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# Factors Impacting Investment Decision Making: A Mediation of Risk Tolerance and Moderation of Demographic Variables

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**Abstract**
*The purpose of this paper was to find out the impact of Personality Traits, Behavioral Biases, Financial Literacy and Intention towards Investment on Investment Decision Making while taking Risk Tolerance as a mediator and Demographic variables as moderators. As with time the behavior of individual changes, there are different factors that may influence* their decisions. *Many factors including risk, vagueness and different choices come into contact when investor is willing to make decisions. Sometimes the choices made by investors may result in profit making while other time when wrong judgment are made may result in loss. From prior researches it has been found that there is a need to study various psychological factors on investor's decision making. The objective of the study is to study the impact of investor intention, biasness, financial literacy and personality traits of investors on the investment decision making while focusing on the mediating role of risk tolerance. In the theoretical framework we tested the association of independent variable including behavioral biases and its sub variables (Herd behavior, over confidence, openness to experience, disposition effect), Personality traits (Neuroticism, Extraversion, Agreeableness, Openness to experience, Conscientiousness), Financial Literacy and Investor Intentions on dependent variable i.e. investment decision making with risk tolerance as a mediator and Demographic variables as moderators. The sample for this study comprised individuals who are experienced and have invested in stock market. The sample size of our study was 261. The sample participants have received basic education in Accounts and Finance and they have invested in stock market and works in financial institutions. SPSS, AMOS and EXCEL were used for performing Regression, CFA, reliability and validity of models, model fitness test. The findings revealed that personality traits, intention towards investment and financial literacy have impact on an individual's risk*-tolerance behavior, which, in turn, *influences investment decisions about Financial Securities. Thus the findings suggested that for the investment advisors it is better to consider various personality traits, financial literacy and individual risk tolerance when making investment decisions for securities. For future research other psychological and behavioral factors can be tested.*

**Keywords:** Personality, Risk tolerance, Investment decision making, Behavioral Biases, Intention towards Investment, financial literacy

## Introduction

On a daily routine bases there are number of decisions which we have to take. Among these decisions some decisions are extremely important while other is less important. Some choices are quite straight forward where as there are some which are complex and thus require multi step approach for making decisions (Bashir, Rasheed, Raftar, Fatima, & Maqsood, 2013). Financial theories & studies are being developed since last few year, these studies are helping us to understand how investors make logical judgments in the financial market by implementing new models. It is assumed that when investors use traditional financial theories in order to make decision related to stock investments they don't face much difficulty since they are cautious, unfailing and up to date (Alquraan, Alqisie, & Shorafa, 2016). Traditionally, Behavioural finance helps in performing different experiments and testing in economics and psychology for the purpose of motivating its behavioural as well as empirical models analysis (Duxbury, 2015). For the unsophisticated investors it is better to make proper investment decisions because there is an increase in individual's status between upper and middle classes (Newton, Gallery, & Nguyen, 2017). No matter either its retail, organizational or simply a usual individual but within the area of behavioural finance they may have certain characteristics of absurdity in their decisions, actions & reasons. Within a human being irrationality is embedded that is as a biological trait, sociological or psychological trait (Ahmad, Ibrahim, & Tuyon, 2017). In order to get a higher return from their additional funds for the purpose of investing is known as investment process. While making investment decisions there are number of factors which affect investment decisions and these factors may include investment knowledge, characteristic of personality, influence of family and friends and efficiency of the funds. Although there are

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various factors which are impacting investment decisions but they all have the same purpose i.e. to earn profit (Zhuan, Ying, Boon, Hui, & Hong, 2016). Factors of investment in behavioural and rational model, provides information to investors that results in more trading (Abreu & Mendes, 2012). Financial researchers and participants of market beliefs that, the reasons and the type of investment alternatives preferred by individual investor is of high interest (Arena, Aydemirb, & b, 2015). A sub-discipline of psychology that is personality psychology, it is argued that behaviour of humans and their performance are the factors that determine personality in the literature of behavioural finance. Some of the researches have modelled the buying and selling behaviour of investors by studying and taking help from psychology (Tauni, Fang, & Amjad, 2015).

The study of behavioural finance examines the level, delicate sides and communication in the human's brains while making uncertain economic decisions. The most familiar characteristics of human are selflessness, alarm, greed and anger which place a huge impact on how decisions are made regarding money. Someone with capable mind, logical mind, emotions & proper reasoning are all related with each other & is a mechanism behind decision making process. Human behaviour is normally responsive not proactive, hence it is hard to predict how a human behaviour is based on these rules. The study of behavioural finance can explain why a person makes certain decision, but it is hard to estimate what will be underlying effects of the decision made by an individual (Oprean, 2014). Behavioralist who study human behaviour argue that the stock markets unnecessary volatility and its crashes and stock market bubbles provide indication against rationality, they argue that irrational investor matter as they make these anomalies, otherwise these anomalies would have never occurred (Feldman & Lepori, 2016). Behavioural finance also deals with behavioural bias of investor with placing priority on individual investor in making it financial decision (Hirshleifer, 2015).

By performing fundamental and technical analysis, judgement decisions are made either by investor or investment managers. These decision made by investors are often backed by decision tools. Factors and information floating in the market influence person's investment decision resulting in different market outcomes. The market is derive by behaviour of the investor from its psychological principle that influence its decision making style which explain why people buy or sell certain stocks, these factor will show how an investor act on certain information to make investment decision (PhD & Mutswenje, 2014). In the words of Bernstein, (1996) the study of risk is of major interest to the investors as well as for the academics for hundreds or more years. However, many of these researchers have found that financial risk tolerance is a new domain. Lytton and Grable, (1999) stated that there is a need for an instrument that is commonly recognized and used. It is of high importance in today's world as it was in any time in pasts. Due to un-availability of such instruments the financial service providers were forced to use some other kind of assessment techniques in order to measure risk which does not result in an adequate measure of financial risk tolerance.

Factors like choice, vagueness & risk are some multifarious aspects that comes in contact during the investment decision making process. The family units, specialized and experienced finance individuals find it quite exigent. There is risk which the investor has to chase during decision making as it results in profit making, but at the same time any judgment done in a poor or ambiguos manner may result in unfavorable outcomes (Khursheed, Rasheed, Laber, & Awais,2016). Decision making process among investors is found out to be attractive as they can be a part of it because it may result in the decisions of their choice. However it can't be profit all the time and similarly the investors don't make right decisions always during the specific time period (Arena, Aydemirb, & b, 2015). The result shows that behavioral errors i.e. confidence, negativity, depression, nervousness etc progressively wins the arguments against a rational behavior (Oprean, 2014). He suggested that future researchers can extend the study by considering psychological factors in relation with investor's behavior and can focus on the fluctuations within the capital market. The study can be extended by including different time period that can be increased from (days to years). He also suggested that it can be continued during the downfall in current years of developing capital market as compared to the developed capital market. The research of Arena, Aydemirb, & b, (2015) provides significant results of the given instuments that determines the investment. It includes deposits within the bank, overseas currencies, financial instruments including (bonds, shares & mutual funds). His findings suggested that it is of much importance to include some prominent factors of psychology i.e personality traits as well as emotional intelligence in the research model.

In the cross sectional research of Kumar & Goyal (2016) it is found that market conditions leads towards change in behavior of the investors. Investors usually make logical judgments but, however there are some psychological factors which are also involved in the decision making process and can influence the decision making behavior. Many other behavioral biases can be focused while testing them in different situations of the market. A link between variables of psychology can be studied. The findings of (Mahmood & Pak, 2015) suggested that social and cultural factors can be included in their model. Similarly the research can be extended by

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considering family backgrounds, family conditions and individual life experiences. From the research of (Khursheed, Rasheed, Laber, & Awais, 2016) it has been found that it is critical to know the impact of financial literacy on decisions related to investment. This is very important and helpful as it will help the organization and many financial institutions in knowing about the sources which results in developing interest among investors with financial literacy during investment. Similarly it shows that how by having literacy of finance they manage risk and bear it as well as it will result in a healthy investment. In order to enhance the level of confidence among various investors, investment experience plays a major role.

Thus from above it can be concluded that there is a need of performing research in such area and there are many psychological, social, economical and cultural factors that can be considered and can check the impact of those variables on individuals investment decisions.

The main objective of this study is exploring the psychological, economical, behavioral factors and their influence on individual investors decisions related to stocks. The study has many objectives as it aims to study Pakistan's stock Market which is growing and is emerging in current era, as among investors its importance is increasing and with time they are moving towards investing in such securities. Thus the study has many objectives which are as follow:

1. To study the impact of Behavioral Biases, Personality Traits, Intentions towards investment and financial literacy influencing the stocks investment decisions made by investors with demographic variables as moderators whereas Risk Tolerance as a mediator by providing evidence from Pakistan.
2. To study the impact of Personality traits and it's sub variables including (Extroversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience) on Investors investment decisions in presence of mediator Risk Tolerance.
3. To study the impact of financial literacy on investment decisions in presence of mediating variable i.e. risk tolerance.
4. To study the impact of investor intentions towards investment decisions in presence of mediating variable i.e. risk tolerance.
5. To study the impact of behavioral biases and its sub variables on investor's investment decision in presence of mediating variable i.e. risk tolerance.
6. To study the moderating role of Demographic variables (Age, income, Gender, Education and Experience) on investment decision making of investors.

THEOROTICAL FRAMEWORK:

Hon-Snir et al. (2012) studied various behavioral biases including disposition effect, availability and herd bias. They conducted this study on Israeli individuals who manage their investment portfolio. The study found that male investors are less affected than female by these kinds of biases but it is also found that investor's past experience reduces this effect.

Chandra and Kumar (2012) gave evidence that investors individually depends upon their curiosity for making the investment decision and the decisions they make are highly depended upon biases like representativeness and overconfidence. Where, Over confidence is defined as a bias which leads towards sub optimal investment decisions that result in various blunders. (Bhandari & Deaves, 2006).

Shefrin and Statman, (1985) introduce the concept of disposition effect. Weber and Camerer, (1998) stated that the securities are sold automatically when the disposition effect is reduced

Various researchers try to examine the aspects that result in herd behaviors when the managers take decisions to invest (Scharfstein and Stein, 1990).

When making investment decision it is important to know about optimism as it is considered as one of the most important element. It interprets as both macroeconomic and microeconomic activity, for example, high stake judgments are influenced by optimism, like startup investment, investment decisions and behavior (Iqbal, 2015).

Various researches provide evidence that, in unclear conditions, characteristics of personality directs behavior of an investor while making decisions (Back and Seaker, 2004). In the research of Beena & Krishnan, (2009) founded that individuals personality traits impact the risk tolerance, the spending and investment management.

According to Durand, Newby and Sanghani, (2008), the personality trait agreeableness describes that how an individual responds to the information he/she gets on investment when a person has high agreeableness the person tends to be joyful, give importance and respect the beliefs of others, they are more helpful and charitable.

A sense of humor, being social, nonexistence of deep analysis and focus on external events as well as information are aspects of extraverted individuals. Because of their positive attitude,

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with traits like extraversion they may sometime overestimate the increase and may under rate the loss. (Mahmood & Pak, 2015). In the words of Strandh, Sevä, & Berglund, (2015) a trait like openness in a person will be observant, vivid, lenient, fair, curious and hasty. People who are conscientious are found to be diligent, self-disciplined, dependable, competent, effective and visionary. (Strandh et al., 2015) Individual with high neurotic overestimate the risk when the market booms similarly they under evaluate an increase when the market is not in the favour. (Mahmood & Pak,2015).

In order to know that whether an individual is welcoming and unsympathetic vs cool and unfriendly is the purpose of Agreeableness. Whereas, Extraversion is to know whether an individual is outgoing or active versus lonely and aloof. The purpose of openness to experience is to know that either an individual is competent and well organized vs. relaxed and carefree. Conscientiousness is intended to catch whether a man is proficient and sorted out versus nice and lighthearted. Neuroticism is intended to catch whether an individual is touchy and anxious versus secure and certain (Hasan, 2013). In the words of sung & Hanna, (1996) few researchers and investment managers gave their conclusion that people who are at high rank in their working status like attorney, businessman can class the factors related to the level of risk tolerance. Female investors are more prone to take less risk as compared to the male investor when making financial decisions (Stendardi et al., 2002). A study on Tunisian stock market was conducted by Rekik and Boujelbene, (2013), in their study they found that behavioral biases do not have much influence on older investors because of their high level of experience. In the study conducted by Bashir, Azam, Butt, Javed and Ayesha, (2013) a negative relationship is found between disposition effect and age. However, Age is found to be positively linked with risk taking behavior. Age is also positively related with herd and overconfidence.

In the words of Weller and Thulin, (2012) (the big five factor) model of personality is the most common to be used and it uses five personality traits that are neuroticism (emotional stability), openness, extraversion, positivism and conscientiousness. Personality of an individual is a character of a person which remains same over a course of time and is being affected over a broader sense. The most commonly known theory of personality is the big five factors which judge's personality under the five factors that are openness, optimism, conscientiousness, neuroticism and extraversion (Samer & Ambreen, 2015). From the research of Crysel et al., (2012) it has been stated that in past researches that the scholars have suggested traits of personality effects individual investment decisions.

$H_1$: There is no direct relationship between personality traits and investment decision making in presence of a mediator.

Rekik and boujelbene, (2013) found that the factors of demographic like experience, phase and gender have an impact on the decision making of the investors, among the Tunisian investors. Most of the studies have been conducted in order to check the factors of demographic and their effect on the investor's level of risk tolerance when they make investment decisions. Individuals with different ages, income, gender, awareness, profession and marital status shows attitude which differ from one another, some are more risk takers while others are risk adverse (Ishaq & Sadiq, 2014). Heena, (2015) inspected the connection among the demographic variables along with traits of personality in order to check their impact on investors risk attitudes. A positive relationship has been found among the risk tolerance and level of income of individuals. Also person's personality and education are found to be irrelevant as have no impact on Personality of a person and the education of the person and were determined to be irrelevant as didn't have any impact on investor risk determination. (Bashir, Ahmed, Jahangir, Zaigham, Saeed, & Shafi, 2013) conducted a study among the Pakistani's individuals in order to know the relation and the impact of demographic variables on decisions of investors. The study conducted among the Pakistani individuals determines that the men and the youngsters are more of a risk taker than the older generation and the woman. Another fact that was interesting in part of their finding was that men and youngsters mostly invest in risky investment due to the lack of resources for better profit. Factors like age, level of income, education level, gender and marital status have importance because it impacts investors' attitude towards risk. (Mahmoud & Pak,2015). A research conducted in Rajsathan by Jain & Mandot, (2012) investigated demographic variables with individual's investment decisions. For the research Chi square and correlation test was used. A negative relationship was found. Similarly, a positive relation was found between the levels of income, knowledge of investors in different cities. But, however no significant relationship was found between the investment decisions taken by genders.

$H_2$: Demographic variables moderate the relationship between Risk tolerance, Intention towards investment, Behavioral Biases, Financial Literacy, Personality traits and investment decision making.

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Behavioral biases take place while making investment decisions. Due to these biases of an investor, the investor is prevented from making rational decisions (Bashir, Rasheed, Raftar, Fatima, & Maqsood, 2013). The advice and suggestions given by the advisor to their customers are indeed affected by the concepts of what they possess and the beliefs on how to invest. The decisions of investors are impacted by the biases with in the beliefs and conceptions and for this purpose it is necessary to evaluate the behavioural biases of the advisors. The exposure to the biases of an individual is affected by the socio economic factors and the demographic factors (Seppälä, 2009). In the research of Thushari Sewwandi, (2015) it has been found out that when going through different empirical researches that are done in order to find out the relationship with behavioral biases, these researches have usually focused on biases like herd behavior, home bias or disposition as well as overconfidence etc. From results it has been proven that investors (individual, analyst as well as institutions) usually deviate from making rational investment decisions. A number of other factors have also been reported in such study. H3: There is no direct relationship between Behavioral Biases and investment decision making in presence of a mediator.

According to (O'Hara, Hvidkjaer, & Easley, 2010), when there is an intention to invest, an individual who is willing to invest will firstly begin by assessing the company, their financial position. The assessment depends upon some objective measures which may include Return on Equity (ROE), Earning per Share (EPS) etc. When investors try to validate their investment decisions on a specific company there emotional view of that assessment may come into effect.

$H_4$: There is no direct relationship between intention towards investment and investment decision making in presence of a mediator.

Financial literacy is significant. This information is critical as it helps in making decisions on the evidence. A positive indicator results in investors making worthy choices. The investors are needed to decide how they are going to evaluate the risk i.e. on the bases of the clues they receives. Thus, if the clues are changed it will impact decisions and will result in significant information and at the same time the information may result to be of no use. The clues of information come from the decision maker on how it is utilized regarding making the investment decision. When a well-informed investor or individual does not give any value to the information he receives, thus can act like a non-informed one. Better decisions of investment can be made by investor who are well experienced, through time they build their confidence or by utilizing their experience and also by risk management. (Awais et al, 2016). More and more financial products are being introduced in the market and each individual have to decide on the choices that comes due to innovation and it is better to make the correct choices as we are human beings we do not remain productive through our entire life. Since when we get old we become less productive and energetic thus depend upon the investment which we did when we were productive. When a person is looking forward to an investment this should be an opinion but not a necessity of life due to the drop of income after retiring (Lusardi, 2008).

$H_5$: There is no direct relationship between Financial Literacy and investment decision making in presence of a mediator.

Krishnan and Beena (2009) found that the impact on the tolerance of risk, management of investment and expenditures comes from the perspective of each individual personality. Davies, (2014) stated risk to be a wide psychological factor and the degree to which a person accept this risk may result in reducing their profit.

$H_6$: Risk tolerance has a significant positive effect on investment decision making.

Mayfield, Perdue and Wooten (2008) states that individual perception related to risk and the will of investors to take risk can be impacted by their personality traits. The authors have recommended that investing behavior is influenced by perception about risk. Also, in their study a positive influence has been found out on investor risk tolerance by the financial risk attitude of the individual investor. Similarly an investor will invest in stocks. Soane and Chmiel, (2005) used big five personality model in order to measure the personality and other related factors that influences decision making related to risk. They focused on three repetitive decisions and these are personal finance, health as well as work. The authors assessed the steadiness of risk preference. The study suggested a critical role is to be played for both risk perception and process through which decisions are made in shaping the risk taking behavior. Roszkowski and Davey (2010), in their research found that a constant as well as variable aspect of risk tolerance exists.

$H_7$: Risk tolerance mediates the relationship between personality traits and investment decision making.

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$H_8$: There is a significant positive impact of personality traits on investment decision making.

Odean, Heaton, & Gervais, (2011) found that there are some biases including regret as well as overconfidence which seems to impact risk tolerance of an individual. As the risk attitude of an investor is variable thus it can change easily the factors like emotional and economic. Moderate level of overconfidence and other ego centric biases are found to be steady for a decent mental health. There are some behavioral biases among which self-attribution biases, hindsight and confirmation, illusion of control biases can strengthen the over confidence level of individual (Taylor and Brown, 1998). In risky kind of situation people usually reduce the level of regret as feelings of joy is more often outweighed by the feelings of regret. This result in explaining the reasons why herding behavior tends to occur among investors through impetus investing. The momentum investors assume the prices kept on rising when the stock market is performing well. When prices move up the risk tolerance of investors also moves up as the fear of regrets outweighs the monetary benefits as well as potential psychic (O'Neill, Lytton, & Grable, 2010).

$H_9$: Risk tolerance does not mediates the relationship between Behavioral Biases and investment decision making.

$H_{10}$: There is no significant positive impact of Behavioral Biases on Risk Tolerance.

From the research of Hofstede, (2001) it has been found that individuals who are more risk averse are usually affected by the risky and vague circumstances. Hallahan et al. (2004) in his research argued that individuals measure their level of risk tolerance and then try to lessen their exposure to un wanted circumstances, thus results in some level of risk management.

$H_{11}$: Risk tolerance mediates the relationship between intentions towards investment and investment decision making.

$H_{12}$: There is a significant impact of Intention towards investment on Risk Tolerance.

There are people who are willing to take risk while there are many who usually avoid risk; there are people whose level of risk tolerance is defined by the situation in which they are. It is suggested to include aspects of risk tolerance in the research model of financial literacy and investment in order to check the impact and its influence on financial decision making. The impact of financial literacy through risk averseness can be tested (Van Rooij et al., 2007).

$H_{13}$: There is a mediation of risk tolerance between financial literacy and investment decision making.

$H_{14}$: There is a significant positive impact of Financial Literacy on Risk Tolerance.

**Research Methdology**

3.1) Methods of Data Collection

The method of this study we applied in our research is by collecting our data through online reliable resources i.e. by developing a questionnaire online and also through handing over questionnaire to our respondents. In order to develop a questionnaire, we read many researches from authentic journal and then finalized our questionnaire. The questionnaire was distributed in hardcopy form as well as for online questionnaire we used Google docs for the purpose of finding out the relationship between various variables on each other. The respondent of our research were all those who have financial knowledge as either have taken financial courses, have strong grip on accounts and finance. Similarly all those who have invested in stocks were of major focus to us. There were many respondents who were willing to fill our questionnaire and there were many respondents who were reluctant to fill the questionnaire but we were humble and kept asking but they gave their questionnaire either during deadlines or showed least interest while filling it up so the data can be bias. As we had to visit different brokerage houses or financial institutions therefore we also got permission letter from our university so that we can get our survey filled as many required permission letter from university.

**3.2) Techniques and Size of Sampling:**

The size of our questionnaire was around 400. We distributed around 400 questionnaires out of which we got 320 back and also among which there were many which were either incomplete or showed biasness to a higher level which we had to skip as they were not reliable. In the end we managed to get around 261 samples which were reliable for testing. The target audience of our research was either those who have financial knowledge or have taken their majors in finance and similarly are working in brokerage house also from those who invest in financial security.

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From nature our questionnaire is likert scale i.e. consist of 5 options. The respondents were requested to fill the questionnaire in which there were statements and each were having 5 options with 1 as Strongly Agree, 2 as Agree, 3 as Neutral, 4 as Dis Agree and 5 as Strongly Dis Agree. Whereas, Demographic variables consist of dichotomous and multiple choice questions.

**3.3) Instrument of Research:**

The instrument of our research has been adopted from Mayfield, Perdue, & Wooten, (2008) which includes questions related to Big Five Personality Traits and Investment Intentions. For Behavioral biases the questionnaire was adopted from Prosad, Kapoor, & Sengupta, (2016). Financial literacy which we have adopted from the research of (Nguyen, Gallery, & Newton, 2016). As the most widely scaled used for measuring risk tolerance is of Lytton and Grable, (1999) therefore we had also used that scale but for better result we converted the questionnaire into Likert Scale. For investment decision making we adopted from Pasewark & Riley, (2010) questionnaire.The questionnaire for our research is as follows:

| **Instruction**: Tick anyone option of the following: | | **Strongly Agree** | **A** |
|---|---|---|---|
| **INVESTOR INTENTION Mayfield, Perdue, & Wooten, (2008)** | | | |
| 1 | I do a comparison of my portfolio performance with that of specialized Manager.* | | |
| 2 | I plan to take course on how to do investment. | | |
| 3 | I perform management of portfolio activities at least two times a week. | | |
| 4 | I will invest at least 50% of my investment money into the stock market | | |
| **NEUROTICISM (Mayfield, Perdue, & Wooten, 2008)** | | | |
| 5 | At times I feel useless.* | | |
| 6 | I feel inferior to others when investing* | | |
| **EXTRAVERSION(Mayfield, Perdue, & Wooten, 2008)** | | | |
| 7 | I consider myself as an energetic individual.* | | |
| 8 | I like talking to people about my investment. | | |
| **OPENESS TO EXPERIENCE (Mayfield, Perdue, & Wooten, 2008)** | | | |
| 9 | I feel motivated when I see art and nature | | |
| 10 | Frequently, I try overseas and new food | | |
| **AGREEABLENESS (Mayfield, Perdue, & Wooten, 2008)** | | | |
| 11 | I usually argue with family members and colleagues. | | |
| 12 | I try to be kind and thoughtful. | | |
| **CONSCIETIOUSNESS (Mayfield, Perdue, & Wooten, 2008)** | | | |
| 13 | I keep my things tidy. | | |
| 14 | Sometime I feel like I am not much reliable as I should be.* | | |
| **BEHAVIORAL BIASIS (Prosad, Kapoor, & Sengupta, 2016)** | | | |
| 15 | I like to discuss my investment decision with friends in order to reduce my level of stress.* | | |
| 16 | I prefer to invest in stocks when many buy orders are placed at the start of trading period. | | |
| 17 | I like to sell stocks when the price starts to increase. | | |
| 18 | My successful past investment experience makes me invest more in Securities. | | |
| 19 | In upcoming quarter I am planning to increase my investment. | | |
| 20 | I mostly think about potential gain before I think of investing. | | |
| 21 | I can pick better stocks then others | | |
| 22 | I take full responsibility of my own portfolio performance. | | |
| | **FINANCIAL LITERACY: (Nguyen, Gallery, & Newton, 2016)** | | |
| 23 | I think self-rating my overall financial knowledge is important. | | |
| 24 | I am well informed about investment. | | |
| 25 | I am positive about my skills to invest. | | |
| **RISK TOLERANCE (LYTTON AND GRABLE, 1999)** | | | |
| 26 | While investing I prefer safety to risk. | | |
| 27 | I don’t like making money in short time.* | | |
| 28 | I think Risk means opportunity. | | |

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| | |
|---|---|
| 29 | I like to take risk when making investment decision. |
| | **INVESTMENT DECISIONS (Pasewark & Riley, 2010)** |
| 30 | I believe it is safe to invest. |
| 31 | The investment I make has low risk as compared to the market |
| 32 | I will use investment for the betterment of society. |
| 33 | I will get principle amount at maturity of my investment. |

There are some questions which were removed as they were showing error more than 50%. In order to get the most appropriate result those questions were skipped during testing process.

### 3.4) Statistical Techniques:

The data after being collected and recored to excel file was then uploaded to the SPSS data file. In order to perform the analysis, for SEM i.e Structural Equation Modeling a two phase approach was adopted. In order to measure the data first of all CFA ( Confirmatory Factor Analysis) was performed to test and measure the Cronbach's alpha which was performed in Spss whereas CR,AVE,MSV,ASV were performed using AMOS. In order to perform hypothesis amos was used in which two tailed test was perform. For moderation Spss was used. Beta, R square and other needed values were tested using Amos and Spss. For our research we have worked on SPSS and AMOS. Also in order to record or note data we have used advanced Excel as well.

### 3.5)Theoritical Frame Work of Research:

The model of our research include independent, dependent, Mediators and Moderators. The dependent variable of our research is investment decision making where our independent variable are Behavioral Biasis, Invetors intention towards investment, financial literacy and Personality traits i.e Big five personality traits. The sub variables of our research for Behavioral biasis include (Over confidence, Herd, Optimism and Disposition effect), For personality traits include (Neuriticism, Extraversion, Openess to Experience, Agreeableness & Conscientiousness). The mediator of our research is Risk Tolerance Where as moderators are demographic variables which include (Age, Income, Gender, Experience and Qualification). The models have been adopted from previous researches of Mahmood & Pak, (2015), Prosad, Kapoor, & Sengupta, (2016). The model is shown in the figure 1 below:

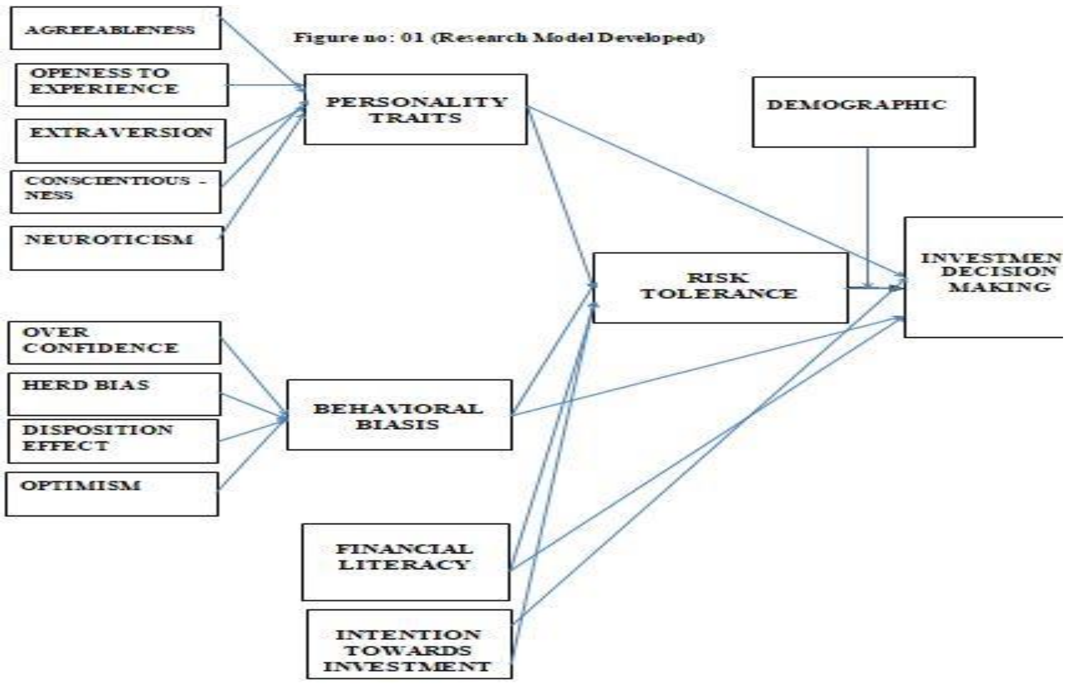


Figure no: 01 (Research Model Developed)

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**Descriptive Analysis**

Frequency Table:

| VARIABLE | CATEGORY | SAMPLE SIZE | % |
|---|---|---|---|
| GENDER | MALE | 216 | 82.8 |
| | FEMALE | 45 | 17.2 |
| AGE | Below 20 years | 43 | 16.5 |
| | 20-30 years | 184 | 70.5 |
| | 30-40 years | 29 | 11.1 |
| | 41-50 years | 5 | 1.9 |
| INCOME | Below 25,000 | 42 | 16.1 |
| | 26,000-50,000 | 96 | 36.8 |
| | 51,000-75,000 | 51 | 19.5 |
| | 76,000-100,000 | 35 | 13.4 |
| | Others | 37 | 14.2 |
| QUALIFICATION | Metric | 3 | 1.1 |
| | Intermediate | 47 | 18 |
| | Bachelors | 119 | 45.6 |
| | Masters | 66 | 25.3 |
| | PHD | 11 | 4.2 |
| | Others | 15 | 5.7 |
| EXPERIENCE | Less than 1 year | 88 | 33.7 |
| | 1-3 years | 83 | 31.8 |
| | 4-6 years | 54 | 20.7 |
| | 7-10 years | 25 | 10 |
| | Above 10 years | 10 | 3.8 |

*Table Number: 01*

The demographics result clearly shows that in this research there are 82.8% males and females comprises of 17.2%. That shows that majority are males who participated in the research. The study was conducted among those who have invested in stock market and have much knowledge thus the respondents include 16.5% who are below 20 years, 70.5% between 21-30 years, 11.1% between 31-40 years, 1.9% between 41-50 years. The income group cover 16.1% whose income is below 25,000, 36.8% covers 26,000-50, 000, 19.5% covers 51,000-75,000, 13.4% covers 76,000-100, 000 income groups, whereas 14.2% covers other income groups. The Experience Group covers 33.7 of those who have less than 1 year experience, 31.8% who have 1-3 years of experience, 20.7% who have 4-6 years of experience, 10 who have 7-10 years of experience and 3.8% who have above 10 years of experience. 45.6% of the Bachelors' students and 25.3% of the Masters students participated in the study.

**CFA (Confirmatory Factor Analysis)**

The results are accurate as they show Cronbach's Alpha values to be above than 0.7. It shows that the questionnaires internal consistency to predict the results is better. Whereas, AVE values are above 0.50, CR values are also above 0.7 which shows accurateness, while the discriminant validity i.e. MSV and ASV is also as per the required standard which shows that all the instruments are explaining the result in the right way. The values are shown in table: 02 which is shown below:

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| Construct/Indicators | Standardized Factor Loading (CFA-AMOS) | Construct Reliab10ly | | Construct Validity | | |
|---|---|---|---|---|---|---|
| | | Cronbach's alpha | Composite Reliability (CR) | Convergent Validity | Discriminant Validity | |
| | | | | Average Variance Extracted (AVE) | Maximum Shared Variance (MSV) | Average Shared Variance (ASV) |
| INVESTER INTENTION TOWARDS INVESTMENT | | 0.776 | 0.777, | 0.538 | 0.1936 | 0.09148 |
| II1 | 0.72 | | | | | |
| II2 | 0.74 | | | | | |
| II3 | 0.74 | | | | | |
| PERSONALITY TRAITS | | 0.893 | 0.895 | 0.590 | 0.0784 | 0.04524 |
| PT1 | 0.83 | | | | | |
| PT2 | 0.86 | | | | | |
| PT3 | 0.79 | | | | | |
| PT4 | 0.65 | | | | | |
| PT5 | 0.74 | | | | | |
| PT6 | 0.72 | | | | | |
| BEHAVIOURAL BIASES | | 0.908 | 0.911 | 0.594 | 0.2209 | 0.10004 |
| BB1 | 0.78 | | | | | |
| BB2 | 0.77 | | | | | |
| BB3 | 0.81 | | | | | |
| BB4 | 0.84 | | | | | |
| BB5 | 0.80 | | | | | |
| BB6 | 0.72 | | | | | |
| BB7 | 0.66 | | | | | |
| FINANCIAL LITERACY | | 0.766 | 0.768 | 0.525 | 0.2209 | 0.1092 |
| FF1 | 0.72 | | | | | |
| FF2 | 0.77 | | | | | |
| FF3 | 0.68 | | | | | |
| RISK TOLERANCE | | 0.791 | 0.801 | 0.578 | 0.1764 | 0.0843 |
| RT1 | 0.63 | | | | | |
| RT2 | 0.88 | | | | | |
| RT3 | 0.75 | | | | | |
| INVETMENTDECISION MAKING | | 0.788 | 0.789 | 0.483 | 0.1764 | 0.056262 |
| IDM1 | 0.71 | | | | | |
| IDM2 | 0.71 | | | | | |
| IDM3 | 0.69 | | | | | |
| IDM4 | 0.67 | | | | | |
| Reliability and Construct Validity Thresholds: [Suggested by Fornell and Larcker (1981)] | | $\alpha > 0.70$ (Nunnaly,1967) | CR > 0.70 | i) AVE > 0.50 ii) CR > AVE | MSV < AVE | ASV < AVE |

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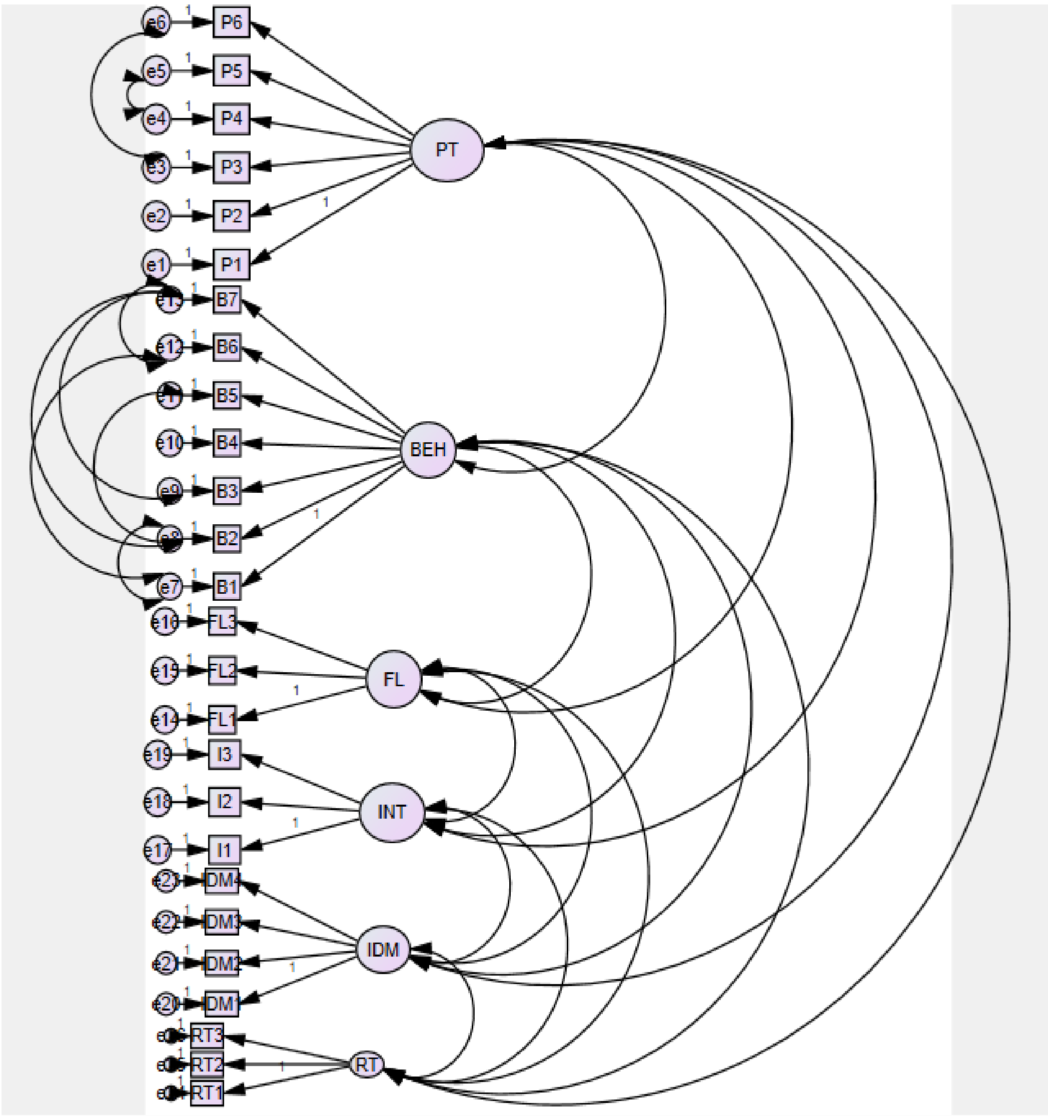


*CFA : Model Fitness Test: Figure no: 02*

In order to measure the model there are some standards or mark set. This study has taken seven indices which are Chi-square/df , P. Value, Goodness-of-Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index, Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA). Mostly the values reached threshold i.e. of Hair et al., (2006) but AGFI, GFI were found to be slightly low.

**Before Modification:**

| Chi-square/df | P-Value | GFI | AGFI | CFI | TLI | RMSEA |
|---|---|---|---|---|---|---|
| 1.645 | .000 | .884 | .857 | .941 | .933 | 0.050 |

*Table: 03*

**After Modification Indices:**

| Chi-square/df | P-Value | GFI | AGFI | CFI | TLI | RMSEA |
|---|---|---|---|---|---|---|
| 1.493 | .000 | .898 | .870 | .956 | .948 | 0.046 |

*Table: 04*

After modification values almost reached the mark point i.e. GFI is almost up to the mark whereas AGFI is slightly lower but has improved while the rest in meeting the level of threshold.

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**Hypothesis Testing Using Moderation Analysis:**

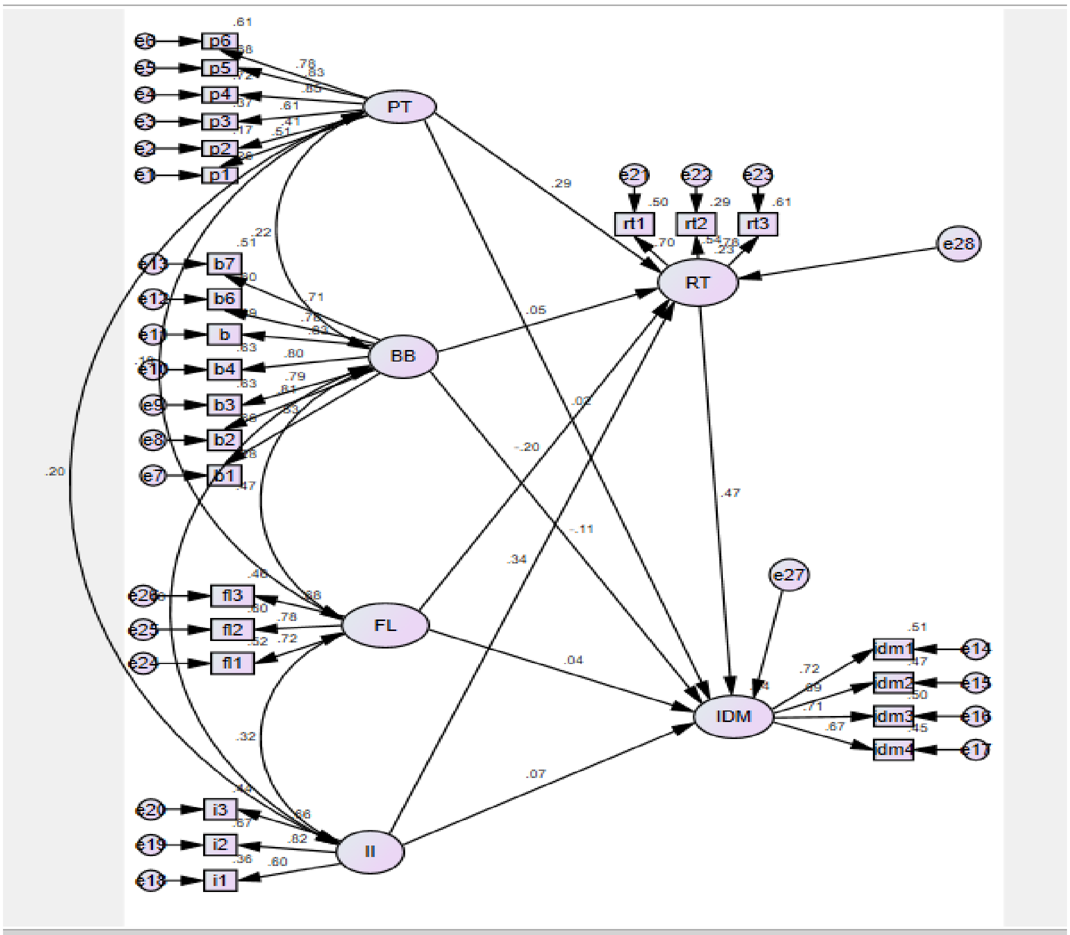


*Figure no: 03 (SEM Model)*

In this model PTS, II, BB and FL are independent variable whereas RT is a mediator and IDM is a dependent variable of research.

**Two Tailed Test:**

**Indirect Effect:**

In order to test the mediation we have taken Personality traits, Behavioral Biases, Intention towards investment and financial literacy as independent variables whereas we have taken Investment Decision Making as a Dependent variable and Risk Tolerance as a mediator. The indirect effect of Intention towards Investment, Financial Literacy and Personality Traits is showing significant relationships at 0.05 confidence interval whereas Behavioral Biases shows insignificant relationship. Thus in the model proposed shows mediation. Results are shown below:

| | FL | II | BB | PT | RT | IDM |
|---|---|---|---|---|---|---|
| RT | ... | ... | ... | ... | ... | ... |
| IDM | .024 | .001 | .513 | .001 | ... | ... |

**Table: 05**

**Direct Effect**

The direct effect of all four independent variables (FL, II, BB, and PT) on IDM is found to be greater than 0.05 which shows that there is no direct effect.

| | FL | II | BB | PT | RT | IDM |
|---|---|---|---|---|---|---|
| RT | .037 | .001 | .544 | .002 | ... | ... |
| IDM | .719 | .542 | .202 | .733 | .001 | ... |

**Table: 06**

From result it can be concluded that Hypothesis H7, H11, H13 is accepted and shows full mediation whereas H9 is rejected because it shows no indirect effect and direct effect. Whereas H6 is also accepted and shows that there is a significant positive impact of Risk tolerance on investment decision making.

| Independent Variables | R2 | Beta | P-value |
|---|---|---|---|
| IDM ← PTS | | 0.021 | 0.786 |
| IDM ← BB | | -0.109 | 0.213 |
| IDM ← RT | 24.5% | 0.471 | 0 |
| IDM ← FL | | 0.043 | 0.645 |
| IDM ← II | | 0.067 | 0.472 |
| RT ← BB | | 0.055 | 0.537 |
| RT ← PTS | | 0.287 | 0 |
| RT ← II | | 0.339 | 0 |
| RT ← FL | | -0.198 | 0.036 |
| IDM ← RT ← FL | | -0.094 | 0.016 |
| IDM ← RT ← II | | 0.1598 | 0.00 |
| IDM ← RT ← PTS | | 0.1363 | 0.001 |
| IDM ← RT ← BB | | 0.0259 | 0.221 |

**Table no: 07 (Hypothesis Testing)**

Where IDM stands for Investment Decision Making, PTS= Personality Traits, BB= Behavioral Biases, RT= Risk Tolerance, FL= Financial Literacy, II= Intention towards Investment. Thus the Beta values of the results mostly show positive impact whereas financial literacy shows negative impact on the model.

| Hypothesis Result | RESULTS |
|---|---|
| H1: There is no direct impact of Personality traits on investment decision making in presence of a mediator. | Rejected |
| H2: There is a moderation of demographic variable (Income) on investment decision making. | Accepted |
| H3: There is no direct impact of behavioral bias on investment decision making in presence of a mediator. | Rejected |
| H4: There is no direct impact of Intention towards investment on investment decision making in presence of a mediator. | Rejected |
| H5: There is no direct impact of Financial literacy on investment decision making in presence of a mediator. | Rejected |
| H6: There is significant positive impact of risk tolerance on investment decision making. | Accepted |
| H7: Risk tolerance mediates the relationship between Personality traits and investment decision making. | Accepted |
| H8: There is a significant positive impact of Personality traits on Risk Tolerance. | Accepted |
| H9: Risk tolerance does not mediate the relationship between Behavioral Biases and investment decision making. | Rejected |
| H10: There is no significant impact of Behavioral Biases on Risk Tolerance. | I |
| H11: Risk tolerance mediates the relationship between intention towards investment and investment decision making. | Accepted |
| H12: There is a significant positive impact of Intention towards Investment on Risk Tolerance. | Accepted |
| H13: Risk tolerance mediates the relationship between financial literacy and investment decision making. | Accepted |
| H14: There is a significant negative impact of Financial Literacy on Risk Tolerance. | Accepted |

**Table no: 08**

The hypotheses estimate table (7) confirms that in the presence of mediation factors Intention towards Investment, Personality Traits and Financial Literacy found insignificant to the investment decision making, whereas, Behavioral Biases shows no direct and indirect effect,which means it shows no mediation and rejects hypothesis.

**Hypothesis Testing Using Moderation Analysis:**

The moderation of demographic variables i.e. **(Age, Income, Education, Qualification and Experience)** has been tested.

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**Before Modification:**

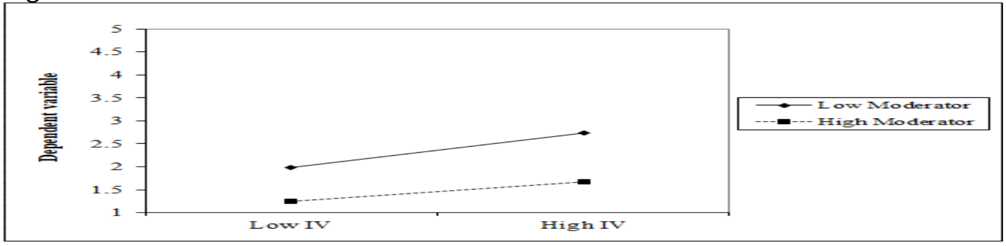
| | R | R2 | ANOVA | UNST B | Sig Values |
|---|---|---|---|---|---|
| constant | 0.220 | 0.048 | 0.001 | 1.399 | 0.000 |
| IV | | | | 0.291 | 0.000 |

**After Modification:**

**AGE:**

| | R | R2 | ANOVA | UNST B | Sig Values |
|---|---|---|---|---|---|
| constant | 0.290 | 0.084 | 0.001 | 1.913 | 0.000 |
| IV | | | | 0.291 | 0.000 |
| Age | | | | -.165 | .236 |
| INTERCEPT | | | | -0.072 | .007 |

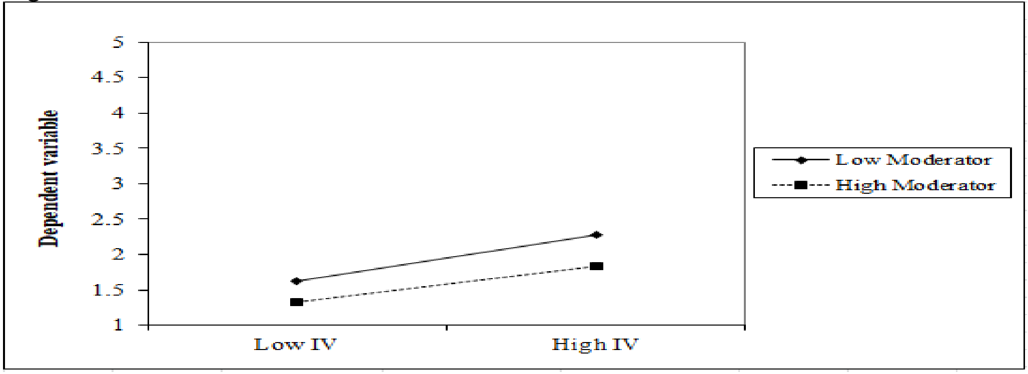
**Figure no : 04**




**Gender:**

| | R | R2 | ANOVA | UNST B | Sig Values |
|---|---|---|---|---|---|
| Constant | 0.246 | 0.060 | 0.001 | 1.510 | 0.000 |
| IV | | | | 0.290 | 0.000 |
| GENDER | | | | -0.184 | .291 |
| INTERCEPT | | | | -0.044 | .465 |

**Figure no: 05**




**Income:**

| | R | R2 | ANOVA | UNST B | Sig Values |
|---|---|---|---|---|---|
| constant | 0.243 | 0.059 | 0.002 | 1.578 | 0.000 |
| IV | | | | 0.279 | 0.000 |
| INCOME | | | | -0.051 | .293 |
| INTERCEPT | | | | -1.00 | .109 |

**Figure no :06**

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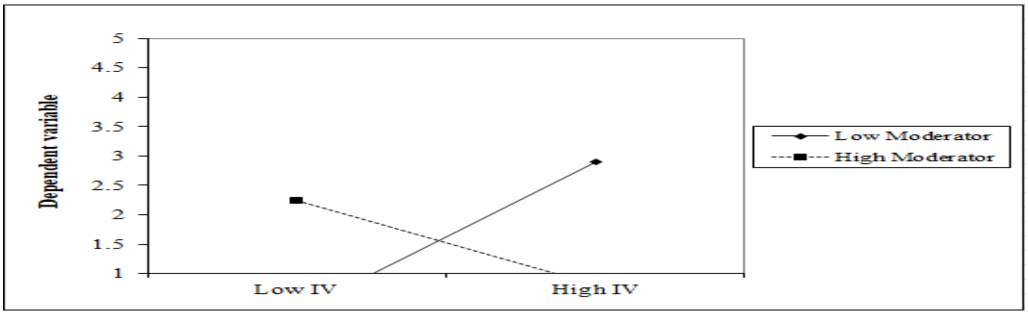


**Education:**

| | R | R2 | ANOVA | UNST B | Sig Values |
|---|---|---|---|---|---|
| constant | 0.232 | 0.048 | 0.003 | 1.620 | 0.000 |
| IV | | | | 0.297 | 0.000 |
| EDUCATION | | | | -0.073 | .229 |
| INTERCEPT | | | | 0.022 | .749 |

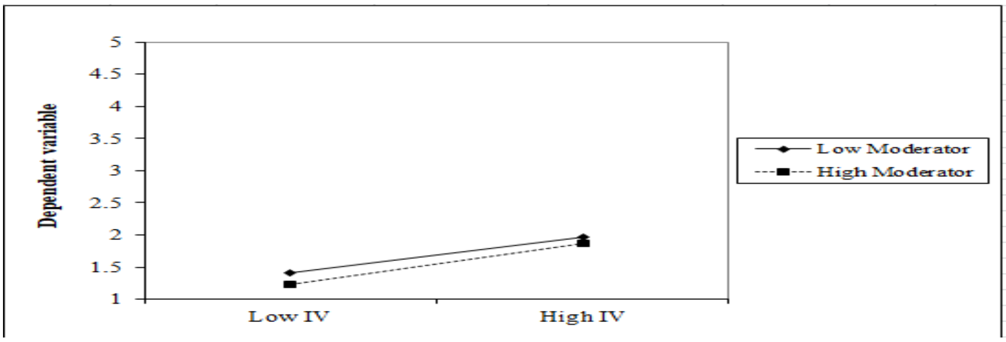


**Figure no: 07**

**Experience:**

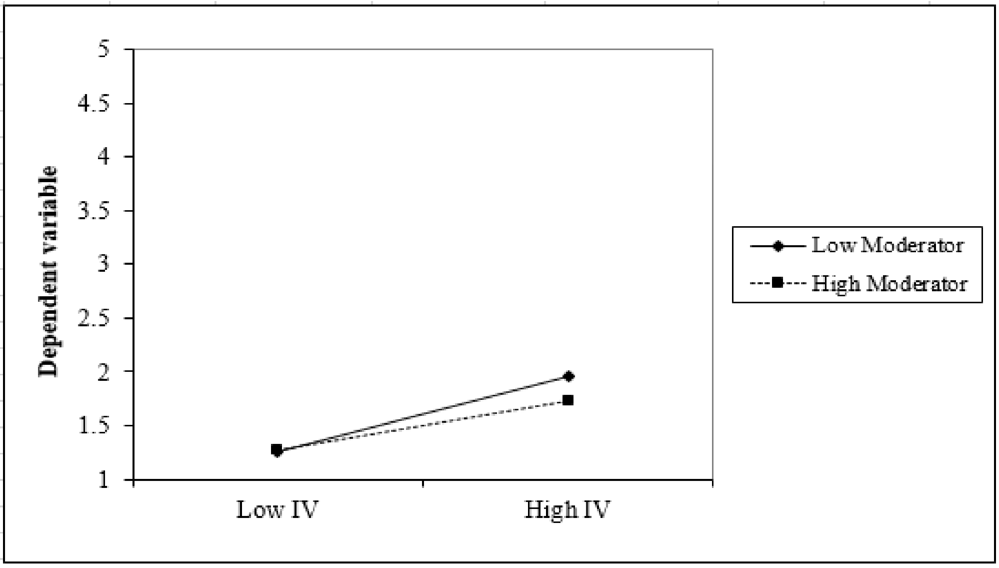


**Figure no: 08**

The R square without moderation is found to be 0.048 which after moderation has improved. However the R square of all 5 demographic variables i.e. Age, Income, Education, Experience and Gender showed improvement. The demographic variables (Age, Education, Experience and Gender) as shown in figure (4, 5, and 7) showed no moderation as there lines did not interact it can be seen in figure. Whereas, Income and Experience as shown in figure 6 as well in 8 showed moderation. As the graph is moving downwards shows deflation. Thus the moderator (income and experience) deflates the relationship among variables. Although, the interaction of moderation is not much strong but the effect is here.

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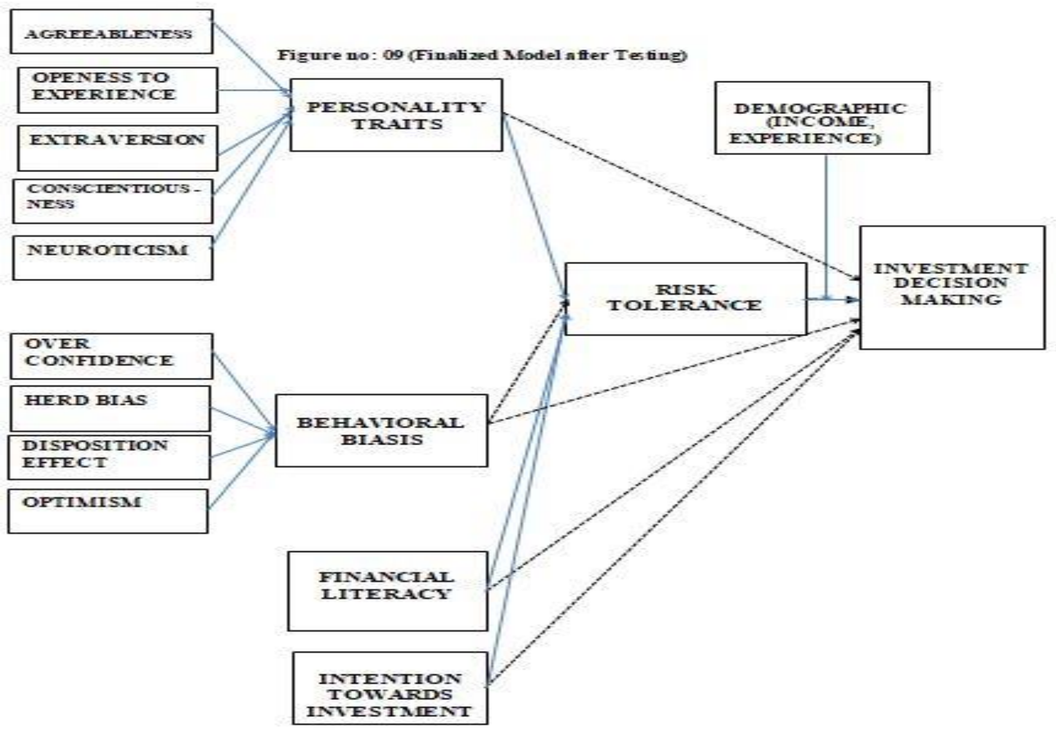


**Figure no: 09 (Finalized Model after Testing)**

Where, the dotted line show rejection of hypothesis and shows no impact whereas the blue line shows impact on the variables.

**Conclusion, Recommendation and Limitations:**

The study used a mediation which is Risk Tolerance in order to measure the impact of Behavioral Biases, Intention towards Investment, Personality traits and financial literacy on Investment decision making. The study proposed the moderation of demographic variables (age, income, education, experience, qualification). The study attempted to determine which factor effects investment decision making and which does not have any impact. In first phase the mediation was performed using AMOS whereas in second phase moderation was performed in SPSS. The result showed that Personality Traits, Intention towards Investment and Financial literacy were found insignificant with investment decision making in presence of a mediator i.e Risk Tolerance which shows that there is full mediation and Level of Risk Tolerance can have a huge impact on Investment Decision Making. Personality Traits and Intention towards Investment were found positively significant with Risk Tolerance whereas Financial Literacy is found to be negatively related with Risk Tolerance. The study can be used by various individuals and can take advantage from it. The study can be used in order to improve various financial literacy programs. The results shows that personality has an impact on decision making, therefore it is necessary to keep an eye on individual’s personality traits in order to know how they will invest. Similarly, Risk tolerance of individuals also shows impact and can change the way we invest therefore should be of major focus while giving advice to invest. By looking at individual’s personality traits, there level of financial literacy and their intention towards investment needs to be considered while giving advice to investors related to investment. The demographic variable Income showed moderation, while giving advice to various investor income groups as well as experience of individual must be kept in mind as it shows moderating impact.

There are several limitations to our study. First the study was conducted in Karachi, Pakistan and the sample size of the study is 261. For future research the sample size and the geographic area can be increased in order to get a much better result. Our research does not completely represent all the investors so should be focused. As our research considered some of the sub variables of independent variables, future researchers should consider other sub variables and check their impact on investment decision making in presence of Risk Tolerance. Although, the study had these limitations but still the research provided valuable results.

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