Dual-process Theory and Investment Behaviours of South African Students

Damilola Aboluwodi[1], Bomi Nomlala[2], Moyosore Ogun[3], Tshegang Chipeya[4], Arshad Abdul Latiff[5]

Abstract: Hitherto, the investment behaviours of university students in South Africa remains largely unknown. Understanding behavioural tendencies of students studying towards business degrees can reveal interesting facts about the mediating role of financial education on financial behaviours. The study is based on a survey of 344 business students at a South African university whose investment behaviours and the relationship between their investment behaviours and their socio-demographic factors were voluntarily assessed. As a novel study, there is currently no scientific evidence on the investment behaviours of South African, especially such considering the investment behaviour of South African students using the Dual-process theory approach. This study utilised ANOVA and a logistic regression model to analyse and explore relationships between the students' mean percentage scores and their investment behaviours vis-à-vis their socio-demographic factors. The findings suggest that business students have negative investment behaviours as they are likely to rely on their intuition rather than the cognitive thinking process. Furthermore, it was found that students in Finance-related professions are more likely to rely on their intuition when making financial decisions in comparison to their Non-Finance related counterparts. Lastly, although it was found that there is no statistical significance between students' demographic factors towards intuitive investment behaviour and the overall investment behaviour of students. The findings of the study suggest that male students and students who major in Law degrees are less likely to make uncontrollable, unintentional, unconscious and efficient (fast) finance-related decisions.

Keywords: Dual-process theory; Investment behaviour; Financial literacy; South Africa; Logistic regression model

JEL Classification: G5; G4; M5; M2; D7

1. Introduction

Decision making is an inseparable part of daily human lives, as individuals are faced with a plethora of decisions on a daily basis. Most common among these decisions are decisions that are finance-related, which involves how individuals manage their scarce financial resources. Often referred to as financial literacy, this popular area of personal finance studies the ability of individual to make significant monetary decisions via basic knowledge of financial tools such as budgeting, spending, saving, risk management and investing (Rashid et al., 2020). While several scholars evaluated these financial tools vis-à-vis individual broad financial literacy, some studies have considered these financial tools vis-à-vis

---

[1] University of KwaZulu-Natal, South Africa, Corresponding author: oludamilola123@gmail.com.

[2] University of KwaZulu-Natal, South Africa.

[3] University of KwaZulu-Natal, South Africa.

[4] eThekwini Municipality, KwaZulu-Natal, South Africa.

[5] Durban University of Technology, South Africa.

a componental analysis of individual financial literacy. A componental analysis of financial literacy is such that disaggregates the concept of financial literacy into financial knowledge, financial attitude and financial behaviour of individuals. Whilst several studies have succinctly explained the concepts of financial knowledge and financial attitude, Xiao (2008) conceptualised financial behaviour as human behaviours that are relevant to the management of money and financial resources. In the context of investing, these behaviours vary between rational and relational human tendencies depending on the financial product or service (Gautam and Matta, 2016). Mattsson (2019) notes that investment behaviour is a process that incorporates both internal and external influences that drive actual investment decisions. Veena (2020) described investment behaviour as the process by which individuals attempt to satisfy their investment needs as evident in their investment choices. The scholar further stressed that this process is mostly influenced by psychological factors. Nomlala and Sibanda (2020) asserted that South African students who exhibit positive behaviours in their financial decisions are more likely to be financially capable than their peers with negative financial behaviours.

Due to this, it is necessary to understand the underlying thought processes that inform decisions made by individuals, especially individual financial decisions. The dual-process theories, a notable fundamental theory in the field of social psychology, has been considered as by several studies and scholars in an attempt to understand human thinking process. The dual-process theory has been described by Pennycook et al. (2018) as the idea that human cognitive thought process can be categorised into two broad perspectives of Type1 and Type 2 cognitive processing. Whilst the Type 1 category is characterised being uncontrollable, unintentional, unconscious and efficient, and the Type 2 cognitive category is notable for being controllable, intentional, conscious and inefficient. Scholars such as (Glaser & Walther, 2014a) have asserted that psychological theories such as the dual-process theory can be used to explain the rationality of individuals in financial investment decisions via their investment behaviours. The application of this theory is crucial to further understand the underlying thought process that is likely to influence behaviours of individuals especially within the context of financial decisions.

Specifically, the context of this study aims to under how the dual-process theory can be utilised to evaluate investment behaviours among university students in South Africa. To achieve this, this study sought to: (1) assess investment behaviours among South African university students, (2) determine whether finance-related students have better investment behaviour than non-finance-related students, (3) explore the relationship between investment behaviours and students' socio-demographic characteristics and, (4) provide empirical evidence that will assist and facilitate the development of strategies to improve investment behaviours among university students. The structure of this article is ordered in the following sequence.the the second section discusses relevant kinds of literature on the dual-process theory and investment behaviours. The third section clarifies the research methods, data structure and methodology of the study. The fourth section of the study succinctly explains the findings and results of the analysis. The last section provides a conclusion for the study based on the findings of the study.

2. Literature Review

2.1. The Dual-Process Theory

The dual-process theories are foundational theories in the field of psychology, which were grafted into modern finance theory to elucidate questions bordering on rational decision making among individuals. The dual-process theories provide a mechanism whereby individual decision making can be understood from the two perspectives of intuition and cognition (Evans & Stanovich, 2013). The theories, which were first propounded by Williams James, postulate a dual perspective explanation for decision biases, via the existence of a thought system characterised by two extremes. The theories assume that decision making is either born out of an intuitive thought process or a cognitive thought process (Glaser & Walther, 2014a)

Evans and Stanovich (2013) highlighted and compared both decision making extremes under the themes of Type 1 process (intuitive) and Type 2 process (reflective). According to Glaser & Walther (2014), Type 1 decisions are those that are fast, nonconscious, associative, experience-based and exclusive of cognitive ability, Type 2 is slow, conscious, rule-based, consequence based and correlated with cognitive ability. This was an improvement on the categorical captions of System 1 and System 2 extremes (Stanovich, 1999).

In the context of behavioural finance, Osmont et al. (2015) consider system 1 to be intuitive heuristics and system 2 deliberate analytic. Adding to existing studies on the dual-process theory and investing biases, they further identified ambiguity aversion as an intuitive heuristic issue that relates to System 1 (Glaser & Walther, 2014b; Osmont et al., 2015). This heuristics approach of errors and biases was a landmark revolution in behavioural finance, led by Nobel laureates Kahneman and Tversky, who developed prospect theory and formed a cognitive rationale for decision making under uncertainty (Kahneman & Tversky, 1979; Mousavi et al., 2016).

While Tversky and Kahneman (1985) have further studied the application of the dual-process theories on framing effects, other leading scholars have identified the usability of representative bias in investing decisions (Toplak et al., 2014). Croskerry et al. (2013), considered cognitive debiasing by decoupling cognitive and affective biases in both Type 1 and Type 2 processes within clinical medicine. Heuristics, which are broad basic rules of thumb, are a cognitive mechanism that individuals utilise in solving specific choice problems under uncertainty by means of a fast (time-efficient) and frugal (effort efficient) process (Altman, 2012; Baker & Ricciardi, 2015). Whilst Type 1 processes were further classified into hard-wired processes, emotional processes, over-learned processes and implicitly learned processes, the study by Croskerry et al. (2013) affirmed the presence of potential behavioural biases, such as anchoring, the framing effect, overconfidence and confirmation bias, when clinical practitioners are expected to make decisions in high-risk situations.

Furthermore, Glaser & Walther (2014b) suggested that the System 2 process cognitively acts as a support system that intervenes and improves individual decisions under uncertainty. Their research further examined the impact of financial literacy on investment behaviour, and experimental findings showed that indeed intuitive process negatively impacts savings and investment behaviours of investment professionals.

However, Epstein et al. (1996), in a survey of 973 undergraduates of a large state university conducted using a rational-experiential inventory questionnaire, revealed that thinking styles of individuals significantly differ between bounds of experiential/intuition and rationality. The study further found that males are more rational than females, while females tend to be more trusting and confident about decisions based on impressions and intuitions.

The role of financial education in the improvement of cognitive reasoning for rational financial decisions has been a controversial issue, which has attracted research interest in recent times. While some researchers believe that financial education positively affects investing behaviours via a slow, conscious and deliberate analytic approach rather than one that is intuition driven (Mandell & Klein, 2009; Altman, 2012; De Bassa Scheresberg, 2013; Klapper et al., 2013), others studies have shown otherwise (Croskerry et al., 2013; Glaser & Walther, 2014b). Furthermore, Kane et al. (2007) suggested that these irrationalities often emanate from either information processing errors as a result of poor risk analysis or suboptimal investment choices, even when an individual is provided with the necessary risk analysis.

The guiding theme of behavioural finance is that humans are not rational agents nor are their markets frictionless (De Bondt et al., 2015; Garcia, 2013), while behavioural scientists have studied finance from the purview of the psychology that drives financial investment decisions (Coleman, 2014; De Bondt et al., 2015; Garcia, 2013). In contrast with the neoclassical scientists, these researchers seek facts via experiments, field studies and surveys, and they conduct analyses and organise them in order to establish the "super facts" that influence financial decisions (De Bondt et al., 2015).

The major question for this school of thought is: *what do people do, and how do they do it?* Hence, their research methods are often used inductively via field studies and surveys. Amongst the notable thinkers in this school of thought was Paul Slovic, who in 1972 expressed the view that "a full understanding of human limitations will ultimately benefit the decision-maker more than the naive faith in the infallibility of his intellect" (De Bondt et al., 2015).

Furthermore, pioneer studies in heuristics and biases literature had as their main focus inquiring how people think and make decisions, especially within financial contexts, within the three dimensions of representativeness, anchoring and availability bias (Tversky and Kahneman, 1975). Hence, recent studies in finance have focused interest on the spectrum of human cognition (prospect theory), emotional behaviours (overconfidence, gambler's fallacy and money illusion) and social psychology (herding behaviours) that subjectively influence investing behaviours (Coleman, 2014; De Bondt et al., 2015; Garcia, 2013; Abreu, 2014).

Central insights on behavioural finance can be found in existing studies (Coleman, 2014; De Bondt et al., 2015; Garcia, 2013; Abreu, 2014). Major findings within this context can be categorised in three dimensions: humans have a bouquet of biases ranging from predictable mistakes such as wishful thinking, overconfidence, short-sightedness; humans are prone to the effects of systematic errors caused by "noise traders/investors" (unknowledgeable/inexperienced investors) that affect the speculative dynamics of investment behavioural attitudes; all financial outcomes are significantly influenced by behavioural biases (Shefrin, 2002; De Bondt et al., 2015).

2.2. Behavioural Attitudes and Financial Decisions

Recent studies across the globe have provided evidence that low level of university students' literacy and poor behavioural attitudes in investment-related matters is not exclusive to the South African and American environment only. Ansong and Gyensare (2012), in an assessment of 250 working-students in the university of Cape Coast in Ghana., found age and work experience as variables that impact financial literacy. They further asserted that a low level of financial knowledge could be attributed to a lack of a finance-related curriculum or of prior knowledge of personal finance. Hira (2012) suggests that

there is a positive association between financial education and sustainable financial behaviour. He further argues that this is a key influence in improving both individuals' economic wellbeing and that of society.

Glaser & Walther (2014b), in two experiments conducted among 119 individuals with an average age of 22 years, found age to be statistically significant in determining behavioural attitudes when faced with choosing between risky and risk-free investment opportunities. Lam (2015) found that female Chinese university students are more risk-averse in investment decisions than their male peers. Some studies have further reported that parental influences are key determinates of financial behaviours amongst students and young adults in investment decisions (Rodrigues et al., 2012; Angulo-Ruiz and Pergelova, 2015; Jorgensen and Savla, 2010).

Özdemir et al. (2015) investigated the awareness of financial products among students in the faculty of Economics and Administrative Sciences at a Turkish University. It was found that the exposure to financial concepts has a significant impact on the students' understanding of pension funds, investment accounts, unsecured debts and mobile payments. While Kane et al. (2007) identified several investment products that are available to individual investors, Shefrin (2002) identified certain behaviours that may affect individual investing patterns are: heuristics, framing, and market inefficiencies.

Potrich et al. (2016), using a contextual model, developed and compared the financial knowledge attitudes and behaviours of 534 university students attending public and private universities in Southern Brazil. Also, Chmelíková (2016) investigated financial decision making in personal finance matters among 575 undergraduate and graduate finance students of Masaryk University in the Czech Republic. The study found that students' financial decisions were not significantly influenced by their socio-demographic characteristics. Nevertheless, the opinions of friends or relatives who work with financial service organisations as well as their previous personal experiences, do vastly influence the students' financial decisions. Furthermore, Shih and Ke (2014), who considered the determinates of financial behaviours amongst Taiwanese university students, found that socio-demographic variables play only a segmentation role as students with anxiety regarding money tend to invest in low-risk investment products as compared with students who exhibit achievement-esteem attitudes and who tend to invest in high-risk investment products. Shih and Ke (2014) further asserted that literacy scales are better measures of determinants of financial behaviours than attitudinal scales.

Akben-Selcuk (2015) considered the factors influencing financial behaviours among 1539 Turkish college students. The logistic regression showed that a significant difference between male and female students was only observed for budgeting behaviour, and male students were found to be less likely to have a budget in place to control their finances. Finance courses are taken in college, or high school and work experience were positively related to saving behaviour. Brugiavini et al. (2015) explored the impact of financial education on investment attitudes of university students via a mixed-method approach that adopted both field and laboratory experiments. It was found in both cases that financial education improves the financial confidence of respondents. This was evident as students perceived themselves to be more investment literate than they are in actual terms. In line with Cole et al. (2014), who assert that financial decisions are quite complex and cognitive ability is often required to simplify these complications, Harrington et al. (2017) posited that attitude, subjective norms and perceived control could be positively used to improve business students' cognitive behaviours within a financial budgeting context. Some recent studies have also indicated that level of education and knowledge of

financial investments can positively influence investors' behavioural attitudes towards investing (Karpova and Panova, 2018; Aboluwodi and Nomlala, 2020). For instance, while Karpova and Panova (2018) observed a positive correlation between investor's level of education and investment preferences, Aboluwodi and Nomlala (2020) opined that students studying towards finance-related degrees indicated better understanding of financial investments than their peers in non-finance related disciplines.

While considering the role of cognitive ability in investment decisional process, Christelis et al. (2010) found that individuals' cognitive abilities strongly influence their participation in the stock market. The study found that an investor's cognitive abilities and stock market participation are influenced by their information constraints rather than psychological features or preferences. However, in a study conducted by Doran et al. (2010), it was found that the cognitive abilities of a group of finance professors about the optimal investment strategy and market efficiency did not translate to their actual behaviour in investment and trading decisions. Nguyen and Schuessler (2012), while considering the impact of demographic features on investment decisions made by German investors, found that individual investment decisions are often susceptible to investment biases. While highlighting biases such as endowment effect, representativeness, self-attribution, anchoring and herd behaviour, they asserted that education plays a key role in ameliorating such investment biases and the possibility of poor investment decisions. Nguyen and Schuessler (2012) conclude that investment decisions are driven by psychological factors but can be improved through education.

3. Data and Research Methodology

A quantitative research design was adopted for the purpose of this research study. Herein, a structured questionnaire was utilised to elicit the necessary information on investment behaviours among university students. The questionnaire used for this study measured the students' investment behaviours, and further assessed the investment behaviours vis-à-vis their socio-demographic distribution. Prior to the finalisation of the questionnaire, a pilot study was conducted among a separate group of students. The finalised questionnaire was further tested for reliability and validity using the Cronbach's Alpha.

3.1. Survey Questionnaire

The finalised questionnaire comprised of a set of 27 questions, in a subset of the socio-demographic question (7) and investment behaviour questions (20). The first subset comprised of questions such as gender, age, major field of study, monthly allowance and race.

The second subset of the questionnaire assessed the investment behaviours of the students via a set of intuitive and cognitive questions. This comprised of a total of 20 questions that were constructed via a 4-point Likert scale. The scale measured the student's behavioural predisposition to rely on either intuition or cognition whilst making financial decisions that relate to investing. The questions in this category were adapted from items used in existing published pieces of literature (Epstein et al., 1996; Keller et al., 2000; Glaser & Walther, 2014a).

3.2. Descriptive and Frequency Distribution of Data

This study conducted on both Westville and Howard campuses, amongst final-year business students in the College of Law and Management Studies, University of KwaZulu-Natal, South Africa. This population group comprised of final year students in Accounting, Economics, Finance, Management, and Law B. Comm and LLB degrees. The student group were further categorised into finance and non-finance cohorts for the purpose of the study. The finance group (SAEF), consisted of students studying towards Accounting, Economics and Finance degrees, while the non-finance group (Non-SAEF), consisted of students studying towards Management and Law degrees.

The study utilised a random sampling technique, and total sample size of 344 questionnaires was considered valid for the study while 27 questionnaires were invalidated for reasons such as non-completion of questions, and/or omission of consent on the accompanying informed consent page.

Sample's Demographic Characteristics

Table 1 shows a detail description of the respondents' characteristics. The descriptive computation matrices in Table 1 revealed that most of the respondents (56.1%) were female as compared to their counter. Although there were more female participants than male participants, this study further revealed that most of the respondents (76.2%) fell within the ages of 21 years and above. On respondents' discipline, the findings from this study recorded high participation among the SAEF, with about 58.7%.

Furthermore, the results of this study revealed that about 33.4% of the respondents were Accounting students; 23.8% and 17.4% of the respondents were Law and Management students, respectively. On racial affiliation, the descriptive statistics revealed that most of the respondents (69.8%) were Africans, and about 27.0% of the respondents were Indians. The results from this study further indicated that most of the respondents (53.2%) reported that they received a total monthly allowance of ≤ R1000 and about 31.1% of the respondents indicated that they received a monthly income of between R1001 – R2000.

Table 1. Socio-Demographic Characteristics of Respondents

Characteristics	Frequency	Percentage	Mean (M)	Standard Deviation (SD)	
Gender					
Male	151	43.9	1.50	0.497	
Female	193	56.1			
Age Categories					
18 – 20 years old	82	23.8	1.76	0.427	
21+ years old	262	76.2			
Discipline					
SAEF	202	58.7	1.41	0.493	
Non-SAEF	142	41.3			
Major Field of Study					
Accounting	115	33.4			
Finance	36	10.5			
Economics	51	14.8	2.81	1.533	
Law	82	23.8			
Management	60	17.4			
Racial Affiliation					
African	240	69.8			
Indian	93	27.0			
Colored	8	2.3	1.34	0.570	
White	3	0.9			
Monthly Allowance					
≤ R1000	183	53.2			
R1001 – R2000	107	31.1			

R2001 – R3000	25	7.3		
R3001 – R4000	11	3.2	1.80	1.197
R4001 – R5000	5	1.5		
≥ R5001	13	3.8		

3.3. Research Methodology

To assess the investment behaviour, the behavioural attitude of respondents was measured using mean scores from a 4-point Likert scale. The scale consisted of statements selected to evaluate whether a respondent would rather go with their intuition or would seek for more knowledge (cognition) when faced with an investment decision-making dilemma. Hence, the faith in intuition statements was reverse coded during the data capturing, and respondents' behavioural attitudes were assessed based on their mean scores. The respondents that scored a mean score ≥ 2.5 were said to have a good (cognitive) behavioural attitude towards investment decision-making. In contrast, respondents that scored a mean score ≤ 2.5 were said to have a poor (intuitive) behavioural attitude towards investment decision-making.

Furthermore, a one-way ANOVA was used to determine the differences between each of the independent variables and the aggregate investment literacy score. The F statistics were tested at ≤ 0.05 significance level.

In order to assess the impact of socio-demographic variables on the students' investment literacy, a binary logistic regression model was developed. In this study context, the dichotomous variable, based on responses obtained from the main questions in the questionnaire was used in the logistic regression model as the dependent variable, which was further explicated by each independent variable category to test for significance with respect to investment literacy. The independent variable categories considered were socio-demographic variables such as gender, age, major field of study, race, and monthly allowance, while the dependent variable categories include each investment literacy question.

The coefficients of these variables represented the influence of the individual subgroup relative to a reference group that was chosen subjectively. For example, DISCIPLINE was coded as (1) if the respondent's discipline is non-finance related (Non-SAEF), 0 otherwise. Therefore, the reference category (0) is financed-related (SAEF). If the logistic coefficient of the variable is negative, then it implies that in comparison with finance-related (SAEF), the non-finance related (Non-SAEF) are associated with a decreased log odds ratio of being investment literate. The Maximum likelihood estimate was further utilised to obtain the coefficients of the predictors. Thus, the logistic model for this study was expressed in the following form:

$log\ [p/(1-p)]\ IL = \beta_0 + \beta_1(\text{GENDER}) + \beta_2(\text{AGE}) + \beta_3(\text{DISCIPLINE}) + \beta_4(\text{MAJOR1}) + \beta_5(\text{MAJOR2}) + \beta_6(\text{MAJOR3}) + \beta_7(\text{MAJOR4}) + \beta_8(\text{RACE1}) + \beta_9(\text{RACE2}) + \beta_{10}(\text{RACE3}) + \beta_{11}(\text{ALLOWANCE1}) + \beta_{12}(\text{ALLOWANCE2}) + \beta_{13}(\text{ALLOWANCE3}) + \beta_{14}(\text{ALLOWANCE4}) + e_i$

Where:

IL= The level of investment literacy.

P = The probability of a student with relatively more investment literacy.

GENDER =1 if the respondent is a Male, 0 otherwise.

AGE = 1 if a respondent is in the age group of below 18-20, 0 otherwise.

DISCIPLINE = 1 if a respondent is a Non-SAEF major, 0 otherwise.

MAJOR1 = 1 if a respondent is Accounting, 0 otherwise.

MAJOR 2 =1 if a respondent is Economics, 0 otherwise.

MAJOR3 = 1 if a respondent is Law, 0 otherwise.

MAJOR4 =1 if a respondent is management, 0 otherwise.

RACE1 = 1 if a respondent is Indian, 0 otherwise.

RACE2 = 1 if a respondent is coloured, 0 otherwise.

RACE3 = 1 if a respondent is white, 0 otherwise.

ALLOWANCE1 = 1 if a respondent's Monthly Allowance is less than R1000, 0 otherwise.

ALLOWANCE2 = 1 if a respondent's Monthly Allowance is between R1001-R2000, 0 otherwise.

ALLOWANCE3 = 1 if a respondent's Monthly Allowance is between R2001-R3000, 0

otherwise.

ALLOWANCE4 = 1 if a respondent's Monthly Allowance is between R3001-R4000, 0

otherwise.

ALLOWANCE5 = 1 if a respondent's Monthly Allowance is between R4001-R5000, 0

otherwise.

4. Results and Discussion

The results of this study are divided into categories that address three issues. The first category assesses the investment behaviours of certain South African university students. The second category addresses whether finance-related students have better investment behaviour as opposed to non-finance-related students. The final category sets out to explore the link between students' socio-demographic profiles and investment meant behaviour.

4.1. Descriptive Analysis: *Investment Behaviours of Students*

To measure respondents' investment behaviour, we made use of 20 questions that measure respondents intuitive and cognitive investment behaviour. This was to determine whether there was a difference between the SAEF and Non-SAEF disciplines. Therefore, to accurately measure respondents Investment Behaviour, we used four-Likert Scale questions to estimates their investment Behaviour; where a score of 1 = "Strongly Disagree", 2 = "Disagree", 3 = "Agree" and a score of 4 = "Strongly Agree". Under the *Investment Intuitive Questions*, these scales were further transformed as 1 and 0; where 1 = "Positive Behaviour" = a score of 1 or 2. On the other hand, a score of 3 or 4 was transformed into "Negative Behaviour" = 0. Since the Cognitive Investment Questions were reversedly coded, a score of 1 or 2 was transformed as "Positive Behaviour" towards investments = 1; while a score of 3 or 4 was transformed as "Negative Behaviour" towards investments = 0. Table 2 Shows the Investment Behaviour of Students.

Table 2. Investment Behaviours of Respondents in Aggregate and Per Question

Variables	Positive Behaviour	Negative Behaviour	M	SD
Investment Behaviour of the Total Study Sample	44 (12.8%)	300 (87.2%)	6.05	3.017
Intuitive-Investment Behaviour of the Total Study Sample	114 (33.1%)	230 (66.9%)	3.57	2.448
Cognitive-Investment Behaviour of the Total Study Sample	54 (15.7%)	290 (84.3%)	2.47	s-2.065
Question 1	92 (26.7%)	252 (73.3%)	0.26	0.443
Question 2	64 (18.6%)	280 (81.4%)	0.18	0.389
Question 3	138 (40.1%)	206 (59.1%)	0.40	0.490
Question 4	117 (34.0%)	227 (66.0%)	0.34	0.474
Question 5	114 (33.1%)	230 (66.9%)	0.33	0.471
Question 6	92 (26.7%)	252 (73.3%)	0.26	0.443
Question 7	143 (41.6%)	201 (58.4%)	0.41	0.493
Question 8	174 (50.6%)	170 (49.4%)	0.50	0.500
Question 9	109 (31.7%)	235 (68.3%)	0.31	0.465
Question 10	188 (54.7%)	156 (45.3%)	0.54	0.498
Question 11	39 (11.3%)	305 (88.7%)	0.11	0.317
Question 12	157 (45.6%)	187 (54.4%)	0.45	0.498
Question 13	66 (19.2%)	278 (80.8%)	0.19	0.394
Question 14	66 (19.2%)	278 (80.8%)	0.19	0.394
Question 15	104 (30.8%)	240 (69.8%)	0.30	0.459
Question 16	67 (19.5%)	277 (80.5%)	0.19	0.396
Question 17	52 (15.1%)	292 (84.9%)	0.15	0.358
Question 18	49 (14.2%)	295 (85.8%)	0.14	0.350
Question 19	148 (43.0%)	196 (57.0%)	0.43	0.495
Question 20	103 (29.9%)	241 (70.1%)	0.29	0.458

With a total mean score of 6.05 and a standard deviation (SD) of 3.017, the descriptive matrices of this study suggested that most of the respondents (87.2%) have negative investment behaviour as compared to the 12.8% of those who have positive investment behaviour. This implies that majority of the students rely on their intuition for making financial decision making, especially those relating to investing. This kind of thought process relates to Type 1 thinking style, which is characterised as being uncontrollable, unintentional, unconscious and efficient (Pennycook et al., 2018). The role of financial education in the improvement of cognitive reasoning for rational financial decisions has been a controversial issue, which has attracted research interest in recent times. While some researchers believe that financial education positively affects financial behaviours via a slow, conscious and deliberate analytic approach rather than one that is intuition driven (Mandell & Klein, 2009; Altman, 2012; De Bassa Scheresberg, 2013; Klapper et al., 2013), others studies have shown otherwise (Croskerry et al., 2013; Glaser & Walther, 2014b). A breakdown analysis of the cognitive and intuitive descriptive results is further detailed in Table 2.

4.2. Analysis of Variance: *Finance-related students versus Non-finance-related students*

In order, to determine whether there is a significant difference between investment behaviours of finance-related students (SAEF) and non-finance-related students (Non-SAEF), Table 3 shows the results of the respondents' investment behaviours based on whether or not the respondent had negative behaviour toward investment. The average personal negative investment behaviour was 87.2% (n=300). Although these scores were high in comparison to respondents disciplines, there was a significant

difference between those who are SAEF and Non-SAEF students, with average scores of 91.6% (n=185) and 81.1% (n=115), respectively. Interestingly, a higher percentage of the students who had taken the SAEF courses (Accounting, Finance, and Economics) had negative personal investment behaviour, 93.0% vs 7.0%; 91.7% vs 8.3%; and 88.2% vs 11.8%, respectively. As expected, those who had taken the Non-SAEF courses (Law and Management) also had high negative personal investment behaviour of 82.9% vs 17.1% and 78.3% vs 21.7%, accordingly. Therefore, these findings support the conclusion that SAEF students are subsequently more negatively-oriented in terms of investment behaviour than those who are Non-SAEF students. In other words, the findings in Table 3 are suggesting that SAEF students are more likely to have negative financial investment behaviour as compared to their counterparts. While a number of studies have suggested that discipline does not affect knowledgeability in financial decision-making (Botha, 2013), other studies have posited differently (Volpe et al., 1996; Kotzé and Smit, 2008; Shaari et al., 2013; Shahrabani, 2013). This is descriptively illustrated in Table 3.

Table 3. Investment Behaviours of Respondents Based on Discipline

Variables	Investment Behaviour		P-Value
	Positive	Negative	
Major Fields			
Accounting	8 (7.0%)	107 (93.0%)	
Finance	3 (8.3%)	33 (91.7%)	
Economics	6 (11.8%)	45 (88.2%)	0.002
Law	14 (17.1%)	68 (82.9%)	
Management	13 (21.7%)	47 (78.2%)	
Disciplines			
SAEF	17 (8.4%)	185 (91.6%)	0.004
Non-SAEF	27 (19.0%)	115 (81.0%)	
Pearson's R test or Spearman's correlation test (used to compare categorical variables)			

4.3. Logistic Regression Model: *Socio-demographic factors vs investment behaviours*

Even though most of the respondents have negative cognitive investment behaviour, the results from the impact of socio-demographic factors on students' investment behaviour revealed that male respondents and those who major in Law are less likely to have negative cognitive investment behaviour. The results are suggesting that those who major in other fields and female respondents are more likely to have negative cognitive investment behaviour at a <0.05 significant level. This implies that male university students and business students majoring in Law degrees are more likely to have a Type 2 deliberate - analytic thinking process (Osmont et al., 2015). This cognitive category is notable for being controllable, intentional, conscious and inefficient (Pennycook et al., 2018). The results on intuitive investment behaviour and the overall financial investment behaviour of students revealed that there is no statistical significance between students' demographic factors towards intuitive investment behaviour and the overall financial investment behaviour of students.

In summary, the findings from this study revealed that respondents' age group, discipline, major field and racial affiliation has no statistical significance on their cognitive, intuitive and overall financial investment behaviour. Similarly, the findings from this study revealed that respondents' monthly income or monthly allowances has no statistical significance on their cognitive, intuitive and overall financial investment behaviour. Therefore, the findings from this study revealed that most respondents have

negative cognitive, intuitive and overall financial investment behaviour – regardless of their socio-demographic profiles. These findings are further explicated descriptively in Table 4.

Table 4. Results from Binary Regression Analysis (n=344)

FACTORS	Cognitive Investment Behaviour			Intuitive Investment Behaviour			Sample Total Investment Behaviour		
	B	S.E.	Odds Ratio	B	S.E.	Odds Ratio	B	S.E.	Odds Ratio
Gender (Reference Category: *Female*)									
Male	0.656*	0.317	4.266	0.0178	0.239	0.006	0.268	0.337	0.632
Age Categories (Reference Category: *21+ years*)									
18 – 20 years old	-0.158	0.425	0.138	0.217	0.294	0.543	-0.458	0.452	1.025
Discipline (Reference Category: *Non-SAEF*)									
SAEF	-0.534	0.485	1.211	0.101	0.439	0.053	-0589	0.555	1.126
Major Field of Study (Reference Category: *Management*)									
Accounting	-0.784	0.499	2.474	0.273	0.378	0.522	-0.743	0.587	1.602
Finance	-1.094	0.753	2.113	0.035	0.499	0.005	-0.489	0.587	0.393
Economics	--	--	--	--	--	--	--	--	--
Law	-1.130*	0.486	5.404	0.444	0.412	1.162	-0.178	0.490	0.132
Racial Affiliation (Reference Category: *White*)									
African	-0.225	1.402	0.026	20.649	23165.370	0.000	19.614	23103.855	0.000
Indian	-0.529	1.423	0.138	20.644	23165.370	0.000	19.350	23103.855	0.000
Colored	0.919	1.657	0.308	20.752	23165.370	0.000	20.018	23103.855	0.000
Monthly Allowance (Reference Category: *≥ R5001*)									
≤ R1000	-0.748	0.724	1.073	-0.255	0.669	0.145	0.065	0.849	0.006
R1001 – R2000	-1.350	0.764	3.124	0.139	0.681	0.042	-0.465	0.891	0.272
R2001 – R3000	-0.375	0.843	0.198	-0.656	0.793	0.685	0.282	0.956	0.087
R3001 – R4000	-0.867	1.060	0.669	-0.945	1.022	0.854	-0.648	1.340	0.234
R4001 – R5000	-0.640	1.338	0.229	-20.658	17915.989	0.000	-19.684	17757.155	0.000
Constant	-0.002	1.381	0.000	-21.482	23165.370	0.000	-20.797	23103.855	0.000
Nagelkerke R Square	0.125			0.058			0.093		
2Log Likelihood Test: X^2 (df)	273.067			422.242			245.637		
Cox & Snell R Square	0.073			0.042			0.049		
Note: *p<0.05; **p<0.01; ***p>0.001									

5. Conclusion

The findings of this study suggest that majority (87.2%) of the university students in South Africa are more likely to be intuitively driven when making financial decisions. This is based on their observable investment behaviours which reveal that almost all the students are vulnerable to making uncontrollable, unintentional, unconscious and efficient (fast) finance-related decisions. Furthermore, it was found that students in Finance-related professions are more likely to rely on their intuition when making financial decisions in comparison to their Non-Finance related counterparts. Perhaps, a plausible explanation for this could be as a result of overconfidence behavioural bias. Lastly, although it was found that there is no statistical significance between students' demographic factors towards intuitive investment behaviour and the overall investment behaviour of students. The findings of the study suggest that male students and students who major in Law degrees are less likely to make uncontrollable, unintentional, unconscious and efficient (fast) finance-related decisions. Thus, the findings suggest that female students and students who major in other degrees are more likely to make uncontrollable, unintentional, unconscious and efficient (fast) finance-related decisions.

References

Aboluwodi, D. & Nomlala, B. (2020). Investment Literacy of University Students in South Africa. *Acta Universitatis Danubius. Œconomica* 16.

Abreu, M. (2014). *Individual Investors' behavioral biases: excerto da Lição de Síntese das Provas de Agregação*.

Akben-Selcuk, E. (2015). Factors influencing college students' financial behaviors in Turkey: Evidence from a national survey. *International Journal of Economics and Finance,* 7, pp. 87.

Altman, M. (2012). Implications of behavioural economics for financial literacy and public policy. *The Journal of Socio-Economics,* 41, pp. 677-690.

Angulo-Ruiz, F. & Pergelova, A. (2015) An empowerment model of youth financial behavior. *Journal of Consumer Affairs* 49, pp. 550-575.

Ansong, A. & Gyensare, MA. (2012). Determinants of university working-students' financial literacy at the University of Cape Coast, Ghana. *International Journal of Business and Management* 7, pp. 126.

Baker, HK. & Ricciardi, V. (2015). *Understanding behavioral aspects of financial planning and investing*.

Botha M. (2013) *A Comparative Analysis of the Financial Literacy of Final Year Diploma Students in Different Fields of Study at the University of Johannesburg*: University of Johannesburg.

Brugiavini, A.; Cavapozzi, D.; Padula, M. et al. (2015). *Financial education, literacy and investment attitudes*.

Chmelíková, B. (2016) Financial Decision-Making among Finance Students: An Empirical Study from the Czech Republic. *Self* 498, p. 84.

Christelis, D.; Jappelli, T. & Padula, M. (2010). Cognitive abilities and portfolio choice. *European Economic Review* 54, pp. 18-38.

Cole, S.; Paulson, A. & Shastry, GK. (2014). Smart money? The effect of education on financial outcomes. *The Review of Financial Studies* 27, pp. 2022-2051.

Coleman L. (2014). Why finance theory fails to survive contact with the real world: a fund manager perspective. *Critical Perspectives on Accounting* 25, pp. 226-236.

Croskerry, P.; Singhal, G. & Mamede, S. (2013). Cognitive debiasing 1: origins of bias and theory of debiasing. *BMJ Qual Saf*: bmjqs-2012-001712.

De Bassa Scheresberg, C. (2013). Financial literacy and financial behavior among young adults: Evidence and implications. *Numeracy* 6, p. 5.

De Bondt, WF.; Muradoglu, YG.; Shefrin, H.; et al. (2015). *Behavioral finance: Quo vadis?*

Doran, JS.; Peterson, DR. & Wright, C. (2010). Confidence, opinions of market efficiency, and investment behavior of finance professors. *Journal of Financial Markets* 13, pp. 174-195.

Epstein, S.; Pacini, R.; Denes-Raj, V.; et al. (1996). Individual differences in intuitive–experiential and analytical–rational thinking styles. *Journal of personality and social psychology* 71, p. 390.

Evans, JSB. & Stanovich, KE. (2013). Dual-process theories of higher cognition: Advancing the debate. *Perspectives on psychological science* 8, pp. 223-241.

Garcia, MJR. (2013). Financial education and behavioral finance: new insights into the role of information in financial decisions. *Journal of Economic Surveys* 27, pp. 297-315.

Gautam, S. & Matta, M. (2016) Socio-demographic determinants of financial behaviour of individual investors in India. *Journal of IMS Group* 13, pp. 38-49.

Glaser, M. & Walther, T. (2014a). Run, walk, or buy? Financial literacy, dual-process theory, and investment behavior. *Financial Literacy, Dual-Process Theory, and Investment Behavior.*

Glaser, M. & Walther, T. (2014b). Run, walk, or buy? *Financial literacy, dual-process theory, and investment behavior.*

Harrington, C.; Smith, W. & Bauer, R. (2017). Influencing business student intent to use a personal budget. *The Accounting Educators' Journal* 26.

Jorgensen, BL. & Savla, J. (2010). Financial literacy of young adults: The importance of parental socialization. *Family relations* 59, pp. 465-478.

Kahneman, D. & Tversky, A. (1979) Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*: pp. 263-291.

Kane, A.; Marcus, A. & Bodie, Z. (2007). *Essentials of investments*: McGraw-Hill.

Karpova, D. & Panova, S. (2018) The study of investment preferences of Russians on individual investment accounts. *Journal of Reviews on Global Economics* 7, pp. 626-644.

Keller, J.; Bohner, G. & Erb, H-P. (2000). Intuitive and heuristic judgment-Different processes? P*resentation of a German version of the rational-experiential inventory and of new self-report scales of heuristic use*.

Klapper, L.; Lusardi, A. & Panos. GA. (2013). Financial literacy and its consequences: Evidence from Russia during the financial crisis. *Journal of Banking & Finance* 37, pp. 3904-3923.

Kotzé, L. & Smit, A. (2008) Personal financial literacy and personal debt management: the potential relationship with new venture creation. *The Southern African Journal of Entrepreneurship and Small Business Management* 1, pp. 35-50.

Lam, D. (2015). Gender Differences in Risk Aversion Among Chinese University Students. *Journal of gambling studies* 31, pp. 1405-1415.

Mandell, L. & Klein, LS. (2009). *The impact of financial literacy education on subsequent financial behavior*.

Mattsson, J. (2019). *Investment behavior of bachelor level students.*

Mousavi, S.; Gigerenzer, G. & Kheirandish, R. (2016). Rethinking behavioral economics through fast-and-frugal heuristics. Frantz, R., Chen, S.-H.; Dopfer, K.; Heukelom, F. & Mousavi, S. *Routledge Handbook of Behavioral Economics*: pp. 280-296.

Nguyen, T. & Schuessler, A. (2012). Investment decisions and socio-demographic characteristics–empirical evidence from Germany. *International Journal of Economics and Finance* 4: p. 1.

Nomlala, B. & Sibanda, M. (2020). Financial Capability of Accounting Students in South African Universities. *Journal of Reviews on Global Economics* 9, pp. 200-215.

Osmont, A.; Cassotti, M.; Agogué, M. et al. (2015). Does ambiguity aversion influence the framing effect during decision making? *Psychonomic bulletin & review* 22, pp. 572-577.

Özdemir, A.; Temizel, F.; Sönmez, H. et al. (2015). Financial Literacy of University Students: A Case Study for Anadolu University, Turkey/Üniverste Ögrencilerinin Finansal Okuryazarligi: Anadolu Üniversitesi Türkiye Için Bir Vaka Çalismasi. *International Journal of Management Economics & Business* 11: p. 97.

Pennycook, G.; De Neys, W.; Evans, JSB. et al. (2018). The mythical dual-process typology. *Trends in Cognitive Sciences* 22: pp. 667-668.

Potrich, ACG.; Vieira, KM. & Mendes-Da-Silva, W. (2016). Development of a financial literacy model for university students. *Management Research Review* 39: pp. 356-376.

Rashid, AAA.; Jantan, MS.; Fairuz, Mafa. et al. (2020). Financial Knowledge and Personal Financial Literacy in Investment Priorities Among University Students. *Available at SSRN 3541998*.

Rodrigues, CS; Vieira, FD; Amaral, AMPdS, et al. (2012). Financial literacy of university students. *Academic Conferences and Publishing International*.

Shaari, NA.; Hasan, NA; Mohamed, R. et al. (2013). Financial literacy: A study among the university students. *Interdisciplinary journal of contemporary research in business* 5, pp. 279-299.

Shahrabani, S. (2013). Financial literacy among Israeli college students. *Journal of College Student Development* 54, pp. 439-446.

Shefrin, H. (2002). *Beyond greed and fear: Understanding behavioral finance and the psychology of investing*: Oxford University Press on Demand.

Shih, T-Y. & Ke, S-C. (2014). Determinates of financial behavior: insights into consumer money attitudes and financial literacy. *Service Business* 8, pp. 217-238.

Stanovich, KE. (1999) *Who is rational?: Studies of individual differences in reasoning*: Psychology Press.

Toplak, ME.; West, RF. & Stanovich, KE. (2014). Rational thinking and cognitive sophistication: Development, cognitive abilities, and thinking dispositions. *Developmental psychology* 50, p. 1037.

Tversky, A. & Kahneman, D. (1975). Judgment under uncertainty: Heuristics and biases. *Utility, probability, and human decision making.* Springer, pp. 141-162.

Tversky, A. & Kahneman, D. (1985). The framing of decisions and the psychology of choice. *Environmental Impact assessment, technology assessment, and risk analysis.* Springer, pp. 107-129.

Veena, M. (2020). Influence of Behavioral Biases on Investment Behaviour of Women Investors–A Study on Hyderabad Karnataka Region. *Studies in Indian Place Names* 40, pp. 440-454.

Volpe, RP.; Chen, H. & Pavlicko, JJ. (1996). Personal investment literacy among college students: A survey. *Financial Practice and Education* 6, pp. 86-94.

Xiao, JJ. (2008). *Handbook of consumer finance researc*h. Springer New York.