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# Behavioral biases and individual investor trade return in the nexus of prospect and demographic theory: The moderation of age and education

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## Abstract

Various economic, social, and behavioral factors implicitly affect investors' behavior, specifically their investment performance. Therefore, this study inquires about the impact of specific behavioral biases such as overconfidence, anchoring, mental accounting, and herding on individual investors' trade return directly and through the moderation of investors' age and education. The study collected data from 302 Pakistan Stock Exchange (PSX) investors through an adopted questionnaire. Employing structural equation modeling using SmartPLS version 3.2.7 revealed that anchoring and mental accounting significantly affect investors' returns. However, herding and Overconfidence have an insignificant impact on investor return. Similarly, it was shown that the relationship between Anchoring, Overconfidence, and investors' returns is moderated by their age and level of education. In contrast, it does not significantly moderate the relationship between herding, mental accounting, and investor return. Besides enriching the existing body of knowledge, the study offers numerous empirical implications for stakeholders, including PSX, investors, and regulators of developing countries, especially Pakistan. Furthermore, the study has several social implications for multiple stakeholders.

**Keywords: Behavioral Biases, Trade Return, Age, Education, Moderation**

## Introduction

The stock market is imperative to a country's prosperity by channelling savings into the economy (Shafi, 2014). As per the Efficient Market Hypothesis (EMH), investors are always believed to be rational, efficient, and seasoned in making their investment decisions in the stock market (Tripathy, 2014). Investors' behavioris essential as it is pivotal in developing a stock market that reflects a country's economic growth (Rasheed et al., 2015). However, individual investors' behaviour might be influenced by sociological, cultural, and economic factors (Sadiq & Ishaq, 2014). According to Sewell (2011), Behavioral finance is the study of psychology and its impact on the behaviour of financial practitioners and its subsequent effect on markets; hence, behavioral finance emerged as a new area by combining finance with psychology. Unlike traditional finance, which recommends that investors are always rational and systematic in the stock market, behavioral finance assumes investors' behaviour to be influenced by various psychological and emotional biases (Birău, 2012).

Behavioral finance criticizes conventional finance theories such as efficient market hypotheses (EMH) and expected utility theory (EUT) (Zahera & Bansal, 2016). Behavioral finance explains how investors incorporate illogical biases into their investment decisions (Atif Sattar et al., 2020). Tversky and Kahneman (1973) are pioneers of behavioral finance, and since then, the subject has shown remarkable growth, especially in developed countries. Significant success has been seen in the area during the last decade. Behavioral finance is widely recognized as a crucial determinant of fluctuations in the stock market (Wali et al., 2022). However, behavioral finance continues to expand, particularly in developing nations (Awais et al., 2016). It is vital as predicting investors' behavioris challenging for policymakers, businesses, and stock market practitioners in developing countries (Patil & Bagodi, 2021). In addition, behavioral finance is getting the attention of the various stakeholders of society, especially researchers and academicians (Chandani et al., 2020).

Studying behavioral finance and investors' conduct is crucial for recognizing and considering various behavioral biases in investing choices (Atif Sattar et al., 2020). Pakistani investors are susceptible to multiple factors, including market and psychological, impacting their investing performance (Sohail et al., 2020). In addition, the people of Pakistan adhere to a conventional

strategy when it comes to investing, favouring the retention of funds in banks rather than allocating them to the stock market (Wali et al., 2022). The reason may be the existence of various behavioral biases that either stop them from investing or affect their investment return in the stock market. Consequently, through this study, individuals may enhance their decision-making abilities by circumventing these cognitive biases, eventually augmenting their investment yield in the market. The emergence of behavioral finance has facilitated the assessment of players' conduct in the stock market (Gupta & Ahmed, 2016). Investors' preferences and profits are influenced by behavioral biases (Kalra et al., 2012).

Investors in emerging countries such as Pakistan are increasingly interested in engaging in the stock market, regardless of age, gender, and experience (Ahmad et al., 2021). Consequently, they must thoroughly understand the behavioral biases that might impact their trading outcomes (Wali, 2019). Regardless of the impact of behavioral biases on investors' trade return, research has shown that demographics, such as age, gender, and education, also affect investor decision-making (Sutyanto et al., 2022). Older investors possess more expertise and exhibit a greater prevalence of behavioral biases due to their cautious nature. In comparison, younger investors display more assertiveness and are inclined towards making riskier judgements (Ansari & Moid, 2013). Age plays a crucial role in investing and decision-making in the stock market. Younger investors tend to be more informed and knowledgeable about the stock market since they have more access to information (Wali et al., 2022).

In the same way, the level of education has a significant role in influencing investors' attitudes and actions when investing in the stock market (Jhandir & Elahi, 2014). According to Liivamägi (2016), investors with greater education levels are more actively involved in trading stocks than those with lower education levels. Contemporary society witnesses greater participation of well-informed persons in stock trading, owing to their understanding and awareness of the prevailing conditions in the stock market (Wali et al., 2022). Various scholars' debates on age and education suggest that these elements significantly impact investor behavior(Jhandir & Elahi, 2014; Sutyanto et al., 2022). Thus, the current study intends to examine the moderating role of personal characteristics (age and education) in the relationships between behavioral biases and the investment return of individual investors. In addition to contributing to the current body of

knowledge in behavioral finance, this study examined the influence of age and education as moderating factors, a novel work that previous researchers have rarely investigated.

The research seeks to examine the influence of dominant behavioral biases on investors' trading outcomes, taking into account the moderating factors of age and education. The current work makes theoretical, contextual, and methodological contributions and expands existing literature. The researcher used two theories: prospect theory and demographics theory. The study's findings align with both theories, making it a valuable theoretical addition. Furthermore, Pakistan is a developing nation with the fifth largest population globally and a significant number of young people (Asif et al., 2023). However, the literacy rate has seen a considerable improvement compared to past decades. Consequently, age and education have been seen as moderating factors in the relationship between prospect and demographic theory. This research is a novel and unique addition to the field since it has not been undertaken in Pakistan. Furthermore, the work has made a methodological addition by using SmartPLS to examine a complicated model and assess both the direct and moderating effects. The research also has practical implications since it suggests that individual investors, regardless of age or education, can comprehend behavioral biases and effectively manage them in their everyday decision-making to optimize profits.

Moreover, policymakers must consider the significance of behavioral biases in identifying stock market abnormalities and formulating rules. The research has important implications for business schools to include behavioral finance in their curriculum for business students. Furthermore, this current research is crucial for future researchers to choose behavioral finance as a field of interest and conduct several research investigations.

## Literature review and hypotheses development

### *Theoretical Overview- Prospect Theory*

Prospect theory and Expected Utility Theory (EUT) are distinct decision-making methodologies. The prospect theory illustrates how investors behave in risk and uncertainty situations (Anum & Ameer, 2017). Daniel Kahneman received the Nobel Prize in 1979 for his development of prospect theory, which serves as a critique of the anticipated utility theory. The prospect theory may describe an individual investor's preference for avoiding losses over seeking gains. This theory suggests that people are not always opposed to taking risks but only when facing unfavourable

outcomes. Kahneman and Tversky (1979) proposed a value function concerning prospect theory, which explains how decision-makers pick between two alternatives that contain risk. Similarly, when faced with a risky circumstance, decision-makers may consider choosing between several prospects or gambles. Several reference points may influence an individual investor's decision-making process. For instance, the purchase price of stocks might serve as a reference point when making purchasing decisions (Zellweger et al., 2005). Conversely, the anticipated utility theory elucidates the rationality of investors during decision-making while disregarding the influence of behavioral biases (Dubra et al., 2004).

This concept is strongly related to behavioral finance, investigating the influence of demographic characteristics and cognitive biases, such as Overconfidence, herding, and loss aversion, on financial decision-making. A behavioral finance study uses prospect theory to examine the impact of biases on investor behaviour, elucidating the reasons investors tend to stray from rational models when evaluating risks, returns, and trading tactics.

*Socio-demographic Theory*

Socio-demographic theory examines the social features and accomplishments of individuals within a group. The demography theory elucidates the temporal evolution of the population by considering many factors such as ethnicity, social status, occupation, geography, and other relevant variables. The social and behavioral sciences field studies human behavior(Bruijn, 1999). The rationale behind beliefs and behaviours is contingent upon shifts and demographic fluctuations. Consequently, human behaviorand decision-making also undergo modifications following demographics, such as age, education, gender, and income (Munir & Shahid, 2021). Liu and Hu (2013) examined the relationship between economic development and demographic change in China. They found that an increase in the working-age population is favourably associated with economic growth, but a higher birth rate has a negative effect. It is possible to understand better how these demographic characteristics regulate the link between behavioral biases and investment outcomes with the assistance of the demographic theory.

*Behavioral finance and biases*

Behavioral finance posits that investors do not exhibit rational behaviorwhile making investment decisions in the stock market. However, the financial decision-making of individuals is influenced by a range of behavioral biases (Kahneman & Tversky, 1979), which in turn impact their investment outcomes. The behavioral finance theories provide a critical analysis of the classic finance theories that presuppose investors to be rational while making financial choices in the stock market (Hayat & Anwar, 2016). The prospect hypothesis postulates that investors base their choices on the outcomes, with losses being more aversive than the pleasure derived from profits. According to the demographic theory, the demographic shift may influence an individual's decision-making process. The researchers have used both of these hypotheses in the present investigation. The present study has used four behavioral components as independent variables: Anchoring, herding, mental accounting, and overconfidence bias. The following are several researchers' prevalent behavioral biases in behavioral finance (Anum & Ameer, 2017; Chandani et al., 2020; Kengatharan & Kengatharan, 2014; Subash, 2012).

A thought process associated with a reference point is called Anchoring, even if it has no logical connection to the decision being made (Murithi, 2014). In Anchoring, the investor may purchase securities in the market based on past experiences and prices, thereby averting new information. Anchoring has been defined by Jain et al. (2020) as historical and fragmentary information that differs from the most recent information. Herding is an additional behavioral bias that was assessed in the investigation. Mahmood et al. (2016) define herding bias as a propensity to emulate the actions of others when making decisions, which has a beneficial impact on investor performance. Investors frequently perpetuate the erroneous notion of herding, which is prevalent in emerging markets (Rahayu et al., 2021). Pakistan is an emerging market in which investors often emulate their peers without conducting thorough research.

Consequently, it is imperative to examine the herding bias in this market. During the Covid-19 pandemic, Espinosa-Méndez and Arias (2021) observed that herding behaviorhad increased in Europe. The study also takes into account mental accounting as a behavioral bias. Financial accounting is the process of recording, classifying, summarising, and interpreting business transitions. In contrast to accounting, which adheres to various principles and dimensions, mental accounting is not governed by such rules and regulations. Instead, it is predicated on observing behaviorand the inference of the rules (Thaler, 1999). The individual in mental accounting

perceives the outcomes differently, which leads to the creation of mental accounts for the sources and uses of money. Overconfidence prejudice is an additional behavioral bias that was assessed in the investigation. The significance of Overconfidence in investment decision-making is undeniable, particularly in the context of Pakistan's emerging market. It is a bias in which the investor overestimates their capabilities during the decision-making process (Pourbijan et al., 2014). Overconfidence bias is a critical factor to investigate in Pakistan, as it is the most prevalent behavioral factor influencing investors' decision-making (Qadri & Shabbir, 2014). The subsequent hypotheses are proposed in accordance with the literature:

H1: Anchoring has a significant positive impact on the investor trade return.
H2: Herding has a significant positive impact on the investor trade return.
H3: Mental Accounting has a significant positive impact on the investor trade return.
H4: Overconfidence has a significant positive impact on investor trade return.

*Demographic factors and behavioral biases*

The present research has considered the age and education of investors as moderating factors. These demographic considerations are believed to have a moderating influence on the behavioral elements of the stock market and the success of investors' trades. Multiple research studies on demographic variables have shown their significant impact on decision-making. Kartašova (2013) conducted a study on irrational behaviorin the stock market of Lithuania. To achieve this objective, data was gathered from individual investors using surveys. The results demonstrated a clear and rational correlation between demographic variables and investor conduct in the market. In their study, Babu, Dhanalakshmi, and Hariharan (2018) investigated the influence of demographic characteristics on investor decision-making in the stock market. Their findings indicate that demographic factors do not significantly affect investor decision-making in this context. The current research assesses how demographic variables moderate the relationship between behavioral biases and investor trading success. Demographic considerations impact investors' decision-making in the stock market (Kartašova, 2013). The impact of demographic characteristics

on investors' decision making in Pakistan cannot be disregarded. These aspects include income level, level of education, investing experience, and investment literacy (Sadiq & Ishaq, 2014).

Age is a critical factor in the investment performance of individual investors, as it influences their decision-making (Sadiq & Ishaq, 2014). Investor decision-making is influenced by behavioral fallacies, as demonstrated by prior research. However, the individual may incorporate more behavioral biases in their investment decision-making due to the age variation, which may function as a moderating factor. Age has a substantial impact on investors' decision-making process, as per Bhavani and Shetty (2017).

Behavioral finance in the modern world has progressively become essential in decision-making. It can potentially affect investors' decision-making, ultimately influencing their trade performance. To make a better decision, the Investors must have a deep understanding of behavioral finance, which is possible due to their level of education. The role of education has been focused too much in the literature on behavioral finance (Bhavani & Shetty, 2017). Education has generally been considered a substantial factor in affecting investor performance. Investors with higher education than the secondary level embrace riskier portfolios (Bhavani & Shetty, 2017). Based on the moderation of age and education, the following are the proposed hypotheses:

H5: Age moderates the nexus between Anchoring and investor trade return.

H6: Age moderates the nexus between Herding and investor trade return.

H7: Age moderates the nexus between mental accounting and investor trade return.

H8: Age moderates the nexus between Overconfidence and investor trade return.

H9: Education moderates the nexus between Anchoring and investor trade return.

H10: Education moderates the nexus between Herding and investor trade return.

H11: Education moderates the nexus between Mental Accounting and investor trade return.

H12: Education moderates the nexus between Overconfidence and investor trade return.

**Research Methodology**

The study is quantitative and deductive. The primary data was collected on an adopted questionnaire form (Luong & Ha, 2011). Before, the distribution of questionnaires, the consent of the respondents, ethical concerns, and confidentiality of the data were confirmed to them. The respondents were also briefed regarding the purpose of the study. After considering all these factors, the data were acquired from the target population (individual investors) of different gender,

age, and education levels. Of 350 distributed questionnaires, 302 were collected; hence, the response rate was noted as 98.05%. The rationale behind a reasonable response rate might be the convenience sampling method. Table 1 reports the demographic details of the respondents of the survey.

Table 1: Demographic Profile of Respondents

| Variables | Categories | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 283 | 92.57% |
| Female | 22 | 7.43% |
| **Education** | | |
| SSC or Less | 23 | 7.5% |
| Undergraduate | 52 | 17.2% |
| Graduate | 66 | 22.2% |
| Masters | 121 | 39.9% |
| MPhil or PhD | 43 | 13.9% |
| **Age** | | |
| 30 to 40 years of age | 214 | 70.16% |
| 40 to 50 years of age | 43 | 14.09% |
| 50 to 60 years of age | 48 | 15.73% |
| **Trading Experience in Years** | | |
| Nil | 72 | 23.60% |
| < 1 Year | 107 | 35.08% |
| 1-3 Years | 68 | 22.29% |
| 3-5 Years | 37 | 12.13% |
| 5-10 Years | 7 | 2.29% |
| >10 Years | 14 | 4.59% |

Among 305 respondents, 93% were characterized as male, and only 7% reported female investors. Male respondents' responses are greater than their female fellows because males in Pakistani society usually make the investment decision. Regarding education, it was found that 17% of respondents were undergraduates, graduated were 22%, and master's degree holders were 40%, while 13.9% had degrees of MPhil and Ph.D. The age of respondents showed that mostly the responses were acquired from 30 to 40 years which signifies 70.2% of the total, 13.9% belong to the age of 40 to 50 years, while 15.73% represent an age of 50 to 60 years. Under the trading experience in Table 1, it is shown thath 35% of the respondents have less than one year of experience, while those having one-to-three-year experience are 22.5%. Likewise, 11.9% of the respondents have three to five years of experience, while just 2% had five to ten years of

experience. Most investors fall in the category of less than one year and no experience as generally, the people in Pakistan have low interest or tendency to invest in the stock market.

**Data Analysis and Results**

After assembling the data, Partial Least Squares, Structural Equation Modelling (PLS-SEM) using SmartPLS 3.2.7 has been applied to it. PLS-SEM modeling is a more robust choice with the least assumptions and impartial estimation of the smaller sample size. PLS requires a normal distribution but is not limited or a large number of interpretations as input data (Hair, Hult, Ringle 2014). To test the anticipated hypotheses of the present study, two procedures have been used as suggested by the former literature (Hair et al., 2014; Vinzi, Chin, Henseler, and Wang, 2010). These procedures contained evaluation of measurement and structural model. The study applied convergent and discriminant validity tests to test the measurement model. The correlation between constructs is measured through convergent validity. For the measurement of convergent validity factor loadings, composite reliability (CR) and average variance extracted (AVE) have been used (Hair et al., 2014).

Table 2: Measurement Model Construct Reliability and Validity

| Items | Factor Loadings | Cronbach's Alpha | CR | AVE | rho_A |
|---|---|---|---|---|---|
| **Invest Return (IR)** | | **0.772** | **0.849** | **0.515** | **0.812** |
| TR1 | 0.825 | | | | |
| TR2 | 0.752 | | | | |
| TR3 | 0.816 | | | | |
| **Anchoring (Anc)** | | **0.772** | **0.841** | **0.515** | **0.813** |
| ANC1 | 0.798 | | | | |
| ANC 2 | 0.572 | | | | |
| ANC 3 | 0.676 | | | | |
| ANC 4 | 0.798 | | | | |
| ANC 5 | 0.785 | | | | |
| **Herding (Her)** | | **0.697** | **0.809** | **0.518** | **0.826** |

| | | | | | |
|---|---|---|---|---|---|
| HER1 | 0.873 | | | | |
| HER2 | 0.738 | | | | |
| HER4 | 0.696 | | | | |
| HER5 | 0.645 | | | | |
| **Mental Accounting (MA)** | | **0.773** | **0.845** | **0.575** | **0.884** |
| MA1 | 0.688 | | | | |
| MA3 | 0.882 | | | | |
| MA4 | 0.854 | | | | |
| MA5 | 0.682 | | | | |
| **Overconfidence (OC)** | | **0.742** | **0.838** | **0.558** | **0.754** |
| OC1 | 0.785 | | | | |
| OC2 | 0.787 | | | | |
| OC3 | 0.729 | | | | |
| OC4 | 0.794 | | | | |

The threshold for factor loadings as recommended by previous literature is (>0.6) concerning to a single item on behalf of a construct. Likewise, composite reliability has to be (>0.7) and AVE (>0.5) as standards. If the values for the measures are more than the designated cutoff values, then there is satisfactory convergent validity (Hair et al., 2014; Vinzi et al., 2010). The results of the above-stated measures described in Table 2 indicate that all the values are more than the cutoff values, and thus, the measurement model is appropriate for all the constructs.

Table 3: Fornell-Larcker Criterion

| | **ANC** | **HER** | **TR** | **MA** | **OC** |
|---|---|---|---|---|---|
| ANC | **0.723** | | | | |
| HER | 0.572 | **0.728** | | | |
| TR | 0.485 | 0.375 | **0.797** | | |
| MA | 0.585 | 0.425 | 0.449 | **0.776** | |
| OC | 0.485 | 0.384 | 0.372 | 0.637 | **0.775** |

***Note:*** *The square roots of AVE are shown diagonally in bold*

For the valuation of the measurement model, discriminant validity was applied to the study. Discriminant validity reveals the dissimilarity or distinction of a construct from its other constructs (Hair et al., 2014). The process for assessing discriminant validity is that the figures in the diagonal should be greater than all other values in the respective row and column (Hair et al., 2014; Vinzi et al., 2010). Table 3 indicates that total diagonal values are larger than others; therefore, the measurements have discriminant validity.

Table 4: Discriminant Validity (HTMT 0.90 Criterion)

| | ANC | HER | TR | MA | OC |
|---|---|---|---|---|---|
| ANC | | | | | |
| HER | 0.738 | | | | |
| IR | 0.574 | 0.467 | | | |
| MA | 0.745 | 0.568 | 0.518 | | |
| OC | 0.572 | 0.488 | 0.438 | 0.829 | |

***Note:*** *(HTMT0.90 Criterion)*

The discriminant validity has also been examined through the HTMT 0.90 standard, as all the figures in Table 4 are lesser than 0.90, which are also described with the help of graphs as presented in Figure 1.

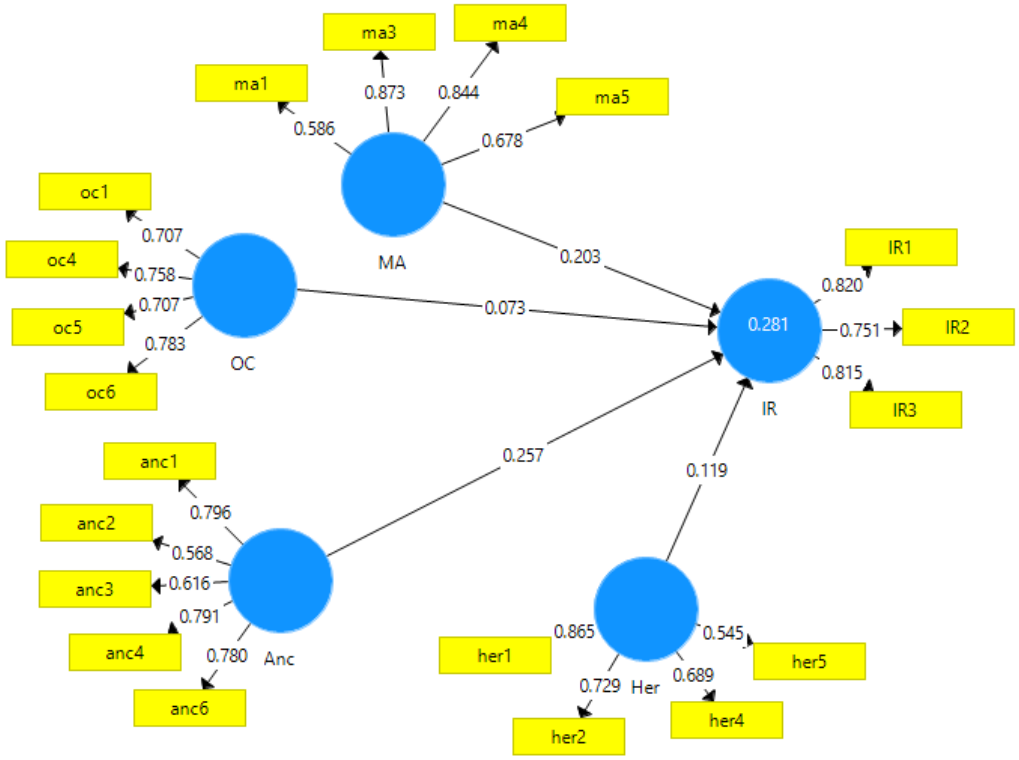


Figure 01: Conceptual Model with Loadings, Beta, and R-Square values

After successfully evaluating the measurement model, the structural model was used to test the anticipated hypotheses. The structural model assesses the R-Square beta and corresponding t-values for each hypothesis of the study. The results of the structural model have been reported in Table 5.

Table 5: Assessment of the Structural Model

| Hypotheses | Std. Beta | Std. Error | t-value | P-Value | Decision |
|---|---|---|---|---|---|
| H1: Anchoring -> Trade Return | 0.264 | 0.079 | 3.429 | 0.002 | Supported |
| H2: Herding -> Trade Return | 0.109 | 0.077 | 1.489 | 0.139 | Not Supported |
| H3: Mental Accounting -> Trade Return | 0.225 | 0.074 | 2.854 | 0.002 | Supported |
| H4: Overconfidence -> Trade Return | 0.057 | 0.088 | 0.636 | 0.529 | Not Supported |
| H5: Anchoring Age -> Trade Return | 0.265 | 0.098 | 2.679 | 0.007 | Supported |
| H6: Age Herding -> Trade Return | 0.112 | 0.117 | 1.065 | 0.289 | Not Supported |
| H7: Age * Mental Acc. -> Trade Return | 0.054 | 0.078 | 0.548 | 0.587 | Not Supported |
| H8: Age * Overconfidence -> Trade Return | 0.296 | 0.087 | 3.649 | 0.000 | Supported |
| H9: Edu * Anchoring -> Trade Return | -0.258 | 0.068 | 3.837 | 0.000 | Supported |

| | | | | | |
|---|---|---|---|---|---|
| H10: Edu * Herding -> Trade Return | -0.099 | 0.057 | 1.628 | 0.103 | Not Supported |
| H11: Edu * Mental Acc. -> Trade Return | 0.056 | 0.077 | 0.515 | 0.609 | Not Supported |
| H12: Edu * Overconfidence -> Trade Return | 0.212 | 0.073 | 2.857 | 0.004 | Supported |

***Note:*** *99% (0.01) and 95% (0.05) Significance Levels*

The first hypothesis indicated an influence of anchoring on individual investor performance. Table 5 Exhibits significant results such as ($\beta = 0.259$, t-value = 3.429, $p < 0.05$), which meets the threshold; therefore, H1 is accepted. These results are consistent with the prospect theory, which describes the incorporation of behavioral biases by the investor in decision-making, and the previous studies that found similar results (Anum & Ameer, 2017). The second hypothesis supposed a significant impact of herding on investor trade return. The results indicate ($\beta = 0.107$, t-value = 1.486, $p > 0.05$) below the recommended threshold; therefore, H2 is unsupported. These results are inconsistent with prospect theory, and in recent times, investors may have become more aware of technological advancement and may not follow others without knowing them personally (Singh et al., 2020). The findings are inconsistent with the previous studies conducted in Pakistan, which found a positive influence of herding on investor performance (Atif Sattar et al., 2020). The third hypothesis was that mental accounting significantly impacts investor trade return. A significant result was found such as ($\beta = 0.221$, t-value = 2.848, $p < 0.05$); hence, H3 is supported. The results are consistent with the prospect theory and preceding studies (Subash, 2012; Mahmood et al., 2016). As per the demographics of the study, maximum responses were reported from respondents who were graduated and above; this may be a reason for not creating mental accounts and relying upon their information. The fourth hypothesis assumed the significant impact of Overconfidence on investor trade return. The results are insignificant ($\beta = 0.055$, t-value = 0.631, $p > 0.05$) and lower than the recommended standard; hence H4 is not supported. The results are inconsistent with the prospect theory because the investors' education and awareness prevent them from over-reliance on their skills and expertise (Im & Oh, 2016). The findings are not similar to previous literature, in which a significant impact was found (Anum & Ameer, 2017; Atif Sattar et al., 2020). However, the results are consistent with Ahmad et al. (2013), who also found a negative relationship between overconfidence and investor performance.

The fifth hypothesis was the moderating role of age in the nexus of anchoring bias and investor return. The results shown in the above table are (β = 0.262, t-value = 2.69, p < 0.05), which are significant. Before moderation, Anchoring had a significant effect on investor trade return reported, while post moderation results are significant also, indicating that age moderates the relationship of anchoring bias and investor return; hence, H5 is accepted. The results are consistent with socio-demographic theory, which explains the changes in behaviorwith the ageing of an individual. These results are similar to those of Willows and West (2015), who found a positive relationship between age and investment return. The sixth hypothesis of the study was the moderation of age in the relationship between herding and investment return. The results shown in Table 5 are insignificant (β = 0.108, t-value = 1.062, p > 0.05), which reveals that age does not moderate the relationship between herding and investors' investment return; therefore, H6 is rejected. The moderation of age in the relationship between mental accounting and investor return was the 7$^{th}$ hypothesis, and the results indicate (β = 0.043, t-value = 0.547, p > 0.05), which are insignificant. These results are not similar to socio-demographic theory as age does not moderate. The reason may be that most of the responses were collected from young people, who are more aware of the stock market anomalies through social media platforms; hence, they may analyze the situation by themselves instead of following others. Furthermore, these results differ from previous studies that found that age influences investor performance (Fares and Khamis, 2011; Babu et al., 2018).

The eighth hypothesis was the moderation of age in the relationship between overconfidence and investor return. The results, as shown by the above table (β = -0.292, t-value = 3.646, p< .05), are significant and indicate a strong moderation. The results are consistent with socio-demographic theory and maybe more confident as young investors have prospects than old investors (Ansari & Moid, 2013). The findings are similar to those of Willows and West (2015), who found a positive relationship between age and investment return. The ninth hypothesis of the study assumed a moderating role of education between the relationships of Anchoring and investor return. Table 5 revealed (β = -0.253, t-value = 3.832, p < 0.05) a negative significant moderation of education between the relationship of Anchoring and investor return. Hence, H9 is accepted. These results are similar to the theory and Liivamägi (2016), who found that educated investors perform well in

the stock market. The tenth hypothesis was the moderation of education on the relationship between Herding and investment return, the results displayed in Table 5 ($\beta$ = -0.097, t-value = 1.626, $p > 0.05$), which explains a negative and insignificant impact of herding on investor return as moderating by education. Therefore, H10 is rejected. These results are inconsistent with the socio-demographics theory and the prior studies (Bhavani & Shetty, 2017). The reason for such insignificant results may be excessive use of social media and insufficient time to get relevant information (Malik et al., 2014); thus, it becomes easy to follow friends and relatives.

The eleventh hypothesis was that education moderates the relationship between mental accounting and investor return. The results are insignificant ($\beta$ = 0.044, t-value = 0.513, $p > 0.05$). Hence, there is no moderation in mental accounting and investor return; therefore, H11 is rejected. The results are inconsistent with the socio-demographic theory, which may be globalization and technological advancement; the investor has more information regarding the market irrespective of education (Malik et al., 2014). The twelfth hypothesis of the study assumed the moderation role of education in the relationship between overconfidence and investor return. The results in Table 5 ($\beta$ = 0.206, t-value = 2.859, $p < 0.05$) show that education moderates the relationship of Overconfidence and investor return. These results are consistent with socio-demographic theory and previous studies (Davydov et al., 2021).

**Discussion and Conclusion**

The study aimed to examine the impact of behavioral characteristics (Anchoring, Herding, mental accounting, and Overconfidence) on investor return, taking into consideration the moderating effects of age and education. The hypotheses were formulated using prior research, positing that dominant behavioral biases impacted investor returns, with age and education playing a moderating effect. To achieve this objective, data was gathered from individual investors in the stock market using a modified questionnaire. The findings indicate that anchoring and mental accounting impact investors' returns, supporting hypotheses H1 and H3. Pakistani investors may be more risk-averse and depend on mental accounting, which might explain the observed behaviour. Similarly, the absence of evidence for H2 and H4 suggests no impact of herding and overconfidence on investor return. The minimal outcome of herding may manifest in the

demographic data, which indicates a greater rate of answers from graduates. Educated individuals, however, are unlikely to conform to others mindlessly but rather gather valuable knowledge before making decisions. Likewise, the negligible outcome of Overconfidence may be that the investor lacks confidence in making investment decisions owing to a lack of understanding and financial literacy. The variable of age was considered as a moderating factor. In this context, it was found that H5 and H8 are supported, indicating that age moderates the link between Anchoring, Overconfidence, and investor return. The cause for this phenomenon may be attributed to the accumulation of knowledge and familiarity that comes with age. As individuals grow older, they receive more experience and exposure, leading to increased confidence and a tendency to avoid relying on external support.

The findings do not support the concepts of herding and mental accounting. As a result, hypotheses H6 and H7 are rejected, suggesting that age does not moderate the effects of herding, anchoring bias, and investor return. The lackluster outcomes may stem from the fact that the Pakistani investor does not mindlessly emulate other investors but rather conducts thorough assessments regardless of age. The study investigated the moderating effect of education on anchoring, overconfidence, and investor return. The findings indicate that education influences these factors, supporting hypotheses H9 and H12. According to most experts in behavioral finance, education can help individual investors avoid behavioral biases in the market (Wali, 2019). The data indicate that education has no moderation effect on the link between herding, mental accounting, and investor return. Therefore, the hypotheses H10 and H11 are not supported. Based on the preceding discussion, it can be inferred that behavioral biases impact investor behaviorin the Pakistan stock market. The influence of age on the relationship between Anchoring, Overconfidence, and investor trade return is found to be moderating. In contrast, it does not moderate the relationship between mental accounting, herding, and investor return. Education moderates the association between anchoring, overconfidence, and investor return. However, it does not have a moderating effect on the relationship between herding and mental accounting.

This study compares the significant difference between standard and behavioral finance and explains the irrationality of investors in the stock market. The study considered the four most common behavioral biases, anchoring, overconfidence, herding, and mental accounting, influencing investor trade return in the stock market. Therefore, it may be helpful for individual

investors of different ages and education levels to know the role of behavioral biases in their routine decision-making, and, by evading these biases, the investment return can be improved.

This study provides valuable insights for business schools, institutional investors, and regulators to understand behavioral biases and their impact on daily decision-making processes. When designing rules, authorities should consider the influence of behavioral biases on fluctuations in stock market volume. Given the scarcity of publications in behavioral finance, it is advisable to furnish reference materials and relevant resources to educational institutions, particularly business schools, to facilitate the teaching of students on behavioral finance and its ramifications. The study's primary goal was to examine the behavior of investors in the stock market, taking into account the influence of age and education. Future research might expand on this by including additional demographic aspects, such as gender, investing experience, and geography, which would contribute to the existing body of knowledge. Moreover, a prospective investigation might be conducted to analyze the investment patterns of individuals in Pakistan, including not only stock market investors but also real estate investors and entrepreneurs. This study has investigated the impact of behavioral biases on an investor's trade return. It is advisable to include various sociological, cultural, and economic factors and their influence on investor decision-making. Additionally, it is advisable to incorporate other behavioral biases to enhance the study findings, as the current study only considers four commonly seen behavioral biases.

While gathering data from investors, it was discovered that several investors were unfamiliar with the terminology of behavioral finance as employed in the questionnaire. The study's sample size is restricted, and the outcomes may vary when a larger sample size is considered. When considering its larger implications, a potential weakness of the study might be the disproportionate representation of male respondents compared to female respondents. Typically, respondents do not complete surveys with complete focus, which might introduce bias and impact the results. Consequently, this can be considered a drawback of the study.

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## APPENDIX-I QUESTIONNIARE

**Section-1 Demographics**

1. What is your gender?

☐ Male ☐ Female

2. What is your region

☐ Peshawar ☐ Islamabad

3. What is your age?

☐ 30 to 40 years

☐

40 to 50 years

☐ 50 to 60 years

☐ 60 and above

4. How many family members do you have?

☐ Less than 2 members

☐ 2-5 Members

☐ More than 5 Members

5. Marital Status:

☐ Single

☐ Married

6. What is your educational level?

☐ SSC or less

☐ Under graduate

☐ Graduate

☐ Masters

☐ MS and PhD

7. What is your monthly Income?

☐ Less than 20000

☐ 20000-400000

☐ 40000-60000

☐ 60000-80000

☐ More than 80000

8. What is your employment status?

☐ Employed for wages

☐ Self employed

☐ Looking for work

☐ Student

☐ Retired

☐ Other

9. How long you are trading in the stock market?

- ☐ Less than one year
- ☐ One to three years
- ☐ Three to five years
- ☐ Five to ten years
- ☐ More than ten years
- ☐ Nil

10. The total amount of money which you have invested in Pakistan stock market?

- ☐ Less than 100000
- ☐ 100000 to 300000
- ☐ 300000 to 500000
- ☐ 500000 to 1000000
- ☐ More than 1000000
- ☐ Nil

11. For how many years have you had investments other than bank accounts?

- ☐ Less than two years
- ☐ From two to five years
- ☐ From six to ten years
- ☐ More than ten years
- ☐ None

| Strongly Disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** |

**Section-1 Overconfidence**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | While making an investment in the stock market I am overoptimistic. | 1 | 2 | 3 | 4 | 5 |
| 2 | I feel more confident in my own investment opinions over the opinions of my colleagues or friends. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | I do not consult others (family, friends or colleagues) before making a stock purchase. | 1 | 2 | 3 | 4 | 5 |
| 4 | I can predict the future stock price movement after I did some analysis. | 1 | 2 | 3 | 4 | 5 |
| 5 | I believe that my skills and knowledge of other stock market can help me to outperform the market. | 1 | 2 | 3 | 4 | 5 |
| 6 | I am normally able to anticipate the end of good or poor. | 1 | 2 | 3 | 4 | 5 |

**Section-2 Anchoring**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | I usually rely on my previous experience in the market for my next investment. | 1 | 2 | 3 | 4 | 5 |
| 2 | I forecast the changes in stock prices in the future based on the recent stock prices. | 1 | 2 | 3 | 4 | 5 |
| 3 | I compare the current stock prices with their recent 52 week high and low price to justify my stock purchase. | 1 | 2 | 3 | 4 | 5 |
| 4 | I am unlikely to buy a stock if it was more expensive than last year. | 1 | 2 | 3 | 4 | 5 |
| 5 | I fix a target price for buying/selling in advance (say, before start of trading day) | 1 | 2 | 3 | 4 | 5 |
| 6 | I prefer to buy local stocks than international stocks because the information of local stocks is more available. | | | | | |

**Section-3 Herding**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Other investors' decisions of the stock volume have an impact on my investment decisions. | 1 | 2 | 3 | 4 | 5 |
| 2 | Other investors' decisions of choosing stock types have an impact on my investment decisions. | 1 | 2 | 3 | 4 | 5 |
| 3 | I usually react quickly to the changes of other investors' decisions and follow their reactions to the stock market. | 1 | 2 | 3 | 4 | 5 |
| 4 | Other investors' decisions of buying and selling stocks have an impact on my investment decisions. | 1 | 2 | 3 | 4 | 5 |
| 5 | To select a sector for the investment I usually follow my friends and family members. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | The investment decision based on recommendations given by a famous analyst | 1 | 2 | 3 | 4 | 5 |
| 7 | I seek the opinion of my friends and colleagues | 1 | 2 | 3 | 4 | 5 |

**Section-4 Mental Accounting**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | I tend to treat each element of your investment portfolio separately. | 1 | 2 | 3 | 4 | 5 |
| 2 | I ignore the connection between different investment possibilities. | 1 | 2 | 3 | 4 | 5 |
| 3 | I separate my money into different mental accounts depending upon how it is earned. | 1 | 2 | 3 | 4 | 5 |
| 4 | The amount which I have earned in stock trading is different and from salary it is different. | 1 | 2 | 3 | 4 | 5 |
| 5 | I am more cautious while doing large purchases as compare to small purchases. | 1 | 2 | 3 | 4 | 5 |

**Section -5 Investment Returns**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | The return rate of my recent stock investment meets my expectation. | 1 | 2 | 3 | 4 | 5 |
| 2 | My rate of return is equal to or higher than the average return rate of the market. | 1 | 2 | 3 | 4 | 5 |
| 3 | I feel satisfied with my investment decisions in the last year (including selling, buying, choosing stocks, and deciding the stock volumes). | 1 | 2 | 3 | 4 | 5 |