Psychological traits and investment decisions: the mediation mechanism of financial management behavior – evidence from the Tanzanian stock market

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Abstract
Purpose – The purpose of the paper is to examine the financial management behavior (FMB) mediation mechanism in self-control, optimism, deliberative thinking and investment decisions in the Tanzanian stock market.
Design/methodology/approach – A sample of 268 individual investors in the Tanzanian stock market was obtained through questionnaires. The data were analyzed using structural equation modeling.
Findings – The findings show that self-control, optimism and deliberative thinking are significantly and positively related to FMB and investment decisions. The findings also confirmed the mediating role of FMB in the influence of self-control, optimism and deliberative thinking on investment decisions among Tanzanian individual investors. These findings imply that people with good self-control, optimistic and deliberative thinking are more likely to save money, have better FMB and prefer to make investment decisions.
Research limitations/implications – The study deals with individual investors. Future research could examine the effects of psychological traits on investment decisions by adding or modifying the items of particular constructs and studying institutional investors.
Practical implications – Individual investors can use the information to study and evaluate their financial behavior and stock investment decisions. This research can be used by security firms to better understand investor behavior, forecast future market trends and advice investors. Individual investors require psychological features to manage their behavior in various aspects, ranging from affective behavior to cognition, which are relevant for investing decisions.
Originality/value – Few studies have examined the influence of self-control, optimism and deliberative thinking on the investment decisions of individual investors. The unique empirical analysis developed in this paper is that it examines the mediation mechanisms of FMB with respect to self-control, optimism and deliberative thinking and investment decisions among individual investors in the Tanzanian stock market.

Keywords Financial management behavior, Psychological traits, Investment decision, Individual investors

1. Introduction
Psychological and behavioral differences are important factors in the decision-making process and often explain financial management behavior (FMB) based on rational
decision-making (Parise and Peijnenburg, 2017). Drawing upon non-cognitive factors, which are personal preferences, personality, behavior, thoughts or feelings (She et al., 2021), this study suggests that the individual’s investment decisions are not only based on cognitive factors measured using intelligent quotient (IQ), knowledge or numeracy tests (Parise and Peijnenburg, 2017) but also by considering non-cognitive factors such as self-control, optimism and deliberative thinking. Extensive research has shown that personality traits matter for a variety of life outcomes, including economic decisions such as spending behaviors (Ozer and Mutlu, 2019; Strömbäck et al., 2017), and investment decisions (Jiang et al., 2020).

People make bad financial decisions (Strömbäck et al., 2017), save too little (Lusardi, 1999), overspend (Sotiropoulos and d’Astous, 2013) and sometimes invest in things they regret (Abendroth and Diehl, 2006). In Tanzania, most people are irrational and do not make good investment decisions because of low financial literacy (Kasoga, 2021). There is evidence indicating that lack of self-control is responsible for many social problems, such as impulse-control problems, procrastination and overspending (Ozer and Mutlu, 2019).

Most of the previous studies have focused on the influence of the big five personality traits on investment decisions (Jiang et al., 2020; Priyadharshini, 2020; Raheja, 2017). Other studies have focused on cognitive factors such as financial literacy and investment decisions (Kasoga, 2021; Lusardi and Mitchell, 2007). Few studies have focused on the influence of non-cognitive factors related to self-control and other similar constructs such as deliberative thinking and optimism on financial behavior, investment decisions and financial well-being (e.g. Elgebeily et al., 2021; Strömbäck et al., 2017; Younas et al., 2019). For instance, Elgebeily et al. (2021) found a positive association between optimism and investment decisions. Moxley et al. (2012) found a positive association between deliberative thinking and human decisions. Sekścińska et al. (2021) found a positive association between self-control and investment decisions. Puri et al. (2007) found a positive association between optimism and financial behavior. Thoma et al. (2015) found a positive association between deliberative thinking and financial behavior. Strömbäck et al. (2017) found a positive association between self-control and financial behavior. However, Puri and Robinson (2007) found a negative association between optimism and financial behavior. Guzman et al. (2019) found a negative association between intuitive thinking and financial behavior. Ballinger et al. (2011) found in experiments that neither self-control nor four different kinds of measured impulsive behavior affect financial behavior. Thus, the relationship between optimism, deliberative thinking, self-control and FMB is still inconclusive.

FMB has been found to be a mediator in explaining an individual’s financial well-being with other factors, including psychological factors (Saurabh and Nandan, 2018; She et al., 2021). However, their study did not mediate FMB with self-control, optimism, and deliberative thinking and investment decisions. Moreover, a key finding from the recent household finance literature is that there is persistent heterogeneity across individuals (Fagereng et al., 2020; Jiang et al., 2020; She et al., 2021), which suggests future research should be conducted in different contexts. Kirti Goyal et al. (2021) suggest that additional research on FMB needs to be conducted on other human decisions such as investment decisions. As investment decisions are just another form of life decision, it is reasonable to expect them to be affected by a psychological process.

This study therefore addresses the neglect-spotting gap in the literature by examining how psychological traits (self-control, optimism and deliberative thinking) affect the FMB and investment decisions of individual investors in the Tanzanian stock market. To the best of the authors’ knowledge, no previous study has examined the relationship between FMB and psychological traits (self-control, optimism and deliberative thinking) and investment decisions. This study responds directly to the work of Sekścińska et al. (2021), Strömbäck et al. (2017) and Copur and Gutter (2019), who urged future research on self-control and other
psychological traits to be conducted in developing countries in order to enhance a better understanding of FMB and investment choices.

The main issue in this study is that differences in personality traits can explain the differences in investment decisions. Practically, mediation mechanisms provide the level of details required by investors and financial advisors, which enables better management of investment decisions (Sekścińska et al., 2021). Psychological traits are needed to regulate behavior in different dimensions, ranging from affective behavior to cognition, which are relevant for investment decisions (Raheja, 2017).

The rest of the paper is structured as follows. The existing literature is reviewed to arrive at the hypotheses and conceptual model. This is followed by the research methodology, the presentation of results and the discussion of the findings. Finally, the summary and conclusion of the study are presented.

2. Literature review
2.1 Behavioral life-cycle
The behavioral life-cycle (BLC) theory (Shefrin and Thaler, 1988) is an extension of the traditional life-cycle theory and has been influential in understanding savings behavior, which assumes that people perceive money as completely fungible and that the farsighted individual rationally plans his/her life-time consumption (Modigliani and Brumberg, 1954). Moreover, BLC theory states that people’s financial behavior over the course of life is determined by their ability to control impulses and the costs connected to exercising such self-control. Depending on our mental accounts and how we categorize money, it is more or less costly for us to save for the future. The implication of the BLC theory for understanding investors’ financial behavior and investment decisions is that people with self-control problems, not optimism and bad deliberative thinking, may mismanage resources and fail to make investment decisions.

People who are optimistic are more likely to save, work harder and make investment decisions. However, extremely optimistic people demonstrate deficient FMB as well (Puri and Robinson, 2007). Therefore, optimism may be an important aspect of investment decisions. Depressed individuals are more prone to pessimistic thoughts about the future and suffer to a greater extent from pessimism bias than non-depressed individuals (Strunk et al., 2006). With respect to deliberative thinking, Thoma et al. (2015) found that professional financial traders tend to engage in deliberative thinking to make financial decisions. Thus, it is also interesting to explore to what extent these psychological traits (self-control, optimism and deliberative thinking) when mediated by FMB are linked to investment decisions.

2.2 Empirical review and hypothesis development
2.2.1 Self-control. Self-control is the ability to break bad habits, resist temptations and overcome first impulses (She et al., 2021). Strömbäck et al. (2017) found out that self-control predicts sound FMB. They further show that the ability to control impulses is undoubtedly a key factor for long-term success in many areas of life. Other studies have examined the relationship between self-control and FMB and found that people with low self-control are more likely to engage in unforeseen expenses (e.g. Gathergood, 2012). Biljanovska and Palligkinis (2015) found that people’s savings behavior is affected by their self-control. They further revealed that households with self-control problems due to a lack of planning, monitoring or commitment have lower wealth accumulation.

Kimball and Shumway (2009) found that a lack of self-control negatively influences an individual’s overall savings. Strömbäck et al. (2017) found that self-control influences an individual’s savings and that individual feel more secure in his/her current and future...
financial situations. However, Ameriks et al. (2007) found that self-control problems do not influence the amount of savings. Sekščińska et al. (2021) found that self-control influences investment choices positively. Therefore, the study hypothesizes that

\[ H1a. \] Self-control is positively related to financial management behavior among individual investors.

\[ H1b. \] Self-control is positively related to investment decisions among individual investors.

2.2.2 Optimism. Optimistic refers to the ability of an individual to be hopeful and confident about the future (Strömbäck et al., 2017). Puri et al. (2007) found that optimism has a positive impact on FMB. They further argued that optimistic people are more concerned about their future. Strömbäck et al. (2017) found that more optimistic individuals demonstrated better FMB, were less anxious about financial matters and were more confident about their financial situation. They further found out that people who are optimistic are more likely to save and work harder. However, extremely optimistic people demonstrate deficient financial behavior as well (Puri and Robinson, 2007).

Elgebeily et al. (2021) investigate the impact of managerial optimism on investment decision sensitivity to cash flow. They found that optimists tend to overestimate returns and make overly optimistic cash flow forecasts, which leads to increased investment levels as well as increased sensitivity of investment decisions to cash flow. In addition, Jiang et al. (2020) found that individuals, who are more pessimistic, in the context of financial markets, assign a higher probability to negative outcomes, which negatively affects investment decisions. Sias et al. (2020) found that pessimistic investors tend to exhibit lower equity market participation. Thus, the following hypotheses are worth pursuing:

\[ H2a. \] Optimism is positively related to financial management behavior among individual investors.

\[ H2b. \] Optimism is positively related to investment decisions among individual investors.

2.2.3 Deliberative thinking. Deliberative thinking is the ability to think carefully or make very conscious, well thought choice (Strömbäck et al., 2017). Moxley et al. (2012) found that human decision-making is largely based deliberative thinking. Hilgert et al. (2003) stated that individuals who can act rationally are those who can think logically, indicated by the good activities in financial planning, organizing and controlling. Thoma et al. (2015) found that professional financial traders tend to engage in deliberative thinking to a greater extent than non-financial traders, use fewer heuristics in decision-making and make investment decisions. They further found that intuitive thinkers want to think about the future, and they like planning to address future needs. However, Guzman et al. (2019) found out that intuitive thinking is not associated to either short- or long-term financial planning. Hence, the following hypotheses are proposed:

\[ H3a. \] Deliberative thinking is positively related to financial management behavior among individual investors.

\[ H3b. \] Deliberative thinking is positively related to investment decisions among individual investors.

2.2.4 Financial management behavior. Financial behavior is defined as any behavior that is relevant to money management and planning, such as borrowing, saving, investing, insuring and spending (Xiao, 2008). These behaviors help people develop plans to manage their spending and to save (Copur and Gutter, 2019). According to Hilgert et al. (2003), the way a person organizes his/her cash inflow and outflow, credit management, savings and
investment is an indicator of good financial behavior. They went on to say that those people
will divide their income between short-term (consumption) and long-term (investment) needs.

Studies have demonstrated that an individual’s behavior is directly or indirectly associated with investment decisions (Strunk et al., 2006; Thoma et al., 2015). Sekścińska et al. (2021) found a positive relationship between self-control and investment choices. Copur and Gutter (2019) found that self-control was associated with saving and investment accounts. Thoma et al. (2015) found a positive relationship between deliberative thinking and investment choices. Jiang et al. (2020) found that optimism is positively related to investment choices.

Pompian (2006) argued that FMB, which includes cash management, credit management, budgeting, financial planning and other general money management behavior, has both a direct and indirect effect on the self-control levels of a person. Individuals with positive financial behavior, especially in financial planning and regular savings, are found to have higher levels of financial management (Ozer and Muthu, 2019). Pompian (2006) revealed that many people cannot set aside money for the future, thus forgetting the long-term goal because of a lack of individual self-discipline in controlling themselves. Copur and Gutter (2019) found that individuals who had an orientation toward the future were more likely to continue building assets via saving, thus good financial management behavior.

However, Zulfaris et al. (2020) found a negative relationship between self-control and FMB. Ameriks et al. (2007) found that self-control does not influence FMB. Puri and Robinson (2007) found that optimism influences FMB negatively. Guzman et al. (2019) found that intuitive thinking influences FMB negatively. However, this study examines the relationship between self-control, optimism, deliberative thinking and investment decisions when mediated by financial behavior. Therefore, the following hypothesis is proposed:

H4a. Financial management behavior is positively related with investment decisions among individual investors.
H4b. Financial management behavior mediates positively the relationship between self-control and investment decisions among individual investors.
H4c. Financial management behavior mediates positively the relationship between optimism and investment decisions among individual investors.
H4d. Financial management behavior mediates positively the relationship between deliberative thinking and investment decisions among individual investors.

The following hypothetical model (Figure 1) has been developed based on the stated hypotheses. It demonstrates that self-control, optimism and deliberative thinking influence investment decisions when mediated by FMB. People with self-control, optimism and deliberative thinking will manage resources and make investment decisions. The objective of this study is to address the following research question:

RQ1. How do self-control, optimism and deliberative thinking when mediated by FMB influence investment decisions in the Tanzanian stock market?

3. Methodology
3.1 Research design, population and sample
This research was carried out at the Dar es Salaam Stock Exchange (DSE) in Tanzania, with a focus on individual investors. The correlational research design, as shown in Figure 1, was used to test the proposed research model. Data were gathered face to face with the assistance of brokers. The data were gathered via a questionnaire. Respondents were approached cordially, and the study’s goal was stated. Respondents were assured of anonymity and
confidentiality, and their participation was entirely voluntary. From November 2021 to December 2021, the process was carried out. The questionnaire took over 25 min to complete. Respondents were asked to place their completed questionnaires in a box located near the front counter. Individual investors account for 40% of total investors, according to data acquired from the DSE (2020). As a result, the sample size for the study was estimated using Kothari (2010) as follows:

\[ n = \frac{z^2pq}{e^2} \]

where

\[ p = \text{sample proportion which is 0.4, } q = 1 - p \]

\[ z = 1.96, \text{ the value of the standard variate as per table of area under normal curve for the confidence level of 95\%.} \]

The computation revealed that the sample size required is approximately 369 responses. As a result, 268 legitimate questionnaires were returned (a response rate of 73%). The findings show that male were 175 (65.3%), and female were 93 (34.7%). The majority of respondents were aged 40–59 years (43.2%), implying that the elderly are more interested in investments. The majority of respondents had secondary to university degree education (92.9%). In terms of income per household per month, the majority of respondents had two million and above (86.2%).

3.2 Reliability and validity of the questionnaire, common methods variance and variables measurements

Factor analysis was used to test the reliability and validity of the data collection instrument. In order to validate the measurement model, the adequacy of the sample size was examined. The results indicate a Kaiser–Meyer–Olkin (KMO) value of 0.550, which is above the recommended value of 0.5, suggesting adequacy of the sample size for factor analysis (Sarstedt et al., 2019). This was also confirmed by a significant (\( p < 0.001 \)) Bartlett’s test of sphericity (Hair et al.,
The reliability of the measures was confirmed with Cronbach’s alpha coefficients ($\alpha$) higher than the recommended level of 0.6 (Tenenhaus et al., 2005). Convergent validity was confirmed by factor loadings. All factor loadings for indicators measuring the same construct were above 0.5, implying convergent validity (Hair et al., 2019).

Discriminant validity was confirmed by correlations between the constructs and the square root of their average variance extracted (AVE). As Table 2 shows, estimated pair-wise correlations between factors did not exceed 0.80, and the square root of AVE for each construct was higher than the correlations between them, supporting discriminant validity (Hair et al., 2019).

Potential common method variance was reduced by using existing scales and ensuring respondents’ anonymity (Sarstedt et al., 2019). Moreover, extremely high correlations ($r > 0.80$) between constructs were not observed (Table 2), suggesting that common method bias was not a serious threat to the analyses (Hair et al., 2019). Further, Table 2 shows that there were no high correlations ($r > 0.80$) between constructs, suggesting that there was no problem of multicollinearity among the independent variables. Variance inflation factor (VIF) values for all the variables were below the common cut-off threshold of 10 (Table 4), suggesting that the variables were not correlated (Hair et al., 2019).

Measures of the constructs in the questionnaire were adapted from prior research, given their proven reliability. FMB was measured by twelve items adopted from Gathergood (2012), Lusardi (2012) and Rha et al. (2006). Self-control was measured by five items from a shorter version of the Brief Self-Control Scale adopted from Tangney et al. (2004), which is a general measure of self-control, and the four items from the Short-Term Future Orientation Scale adopted from Antonides et al. (2011). Optimism was measured by using five items from the Life Orientation Scale adopted from Scheier and Carver (1985). Deliberative thinking was measured by two items from the Unified Scale to Assess Individual Differences in Intuition and Deliberation adopted from Pachur and Spaar (2015). Two items were used to measure investment decisions adopted from Mayfield et al. (2008) and Vlaev et al. (2007). Financial literacy was estimated by two items adopted from Van Rooij et al. (2011). A pre-test was conducted with the help of two specialists in finance, an English master and three finance students. Based on their recommendation, corrections were made. The responses were measured using point-point Likert scales, ranging from 1 = strongly disagree to 5 = strongly agree.

4. Results
4.1 Descriptive statistics
The descriptive statistics of the study variables are shown in Table 1. The results demonstrate that self-control, optimism, deliberative thinking and FMB are all average (Mean = 3.52; 3.47; 3.62; 3.45, respectively). These findings suggest that the majority of

<table>
<thead>
<tr>
<th>Variable</th>
<th>High (%)</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>41.5</td>
<td>2.18</td>
<td>3.95</td>
<td>3.52</td>
<td>0.36</td>
</tr>
<tr>
<td>Optimism</td>
<td>44.7</td>
<td>2.83</td>
<td>3.76</td>
<td>3.47</td>
<td>0.58</td>
</tr>
<tr>
<td>Deliberative thinking</td>
<td>66.8</td>
<td>3.49</td>
<td>3.65</td>
<td>3.62</td>
<td>0.45</td>
</tr>
<tr>
<td>Financial management behavior</td>
<td>41.5</td>
<td>1.91</td>
<td>4.63</td>
<td>3.45</td>
<td>0.21</td>
</tr>
<tr>
<td>Investment decisions</td>
<td>68.8</td>
<td>3.46</td>
<td>3.68</td>
<td>3.57</td>
<td>0.49</td>
</tr>
<tr>
<td>Financial literacy</td>
<td>38.6</td>
<td>3.21</td>
<td>3.34</td>
<td>3.23</td>
<td>0.99</td>
</tr>
<tr>
<td>Age (years)</td>
<td>NA</td>
<td>26</td>
<td>75</td>
<td>48</td>
<td>0.75</td>
</tr>
<tr>
<td>Income per household/month (Tshs)* (in million)</td>
<td>NA</td>
<td>0.7</td>
<td>10</td>
<td>1.9</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Note(s): *Income was reported as household’s monthly income before tax

Table 1. Descriptive statistics

Psychological traits and investment decisions
investors in Tanzania are average in terms of self-control, optimism, deliberate thinking and FMB. The level of financial literacy was average (Mean = 3.23), consistent with the findings of Strömback et al. (2017), who found that the Swedish population has moderate self-control, optimism, deliberative thinking and financial behavior. The mean for age and income were 48 years and 1.9 million, respectively. Finally, the level of investment decisions was also average (Mean = 3.57), suggesting an average investment in the Tanzanian stock market.

The researchers split the sample at the median level of self-control, optimism, deliberative thinking and compare the groups with self-reported FMB. Individuals scoring 3.5 or more were classified as having high self-control (41.5%), more optimistic (44.7%) and high deliberative thinking (66.8%). People with high self-control, optimistic and deliberative thinking have an average score of 3.58 on FMB, indicating that people with high self-control, optimistic and deliberative thinking have better financial behavior. A t-test shows that the difference in mean scores between the groups is statistically significant (p < 0.05).

Further the researchers split the sample at the median level of self-control, optimism, deliberative thinking and compare the groups with self-reported investment decisions. People with high self-control, optimistic and deliberative thinking have an average score of 3.57 on investment decisions, indicating that people with high self-control, optimistic and deliberative thinking have better investment decisions. A t-test shows that the difference in mean scores between the groups are statistically significant (p < 0.05).

4.2 Correlation results
The correlation of the study variables are presented in Table 2. The findings reveal that the correlation between self-control, optimism, deliberative thinking and FMB were positive and significant (r = 0.192, p < 0.05, r = 0.080, p < 0.05, r = 0.343, p < 0.01, respectively). This suggests that people with high self-control, optimism and deliberative thinking have better FMB. Further, the correlation between self-control, optimism, deliberative thinking, FMB and investment decisions were also positive and significant (r = 0.380, p < 0.01, r = 0.130, p < 0.05, r = 0.394, p < 0.01, r = 0.314, p < 0.01, respectively). This suggests that people with high self-control, optimism, deliberative thinking and better financial behavior prefer to make investment decisions.

For the control variables, the correlation between age and FMB was positive but insignificant (r = 0.069, p > 0.05). However, the correlation between financial literacy, education, income and financial behavior were positive and significant (r = 0.061, p < 0.05, r = 0.493, p < 0.01, r = 0.477, p < 0.01, respectively). This suggests that people with education, high income and financial literacy prefer to invest in stocks. The correlation between age and investment decisions was positive but insignificant (r = 0.166, p > 0.05). The correlation between financial literacy, education, income and investment decisions were positive and significant (r = 0.277, p < 0.01 r = 0.393, p < 0.01, r = 0.328, p < 0.01, respectively). This suggests that people with education, high income and financial literacy prefer to invest in stocks.

4.3 Structural model
The proposed theoretical model (Figure 1) and research hypotheses were tested using structural equation modeling. SEM is able to assess the relationship between the variables and the strength of the relationship directly or indirectly (Hair et al. 2019). The study controls for investors’ characteristics, including level of financial literacy, age, educational attainment and income. Previous research has shown that these variables influence FMB (Biljanovska and Palligkis, 2015; Strömback et al., 2017). The goodness-of-fit indices were analyzed and found to be within the recommended guidelines (Hair et al., 2019), confirming the structural model’s acceptable fit to the data (Table 3).
<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
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<th>9</th>
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</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>0.809</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Optimism</td>
<td>0.979</td>
<td>0.809</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Deliberative thinking</td>
<td>0.291</td>
<td></td>
<td>0.892</td>
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<tr>
<td>Financial behavior</td>
<td></td>
<td>0.309</td>
<td>0.393</td>
<td></td>
<td></td>
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<td></td>
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<td>Financial literacy</td>
<td></td>
<td></td>
<td>0.351</td>
<td>0.384</td>
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<tr>
<td>Investment decisions</td>
<td></td>
<td>0.384</td>
<td>0.383</td>
<td>0.277</td>
<td></td>
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<tr>
<td>Age</td>
<td>0.128</td>
<td>-0.130</td>
<td>0.170</td>
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<td></td>
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<tr>
<td>Education</td>
<td>0.091</td>
<td>-0.093</td>
<td>0.001</td>
<td>-0.034</td>
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<td></td>
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</tr>
<tr>
<td>Income</td>
<td>0.135</td>
<td>-0.130</td>
<td>0.115</td>
<td>-0.034</td>
<td>0.301</td>
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<tr>
<td>Financial literacy</td>
<td>0.039</td>
<td>-0.001</td>
<td>0.016</td>
<td>0.008</td>
<td>0.008</td>
<td>0.308</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Investment decisions</td>
<td>0.035</td>
<td>-0.130</td>
<td>0.108</td>
<td>-0.034</td>
<td>0.034</td>
<td>0.308</td>
<td>0.035</td>
<td></td>
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</tbody>
</table>

Note(s): Diagonal elements are the square root of AVE between the constructs and their measures. The off-diagonal elements are correlations between the constructs.

Table 2. Correlation matrix and discriminant validity
4.4 Hypotheses testing

The findings in Table 4 indicate the direct, indirect and total effects of independent variables on dependent variables. Table 4 demonstrates that self-control is significantly and positively related to FMB and investment decisions ($\beta = 0.162, p < 0.05, \beta = 0.319, p < 0.01$, respectively), supporting H1a and H1b. H2a and H2b are supported by the findings, which show that optimism is significantly and positively related to FMB and investment decisions ($\beta = 0.148, p < 0.05, \beta = 0.128, p < 0.05$, respectively). Further, the findings show that deliberative thinking is positively related to FMB and investment decisions ($\beta = 0.427 p < 0.01, \beta = 0.381, p < 0.01$, respectively), supporting H3a and H3b.

Furthermore, the findings support H4a by indicating that FMB is positively related to investment decisions ($\beta = 0.151, p < 0.05$). The findings show that FMB significantly mediates the effect of self-control on investment decisions ($\beta = 0.025, p < 0.05$), supporting H4b. The findings also support H4c and H4d that financial behavior mediates significantly the effects of optimism ($\beta = 0.022, p < 0.05$) and deliberative thinking ($\beta = 0.065, p < 0.01$) on investment decisions.

Table 4 also shows that deliberative thinking has the greatest influence on investment decisions (= 0.446), followed by self-control (= 0.344), financial behavior (= 0.151) and optimism (= 0.141).

### Table 3.
Testing model fit

<table>
<thead>
<tr>
<th>Description of model</th>
<th>CMIN</th>
<th>CFI</th>
<th>TLI</th>
<th>IFI</th>
<th>RFI</th>
<th>GFI</th>
<th>AGF1</th>
<th>NFI</th>
<th>RMR</th>
<th>RMSEA</th>
<th>PCLOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-mediation</td>
<td>1.531, df = 4</td>
<td>0.992</td>
<td>0.970</td>
<td>0.992</td>
<td>0.919</td>
<td>0.992</td>
<td>0.959</td>
<td>0.978</td>
<td>0.014</td>
<td>0.045</td>
<td>0.469</td>
</tr>
</tbody>
</table>

**Note(s):** $\chi^2$: chi-square; df: degrees of freedom; RMR: root mean square residual; GFI: the goodness of fit index; AGFI: adjusted goodness of fit index; NFI: normed fit index; RFI: relative fit index; IFI: incremental fit index; TLI: Tucker–Lewis index; CFI: comparative fit index; RMSEA: root mean square error of approximation; PCLOSE: parsimony close

### Table 4.
Direct and indirect effects of independent variables on dependent variable

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>FMB</th>
<th>Investment decisions</th>
<th>Investment decisions Via financial behavior</th>
<th>Total effects</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-control</td>
<td>0.162**</td>
<td>0.319***</td>
<td>0.025**</td>
<td>0.162**</td>
<td>0.344***</td>
<td>0.903</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.148**</td>
<td>0.128**</td>
<td>0.022**</td>
<td>0.148**</td>
<td>0.141***</td>
<td>0.620</td>
</tr>
<tr>
<td>Deliberative thinking</td>
<td>0.427***</td>
<td>0.381***</td>
<td>0.065***</td>
<td>0.427***</td>
<td>0.446***</td>
<td>0.334</td>
</tr>
<tr>
<td>FMB</td>
<td>0.084**</td>
<td>0.212**</td>
<td>0.013**</td>
<td>0.084</td>
<td>0.200**</td>
<td>0.832</td>
</tr>
<tr>
<td>Financial literacy</td>
<td>0.118</td>
<td>0.186</td>
<td>0.206</td>
<td>0.117</td>
<td>0.206</td>
<td>0.899</td>
</tr>
<tr>
<td>Age</td>
<td>0.504***</td>
<td>0.538***</td>
<td>0.435***</td>
<td>0.492***</td>
<td>0.545***</td>
<td>0.163</td>
</tr>
<tr>
<td>Education</td>
<td>0.135**</td>
<td>0.276***</td>
<td>0.296**</td>
<td>0.168**</td>
<td>0.296**</td>
<td>0.184</td>
</tr>
<tr>
<td>Income</td>
<td>0.118</td>
<td>0.186</td>
<td>0.206</td>
<td>0.117</td>
<td>0.206</td>
<td>0.899</td>
</tr>
</tbody>
</table>

FB: $R^2 = 0.384$, Adjusted $R^2 = 0.367$, Durbin–Watson = 0.358, F-statistic = 23.130***

ID: $R^2 = 0.603$, Adjusted $R^2 = 0.590$, Durbin–Watson = 0.294, F-statistic = 49.119***

**Note(s):** The cell values of table shows the standardized regression weights. ***$p < 0.001$; **$p < 0.05$ (two-tailed)
For the control variables, the effects of age on FMB and investment decisions were positive but insignificant ($\beta = 0.118, p > 0.05, \beta = 0.186, p > 0.05$, respectively). However, the effects of financial literacy, education and income on FMB were positive and significant ($\beta = 0.084, p < 0.05, \beta = 0.504, p < 0.01, \beta = 0.135, p < 0.05$, respectively). Also, the effects of financial literacy, education and income on investment decisions were positive and significant ($\beta = 0.212, p < 0.05, \beta = 0.538, p < 0.01, \beta = 0.276, p < 0.01$, respectively).

5. Discussion of findings

This study examines the effect of self-control, optimism and deliberate thinking on investment decisions by considering the mediation mechanism of FMB. The findings indicate that self-control is significantly and positively related to FMB and investment decisions supporting H1a and H1b. These findings suggest that self-control influences investors' FMB and their investment decisions. The findings imply that investors with good self-control are more likely to save money, be prepared to manage unforeseen expenses and have enough money for investment decisions. The findings are in line with the BLC theory (Shefrin and Thaler, 1988) that people’s financial behavior over the course of life is determined by their ability to control impulses and the costs connected to exercising such self-control. The findings concur with previous findings (Biljanovska and Palligkinis, 2015; Strömback et al., 2017) that self-control predicts sound financial behavior. The findings are also in line with previous studies (Sekshińska et al., 2021; Copur and Gutter, 2019) that show self-control influences investment choices positively.

The findings support H2a and H2b that optimism is significantly and positively related to FMB and investment decisions. These findings suggest that optimism predicts sound financial behavior and investment decisions. The findings are in line with the BLC theory (Shefrin and Thaler, 1988) that optimistic investors are confident about the future, are more likely to save and demonstrate better financial behavior. The findings concur with previous findings (Puri et al., 2007; Strömback et al., 2017) that people who are optimistic are more likely to save, have a more positive view of their life and assume, to a greater extent than others, that good things will happen to them and demonstrate good FMB. Further, the findings concur with Elgebeily et al. (2021) that optimism leads to increased investment decisions. However, the findings contrast with those of Jiang et al. (2020) and Sias et al. (2020) that optimistic individuals assign a higher probability to negative outcomes, which affects investment decisions negatively.

The findings support H3a and H3b that deliberative thinking is positively related to FMB and investment decisions. These findings imply that investors who think carefully or make very conscious, well-thought-out choices are more likely to make plans and analyze problems, which have positive effects on FMB and investment decisions. The findings are consistent with the BLC theory (Shefrin and Thaler, 1988) that a farsighted individual rationally plans his/her life-time consumption, manages resources and demonstrates good financial behavior. The findings are in line with previous results (Hilgert et al., 2003; Strömback et al., 2017) that suggest that deliberative thinking has a positive effect on financial behavior. Also, the findings concur with Thoma et al. (2015), who found a positive relationship between deliberative thinking and investment choices. However, the findings contradict the finding of Guzman et al. (2019) that intuitive thinking is not associated with either short-term or long-term financial planning.

The support of H4a that FMB is positively related to investment decisions implies that investors who manage their spending and save prefer to make investment decisions. The finding concurs with Hilgert et al. (2003) that individuals with good financial behavior organize their cash inflow and outflow, credit management, savings and make investment decisions.

The findings of this study also confirmed the mediating role of FMB in the influence of self-control (H4b), optimism (H4c) and deliberative thinking (H4d) on investment decisions.
among Tanzanian individual investors. The findings explain the mechanism by which self-control, optimism and deliberative thinking are related to investment decisions, which suggests that FMB explains how these variables are associated. The findings concur with the BLC theory (Shefrin and Thaler, 1988) that people’s financial behavior over the course of life is determined by their ability to control impulses, think carefully or make very conscious, well-thought-out choices and are optimistic, which will in turn influence investment decisions. Further, the findings revealed that deliberative thinking has the highest impact on investment decisions, followed by self-control, FMB and finally optimism. These findings imply that human decision-making is largely based on deliberative thinking, which is consistent with Moxley et al. (2012).

With respect to the control variables, the effects of age on financial behavior and investment decisions were positive but insignificant. This implies that FMB and investment decisions among individual investors in Tanzania are unrelated to their age. The finding concurs with Copur and Gutter (2019) that age was not significantly related to FMB. However, the effects of financial literacy, education and income on financial behavior and investment decisions were positive and significant. These findings imply that FMB and investment decisions among individual investors in Tanzania are related to their financial literacy, education and income. The findings concur with those of Strömöck et al. (2017), who found that financial behavior is related to financial literacy, education and income.

6. Conclusion and recommendations
This study examined the effects of psychological traits on investment decision-making through the mediation mechanisms of FMB among individual investors in the Tanzanian stock market. Based on the research findings, it can be concluded that self-control is significantly and positively related to FMB and investment decisions. This implies that investors with good self-control are more likely to save money, be prepared to manage unforeseen expenses and have enough money for investment decisions. The findings also show that optimism is significantly and positively related to FMB and investment decisions. These findings imply that optimistic investors are confident about the future, are more likely to save and demonstrate better financial behavior and make investment decisions. Further, the findings reveal that deliberative thinking is positively related to financial behavior and investment decisions. These findings imply that investors who think carefully are more likely to make plans and analyze problems, which have positive effects on financial behavior and investment decisions. Moreover, the finding shows that FMB is positively related to investment decisions. This implies that investors who manage their spending and saving prefer to make investment decisions. The findings also confirmed the mediating role of FMB in the influence of self-control, optimism and deliberative thinking on investment decisions among Tanzanian individual investors.

This paper contributes to the body of knowledge by using behavioral finance to enhance the understanding of the relationship between psychological traits and the investment decisions of individual investors through the conceptualization of a mediation mechanism of FMB in the Tanzanian stock market. The stock market is a mixture of sellers and buyers, in which their psychological traits affects investment decisions. By examining self-control, optimism and deliberative thinking on FMB and investment decisions on individual investors, the study gains insights that are beneficial to individual investors and security institutions. Therefore, individual investors can analyze and evaluate their behavior and make appropriate investment decisions. Securities institutions can use this research to understand investors’ behavior, evaluate future market trends and provide advice to investors.

Future research should confirm the findings of this research in other contexts and consider other factors of psychological traits such as extraversion, agreeableness,
conscientiousness, neuroticism and openness that could have significant influences on stock market investment decisions. Second, the study deals with individual investors. Further research could examine the effects of psychological traits on investment decisions by studying institutional investors.

References
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Further reading


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