seven hypotheses not confirmed. The significance level was 95%. As shown in Table 4, dopamine (Dop) has a significant effect on some factors such as investment horizon, risk attitude, loss aversion, self-confidence, and investors' decisions. Dopamine represents pleasure and happiness. Serotonin (Ser) has a significant effect on some factors such as investment horizon, risk attitude, self-confidence, control, and investors' decisions. Serotonin represents mood and morale. Norepinephrine (Nepi) has a significant effect on some factors such as risk attitude, loss aversion, self-confidence, control, and investor decisions. Norepinephrine shows stress and concentration. Epinephrine (Epi) has a significant effect on some factors such as investment horizon, risk attitude, self-confidence, and control. Epinephrine shows the body's reaction during fight or flight.

Table 5.
Sub-hypotheses related to the third and fourth main hypotheses

Relationship	β	Sig.	Relationship	β	Sig.
SEA → InH	0.021	0.783	OEA → InH	0.167	0.018
SEA → RiA	0.111	0.064	OEA → RiA	0.223	0.000
SEA → Rerl	0.145	0.037	OEA → Rerl	0.108	0.077
SEA → Conf	0.137	0.078	OEA → Conf	0.241	0.001
SEA → Cont	0.129	0.040	OEA → Cont	0.108	0.061
SEA → ID	0.096	0.164	OEA → ID	0.214	0.001
UOE → InH	0.129	0.149	ROE → InH	0.105	0.188
UOE → RiA	0.006	0.933	ROE → RiA	0.266	0.000
UOE → Rerl	0.121	0.113	ROE → Rerl	0.105	0.125
UOE → Conf	0.177	0.056	ROE → Conf	0.083	0.309
UOE → Cont	0.165	0.027	ROE → Cont	0.176	0.009
UOE → ID	0.068	0.403	ROE → ID	0.283	0.000

Table 5 comprises 24 hypotheses, which ten hypotheses confirmed and 14 hypotheses not confirmed. The significance level was 95%. As shown in Table 5, self-appraisal of emotions (SEA) has a significant effect on two factors (i.e., loss aversion and control). Use of emotion (UOE) is having a significant effect only on one factor (i.e., control). Other's emotion appraisal (OEA) affects some factors such as investment horizon, risk attitude, self-confidence, and investors' decisions. Regulation of emotion (ROE) affects three factors (i.e., risk attitude, control, and investors' decisions).

Table 6.
Sub-hypotheses related to the fifth and sixth main hypotheses

Relationship	β	Sig.	Relationship	β	Sig.
Ext → InH	0.180	0.011	Ope → Conf	0.079	0.229
Ext → RiA	0.079	0.189	Ope → Cont	0.124	0.031
Ext → Rerl	0.156	0.011	Ope → ID	0.213	0.001
Ext → Conf	0.018	0.788	Cons → InH	0.300	0.002
Ext → Cont	0.050	0.376	Cons → RiA	0.219	0.010
Ext → ID	0.190	0.773	Cons → Rerl	0.074	0.332
Neu → InH	0.007	0.935	Cons → Conf	0.356	0.000
Neu → RiA	0.232	0.003	Cons → Cont	0.390	0.000
Neu → Rerl	0.116	0.095	Cons → ID	0.488	0.000
Neu → Conf	0.172	0.031	Agr → InH	0.236	0.019
Neu → Cont	0.014	0.838	Agr → RiA	0.245	0.008
Neu → ID	0.020	0.795	Agr → Rerl	0.288	0.002
Ope → InH	0.028	0.676	Agr → Conf	0.414	0.000
Ope → RiA	0.198	0.003	Agr → Cont	0.139	0.090
Ope → Rerl	0.152	0.012	Agr → ID	0.018	0.847

Table 6 covers 30 hypotheses, which 17 hypotheses confirmed and 13 hypotheses not confirmed. The significance level was 95%. As shown in table 6, Extraversion (Ext) has a significant effect on two factors (i.e., investment horizon and risk attitude). Neuroticism (Neu) has a significant effect on two factors (i.e., risk attitude and self-confidence). Openness to experience (Ope) has a significant effect on some factors such as risk attitude, loss aversion, control, and investors' decisions. Conscientiousness (Cons) has a significant effect on some factors such as (investment horizon, risk attitude, self-confidence, control, and investors' decisions). Agreeableness (Agr) has a significant effect on some factors such as (i.e., investment horizon, risk attitude, loss aversion, and self-confidence).

Discussion and Conclusion

Until now, the effects of three independent variables of this research (i.e., neurotransmitters, emotional intelligence,

and personality traits) on the behavior of individual investors have been investigated independently. In the other hand, previous studies have paid little attention to the effects of these variables on the behavior and decisions of investors simultaneously. Therefore, the current research examined the impacts of these three independent variables on two dependent variables (i.e., investors' behavior and decisions).

Brain signals influence the investors' behavior and decisions significantly. Neurotransmitters may affect the behavior and decisions of investors by stimulating, inhibiting, or modulating neurons (Blobe et al. 2000). According to the research findings, neurotransmitters (i.e., dopamine, serotonin, norepinephrine, and epinephrine) have a significant positive effect on the behavior and decisions of investors (first and second hypotheses). Until now, little studies have investigated the effects of neurotransmitters on the behavior and decisions of investors. Nevertheless, this finding was consistent with the findings of Singh et al. (2017), Long et al. (2017), and Ahmad (2018).

According to the third and fourth hypotheses, emotional intelligence has a significant positive effect on the behavior and decisions of investors. It means that individual investors can identify, understand, and control their emotions and are also able to use them in their decision-making. The findings indicated that emotional intelligence relates to various aspects of investors' behavior, such as investment horizon, risk attitude, loss aversion, self-confidence, and control. Moreover, according to the findings of this research, emotional intelligence affects financial decisions. In general, emotional intelligence is considered a part of good sense and is related to decision-making. It would affect the stock price. This finding was in line with the findings of Ameriks et al. (2009), Chaarani (2016), Mitroi & Oproiu (2014), and Ashari et al. (2022).

Personality traits affect the individual investors' understanding of financial information and make decisions (Rao & Lakkol, 2022). The findings of the fifth and sixth hypotheses showed that personality traits (i.e., extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness) have a significant positive effect on the behavior and decisions of individual investors. This finding was in consistence with the findings of Crysel et al. (2012), Dhochak & Sharma (2016), and Ashari et al. (2022).

According to Olsen (2007) one of the important human traits is solving the problems by managing the complex thoughts. Many researchers believe that financial decisions are strongly influenced by feelings and emotions, then it is useful to understand them completely and correctly (Sjöberg & Engelberg, 2006). In this regard, the present study endeavored to present a suitable model for this issue by combining two fields of neurofinance and behavioral finance. This action can be considered a positive step.

The findings of this research could be helpful for policymakers and investors in developing the effective financial policies, by considering issues such as reward system, fight and flight situations, and behavioral traits. Moreover, the findings showed that a better understanding of the relationship between neurotransmitters and investment decisions can help investors make sound financial decisions. According to the findings, the investment horizon and loss aversion are among the factors that influence the decisions of individual investors. Finally, the findings of this research could help investigate the concepts of neurofinance and behavioral finance with emphasis on the capital market context.

Since this research is based on cross-sectional data, using longitudinal data may increase the generalizability of the findings. Since the population of the present study only includes individual investors, thus considering the institutional investors and brokers as the population of future studies would be helpful. This issue led to collecting more comprehensive data. In the current research, a limited number of sub-constructs and items have been used for each of the primary constructs. Therefore, expanding

these sub-constructs and items can increase the comprehensiveness of the results.

The findings of this research could provide new horizons in the fields of neurofinance and behavioral finance. In addition, the latent constructs related to the introduced personality and behavioral traits can be a good reference for future studies. Furthermore, it is necessary to perform more research in the field of neurofinance with emphasis on the prefrontal cortex and anterior cingulate cortex, because it lead to make sound financial decisions. The findings of this research provide a good picture of the behavior and decisions of individual investors with an emphasis on neurofinance and behavioral finance. Another feature of the current study was providing items to measure the sub-constructs of neurotransmitters.

References

Ahmad, M. (2018). Impact of neurotransmitters, emotional intelligence and personality on investor's behavior and investment decisions. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 12(1), 330-362.

Akhtar, F., Thyagaraj, K. S., & Das, N. (2015). A review of literature on financial investment decision of individuals' investor: Behavior and risk related explanations. *International Journal of Applied Business and Economic Research*, 13 (1), 303-330.

Alaoui, A. O., Dewandaru, G., Rosly, S. A., & Masih, M. (2015). Linkages and co-movement between international stock market returns: Case of Dow Jones Islamic Dubai Financial Market index. *Journal of International Financial Markets, Institutions and Money*, 36, 53-70. https://doi.org/10.1016/j.intfin.2014.12.004.

Allport, F. H., & Allport, G. W. (1921). Personality traits: Their classification and measurement. *The Journal of Abnormal Psychology and Social Psychology*, 16(1), 6-40. https://doi.org/10.1037/h0069790.

Ameriks, J., Wranik, T., & Salovey, P. (2009). Emotional intelligence and investor behavior. *Charlottesville, VA: Research Foundation of CFA Institute*.

Ashari, E., Khodabakhsh, R., Khomami, s. (2022). Personality traits, emotional intelligence of investors and their risk tolerance. *Journal of Accounting and Auditing Studies*, 11(43), 105-120. 10.22034/IAAS.2022.161718.

Aupperle, K. E., Carroll, A. B., & Hatfield, J. D. (1985). An Empirical examination of the relationship between corporate social responsibility and profitability. *Academy of Management Journal*, 28 (2), 446-463. https://doi.org/10.5465/256210.

Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical Latent Variable Models in PLS-SEM: Guidelines for Using Reflective-Formative Type Models. *Long Range Planning*, 45 (1), 359-394. https://doi.org/10.1016/j.lrp.2012.10.001 .

Blobe, G. C., Schiemann, W. P., & Lodish, H. F. (2000). Role of transforming growth factor β in human disease. *New England Journal of Medicine*, 342(18), 1350-1358. https://doi.org/10.1056/nejm200005043421807.

Carolyn, M., Dana, J., Daniel, N., & Richard D, R. (2014). Emotional intelligence is a second stratum factor of intelligence: Evidence from hierarchical and bi-factor models. *Emotion*, 14(2), 358-374. https://doi.org/10.1037/a0034755.

Chambers, D., & Simon, D. (2022). Analyzing the Influence of Emotional Intelligence on Investor Behavior in Developing Regions: A PRISMA Systematic Review. *International Journal of Management and Humanities*, 8(12), 19-22. https://doi.org/10.35940/ijmh.l1510.0881222.

Chaarani, H. (2016). Exploring the impact of emotional intelligence on portfolio performance: An international exploratory study. *Humanomics*, 32(4), 474-497. https://doi.org/10.1108/h-02-2016-0012.

Cherniss, C. (2000). Emotional intelligence: *What it is and why it matters (p. 15)*. Rutgers University, Graduate School of Applied and Professional Psychology.

Chin, A. L. L. (2012). Psychological biases and investor behaviour: Survey evidence from Malaysian stock market. *International Journal of Social Science, Economics and Arts*, 2(2), 67-73.

Chun, W. W., & Ming, L. M. (2009). Investor behavior and decision-making style: a Malaysian perspective. *Banker's Journal Malaysia*, 133, 3-13.

Conway, C. C., & Slavich, G. M. (2017). Behavior genetics of prosocial behavior. In P. Gilbert, Compassion:Concepts, Research and Application (pp. 151-170). Oxford: Routledge. https://doi.org/10.4324/9781315564296-9.

Corea, F. (2017). *Investing in Artificial Intelligence*. In F. Corea, Artificial Intelligence and Exponential Technologies: Business Models Evolution and New Investment Opportunities (pp. 1-45). Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-319-51550-2.

Crysel, L., Crosier, B., & Webster, G. (2012). The dark triad and risk behavior. *Personality and Individual Differences*, 54(1), 35-40. https://doi.org/10.1016/j.paid.2012.07.029.

Dangl, T., Randl, O., & Zechner, J. (2015). *Risk control in asset management: Motives and concepts* (pp. 239-266). Springer International Publishing. https://doi.org/10.1007/978-3-319-09114-3_14.

Demir, S. (2022). Comparison of normality tests in terms of sample sizes under different skewness and kurtosis coefficients. *International Journal of Assessment Tools in Education*, 9(2), 397-409. https://doi.org/10.21449/ijate.1101295.

Dhiman, B., & Raheja, S. (2018). Do personality traits and emotional intelligence of investors determine their risk tolerance? *Management and Labour Studies*, 43(1-2), 88-99. https://doi.org/10.1177/0258042x17745184.

Dhochak, M., & Sharma, A. K. (2016). Identification and prioritization of factors affecting venture capitalists' investment decision-making process an analytical hierarchal process (AHP) approach. *Journal of Small Business and Enterprise Development*, 23 (4), 964 - 983. https://doi.org/10.1108/jsbed-12-2015-0166.

Diacogiannis, G., & Bratis, T. (2010). Neurofinance: A collaboration of psychology, Neurology and investor behavior. *SPOUDAI-Journal of Economics and Business*, 60(3-4), 35-57.

Dornelles, A., de Lima, M. N. M., Grazziotin, M., Presti-Torres, J., Garcia, V. A., Scalco, F. S., ... & Schröder, N. (2007). Adrenergic enhancement of consolidation of object recognition memory. *Neurobiology of learning and memory*, 88(1), 137-142. https://doi.org/10.1016/j.nlm.2007.01.005.

Durand, R., Newby, R., Tant, K., & Trepongkaruna, S. (2013). Overconfidence, overreaction and personality. *Review of Behavioral Finance*, 5(2), 104-133. https://doi.org/10.1108/rbf-07-2012-0011.

Efremidze, L., Sarraf, G., Miotto, K., & Zak, P. J. (2017). The neural inhibition of learning increases asset market bubbles: Experimental evidence. *Journal of Behavioral Finance*, 18(1), 114-124. https://doi.org/10.1080/15427560.2016.1238372.

Fineberg, S. K., Stahl, D., & Corlett, P. (2017). Computational psychiatry in borderline personality disorder. *Current Behavioral Neuroscience Reports*, 4 (1), 31-40. https://doi.org/10.1007/s40473-017-0104-y.

Ge, Y., & Liu, J. (2015). Psychometric Analysis on Neurotransmitter Deficiency of Internet Addicted Urban Left-behind Children. *Journal of Alcoholism & Drug Dependence*, 3(5), 1-6. https://doi.org/10.4172/2329-6488.1000221.

Goldberg, L. R. (1990). An alternative "description of personality": The big-five factor structure. *Journal of Personality and Social Psychology*, 59(6), 1216-1229. https://doi.org/10.1037//0022-3514.59.6.1216.

Goshtasbi Maharlooi, R., Khodaei Valahzaqrd, M., Seyed Mohammad, A. K., & Saeedi, A. (2022). Exploring the effect of personality and demographic characteristics on the risk-taking behavior of investors. *Journal of System Management*, 8(4), 81-96. https://doi.org/10.30495/JSM.2022.1966338.1681

Harden, K. P., & Klump, K. L. (2015). Introduction to the special issue on gene-hormone interplay. *Behavior genetics*, 45, 263-267. https://doi.org/10.1007/s10519-015-9717-7.

Harlow, W. V., & Brown, K. C. (1990). Understanding and assessing financial risk tolerance: a biological perspective. *Financial Analysts Journal*, 46(6), 50-62. https://doi.org/10.2469/faj.v46.n6.50.

Hodge, V. J., & Austin, J. (2004). A survey of outlier detection methodologies. *Artificial Intelligence Review*, 22 (2), 85-

126. https://doi.org/10.1023/b:aire.0000045502.10941.a9.

Jafari, A. H., Roshan, H. G., & Dadashi, I. (2023). Identifying the dimensions and components of the perceptual cognitive model of investors with regard to information environment of Iranian capital market. *Journal of System Management (JSM)*, 9, 2. https://doi.org/10.30495/JSM.2023.1972755.1712

Khan, A., & Mubarik, M. S. (2022). Measuring the role of neurotransmitters in investment decision: A proposed constructs. *International Journal of Finance & Economics*, 27(1), 258-274. https://doi.org/10.1002/ijfe.2150.

Klein, L. R. (1951). *Studies in investment behavior*. In U.-N. Bureau, Conference on Business Cycles (pp. 233 - 318). Cambridge: National Bureau of Economic Research.

Kourtidis, D., Sevic, Z., & Chatzoglou, P. (2011). Investors' trading activity: A behavioural perspective and empirical results. *The Journal of Socio-Economics*, 40(5), 548–557. https://doi.org/10.1016/j.socec.2011.04.008.

Kuhnen, C. M., & Chiao, J. Y. (2009). Genetic determinants of financial risk taking. *PloS one*, 4(2), e4362. https://doi.org/10.1371/journal.pone.0004362

Kuhnen, C. M., & Knutson, B. (2005). The neural basis of financial risk taking. *Neuron*, 47(5), 763-770. https://doi.org/10.1016/j.neuron.2005.08.008.

Kuhnen, C. M., Samanez-Larkin, G. R., & Knutson, B. (2013). Serotonergic genotypes, neuroticism, and financial choices. *PloS one*, 8(1), e54632. https://doi.org/10.1371/journal.pone.0054632.

Kumar, K. A., & Sireesha, M. A. G. A. N. T. I. (2017). An analysis of recent developments in Neuro financing and carbon financing in India. *International Journal for Research and Development in Technology*, 7(6), 18-21.

Lang, M., Bahna, V., Shaver, J. H., Reddish, P., & Xygalatas, D. (2017). Sync to Link: Endorphin-Mediated Synchrony Effects on Cooperation. *Biological Psychology*, 127 (7), 191–197. https://doi.org/10.1016/j.biopsycho.2017.06.001.

Lazer, S. G., Geva, R., Gur, E., & Stein, D. (2017). Reward dependence and harm avoidance among patients with binge-purge type eating disorders. *European Eating Disorders Review*, 25(3), 205-213. https://doi.org/10.1002/erv.2505.

Lubis, H., Kumar, M. D., Ikbar, P., & Muneer, S. (2015). Role of psychological factors in individuals investment decisions. *International Journal of Economics and Financial Issues*, 5(1), 397-405.

Mallick, L. R. (2015). Biases in behavioural finance: a review of literature. *Journal of Advances in Business Management*, 1(3), 100-104. https://doi.org/10.14260/jadbm/2015/13.

Mamula, T. A. T. J. A. N. A., & Blazanin, B. (2017). Are We Buying Rationally or Impulsively? What Actually Happen in The Consumer's Mind And What Does Neurotechnology Reveal? *In Innovation, Competitiveness and Sustainable Development Conference* (pp. 1-7).

Mayer, J. D., Caruso, D. R., & Salovey, P. (1999). Emotional intelligence meets traditional standards for an intelligence. *Intelligence*, 27(4), 267-298. https://doi.org/10.1016/s0160-2896(99)00016-1.

Mayer, J. D., Perkins, D. M., Caruso, D. R., & Salovey, P. (2001). Emotional intelligence and giftedness. *Roeper review*, 23(3), 131-137. https://doi.org/10.1080/02783190109554084.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). TARGET ARTICLES:" emotional intelligence: Theory, findings, and Implications". *Psychological inquiry*, 15(3), 197-215. https://doi.org/10.1207/s15327965pli1503_02.

McCrae, R. R., & Jr, P. C. (1997). Personality trait structure as a human universal. *American*, 52(5), 509–516. https://doi.org/10.1037//0003-066x.52.5.509

Miendlarzewska, E. A., Kometer, M., & Preuschoff, K. (2019). Neurofinance. *Organizational Research Methods*, 22(1), 196-222. https://doi.org/10.1177/1094428117730891 .

Mitroi, A., & Oproiu, A. (2014). Behavioral finance: new research trends, socionomics and investor emotions. *Theoretical and applied economics*, 21(4), 153-166.

Mosher, C. P., & Rudebeck, P. H. (2015). The amygdala accountant: new tricks for an old structure. *Nature neuroscience*, 18(3), 324-325. https://doi.org/10.1038/nn.3949 .

Nakamura, K., & Kawabata, H. (2017). Mediating role of memory of another person's choice in social influence on preference. *Japanese Psychological Research*, 59 (1), 1-13 https://doi.org/10.1111/jpr.12138 .

Olsen, R. A. (2007). Investors' predisposition for annuities: a psychological perspective. *Journal of Financial Service Professionals*, 61 (5), 51-57

Parashar, N. (2010). An Empirical study on personality variation and investment choice of retail investors. *Journal of Management and Information Technology*, 2(1), 33-42.

Pasewark, W. R., & Riley, M. E. (2010). It's a matter of principle: the role of personal values in investment decisions. *Journal of Business Ethics*, 93(2), 237-253. https://doi.org/10.1007/s10551-009-0218-6.

Pennings, J.M.E., Scott, H.I., Good, D.L. (2002). Surveying farmers: a case study. *Review of Agricultural Economics*, 24(1), 266–277. https://doi.org/10.1111/1467-9353.00096.

Pertl, M. T., Benke, T., Zamarian, L., & Delazer, M. (2017). Effects of healthy aging and mild cognitive impairment on a real-life decision-making task. *Journal of Alzheimer's disease*, 58(4), 1077-1087. https://doi.org/10.3233/jad-170119

Peterson, R. L. (2014). Neurofinance. In B. H. Kent, & R. Victor, *Investor behavior: The psychology of financial planning and investing* (pp. 381-401). Hoboken, New Jersey: John Wiley & Sons. https://doi.org/10.1002/9781118813454.ch21.

Pizzani, L. (2017). Don't Get Burned: Preventing burnout is key for professionals and their firms. *CFA Institute: Deep Liquidity is within your Reach*, 28 (2), 26-52. https://doi.org/10.2469/cfm.v28.n2.11.

Pompian, M. M. (2006). Neuroeconomics: The next frontier for explaining investor behavior. *MM Pompian, Behavioral Finance and Wealth Management: How to Build Optimal Portfolios That Account for Investor Biases*, 295-302.

Preuschoff, K., Bossaerts, P., & Quartz, S. R. (2006). Neural differentiation of expected reward and risk in human subcortical structures. *Neuron*, 51(3), 381-390. https://doi.org/10.1016/j.neuron.2006.06.024.

Qureshi, S. A. (2012). Measuring validity of the determinants of investment decision making. *International Journal. Department of Business Administration, Allama Iqbal Open University, Islamabad, Pakistan*.

Raheja, S., & Dhiman, B. (2020). How do emotional intelligence and behavioral biases of investors determine their investment decisions? *Rajagiri Management Journal*, 14(1), 35-47. https://doi.org/10.1108/ramj-12-2019-0027.

Rao, A. S., & Lakkol, S. G. (2022). A review on personality models and investment decisions. *Journal of Behavioral and Experimental Finance*, 35, 100691. https://doi.org/10.1016/j.jbef.2022.100691.

Reid, M. M. (2017). Rethinking the fourth amendment in the age of supercomputers, artificial intelligence, and robots. *West Virginia Law Review*, 109(1), 101-126. https://ssrn.com/abstract=2934484.

Rizo, J. (2018). Mechanism of neurotransmitter release coming into focus. *Protein Science*, 27(8), 1364-1391. https://doi.org/10.1002/pro.3445.

Rizvi, S., & Fatima, A. (2015). *Behavioral finance: A study of correlation between personality traits with the investment patterns in the stock market*. In Managing in recovering markets (pp. 143-155). Springer India. https://doi.org/10.1007/978-81-322-1979-8_11.

Rubaltelli, E., Agnoli, S., Rancan, M., & Pozzoli, T. (2015). Emotional intelligence and risk taking in investment decision-making. *CEFIN WORKING PAPERS*. http://155.185.68.2/CefinPaper/CEFIN-WP53.pdf (application/pdf).

Sadi, R., Asl, H. G., Rostami, M. R., Gholipour, A., & Gholipour, F. (2011). Behavioral finance: The explanation of investors' personality and perceptual biases effects on financial decisions. *International Journal of Economics and Finance*, 3(5), 234-241. https://doi.org/10.5539/ijef.v3n5p234.

Salmani Danglani, S., Saeedi, P., Bahramzadeh, H. A., & Pourshahabi, F. (2019). Representing the pattern of relationship between personality traits and investment patterns in the stock market. *Journal of System Management*, 5(1), 79-114.

Salovey, P. (2013). *Applied emotional intelligence: Regulating emotions to become healthy, wealthy, and wise. In Emotional intelligence in everyday life* (pp. 229-248). Psychology Press.

Shao, R., Zhang, H. J., & Lee, T. M. (2015). The neural basis of social risky decision making in females with major depressive disorder. *Neuropsychologia*, 67, 100-110. https://doi.org/10.1016/j.neuropsychologia.2014.12.009.

Sheikh, M. F., & Riaz, K. (2012). Overconfidence bias, trading volume and returns volatility: Evidence from Pakistan. *World Applied Science Journal*, 18(12), 1737-1748. Available at SSRN: https://ssrn.com/abstract=2210352.

Singh, S., Mallaram, G. K., & Sarkar, S. (2017). Pathological gambling: An overview. *Medical Journal of D.Y. Patil University*, 10 (2), 120-127. https://doi.org/10.4103/0975-2870.202105.

Sjöberg, L., & Engelberg, E. (2006). *Attitudes to economic risk taking, sensation seeking and values of economists specializing in finance*. Centre for Risk Research, working paper 2006, 3.

Snyder, S. H. (2017). A life of neurotransmitters. *Annual Review of Pharmacology and Toxicology*, 57, 1-11. https://doi.org/10.1146/annurev-pharmtox-010716-104511.

Song, X., Wang, H., Zheng, L., Chen, D., & Wang, Z. (2010). The relationship between problem behavior and neurotransmitter deficiency in adolescents. *Journal of Huazhong University of Science and Technology (Medical Sciences)*, 30(6), 714-719. https://doi.org/10.1007/s11596-010-0646-7.

Stone, E. F. (1978). *Research methods in organizational behavior*. California: Goodyear Pub. Co.

Storm, P., & De-Vries, S. (2006). Personality psychology and the workplace. *MLA Forum*, 5 (2), 70-82.

Tauni, M. Z., Fang, H. X., Rao, Z. R., & Yousaf, S. (2015). The influence of Investor personality traits on information acquisition and trading behavior: Evidence from Chinese futures exchange. *Personality and Individual Differences*, 87 (12), 248-255. https://doi.org/10.1016/j.paid.2015.08.026.

Tédongap, R. (2015). Consumption volatility and the cross-section of stock returns. *Review of Finance*, 19(1), 367-405. https://doi.org/10.1093/rof/rft058.

Thapa, B. S. (2014). Investment behavior of investors in Nepalese Stock Market. *San Francisco: Academia Education*, 1-20.

Ty, A., Mitchell, D. G., & Finger, E. (2017). Making amends: Neural systems supporting donation decisions prompting guilt and restitution. *Personality and Individual Differences*, 107(3), 28-36. https://doi.org/10.1016/j.paid.2016.11.004.

Vakola, M., Bourantas, D., & Karli, M. (2017). It is not a way of making money; it is a way of life. D. Halkias, JC Santora, N. Harkiolakis, & PW Thurman, *Leadership and Change Management: A Cross-Cultural Perspective*, 56-60. https://doi.org/10.4324/9781315591766-7.

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. *Journal of Emergency Primary Health Care*, 8 (3), 1-13. https://doi.org/10.33151/ajp.8.3.93.

Wong, C. S., & Law, K. S. (2002). The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. *The Leadership Quarterly*, 13 (3), 243-274. https://doi.org/10.1016/s1048-9843(02)00099-1.

Wood, R., & Zaichkowsky, J. L. (2004). Attitudes and trading behavior of stock market investors: A segmentation approach. *The Journal of Behavioral Finance*, 5(3), 170-179. https://doi.org/10.1207/s15427579jpfm0503_5.