

Assessing the impact of language on the measurement of financial literacy



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MTHWOX001

Research dissertation presented for the approval of the University of Cape Town Senate in fulfilment of part of the requirements for the degree of Master of Commerce (Specialising in Financial Reporting, Analysis and Governance) in approved courses and a minor dissertation. The other part of the requirement for this qualification was the completion of a programme of courses.

I hereby declare that I have read and understood the regulations governing the submission of Master of Commerce dissertations, including those relating to length and plagiarism, as contained in the rules of the University, and that this dissertation conforms to those regulations.

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SUBMITTED: February 2022

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Abstract:

Research in the field of financial literacy has found that black people and other minority groups, globally, underperform in financial literacy assessments, in comparison to their white counterparts. Multiple factors have been identified in literature, which try to explain the distribution of financial literacy results across demographic groups. However, none of these factors fully explain the disparity. Language has been identified as a potential factor, yet no studies have specifically explored this. A common characteristic among the underperforming group is that financial literacy assessments typically are not conducted in the participants' primary language. This paper aims to explore the impact of the language of assessment by testing whether assessing individuals in their primary language would improve their financial literacy scores. A quantitative research methodology was applied to surveys, which were disseminated in both English and isiXhosa (an African language). The survey performed is in line with existing financial literacy assessment however this study is made unique by controlling for language, to isolate its impact on the results. Statistical analysis of 240 respondents found that language was not the issue. Instead, in line with the findings of existing literature, self-efficacy and educational background are significant in determining financial literacy. These findings are key to financial literacy research and will help in the creation of financial literacy interventions. While there are no retrospective interventions for educational background, self-efficacy can be improved through targeted financial literacy intervention programmes designed to bridge the gap in financial literacy across racial groups.

Acknowledgements:

I must thank the following people for their continuous support, assistance, and guidance. Without you this study would not have been possible:

- Gizelle Willows: my supervisor, for all your time and effort on this paper. Thank you for all your advice, help, encouragement, feedback and, most importantly, for your support. Thank you for always making me feel that I am not alone in this journey. I would not have finished this without you.
- Anneli Hardy, our statistics consultant: For your patience, effort, and efficiency. Thank you for always being willing to go along with the ever-changing ideas and for always being willing to answer my questions and provide guidance.
- Francis Kwahene: for providing me with the resources of your team to help translate the survey from English to isiXhosa
- Jacqui Kew: For being happy to take time out of your busy schedule to talk to me and offer advice and wisdom based on your experience with language and learning.
- To my friends and family: Thank you for your support and encouragement throughout this journey. A special mention to Siliziwe: “tsala”, thank you for being my Xhosa and to Steve, thanks for tolerating me when I was stressed and for cooking whenever I had a deadline.
- To my mother, Dr. M.R. Laka-Mathebula: Thank you for always letting me moan and cry on your shoulder, then swiftly reminding me “that’s research baby”. Our phone calls often carried me.
- The lecturers and respondents at the University of Cape Town: Thank you to the lecturers for allowing me to use your course sites to share my survey.
- To the respondents: This would not have been possible without you.
- To all those I could not name, everyone who has had even the smallest impact, thank you for your contribution.

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Introduction

Extant literature has found that Black people and other minority groups are generally observed to have lower levels of financial literacy in comparison to their white counterparts (Bradley, 2021; Charron-Chénier and Seamster, 2021; Lusardi, Mitchell & Curto., 2009; Lusardi, Samek, Kapteyn, Glinert, Huna and Heinberg 2014; Remund, 2010; Webb 2021). While this finding is consistent globally, existing literature is not fully able to explain the cause of the differential in financial literacy among the groups.

Financial literacy results vary significantly across various demographic groups, particularly across races (Bradley, 2021; Charron-Chénier and Seamster, 2021; Lusardi et al., 2009, 2014; Lusardi & Mitchell, 2011; Remund, 2010; Van Rooij et al., 2011; Willows, 2019a). Extant literature has not been able to fully explain the distribution of financial literacy scores of individuals across racial groups however other socio-economic factors such as age, culture, education, gender, household income and nationality have been identified as factors which influence an individual's financial literacy score (Bradley, 2021; Bottazzi and Lusardi, 2021; Charron-Chénier and Seamster, 2021; Brown, Henchoz & Spycher, 2018; Chen, 2013; Lusardi & Mitchell, 2011, 2013; Riitsalu & Pöder, 2016; Willows, 2019a, 2019b, 2020). While these factors are useful in explaining a lot of the variation among the financial literacy results of individuals across demographic groups, none of these factors are sufficiently able to explain the consistent variation of financial literacy scores amongst racial and cultural groups observed across multiple studies globally. To understand the cause of these variations, a common factor needs to be identified among the underperforming groups to test whether this could explain their tendency to underperform. The common characteristic identified within the underperforming groups is that financial literacy assessments are not being conducted in their primary language of understanding. Lusardi and Mitchell (2011) and Van Rooij, Lusardi and Alessie (2011) have found that the language and phrasing of questions used in the assessment of financial literacy has an impact on the answers provided by respondents in financial literacy assessments. Financial literacy assessments are generally conducted in English (Botha, 2013; Lusardi & Mitchell, 2017; Mudzingiri, Muteba Mwanba and Keyser, 2018; Nanziri & Leibbrandt, 2018; Remund, 2010) and the underperforming groups of respondents are typically non-native English speakers (Botha, 2013; Lusardi & Mitchell, 2011).

Through identifying the difference between the language used in assessing financial literacy and the primary language of individuals taking financial literacy assessments, an additional potential explanatory variable is identified. A few existing studies have identified that language may be a factor which impacts financial literacy results across demographic groups, however none have tested this hypothesis to date. This study aims to address this gap in existing literature by assessing whether the language used in the assessment of financial literacy will have an impact on the financial literacy score of individuals whose primary language is not English, which is the language typically used to assess financial literacy. This objective is achieved through assessing whether an individual's financial literacy score is expected to be positively impacted by taking a financial literacy assessment in their primary language, in contrast to if they had taken the survey in English.

Determining whether the language used in the assessment of financial literacy has an impact on financial literacy results will provide useful information to researchers and policy makers who aim to address the financial literacy deficiencies of specific populations. In a country like South Africa, where racial inequality is prevalent in many facets of life, an understanding of the causes of financial literacy inequalities can assist government and private entities develop more targeted financial literacy intervention programmes to try and reduce the wealth and income inequality across racial groups. The life-cycle hypothesis theory expects that individuals will make the best economic decisions with the information they have in order to plan for their financial well-being into the future (Browning and Crossley, 2001). In South Africa where wealth and inequality are so prevalent (Kollamparambil, 2020; Leibbrandt et al., 2012), the decisions individuals make regarding their financial planning are of important for the nation to reduce the inequalities in the country. This is an issue however, as for individuals to make the best financial decisions, they would need to have good financial literacy skills (Parker et al., 2022). Most South Africans do not have good financial literacy skills and this will therefore have an impact on their decision making (Roberts, Struwig & Gordon, 2014). Understanding the financial literacy of its citizens would therefore be a key matter for policy makers which aim to implement measures which decrease inequality and to do so they need to identify factors which may be impacting financial literacy scores. This study therefore aims to answer the questions of whether the language used in the assessment of financial literacy is a statistically significant factor in explaining the dispersion of financial literacy results across different racial groups? This study follows a quantitative research approach in which a survey assessing financial literacy and financial

knowledge is disseminated to respondents. To limit the impact of other indicators of financial knowledge on the results of the study and isolate the impact of language, a population as homogenous as possible was selected. The target population for the sample was undergraduate students at the University of Cape Town (UCT)¹. By limiting the population to undergraduate students, age and education are partially controlled, as undergraduates are typically within the ages of 18 and 25 and will all have a high school qualification. While all respondents will have a high school education at the least, given the South African schooling system, it is important to note that the quality of education received may vary across high schools. As a proxy for the quality of education, the quintile levels² of the high school attended by a respondent is used. Educational background may also differ as individuals may take different subjects in high school, which may impact their exposure to financial concepts. isiXhosa was selected as the alternative testing language, as the majority of the black population in the Western Cape, where UCT is located, are Xhosa.

The survey tested themes surrounding three categories; numeracy, basic financial literacy and advanced financial literacy using questions sourced from existing literature. These questions were translated from English to isiXhosa, resulting in two versions of the survey. Respondents who indicate isiXhosa as their home language were allocated into one of two groups; the control group, who will receive the English survey or the test group which will receive the isiXhosa survey. The results of the two groups were compared to assess the impact of the language of assessment on financial knowledge results.

Based on the results and the analysis performed, this study found that assessing individuals in their primary language did not result in a positive impact on their financial knowledge score. Instead, other factors identified in existing literature such as self-efficacy in financial literacy and educational background had the most significant impact on the financial knowledge scores calculated.

¹ Per the latest transformation statistics for UCT, the student population is comprised of the following demographics (Transformation at UCT: Fact Sheet, 2018): 25% black South Africans, 20% coloured, Indian and Chinese South Africans, 22% white students and 18% of students who identified racially as other. The remaining 15% of the student population consists of international students. 53% of the student population identified as female, and 14 students identified as transgender or other, with the remaining population identifying as male.

² Quintiles are a designation provided by the South African government to various schools across the country to determine how much funding should be allocated to them. One of the factors used to determine quintile levels is the resources available to the schools, which ultimately impact the quality of education provided (Ogbonnaya & Awuah, 2019).

Determining that the language of assessment is not a factor which has an impact on the financial knowledge assessment scores of individuals is an interesting finding. Multiple studies (e.g., Botha, 2013; Lusardi & Mitchell, 2011, 2013; Skagerlund, Lind, Strömbäck, Tinghög & Västfjäll, 2018; Stolper & Walter, 2017; Van Rooij et al., 2011; Worthington, 2006) have suggested that language may be an explanatory variable for the dispersion of financial literacy levels amongst racial groups. In determining that this is not the case, a potential determining factor can be written off, thus placing the emphasis on determining what other factors could be more significant.

In this paper, self-efficacy in financial literacy presents itself as a significant factor in determining the financial literacy of individuals. This indicates that, rather than language being a barrier, confidence plays a bigger role in affecting one's financial literacy. This finding is particularly informative for the policy makers and other parties who aim at reducing the financial literacy gap across different demographic groups. Interventions designed to bridge the financial literacy gap can be targeted at improving individuals' confidence in financial matters and in turn improving financial literacy.

This study contributes to the existing literature on financial literacy by assessing the impact of language on financial literacy. This is a factor identified in existing literature. However, it has yet to be tested and this paper provides a first-mover perspective on the impact of language on the assessment of financial literacy. By finding that the language of assessment is not a factor which impacts the financial literacy results of individuals, researchers are provided with evidence which allows them to rule out a factor which may have otherwise affected policy and decision making. It also provides the opportunity to direct resources to financial literacy interventions which will be more targeted and impactful. In understanding that self-efficacy is a significant factor in explaining the deviation of financial literacy scores across racial and language groups, interventions can be developed to address this.

Literature review:

The economic world is ever-changing and in this new financial world, individuals have an increased responsibility for their own financial security, higher than in the past (Lusardi & Mitchell, 2013; Nanziri & Leibbrandt, 2018; Skagerlund et al., 2018). This means that individuals are now responsible for their own financial decision-making, security and management, which includes retirement planning (Stolper & Walter, 2017). Changes in the retirement and pension spheres have placed greater responsibility for saving, investing and the decumulation of wealth onto the individual (Fatoki & Oni, 2014; Skagerlund et al., 2018). Failure to plan correctly for one's financial future can have dire consequences (Nanziri & Leibbrandt, 2018).

Many of the financial products available in the markets, for individuals to choose from, prove to be complex and difficult to grasp for those who are not financially sophisticated (Bongomin, Ntayi, Munene, & Malinga, 2017; Fatoki & Oni, 2014; Nanziri & Leibbrandt, 2018; Skagerlund et al., 2018). Lusardi and Mitchell (2013) therefore note that being financially literate, being able to make sound financial decisions based on basic knowledge of financial concepts, is an important life skill. This skill is not only important for the sake of the individual, but rather it is also important for the society in which they exist, as financial literacy has a direct impact on financial behaviour and, in turn, on the economy (Brown et al., 2018; Lusardi & Mitchell, 2013; Skagerlund et al., 2018; Willows, 2019a).

This review of literature looks at the literature on financial literacy and why it matters, followed by the factors affecting financial literacy. The literature review then looks at the context in South Africa and financial literacy in South Africa. Lastly, it also looks at the literature on the language used in assessing financial literacy.

Financial literacy

There is no single, universal definition for financial literacy. Rather, there are multiple definitions used in various publications across the globe, some of which are amalgamations of other definitions (Remund, 2010). Willows (2019a) defines financial literacy as the degree to which an individual has acquired the knowledge and skills to make sound financial decisions. Similarly, the definition used by the JumpStart Coalition for Personal Financial Literacy, defines financial literacy as an individual's ability to use knowledge and skills to manage their financial resources effectively, for a lifetime of financial security (Bongomin et al., 2017; Skagerlund et al., 2018). This study uses a combination of the two definitions,

where financial literacy is defined as the degree to which an individual is able to use the knowledge and skills which they have acquired to make decisions regarding their financial resources, to ensure lifetime financial security.

Financial literacy is typically measured using surveys and questionnaires. These questionnaires and surveys may vary between studies. However, they all test (at a minimum) the three major drivers of financial literacy, which are numeracy and knowledge of compounding, knowledge of inflation, and risk diversification (Botha, 2013; Lusardi & Mitchell, 2011, 2013, 2017; Skagerlund et al., 2018; van Rooij et al., 2011; Willows, 2019a). The majority of respondents do not fare well when responding to a set of questions which measure financial literacy, particularly to questions relating to risk and risk diversification (e.g., Lusardi & Mitchell, 2011, 2013; Mudzingiri et al., 2018; Van Rooij et al., 2011).

In response to this, many governments and institutions around the world have initiated financial literacy programmes. However, Skagerlund et al. (2018) and Brown et al. (2018) found that interventions are not always effective, as most financial literacy programmes do not target the underlying factors which are responsible for connecting financial literacy and the desired financial behaviour. In a study on retirement planning, Willows (2020) agreed with these findings by stating that interventions should focus on specific behaviours which are drivers of retirement planning, instead of looking at financial literacy in isolation. Although the reason for the lack of effectiveness of these interventions is unclear, one interpretation is that interventions are not sufficiently targeting the underlying factors which drive the correlation between financial literacy and desired financial behaviour (Lusardi et al., 2014).

Lusardi et al. (2009) also noted that there is likely to be more gained from having financial literacy programmes which target specific groups, rather than generalised interventions. Financial literacy programmes which follow a 'one size fits all' approach for the youth, are less likely to achieve the desired outcomes (Lusardi et al., 2009). This is because there are substantial differences among the youth. This is understandable given that no individual is the same as the next and each has different factors which make up their socio-economic background and demographic profile. Various socio-economic and demographic factors impact financial literacy differently, and therefore a generalist approach to financial literacy will not be able to correct all deficiencies (Lusardi et al., 2009).

A potential reason for financial literacy amongst individuals being low, is that, as with traditional investment decisions, acquiring financial literacy is also an investment decision (Stolper & Walter, 2017). People will only invest in financial literacy if they can expect to receive a return from doing so. This means that the cost of acquiring financial literacy, both financial and other, needs to be lower than the expected benefit of acquiring it (Stolper & Walter, 2017). One benefit of financial literacy is that one can expect increased net returns on financial investments made. However, another benefit could be reduced financial anxiety, as financial literacy is linked with habit formation. Here, rewards and punishment determine the continuity of action and, therefore, an individual can learn and master financial skills if they are positively rewarded (Stolper & Walter, 2017). The low financial literacy rates globally suggest that the cost-benefit is either not worth it for individuals, or that individuals are unaware of the benefits of acquiring sound financial knowledge.

This is reasonable as the benefit of financial literacy is not directly observable. Instead, the benefits generally exist as opportunity costs saved, because financial literacy affects an individual's financial decisions, particularly those regarding savings, borrowings, retirement planning and portfolio choice (Fatoki & Oni, 2014; Lusardi & Mitchell, 2013; Nanziri & Leibbrandt, 2018). The traditional economic approach to saving and consumption suggests that a fully rational and well-informed individual will consume less than their income when their income is high and save the excess to support consumption when income declines, such as in retirement (Fatoki & Oni, 2014). However, this is often not seen. Many individuals do not practise good financial planning, nor do they have retirement plans which are sufficient to maintain their standard of living on retirement (Lusardi & Mitchell, 2011; Willows, 2019b, 2020). Atkinson and Messy (2012) found that financial knowledge and literacy are correlated with positive financial behaviour such as setting long-term financial goals, having a household budget, paying bills timeously and not borrowing to survive. Stolper and Walter (2017), on the contrary, found that financial literacy was not positively related to financial behaviour. Instead, developing and sticking to a retirement plan resulted in better financial behaviour and decisions relating to retirement planning.

The life-cycle hypothesis theory is the backbone of good retirement planning. The theory suggests that individuals will plan their consumption in such a manner that it smooths out over time. Individuals will save their income when they have high income and will conversely borrow in times when they have low income (Browning and Crossley, 2001; Parker et al, 2022; Shefrin and Thaler, 1988). This ensures that in times when income is not

being earned such as retirement, individuals are able to ensure that they plan their income in such a manner that in times where they are no longer able to earn income, they are able to survive off their saved income. Browning and Crossley (2001), state that the life-cycle hypothesis at its most basic level requires an individual to make the best decision they can with the information which is currently available to them. As the hypothesis requires financial planning over a period of time, an individual would need to understand financial principles such as numeracy and time value of money to be able to make the best investment decisions possible (Parker et al, 2022). Parker et al. (2022), found that individuals wealth increased with better investment decision making and this decision making which supports Atkinson and Messy's (2012) findings that financial literacy would result in better financial behaviours.

Financial literacy is important for the individual because there is a cost attached to financial illiteracy, due to suboptimal financial behaviour (Calvet, Campbell & Sodini, 2007). In the United States of America (USA), investors are estimated to have unknowingly sacrificed substantial returns due to expenses, fees and other costs associated with active trading, all in an attempt to outperform markets. The financially illiterate are unlikely to understand fees and are therefore likely to incur these costs unnecessarily (Stolper & Walter, 2017). The financially illiterate may also completely avoid the stock market, which results in welfare losses of approximately four percent of wealth, due to their nonparticipation (Cocco, Gomes & Maenhout, 2005). Calvet et al. (2007) computed the economic cost of holding an under-diversified portfolio, for the median investor in Sweden, to being an annual return loss of up to 2,9 percent or 0,5 percent of disposable household income. However, Calvet et al. (2007) also found that for one in ten investors, the annual cost was significantly higher at 4,5 percent of disposable income. Diversification is one of the key principles surrounding financial literacy, as one of the themes in basic financial literacy assessment (Lusardi et al., 2014; Lusardi & Mitchell, 2011). By improving understanding around diversification, an individual increases their financial literacy while also making more financially sound decisions, thus reducing losses.

In the USA, Campbell (2006) reports that the least financially literate were the least likely to refinance their mortgages, resulting in homeowners paying 0,5–1,0 per cent more in mortgage interest rates, annually. Financial illiteracy can also be linked to credit card behaviour which results in fees and interest charges, paying bills late, exceeding credit limits, using cash advances and only paying the minimum amount due (Stolper & Walter, 2017). It

is also worth noting that those with lower financial knowledge pay (on average) 50 per cent more in fees than the average cardholder (Stolper & Walter, 2017). Those with higher numerical ability, which is linked to higher financial literacy (Christelis, Jappeli & Padula, 2010; Stolper & Walter, 2017) are 20 per cent less likely to likely to default on their subprime mortgages than those who fare in the lowest financial numeracy group (Gerardi, Atlanta & Meier, 2010).

Another way in which one pays for being financially illiterate is through high-cost borrowing choices. The financially illiterate often fail to take advantage of cheaper financing opportunities, rather turning to more costly options (Lusardi & Mitchell, 2013). Lusardi and Mitchell (2013) also note that financial literacy appears to significantly help older households to equip themselves with long-term, focussed risk protection in retirement. Nanziri and Leibbrandt (2018) support the above through their research, where they found that less financially literate individuals are less likely to plan for retirement, less likely to participate in stock markets and more likely to incur more costly debt.

Factors affecting financial literacy

Individual financial literacy has been found to be affected by social capital and individual demographics. These include factors such as the knowledge one is able to absorb and retain relating to money and financial matters, and their understanding of the financial world (Ali, Anderson, Mcrae & Ramsay, 2016). Financial literacy is also affected by multiple socio-economic factors such as race, gender, education, use of language, culture, nationality, household income and age (Bradley, 2021; Brown et al., 2018; Charron-Chénier and Seamster, 2021; Chen, 2013; Lusardi et al., 2009; Lusardi & Mitchell, 2011, 2013; Riitsalu & Pöder, 2016; Webb, 2021; Willows, 2019a, 2020). An Australian study found that certain socio-economic factors which are considered common among groups who could be typically described as disadvantaged, were more common among those with lower financial literacy (Ali et al., 2016).

Age, gender, and income

The age, gender and income level of an individual are some of the most commonly mentioned factors which influence the individual's financial literacy score. These factors are interdependent variables which are accountable for a significant portion of the differences in financial literacy scores (Lusardi et al., 2009; Remund, 2010; Skagerlund et al., 2018; Stolper & Walter, 2017).

Xu and Zia (2012) found that the relationship between financial literacy and age follows an inverted U-shape. Stolper and Walter (2017) referred to this as “a hump-shaped distribution”. The curve shows that financial literacy improves with age, until about 65 years of age. Here the curve tapers down and there appears to be a decline in financial knowledge (Xu & Zia, 2012). Atkinson and Messy (2012) and Stolper and Walter (2017) attribute the decline in financial knowledge and ultimately financial literacy in those above the age of 65 years to cognitive deterioration. Cognitive deterioration and a decrease in semantic memory associated with aging, reduces the extent to which older individuals can retain and apply financial knowledge (Atkinson & Messy, 2012; Stolper & Walter, 2017). Van Rooij et al. (2012) suggests that the positive trend between age and financial literacy may initially be a result of increased market participation as one ages.

Lusardi et al. (2009) found that young people have very little financial knowledge. This makes young people more susceptible to making financial mistakes and therefore increases the need for financial literacy programmes for youth (Lusardi et al., 2009). A similar finding by Remund (2010) states that managing money is a particularly difficult task for young people and those which are considered to be at an economic disadvantage. Low literacy levels among the youth is a matter for concern as consumers are being faced with complicated financial decisions at a young age (Bottazzi and Lusardi, 2021; Lusardi et al., 2009). This is potentially problematic because the decisions made by youth will influence their financial well-being well into the future, potentially impacting their ability to create and accumulate wealth (Fatoki & Oni, 2014; Stolper & Walter, 2017; Browning and Crossley, 2001; Parker et al, 2022; Shefrin and Thaler, 1988).

Although it is generalised that young people lack financial literacy, Lusardi et al. (2009) cautions that young people should not be seen as one homogeneous group of consumers. This is pragmatic when considering that financial literacy is affected by multiple factors.

Studies have shown that women, elderly people and low-income groups tend to have low levels of financial literacy (Skagerlund et al., 2018). In the USA, more men, at 38,3 per cent, are able to correctly answer basic financial literacy questions, while only 22,5 per cent of women could correctly answer the same questions. Women are more likely to choose the “do not know” option when answering the questions (Lusardi & Mitchell, 2013). Choosing the “do not know” option is a sign of being less confident, and having lower self-efficacy in one’s financial capabilities (Stolper & Walter, 2017). Men are generally over-confident in

their financial knowledge, while women tend to be under-confident (Stolper & Walter, 2017). Bannier and Neubert (2016) noted a negative association between female under-confidence and financial planning outcomes, which is significant when observing highly educated women. One positive aspect of women being less confident financially, is that they are more aware of their lack of knowledge, and this makes them ideal candidates for financial education programmes (Lusardi & Mitchell, 2013).

Higher household income has been associated with higher financial confidence and more correct answers in financial literacy questionnaires, compared to those who have lower household incomes (Lusardi et al., 2014). This is supported by Stolper and Walter's (2017) findings, where 76 per cent of individuals in the highest income bracket manage to answer all three of the basic financial literacy questions correctly, while only 50 per cent of those in the lowest income bracket achieved the same results. Similar results can be observed when classifying individuals in wealth quintiles. Results found that 73 per cent of individuals in the highest wealth quintile got all of the questions correct, while only 51 per cent of the lowest quintile got the same questions correct (Stolper & Walter, 2017).

Race and culture

Racial differences are observed in financial literacy studies across the world. In the USA African American and Hispanic respondents show lower levels of financial confidence and financial literacy, when compared to their white counterparts (Bradley, 2021; Charron-Chénier and Seamster, 2021; Lusardi et al., 2009, 2014; Webb, 2021). In South Africa, white respondents are noted as having answered the highest number of questions correctly when compared to the other racial groups (Willows, 2019b). Culture may be an explanatory variable for the differences in financial literacy across different racial groups. Financial knowledge and decision making can be affected by differences in financial socialisation and attitudes towards money, showing that culture may be a psychological factor affecting financial literacy (Bottazzi and Lusardi, 2021; Yamauchi & Templer, 1982).

A study along the German–French language border of Switzerland found that there were significant differences in the financial literacy of the students on each side of the border. Students from the French-speaking region underperformed compared to those in the German-speaking region (Brown et al., 2018). The difference in the performance of students is a result of culture. Brown et al. (2018) also found that financial literacy, regardless of the language group, was better for individuals who were either native language speakers or monolingual.

This supports the finding of Ali et al (2016) that immigrant and bilingual students generally display lower financial literacy results.

Culture has an impact on financial knowledge and decision making because of differences in financial socialisation and attitudes towards money which are imbedded in the culture (Brown et al., 2018). A related study found that German-speaking households had a higher propensity to save when compared to families on the French-speaking side of the language border (Guin, 2017). These results show that the Germans have a higher saving culture and thus, higher financial literacy levels. This is because millions of German households have become market participants following the change in trends towards consumer autonomy (Stolper & Walter, 2017). Stolper and Walter (2017) found that financial literacy levels in Germany are among the highest in the world.

People in higher income countries, on average, also perform better on financial literacy tests than those which come from lower income countries (Xu & Zia, 2012). The countries with the most financially knowledgeable and financially literate population are Australia, Canada, Denmark, Finland, Germany, Israel, the Netherlands, Norway, Sweden and the United Kingdom (Stolper & Walter, 2017). This supports the findings above, which state that household income has a positive impact on financial confidence and in turn their financial literacy.

In a study, in Estonia, comparing the financial literacy of students in Russian schools versus those in Estonian schools, showed that Russians living in Estonia have significantly lower financial literacy scores (Riitsalu & Põder, 2016). One of the key drivers for this difference is the difference in language between these schools. Estonia has two main language groups, Russian and Estonian. Both study the same curriculum under the same education policies and regulatory frameworks. A third of Estonia is Russian speaking, but almost all of these students were born in Estonia. This means that other than language and cultural differences, students from both language groups have been living in the same society and have access to the same financial services and sources of financial education (Riitsalu & Põder, 2016). Students in Russian-language schools score on average 42 points less than students in Estonian-language schools, when assessing financial literacy. Riitsalu and Põder (2016) speculate that the unexplained variances between the schools could potentially be attributable to discriminations against the minority language or a difference in teaching methods in the

Russian language schools, as well as language and cultural differences between the two groups which may drive financial socialisation.

Chen (2013) ran a linguistics study hypothesising that framing speech about future events in particular ways will affect the likelihood of the speaker taking these future-oriented actions. This study found that certain languages equate the past and present, while others distinctly separate the present and future. Participants who are speakers of languages which distinguish the present and the future tend to separate the present from the future. This makes it harder for them to save, as the future seems further away (Chen, 2013). Participants who are speakers of languages which equate the present and future, were more likely to save. This is because the future appears to be closer. As it is not distinguishable from the present in speech, rewards seem closer for the participants (Chen, 2013). The framing of Russian versus Estonian language speakers' financial literacy could therefore be driven by their respective languages.

Education

Along with an individual's socio-economic characteristics, such as age, gender and income level, an individual's education level will affect their financial literacy score. Skagerlund et al. (2018) found that mathematical and reading skills are important for the understanding of complex financial systems. Mathematical skills enable the calculation of costs and earnings, and critical reading skills help individuals find relevant information while minimising information overload when presented with multiple financial choices (Skagerlund et al., 2018). Other higher order competencies, along with mathematics and reading skills, such as an understanding of basic economic concepts, are necessary to become financially literate (Lusardi & Mitchell, 2011; Willows, 2019a). Mathematical skills are required for numeracy and calculating compounding, while reading and economic understanding are required to understand inflation and risk diversification.

The level of education which an individual has achieved is positively correlated with providing correct answers and financial confidence, and negatively correlated with the proportion of "don't know" responses (Lusardi & Mitchell, 2011). Stolper and Walter (2017) observed consistent findings, showing that formal education is positively correlated with financial literacy. Those without tertiary education are significantly less likely to understand advanced financial concepts, and therefore show lower financial literacy scores (Agnew & Szykman, 2005; Lusardi & Mitchell, 2011; Willows, 2019a). This is probably because

numeracy has been found to be lacking among those with low educational accomplishment (Christelis et al., 2010).

Erner, Goedde-Menke, and Oberste (2016) found that basic financial literacy is related to mathematical skills. However, advanced financial literacy is reliant on a student's cognitive aptitude and foreign language skills. The study in Germany found that first-generation migrant children were three times more likely to be low achievers in mathematics than non-migrant children. (Erner et al., 2016). This difference is attributed partly to language difficulties (Lusardi et al., 2014). When looking at advanced financial literacy, mathematical ability became a weak indicator, and instead the student grade in the first foreign language became a more significant indicator (Lusardi et al., 2014). This makes sense as financial literacy has a positive relationship with education and education is reliant on an individual's ability to understand and retain information, which is driven by understanding of language.

The Context in South Africa

South Africa is characterised as having low levels of financial literacy. This is not unexpected as South African consumers generally have limited resources and skills for understanding complexities of the financial sector (Roberts, Struwig & Gordon, 2014). Although South Africa has low levels of financial literacy this is not evenly distributed among different demographic groups. Education, gender and race are among the significant variables driving the differences in financial literacy in South Africa (Willows, 2019b). It is thus important to have an understanding of the South African context before analysing financial literacy in South Africa.

South Africa is a country with a rich history. In the post-colonialism years up to 1994, South Africa operated under the apartheid regime government. Under this system of government South Africans were segregated according to race; economic and other resources were distributed according to a racial hierarchical system (Moses, van der Berg & Rich, 2017). This left many groups in South Africa under-resourced and subject to various degrees of poverty (David, Guilbert, Hamaguchi, Higashi, Hino, Leibbrandt, & Shifa, 2018; Moses et al., 2017). Under the apartheid regime people were classified into four major race categories namely Black, Coloured, Indian/Asian and White (Leibbrandt, Finn & Woolard, 2012) and "Other". Black represents those who are of African descent, most commonly the Khoi-San, Nguni and Sotho tribes (Murphy, 1998) but also includes other people of African descent who were not native to South Africa. 'Coloured' generally refers to those who are of mixed white

and Black descent. This term also loosely includes those who are descendants of the Malays and native Africans brought to South Africa as slaves, during the colonial era (Murphy, 1998). Indians and other Asians are descendants of people who from India or other parts of Asia. White typically refers to those of European descent (Murphy, 1998) Although the laws of racial categories were abolished in 1994, most South Africans still view themselves according to these classifications (Kollamparambil, 2020; Murphy, 1998). Therefore, these terms are used here when referring to the different racial groups in this study.

During the apartheid era, Black people were at the greatest disadvantage both socially and economically, followed by coloured people, while white people had the greatest advantages (Moses et al., 2017). This created a system of inequality between races. Some of the ways in which this manifested itself were through education, housing and income (Kollamparambil, 2020; Leibbrandt et al., 2012; McKeever, 2017; Moses et al., 2017), the effects of which are still seen today. South Africa is one of the most unequal countries in the world, having the highest Gini coefficient (McKeever, 2017) at 62.0 in 2018 (Rica, 2021). This indicates a small percentage of the population holding most of the income in the country (Kollamparambil, 2020; Leibbrandt et al., 2012). During and after apartheid, income inequality has been significant across the racial groups in South Africa. White citizens earn the most income, and Black citizens the least. The latter were, and still are, at the bottom of the income earning distribution (Leibbrandt et al., 2012). The inequalities in the education system also continue to affect the population, over 20 years after the introduction of democracy (McKeever, 2017). Whites consistently show higher average levels of education, followed by Asians, Coloureds and then Blacks (Anderson, Case & Lam, 2001). To address the educational inequalities of the past, the government created a quintile ranking system, which is used to allocate funding to schools across the country (Ogbonnaya & Awuah, 2019). Ogbonnaya and Awuah (2019) find that school quintile levels are associated with learners' achievements in probability, which is an aspect of numeracy. The study found that students in quintile four and above had the highest performance, while the bottom three quintile students had lower achievements. This variation in numeracy skills can be expected to translate into variances in the financial literacy of the individuals in different quintile schools, given the relationship between numeracy and financial literacy.

More than 20 years after the complete dismantling of apartheid, South Africa's socio-economic landscape is still notably segregated by racial, geographical and gender lines (Moses et al., 2017). Although the inter-racial component, which drives inequality in South

Africa, may be decreasing, it is still one of the highest levels globally, which is a reminder that although apartheid has been abolished, it still has a strong influence on how the country is shaped today (Kollamparambil, 2020). The system of laws still affects economic inequality because it shaped the early achievements of a large portion of the current population, including their education (McKeever, 2017).

Financial literacy in SA

The average financial literacy score out of 100 for South Africa is 48,4 however, there is a lot of variation in the figure among individuals (Nanziri & Leibbrandt, 2018). The results follow a normal distribution with the majority of South Africans having a score around the national mean. However, it is also observable that few individuals are financially literate (Nanziri & Leibbrandt, 2018). From the South African population, women, non-Whites, the less educated and rural dwellers are at a financial literacy disadvantage, suggesting the need for financial education (Nanziri & Leibbrandt, 2018; Willows, 2019a). South Africans are confronted with high levels of consumer debt, low savings rates, high product service and related penalty fees, a shortage of available and comparable pricing information, and limited information on how to overcome and manage these challenges (Roberts et al., 2013), a symptom of the low financial literacy levels.

Fatoki and Oni (2014) note that gender is not a significant determinant for financial literacy in South Africa. However, Mudzingiri et al. (2018) show that there is a difference between male and female students' financial literacy. This is because females have lower confidence which affects their financial literacy, when compared to males confidence levels and risk preferences (Mudzingiri et al., 2018). Nanziri and Leibbrandt (2018) and Willows (2019a) find similar results stating that men have higher average financial literacy scores than females.

The country's youth exhibits lower financial literacy levels, on average, than participants of other age groups (Roberts et al., 2014). High school learners have low levels of financial literacy and different schools and population groups show significant variances in financial literacy results (Fatoki & Oni, 2014). University students also tend to have low financial literacy, yet they manage to be overconfident in their financial knowledge, more risk-loving and more impatient (Mudzingiri et al., 2018). The young are noted to generally have low financial literacy and the same can be said about those over the age of 65 (Willows, 2019a). The inverted U-Shape relating to the relationship between age and financial literacy is also

observed in South Africa. This is a result of a slow but steady increase in financial literacy as one ages, which begins to taper off around the age of 59 (Nanziri & Leibbrandt, 2018) and decline at around age 65 (Willows, 2019a).

Looking at factors which determine the financial behaviour of university students, Mudzingiri et al. (2018) find that income, residing in an urban area and being a financial decision maker significantly influences personal financial behaviour. A possible reason is that individuals with higher income can afford the cost of acquiring financial literacy and therefore actively look for opportunities to improve their financial knowledge, so they can better manage their wealth (Nanziri & Leibbrandt, 2018). The employed and pensioners tend to have financial literacy scores which are above average, while students and the unemployed have the lowest scores across the country (Nanziri & Leibbrandt, 2018). Income levels and education are positively correlated with higher financial literacy scores (Nanziri & Leibbrandt, 2018).

Those who lived in urban areas scored above average and higher than their counterparts residing in rural areas (Nanziri & Leibbrandt, 2018; Roberts et al., 2014). Roberts et al. (2014) state that this finding is not particularly surprising because the country's rural areas are often isolated from financial institutions. This could be a sign of financial exclusion of rural citizens. Financial exclusion refers to the inability for some societal groups to access the formal financial system, including appropriate, low-cost, fair, and safe financial products from regulated mainstream providers (Willows, 2019a).

Education is positively correlated with financial literacy (Remund, 2010). Findings show that those with lower levels of education will have lower financial literacy than those with higher levels of education (Willows, 2019a). Having a tertiary education has a positive effect on financial literacy (Remund, 2010; Willows, 2019b). This is supported by Nanziri and Leibbrandt's (2018) finding that individuals with lower qualifications scored lower on average financial literacy.

When performing financial literacy studies in South Africa, non-White racial groups generally produce lower financial literacy scores, when compared to their White counterparts (Remund, 2010). White South Africans were found to be significantly different from their non-White counterparts. This suggests that race could be a proxy for culture, which we previously determined affects financial literacy, or this may be a symptom of the racial prejudice in the education systems which may still prevail today (Roberts et al., 2014). Of the five racial groups, Black people responded with the lowest financial literacy scores (Remund,

2010; Willows, 2019b). These results are not unexpected given the relationship between financial literacy and education, and the educational disparities across races.

Retirement planning is considered a financial decision, informed by an individuals' financial literacy (Lusardi & Mitchell, 2013). In a study on retirement savings, Black people were least likely to have sufficient retirement savings (Willows, 2019b). Willows (2019b) also found that societal and cultural norms of Black people tend to promote high spending levels and high financial dependency relationships. This means that black people are unable to make the right decisions which would set them up to smooth their spending over time which will help them achieve financial security when they no longer make an income, as the life-cycle theory suggests a rational future planning person would do (Browning and Crossley, 2001; Parker et al, 2022; Shefrin and Thaler, 1988). This is a symptom of financial illiteracy which is worsened by financial exclusion.

When examining the determining factors of financial exclusion, Willows (2019a) finds that language is possibly one of the significant factors which affect this. This is a possible explanation for why Black South Africans, who mostly make up the rural areas, are financially excluded. South Africa has eleven official languages, and many other dialects (Brenzinger, 2017). The Black population of South Africa generally belong to either North-Sotho, South-Sotho, Swazi, Tsonga, Tswana, Venda, Xhosa or Zulu language groups (Brenzinger, 2017). For many Black South Africans, English is their second or third language (Spaull, 2015). This could also be a possible explanation of the low financial literacy scores which Black people display, given the potential relationship between language and financial literacy. Financial literacy studies in South Africa have all been done in English (e.g., Botha, 2013; Mudzingiri et al., 2018; Nanziri & Leibbrandt, 2018; Remund, 2010; Willows, 2019a, 2019b, 2020). This could prejudice Black participants because they may not be fluent in English. The way in which questions are worded has previously been noted to affect the answers provided by participants. This may become more significant for non-native English speakers.

Language and financial literacy

There have been no studies which explicitly evaluate the effect of language as an independent variable in financial literacy. However, a number of studies have found that language is statistically significant when determining factors affecting financial knowledge (Botha, 2013; Lusardi & Mitchell, 2011, 2013; Skagerlund et al., 2018; Stolper & Walter, 2017; Van Rooij

et al., 2011; Worthington, 2006). Language abilities impact educational progress, including literacy, which directly impacts financial literacy. Tasks such as processing financial literature, conducting purchases, filling in forms, and communicating with financial bodies all rely heavily on numeracy and reading skills (Winstanley, Durkin, Webb & Conti-Ramsden, 2018).

Lusardi and Mitchell (2011) and Van Rooij et al. (2011) have found that the use of English and the way in which questions on financial literacy are worded, significantly impact the answers given by survey participants. Botha (2013) observed similar findings, noting that financial literacy may therefore be measured with error depending on the way questions are phrased. Botha (2013) conducted a study in English, determining the financial literacy of students in a South African university. All participants were considered to be proficient in English, however the results showed that those who had languages other than English as a home language performed worse than those who identified English as their home language. This is a possible indication that language may be a barrier for financial literacy (Botha, 2013).

Policy makers around the world believe that financial education can diminish the effects of poor decision making due to a lack of financial knowledge, both in the short term and long term (Lusardi et al., 2014). Lusardi et al. (2014) also found that students who took a course on money management or personal finance, were more financially literate than those who did not take such courses. This effect may last for a significant time period. Lusardi et al. (2014) found that middle aged people who had taken a financial management course in high school were likely to save a higher proportion of their income compared to their peers who did not take a financial management course.

Although it has been previously noted that most financial literacy programmes do not achieve their objectives (Skagerlund et al., 2018), evidence suggests that when financial literacy classes are interactive, relevant and fun, they will be more effective than those which are generalised. This is because students do better when they are motivated and understand why financial literacy matters for their futures (Lusardi et al., 2014). Skagerlund et al. (2018) found that visual tools are useful in increasing an individual's confidence in financial knowledge, they are also useful in educating individuals on complex concepts and improving self-efficacy which all improve financial literacy and behaviour.

We need to interrogate why Black South Africans consistently underperform their counterparts in financial literacy assessments, even after financial literacy interventions. Several studies have looked at factors such as the effects of race, culture, age, and socio-economic status on financial literacy. And while some have touched on how language is a factor in determining financial literacy, none explore how the choice and use of language in financial literacy programmes and financial literacy measurement affects results. The literature reviewed showed that mathematical ability and literacy are key factors for developing financial literacy, and that both of these factors are driven by language. Therefore, we can conclude that financial literacy is dependent on the individual's ability to understand language. Most financial literacy interventions and assessments are done in English and English is often a second or third language for Black South Africans. This means that Black South Africans are likely to be financially illiterate as they are unable to understand most financial information provided to them. Although none of the studies referenced explored the extent to which language affects financial literacy, they all indicate that further research is required on this topic. Because language is such an integral part of education and financial knowledge and decision making, it is important that we understand the extent to which it affects financial literacy. It is for this reason that this study aims to look at the impact which language has on financial literacy, and whether providing financial interventions in one's native language would improve their financial literacy scores.

Methodology

It is seen in the literature reviewed, there is a general trend of non-white participants to consistently underperform in financial literacy assessments, in comparison to their White counterparts (Brown et al., 2018; Lusardi et al., 2009, 2014; Stolper & Walter, 2017; Willows, 2019a). This finding holds true across multiple countries, including the USA and South Africa. In South Africa, the literature has found that Black people have the lowest financial literacy levels of all racial groups (e.g., Brown et al., 2018; Stolper & Walter, 2017; Willows, 2019a). Across the various literature, different factors have been suggested as the reason behind the distribution of financial literacy levels, most of which have been studied and statistical significance found (Botha, 2013; Lusardi & Mitchell, 2011, 2013; Skagerlund et al., 2018; Stolper & Walter, 2017; Van Rooij et al., 2011). One of the factors suggested as an explanatory variable for the distribution of financial literacy results has been language. However there have been no studies which have assessed the extent of the impact of the language of assessment on the financial literacy results.

Financial literacy is typically assessed and measured using surveys which test a range of topics such as numeracy, financial anxiety, financial literacy, financial behaviour and self-efficacy (Botha, 2013; Lusardi & Mitchell, 2011, 2013, 2017; Skagerlund et al., 2018; Van Rooij et al., 2011; Willows, 2019a). The composition of topics varies across studies, dependent on the hypothesis and expected outcomes of the research. Regardless of the composition of the surveys, the assessments are generally conducted in English (e.g., Botha, 2013; Lusardi & Mitchell, 2017; Mudzingiri et al., 2018; Nanziri & Leibbrandt, 2018; Remund, 2010), independent of the primary languages of the participants.

Research objective:

The purpose of this study is to assess the impact of language on the assessment of financial literacy as a potential explanatory factor in the differences observed in the financial literacy levels across various racial groups. The study aims to determine whether assessing an individual in their primary language, rather than English, will positively impact their financial literacy scores.

The research question this study aims to answer is:

Is the language used in the assessment of financial literacy a statistically significant factor in explaining the dispersion of financial literacy results across different groups?

To answer the research question the following is hypothesised:

H₀ = An individual's financial literacy score is not improved by receiving a financial knowledge assessment in their primary language.

H₁ = An individual's financial literacy score is improved by receiving a financial knowledge assessment in their primary language.

To answer this question, an exploratory study is undertaken where, a survey assessing financial literacy was disseminated to a sample of students from the University of Cape Town. The survey was available in English and isiXhosa, and participants answered the questions in one of the languages based on the groups they were placed in as detailed in “the survey process.

Developing the survey

A survey was developed to assess financial literacy and other factors which have been noted to impact financial literacy, such as self-efficacy. To develop the survey, questions were sourced from prior research papers, specifically from Lusardi and Mitchell (2011, 2017), Lusardi et al. (2014), Mudzingiri et al. (2018), Skagerlund et al (2017), Van Rooij et al. (2011) and Willows (2019a, 2019b). These questions collectively assess numeracy, financial knowledge, and self-confidence in matters relating to financial literacy. As these questions are sourced from existing literature and have been assessed for reliability in the respective studies, the reliability of these questions for the purposes of this study is explored in the Descriptive statistics section of this paper. Respondents were also asked to assess their own perceived financial literacy, which was used to contrast with their actual financial literacy score determined by the assessment. While the survey questions have been sourced from various sources of literature, some adaptations were made to the wording of questions to ensure that the terminology used is in line with the financial terminology typically used in South Africa. An example of this would be replacing “mutual funds”, which is an American term, to “unit trusts” which is the terminology typically used in South Africa. See Appendix A for the survey and relevant adaptations.

The survey is split into four separate blocks which individually collect different data and information from respondents. The first block of questions consists of up to 11 questions which collect the respondents' personal and demographic information. The second block consists of four questions which are designed to measure an individual's numeracy skills. The third block consists of 17 questions which assess basic and advanced financial literacy concepts. The fourth and final block consists of eight statements, with a five-point Likert

scale, which has been used to measure the individuals' self-assessment of their financial literacy, representing their self-efficacy in financial literacy.

Once the survey was developed, a statistician was consulted to ensure that the order and format of the survey was appropriate for the statistical testing that would be required to answer the research question. Amendments were made to the survey to ensure it was suitable for the testing required, while also ensuring that it is possible to translate the survey.

Ethical Clearance:

Given the nature of the study requiring human participants as respondents to the survey, ethical clearance was required. Upon the finalisation of the questionnaire to be used in the survey, an application was made to the UCT Commerce Ethics in Research Committee (Commerce EiRC). The application detailed the purpose of the research, the target population and the incentives offered to students for their participation. The application was approved by both the Commerce EiRC and the UCT Department of Student Affairs, as the target population was UCT students.

Determining the sample population

The population consisted of undergraduate students in the University of Cape Town (UCT). The sample was limited to undergraduate students to partially control for age and education, which literature has identified to be strong indicators of financial literacy (Lusardi & Mitchell, 2011; Skagerlund et al., 2018; Stolper & Walter, 2017; Willows, 2019a; Xu & Zia, 2012). The sample can reasonably be expected to consist of respondents predominantly between the ages of 18 and 25, who would all have obtained at least a grade 12 (high school) qualification, thereby reducing the impact of age and education level on the financial literacy results.

Online surveys are characterised by low response rates (Saleh & Bista, 2017) and this issue is exacerbated in cases where there is little person-to-person contact between the researchers and the participants (Willott, 2019). Research suggests that incentives may be useful to increase the participation of individuals in online surveys (Göritz, 2006; Saleh & Bista, 2017; Sánchez-Fernández, Muñoz-Leiva, Montoro-Ríos, & Ibáñez-Zapata, 2010), but the effectiveness of the incentives is dependent on the target population (Porter & Whitcomb, 2004). The participation of university students in online surveys and questionnaires is highly sensitive to whether a prize or incentive is being offered for their participation, with prizes

increasing the likelihood of students participating (Porter & Whitcomb, 2004). For this reason, an incentive was offered to students to encourage their participation in the survey. All participants who completed the survey would have the option to enter their email address into a lucky draw to win one of four vouchers to spend at Takealot.com, worth R500 each. While prizes are effective for attracting larger numbers of individuals to participate in surveys, it has to be noted that there are some drawbacks. Some notable drawbacks are that incentives attract very specific types of individuals, which can result in a biased sample (Göriz, 2006). Incentives may potentially cause multiple responses from the same individuals, and they may also cause rapid responses where individuals do not pay sufficient attention to the questions to complete the questions as quickly as possible (Göriz, 2006). However, several authors have found that the positive effects of incentives outweigh the negative effects and have a positive impact on response rates (Sánchez-Fernández et al., 2010).

Language choice

Financial knowledge and decision making can be affected by differences in financial socialisation and attitudes towards money, which vary across cultures, indicating that culture may be a psychological factor which affects financial literacy (Bottazzi and Lusardi, 2021; Yamauchi & Templer, 1982). South Africa has 11 official languages (Brenzinger, 2017). As each of the language groups in South Africa are culturally different (Brenzinger, 2017), it is important to control for cultural differences. To do this, only one language group which represents one cultural group was selected. As the study was being performed in Cape Town, isiXhosa was chosen as it is the language predominantly spoken amongst the Black residents of Cape Town (Clark, Cotton & Marteleto, 2015). While there may be differences across the various language groups and cultures, which may affect financial literacy in general, using one language still allows the study to make meaningful observations of the impact which the language of assessment has on the measurement of financial literacy for non-native English speakers, which can be applied to other language groups. The questions in the surveys will therefore be translated into isiXhosa. This will be the biggest differentiator for this study in comparison to the literature available. While a relationship exists between language and race, it is important to understand that there is a distinction between the two. While it can be assumed that amaXhosa respondents are Black, it cannot be assumed that all English respondents will be white. This distinction is important as while generalisations can be made about Black people based on the results of the amaXhosa respondents, generalisations cannot

be made about White people using the responses of the respondents who selected English as their primary language.

Translating the survey and pilot study

Prior to the translation of the survey questionnaire from English to isiXhosa, a pilot study was conducted using a small test group of five second and third year students, consisting of three Black participants and two White participants. The pilot study particularly focussed on assessing the flow, structure, adequacy and appropriateness of the survey questions as a tool for answering the research question. Participants were asked to provide feedback on their experience with the survey and the feedback provided was used to make minor changes to the survey, such as the flow of questions and wording. Upon finalisation and ethical approval of the survey questions, the survey questions were translated from English to isiXhosa by Mr Francis Kwahene CA(SA), the acting Dean of Commerce and Administration at Walter Sisulu University. He has prior experience in translating academic work for research and teaching purposes. As the study is only looking at the impact of language on the assessment of financial knowledge, only the numeracy and financial literacy blocks were translated. The demographic and self-efficacy blocks were not translated. A second pilot study was performed once the survey had been translated from English to isiXhosa. Here, three Xhosa participants were asked to assess the accuracy of the translations and the flow of information in isiXhosa, by translating the isiXhosa translation of the English survey back into English.

Prior to the finalisation of the survey, a discussion was held with Associate Professor Jacqui Kew, the head of the College of Accounting at UCT, regarding the College's experience with language and learning through the Learn Accounting initiative. Learn Accounting is an online free access library, which hosts short concept videos relating to the accounting discipline, in five of the 11 official languages (*Get Started with Learn Accounting*, 2021). Based on her experience, Jacqui Kew noted (personal communication, 22 July, 2021) that while students may have a primary language which is not English, having access to information in both English and their primary language is most beneficial for their understanding. She therefore suggested that the isiXhosa version of the survey also include the English translation of the questions. This presents a case where amaXhosa participants receive the survey in English, as would typically be done, and the addition of the isiXhosa questions serves as a translator, where an individual is provided the opportunity to understand the questions in their primary language.

The survey and data collection process

The survey was disseminated in a soft copy format online with Qualtrics. Qualtrics is a reliable, user friendly and robust online survey platform which has been designed for the collection of large amounts of data and to provide users with multiple tools for analysing such data (TrustRadius Research Team, 2020). The survey questions were uploaded onto Qualtrics in their respective blocks. The “survey flow” tool was used to determine which version of the survey participants would receive, based on their prior responses. Upon answering the first block of questions, which collect individuals’ demographic information, participants were divided into one of two categories. The two categories are those who completed the survey in English and those who completed the isiXhosa version. Respondents who indicated their primary language to be English or Other automatically received the survey in English. Participants who selected isiXhosa as their primary language were evenly and randomly split into two groups, those who received the English survey only (the control group) or the isiXhosa version(the test group).

For the data collection process, a short video³ was recorded which explained the purpose of the research and a brief outline of the survey. This video was accompanied by an invitation to the study where the link to the survey on Qualtrics was provided. The invitation included a link to the video and students received the invitation to complete the survey either through their academic course or via the Department of Student Affairs research mailing list. The invitation also detailed the incentive of participating in the survey as the opportunity to win a prize. Before commencing with the survey, students were required to read a consent form and accept the information provided by providing their EMPLD ID number⁴. The consent form obtains consent from respondents to access their high school marks from the UCT records and informs the participants that their information will be kept confidential and no information which can be linked to them will be disclosed in the research. The first invitation was sent out on 28 October, 2021, which was the first day of the data collection and a single reminder was sent a week after they received their first invitation. The survey was active and collected responses until 18 November, 2021.

Based on the respondent’s primary language and survey language, the respondents can be split into four distinct groups for analysis as detailed in Table 1.

³ Link to video: <https://youtu.be/FO83BvLN3T8>

⁴ An EMPL ID is a unique 7-digit number which is provided to each student which is registered at UCT, used to identify students anonymously.

Table 1: Analysis Group of Respondents

Group	Primary Language	Survey Language Version	Included in Analysis
Group 1 Reference Group	English	English	Yes
Group 2 Control Group	isiXhosa	English	Yes
Group 3 Test Group	isiXhosa	isiXhosa	Yes
Group 4	Other	English	No

The reference group (Group 1) comprises all respondents who indicated English as their primary language, regardless of their race. The control group (Group 2) comprises respondents who indicated isiXhosa as their primary language and completed the survey in English, while the test group (Group 3) are respondents who indicated isiXhosa as their primary language and received the isiXhosa survey. Group 4 comprises all respondents who selected Other as their primary language, indicating that neither English nor isiXhosa are their primary language, this group will not be included for the purposes of analysis.

Prior research has compared the reference group and respondents who would fall into the control group in determining financial literacy scores and have found that these respondents have lower financial literacy than their counterparts. The inclusion of the test group allows this study to compare the financial literacy score of the test group and the control group to determine whether Black respondents perform better when the financial literacy questions are in their primary language. The reference group can also be compared to the test group to shed light on other differences in measured financial literacy. In the understanding of the impact of the language used in the assessment of financial literacy it is important to note that the test group and reference group represent those who are assessed in their primary language while the control group provides insights on being assessed in a language different to one's primary language.

Analysis of data

Data cleaning

After the dissemination of the survey, 472 total responses were received, which varied in completeness and the characteristics of the respondents. A large number of respondents indicated that their primary language was Other i.e. neither English nor isiXhosa. Thus, these

respondents were removed from the data set as they were not relevant to this study and answering the research question. Further adjustments were made for the age of respondents. All responses from individuals below the age of 18 years were removed as the ethical clearance obtained specifically prohibited the use of responses from individuals younger than 18 years in the analysis⁵. Those whose age exceeded 25 years were also removed from the data set, as the literature has shown that age is a significant determinant of financial literacy and keeping these respondents in the data set could result in outliers who may skew the findings of the study (Lusardi et al., 2009; Remund, 2010). Finally, some respondents did not complete the second block which contained the financial literacy questions. As no meaningful analysis could be made from these responses, they were removed. This data cleaning resulted in a net workable sample size of 240 respondents.

Descriptive statistics

Table 2 details the demographic and identifying information of the sample which has been used in the analysis. The first block of the survey collected respondents' demographic information including their age, gender and race, as these are factors which the literature has identified as influencing financial literacy scores of individuals (Lusardi et al., 2009; Lusardi & Mitchell, 2013; Remund, 2010; Skagerlund et al., 2018; Stolper & Walter, 2017). Respondents were also asked to provide information on their educational background, which was used to determine the quintile level⁶ of their high school and whether or not they took a commerce related subject, either accounting, business studies or economics. This is of interest as Lusardi et al. (2014) found those who took a course related to financial matters in high school tended to have higher financial literacy levels. The quintile level of an individual's high school is of interest as it impacts the individual's numeracy abilities, which directly impacts financial literacy (Ogbonnaya & Awuah, 2019).

⁵ As individuals under the age of 18 are considered minors, parental consent would be required to include their responses in the analysis.

⁶ As stated by Ogbonnaya and Awuah (2019), schools are divided into quintiles

1 **Table 2: Descriptive statistics of survey sample (n=240)**

Age	18	19	20	21-25			
	48	103	39	50			
	20,00%	42,92%	16,25%	20,83%			
	Minimum	Mean	Median	Maximum			
	18	19,58	21,5	25			
Gender	Male	Female	Non-binary				
	110	129	1				
	45,83%	53,75%	0,42%				
Race	Asian	Black	Coloured	Indian	White	Other	Prefer not to answer
	3	90	43	30	68	2	4
	1,25%	37,50%	17,92%	12,50%	28,33%	0,83%	1,67%
Primary language	English	isiXhosa					
	185	55					
	77,08%	22,92%					
Education quintile	Q1	Q2	Q3	Q4	Q5	Unknown	
	4	9	23	10	106	88	
	1,67%	3,75%	9,58%	4,17%	44,17%	36,67%	
	Minimum	Mean	Median	Maximum			
	Q1	Q4,35	Q5	Q5			
Took at least one commerce subject in high school	Yes	No					
	177	63					
	73,75%	26,25%					

The sample population consisted of 240 respondents, between the ages of 18 and 25 with an average age of 19.58 years. The sample is evenly split between male and female respondents, with 53,75 per cent of respondents being female. Looking at the racial distribution of the sample, the largest racial group was Black people followed by Whites then Coloureds. While the largest racial group was Black people, nearly 40 per cent of the racial group indicated English as their primary language. While it is typically expected that Black people will have a primary language which is not English, a significant proportion (23,9 per cent) of the Black population recognises English as their primary language (Brenzinger, 2017). The majority of respondents come from schools which fall within Quintile 5, which is associated with higher numeracy levels, which will translate to higher financial literacy scores⁷. It is also observed that 74 per cent of the sample had taken a commerce related subject in high school. Therefore, it is expected that the financial literacy levels of the sample population will exceed those of the general population and the findings of other studies (Lusardi et al., 2014).

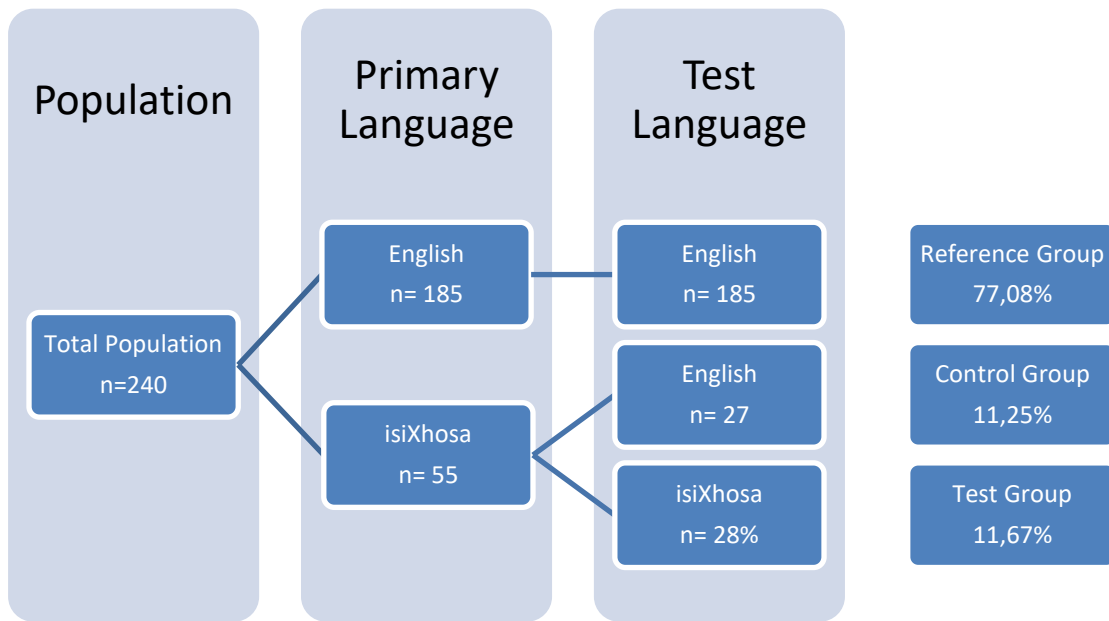
Table 3 details the breakdown of respondents by their primary language and which version of the survey they had received.

Table 3: Primary language to survey language (n=240)

	English Survey		isiXhosa Survey		Total
English primary language	185	100%	0	0%	185
	87,3%		0%		77,1%
isiXhosa primary language	27	50%	28	50%	55
	12,7%		100%		22,9%
Total	212		28		240

⁷ Given that respondents have a higher level of education, the financial literacy results may be skewed and not completely representative of the greater population.

Diagram 1: Population split into analysis groups



The 240 participants have been split into the three separate groups for purposes of analysis, based on the primary language they indicated. The 185 students who indicated English as their primary language all received the English survey, creating the reference group. Of the 55 students who selected isiXhosa as their primary language, half (28) received the isiXhosa survey, becoming the test group, while the other 27 received the English survey, our control group. Delice (2010) states that a sample of at least 100 should be observed for surveys and at least 20 in sub-groups, therefore while a test group of 28 and control group of 27 are small, these figures are sufficient and appropriate to perform statistical analysis on.

Numeracy and financial literacy questions:

The second block of the survey tested the respondents' numeracy skills. This block comprised of four questions, assessed principles surrounding understanding compounding, theoretical probability, conditional probability, and experimental probability. Each respondent's answers were scored to determine an overall numeracy score out of four. The third block consisted of 17 questions which were designed to measure financial literacy. Cumulatively numeracy and financial literacy make up the financial knowledge of individuals, with financial literacy being dependent on numeracy.

The 17 financial literacy questions are split into two categories of basic financial literacy and advanced financial literacy. The basic financial literacy category consists of six questions which cover themes of inflation, portfolio diversification, time value of money, money

illusions and financial risk. The advanced financial literacy category consists of 11 questions which cover the themes; function of share markets, shares, collective investment schemes, bonds, long term returns, returns variability, and risk diversification.

The reliability of the numeracy and financial literacy questions have been estimated using the Kuder-Richardson Formula 20 (KR20). The KR20 formula provides a measure of internal consistency for assessments which have dichotomous choices (El-Uri & Malas, 2013). The formula provides a correlation coefficient between 0 and 1, where 0 is indicative of no reliability and a high KR20 coefficient of $>0,90$ is indicative of an excellent consistency (Wombacher, 2017). A KR20 reliability of 0,70 or higher is deemed acceptable (El-Uri & Malas, 2013; Wombacher, 2017).

For the numeracy questions, a KR20 coefficient of 0.3183 was determined. This indicates low reliability. This might be explained by the numeracy questions being a less established and unstandardised measure. It is also limited as there are only four binary options, making variances and deviations more significant. All questions used in the numeracy block were sourced from Skagerlund et al. (2018) and Lusardi & Mitchell (2011). Skagerlund et al. (2018) also found the reliability score of numeracy questions to be low (they had a Cronbach's alpha of 0.58, while using seven questions to measure numeracy), but found that this is in line with the reliability levels of other numeracy measures.

For the financial literacy question, a KR20 coefficient of 0,7344 is deemed an acceptable level of internal reliability. The responses obtained and measurement of financial literacy can thus be used with confidence.

The sample size for the basic financial literacy portion of this block decreased from the 240 used for numeracy to 208 respondents. This is a result of 32 individuals abandoning the survey once they had completed the numeracy block. The sample size further decreased to 173 respondents who completed the advanced financial literacy portion of the block. The 35 respondents removed from the sample omitted one or more of the advanced financial literacy questions or abandoned the survey before completing the block. To measure overall financial literacy and financial knowledge a sample size of 173 will thus be used, as these are the respondents who have answered all questions in the financial literacy block. For numeracy though, the original 240 responses remain.

Statistical method

A quantitative research approach will be used to answer the research question. Respondents' answers to the survey questions are graded and various statistical analyses will be performed to assess the impact of language on financial knowledge as well as explore the impact of other factors on the financial literacy of respondents.

The testing first looked at the graded scores of each of the analysis groups, across the three categories of financial knowledge, based on the themes of the questions. The performance of the three analysis groups will be compared to each other across the various themes which the questions assess, to discover the impact of language on the responses provided for each of the themes. The questions will be graded as correct, incorrect or as "do not know" responses. "Do not know" responses are particularly isolated as there is an important distinction between answering incorrectly and selecting "do not know". An incorrect response indicates that an individual overestimated their knowledge, while a "do not know" response indicates that an individual does not have confidence in their knowledge or is aware of their lack of knowledge (Bannier & Neubert (2016); Lusardi & Mitchell (2013); Skagerlund et al., (2018); Stolper & Walter (2017)).

Next, the overall scores of the individuals in each analysis group's responses have been aggregated to create an overall score for numeracy, basic financial literacy, advanced financial literacy and financial knowledge. The results of these scores is assessed for each analysis group to determine whether a relationship can be observed with the language of assessment and the responses received at an aggregated level.

Thirdly, the relationship will be explored between an individual's actual financial literacy and their self-assessment of their financial literacy, which represents their self-efficacy in financial literacy. The relationship between self-efficacy and numeracy will be explored separately, as with financial literacy and overall financial knowledge. The responses provided for the questions answered, using the five-point Likert scale, will be aggregated and averaged to provide an overall score out of five, determining where an individual places their overall financial knowledge. The results will be separated into the various analysis groups to determine whether a relationship exists between the characteristics of the analysis groups and their self-efficacy, as well as their self-efficacy and language. The distinction between incorrect and "do not know" responses becomes significant here, as the proportion of "do not

know” responses previously observed would be expected to correlate with the self-assessment scores.

Lastly an OLS regression is performed to determine the relationship between various factors and the financial literacy scores of individuals. The factors assessed in the OLS regression include the respondent’s analysis group, which represent the relationship between their primary language and the language they received the survey in. Gender and race are also explored, along with the respondent’s high school mathematics and English marks. Mathematics marks serve as a proxy for numeracy and the English mark is a proxy for the respondents literacy levels and understanding of English, which are factors which have been identified as determinants of financial literacy.

Limitations

The study only assesses one language in addition to English, isiXhosa. South Africa has 11 official languages, and the black population is widely distributed among the various language groups. Although this may be a limitation of scope, the use of one language group to observe the impact of language and the findings based on the isiXhosa language group can be applied to other languages to observe the impact that language has on the assessment of financial literacy and the subsequent disparity in existing financial literacy data and results.

In assessing the impact of language on financial literacy as an explanatory variable for the dispersion of financial literacy results across racial groups, it is important to note that language is not always indicative of race. While language is often used as a proxy for race, it is important to distinguish that while all respondents which indicated isiXhosa as their primary language are black, not all who indicated English are White. Typically isiXhosa is synonymous with black, however English is not synonymous with White, therefore observations made regarding language will not fully explain racial differences. This creates a limitation where the results observed with the language groups cannot easily be applied to race. However, this does not take away from the usefulness of the study as the impact of language as independent variable can still be observed and an understanding obtained.

Another limitation is the small sample size of isiXhosa respondents. This is further emphasised because of the split of Xhosa respondents between the test group, which received the Xhosa survey, and the control group, which received the English survey. While this is a limitation, we are still able to use the small sample to observe whether a relationship can be observed between the language of assessment and financial literacy scores.

Given the nature of surveys, and their dependence on individual respondents, there is always a risk of a biased sample given the composition of respondents. In the case of this study there is the risk that the sample results are skewed, due to the incentive offered attracting similar individuals. Education quality, given that the majority of respondents have a Quintile 5 high school education, may also skew the data. While these factors may pose limitations to the study, they are not significant risks and therefore the data still provides useful information.

The final limitation is that while this study is looking to isolate the impact of language on the assessment of financial literacy, it is important to note that English is the language of business and finance (Roa, 2017) and therefore even if we find that language has an impact on financial literacy, there would need to be a focus on other factors to reduce the impact of language, as English is the language used in the financial world.

Results

The research question aims to assess whether assessing an individual in their primary language will have a positive impact on their financial knowledge score. The relationship between the language used in the assessment of financial literacy and the financial literacy of individuals, is assessed in three main parts. Firstly, an analysis of the impact of language on various themes relating to numeracy and financial literacy was performed. This was followed by an assessment of the overall scores achieved in numeracy and financial literacy within each analysis group, to determine whether any observable trends or relationships existed between language and numeracy and financial literacy. An analysis into the relationship between an individual's self-efficacy and their financial knowledge was also performed and, lastly, other commonly cited predictors of financial literacy have been assessed to the sample group.

Assessing themes related to financial knowledge

Numeracy

The numeracy block comprised four questions. Respondents' answers were scored, resulting in one of three outcomes, either a correct answer, an incorrect answer or a "do not know" response. Table 4 shows the percentage of correct answers for each question and its correlating theme for each analysis group. The results display the proportion of each analysis group that obtained a particular outcome.

Table 4: Percentage of correct answers in numeracy themes by analysis group (n=240)

	Compounding	Theoretical Probability	Conditional Probability	Experimental Probability	Average
Correct	97,08%	92,50%	39,58%	63,33%	73,12%
Reference Group	97,30%	92,97%	41,62%	66,49%	74,60%
Control Group	100,00%	95,59%	33,33%	40,74%	67,42%
Test Group	92,86%	89,29%	32,14%	64,29%	69,65%
Incorrect	2,50%	5,00%	55,42%	22,50%	21,35%
Reference Group	2,16%	4,86%	52,43%	20,00%	19,86%
Control Group	0,00%	3,70%	66,67%	37,04%	26,85%
Test Group	7,14%	7,14%	64,29%	25,00%	25,89%
Do Not Know	0,42%	2,50%	5,00%	14,17%	5,52%
Reference Group	0,54%	2,16%	5,95%	13,51%	5,54%
Control Group	0,00%	3,70%	0,00%	22,22%	6,48%
Test Group	0,00%	3,57%	3,57%	10,71%	4,46%

The reference group generally outperformed the control and test groups, having a higher average of correct answers across the four themes. The difference between the average results of the control group and the test group are not noteworthy as the results across the two groups are similar.

The first question tested the principle of compounding and is one of the “big three” questions commonly used in financial literacy assessments. The big three questions are considered to be the building blocks of any financial literacy assessment. These three questions are the minimum requirements for the questions to be asked in a financial literacy assessment (Lusardi & Mitchell, 2013). Compounding appears to be the best understood principle among the sample group, with 97,08 per cent of respondents answering correctly and only 0,42 per cent of respondents selecting the “do not know” response. The control group performed the best in this question, with 100 per cent of respondents answering this correctly. The test group had the lowest performance, with only 92,86 per cent of respondents answering this question correctly. However, only respondents from the reference group selected “do not know”.

The principle of theoretical probability displayed similar results as the principle of compounding, with the control group having the highest proportion of correct answers and the test group having the lowest proportion of correct answers. The question was answered correctly by 92,5 per cent of the sample and 5 per cent answered incorrectly with the test

group comprising the proportionately largest share of incorrect answers. The control group had the lowest proportion of incorrect answers at 3,7 per cent and the highest proportion of “do not know” responses, also at 3,7 per cent.

The third principle, conditional probability, had the lowest rate of correct answers, with only 39,58 per cent of the sample group answering this question correctly. This was expected as conditional probability is often a difficult concept for people to understand (Huerta, Cerdán, Lonjedo & Edo, 2011). For this question, the reference group had the highest proportion of correct answers, at 41,62 per cent, and “do not know” responses, at 5,95 per cent. The test group and control group performed similarly with 32,14 per cent and 33,33 per cent of proportional responses correct. Of the test group, 3,57 per cent of respondents provided a “do not know” response.

The final question assessed experimental probability and this question resulted in the largest proportion of “do not know” responses, at 14,17 per cent. While this question had the highest proportion of “do not know” responses, the proportion of correct responses was reasonable at 63,33 per cent. Here the reference group and test group displayed similar results with 66,49 per cent of the reference group and 64,29 per cent of the test group answering correctly. The control group had the lowest results for this question, with only 40,74 per cent of the group answering correctly and having the highest levels of incorrect answers 37,04 per cent and “do not know” responses, 22,22 per cent.

The reference group performed the best on average, with approximately 5 per cent higher than the test group and 7 per cent higher than the control group. Given the hypothesis that receiving the assessment in one’s primary language should improve financial knowledge scores, it would be expected that the test group perform better than the control group. While the difference appears to be small, it is observed that the test group has a higher proportion of correct answers than the control group, which indicates that receiving numeracy questions in one’s primary language may provide a small benefit. Which, in turn, could result in an observation that receiving financial literacy assessments in one’s primary language is beneficial, given the relationship between financial literacy and numeracy. It is also interesting to note that the control group and the test group (isiXhosa participants) have the highest rates of average “do not know” responses, this could potentially be due to the priming effect which arises from stereotypes where it is assumed that black people are less intelligent. Skinner et al. (2021) has found that stereotypes and perceptions have a direct impact on the

confidence of individuals in mathematics, to which numeracy is closely related. This is also supported by the findings of Bottazzi and Lusardi (2021) relating to the impact of stereotypes on performance.

Financial literacy

The financial literacy block consisted of six basic financial literacy questions and a further 11 advanced financial literacy questions. Respondents' answers were scored as either correct, incorrect or as "do not know" responses. Table 5 shows the proportion of each outcome, by the analysis group, for each basic financial literacy question and the corresponding theme.

1 **Table 5: Percentage of correct answers in basic financial literacy questions, by analysis group (n=208)**

2

	Inflation	Diversification 1	Diversification 2	Time Value of Money	Money Illusion	Risk	Average
Correct	83,17%	72,60%	75,96%	12,98%	90,87%	83,65%	69,87%
Reference Group	85,37%	73,78%	79,88%	12,80%	93,90%	82,32%	71,34%
Control Group	79,17%	91,67%	75,00%	16,67%	75,00%	95,83%	72,22%
Test Group	70,00%	40,00%	45,00%	10,00%	85,00%	80,00%	55,00%
Incorrect	13,94%	9,62%	12,50%	84,13%	8,65%	10,58%	23,24%
Reference Group	12,80%	8,54%	10,37%	83,54%	5,49%	12,80%	22,26%
Control Group	16,67%	8,33%	16,67%	83,33%	25,00%	0,00%	25,00%
Test Group	20,00%	20,00%	25,00%	90,00%	15,00%	5,00%	29,17%
Do Not Know	2,88%	17,79%	11,54%	2,88%	0,48%	5,77%	6,89%
Reference Group	1,83%	17,68%	9,76%	3,66%	0,61%	4,88%	6,40%
Control Group	4,17%	0,00%	8,33%	0,00%	0,00%	4,17%	2,78%
Test Group	10,00%	40,00%	30,00%	0,00%	0,00%	15,00%	15,83%

The reference group and control group have a similar proportion of correct responses in comparison to their sample population sizes, while the test group had the lowest proportion of correct answers, with more than 15 per cent less than its counterparts. Notably, while the test group had significantly lower correct responses, the proportion of incorrect responses does not correlate with this finding. Instead, the test group appears to be more likely to have selected “do not know” as their response. This suggests that the test group did not have an advantage from receiving the survey in their home language and instead, their confidence relating to basic financial literacy themes may be low.

The first question in the financial literacy block assessed the principle of inflation. This question is one of the Big Three financial literacy questions which is asked as a minimum in financial literacy assessments. Respondents appeared to have a good understanding of the principles of inflation, with 83,17 per cent of respondents answering correctly. The reference group performed the best, with 85,37 per cent of the population answering correctly and the control group following with 79,17 per cent. The test group had 9,17 per cent lower correct responses than the control group. The test group also had the highest proportion of incorrect responses, 20 per cent, and “do not know” responses, 10 per cent.

The second and third questions of the basic financial literacy questions assessed principles of diversification. The first diversification question is the last of the Big Three questions on financial literacy. Respondents had a fair understanding of the principles of diversification, with an average proportion of correct responses across the two questions of 74,28 per cent. The control group had the highest proportion of correct answers for the first question, 91,67 per cent, and the reference group had the highest proportion of correct answers for the second question, 79,88 per cent. When aggregating the two questions, the control group comes out the victor, with an average of 83,34 per cent correct responses for diversification, in comparison to the 76,83 per cent of the reference group. The results of the test group are opposite from their counterpart with the test group having significantly lower proportions of correct responses. On average only 42,5 per cent of responses were correct. This is almost half the percentage of correct answers as their comparative counterparts, the control group, who also do not have English as their primary language. The test group also had the highest proportion of incorrect answers at an average of 22,5 per cent in comparison to the reference and control groups at 9,46 per cent and 12,5 per cent respectively. Unsurprisingly, the test group also had the highest proportion of “do not know” responses, at 22,5 per cent. The

control group had nearly half the number of “do not know” responses, at 12,5 per cent, which is not far off the 9,46 per cent of the reference group.

The third theme assessed under basic financial literacy is time value of money, and this question had the lowest correct response rate, with only 12,98 per cent of total respondents answering correctly. As with the prior two themes, the control group had the highest proportion of correct answers at 16,67 per cent and the test group had the lowest, at 10 per cent. The majority of respondents answered this question incorrectly, 84,13 per cent. The test group had the highest proportion of incorrect responses at 90 per cent and the reference and test groups had similar results, with around 83 per cent of respondents answering incorrectly. Only the reference group respondents selected the “do not know” response.

Money illusion, the fourth of the basic financial literacy themes, was the best understood concept by the respondents overall; 90,87 per cent of respondents answered this question correctly: 93,9 per cent of the reference group answered correctly, followed by 85 per cent of the test group. The control group had the lowest accuracy rate among the three groups with 75 per cent of the group answering correctly. The control and test groups did not have any respondents select the “do not know” response, resulting in 25 per cent and 15 per cent incorrect responses, respectively. Of the reference group, 5,49 per cent answered incorrectly and 0,61 per cent selected the “do not” know response.

The final theme assessed in basic financial literacy related to respondents’ understanding of risk. 83,87 per cent of respondents answered correctly, while 10,58 per cent answered incorrectly and the balance of 5,77 per cent of respondents selected the “do not know” response. The control group had the highest proportion of correct responses, with a correct response rate of 95,83 per cent. The reference group and test group had similar levels of correct responses, attaining 82,32 per cent and 80 per cent correct responses respectively. 12,8 per cent of respondents in the reference group answered incorrectly, while only 5 per cent of the test group answered incorrectly. The control group had no incorrect responses as the remaining 4,17 per cent of respondents selected the “do not know” response. The reference group had a similar proportion of “do not know” responses at 4,88" per cent. At 15 per cent, the test group had more than three times the proportion of respondents selecting the “do not know” responses.

The average percentage of correct responses for the basic financial literacy questions is 69,87 per cent. This number is significantly affected by the poor responses for the question

assessing time value of money. When removing the impact of this question, the average correct responses increase to 81,25 per cent. Due to the large differences, it is worth taking note of the average results including and excluding the impact of the time value of money question. The reference group and control group have similar average proportions of correct answers, at 71,34 per cent and 72,22 per cent including time value of money and 83,05 and 83,33 per cent respectively excluding the time value of money question. The test group has a significantly lower average proportion of correct responses, a difference of 17 per cent is observed when including the impact of the time value of money question. The average correct response of the test group is only 55 per cent. However, if the impact of the question on time value of money is removed, the average correct response increases to 64 per cent. While this is a significant improvement in the average correct answers, the test group will still underperform in comparison to the control group and reference groups.

“Do not know” responses are most prevalent in the test group. The samples average "do not know" response rate is 6,89 per cent. The test group has almost three times the population average proportion of “Do not know” responses. This is particularly interesting when comparing the results to the control group, 2,78 per cent of responses from the control group will be “do not know”, in contrast to 15,83 per cent of responses from the test group. This difference of over five times is of interest as “do not know” responses are generally associated with a lack of confidence around financial concepts (Lusardi & Mitchell, 2011; Stolper & Walter, 2017).

Based on the results observed, it appears that the language of assessment has no impact on the basic financial literacy levels of individuals. The reference group and the control group had very similar results for basic financial literacy, with differences being negligible. By comparing the result of the control group and the test group, it is observed that being assessed on financial literacy in one’s primary language does not improve financial literacy results. In this case, a decrease is actually seen. This indicates that factors other than language may have a significant impact on the basic financial literacy of individuals. The distribution of "do not know" responses, indicates that an individual’s financial literacy self-efficacy may be a significant contributor, rather than language. This and other factors will be explored later in this chapter.

Table 6 shows the proportion of each outcome, by the analysis group, for each advanced financial literacy question and the corresponding theme.

Table 6: Percentage of correct answers in advanced financial literacy questions, by analysis group (n=173)

	Function of share market	Knowledge of Shares	Knowledge of Collective Investment Schemes	Knowledge of Bonds	Long-term Returns	Highest Return Variability	Risk Diversification 1	Risk Diversification 2	Bond Principles 1	Bond Principles 2	Risk Diversification 3	Average
Correct	89,45%	93,03%	46,63%	78,92%	54,33%	73,56%	90,38%	63,94%	30,29%	76,44%	47,34%	67,66%
Reference Group	90,45%	93,63%	49,63%	82,76%	53,66%	80,49%	92,68%	64,63%	31,10%	76,83%	45,40%	69,21%
Control Group	87,50%	87,50%	62,50%	77,27%	70,83%	45,83%	83,33%	79,17%	29,17%	79,17%	62,50%	69,52%
Test Group	83,33%	95,00%	5,00%	50,00%	40,00%	50,00%	80,00%	40,00%	25,00%	70,00%	45,00%	53,03%
Incorrect	5,53%	4,48%	53,37%	12,43%	38,94%	18,75%	7,21%	11,54%	34,62%	14,42%	43,48%	22,25%
Reference Group	4,46%	3,18%	50,61%	9,66%	39,02%	13,41%	4,88%	10,37%	32,93%	13,41%	44,79%	20,61%
Control Group	12,50%	12,53%	37,50%	22,73%	29,17%	41,67%	16,67%	16,67%	41,67%	20,83%	33,33%	25,93%
Test Group	5,56%	5,00%	95,00%	22,22%	50,00%	35,00%	15,00%	15,00%	40,00%	15,00%	45,00%	31,16%
Do Not Know	5,03%	2,49%	0,00%	8,65%	6,73%	7,69%	2,40%	24,52%	35,10%	9,13%	9,18%	10,08%
Reference Group	5,10%	3,18%	0,00%	7,59%	7,32%	6,10%	2,44%	25,00%	35,98%	9,76%	9,82%	10,21%
Control Group	0,00%	0,00%	0,00%	0,00%	0,00%	12,50%	0,00%	4,17%	29,17%	0,00%	4,17%	4,55%
Test Group	11,11%	0,00%	0,00%	27,78%	10,00%	15,00%	5,00%	45,00%	35,00%	15,00%	10,00%	15,81%

The advanced financial literacy results of the reference group and the control group are nearly identical, while the test group displayed a significantly lower proportion of correct advanced financial literacy questions, with a 16,5 per cent, in comparison with the control group. The proportion of incorrect responses is higher for the test group than the other two groups, with a difference of 5 per cent in comparison to the control group. As with the basic financial literacy questions, the test group displayed higher proportional instances of selecting the “do not know” response.

The first advanced financial literacy theme assessed respondents understanding of the function of share markets. The function of share markets is generally well understood by participants, with 89,45 per cent of respondents answering the question correctly. The remainder of the population is evenly split between incorrect responses, 5,53 per cent, and “do not know” response, 5,03 per cent. The reference group had the highest proportion of correct responses at 90,45 per cent, followed closely by the control group at 87,5 per cent and then the test group at 83,33 per cent. The control group did not have any “do not know” responses and the highest proportion of incorrect responses at 12,5 per cent. The reference group and the test group have similar incorrect responses of 4,46 per cent and 5,56 per cent respectively. The test group had the highest proportion of individuals who did not know the function of share markets, with 11,11 per cent “do not know” responses. The reference group had 5,1 per cent of individuals who did not know the function of share markets.

Knowledge of shares was the best answered advanced financial literacy question, with 93,03 per cent of respondents answering correctly. The highest proportion of correct responses was the test group, with 95 per cent of the group answering correctly. The test group is closely followed by the reference group with 93,63 per cent, then the test group at 87,5 per cent. The control and test groups did not have any respondents selecting the “do not know” response, resulting in incorrect responses of 12,53 per cent and 5 per cent, respectively. The reference group had the lowest proportion of incorrect answers at 3,18, which is matched by the “do not know” responses.

Knowledge of collective investment schemes was generally low among respondents, with only 46,63 per cent of the sample answering the question correctly. With 62,5 per cent correct responses, the control group had the highest proportion of correct responses. The reference group had 46,63 per cent correct responses. The test group had very low understanding of collective investment schemes, with only 5 per cent of the group answering correctly.

Interestingly, while the understanding of collective investment schemes was low, none of the respondents selected the “do not know” response. The test group had the highest level of incorrect answers, with 95 per cent of the group answering incorrectly. Only 37,5 per cent of the control group answered incorrectly, and 50,61 per cent of the reference group answered incorrectly. The high proportions of incorrect answers and lack of “do not know” responses could be indicative of a false sense of confidence surrounding principles on collective investment schemes.

Respondents’ knowledge of bonds was good, with 78,92 per cent of the overall sample answering correctly. The reference group had the highest proportion of correct responses, with 82,76 per cent of the group answering correctly. The control group had 10 per cent less of their group answer correctly at 72,27 per cent. Of the test group, only 50 per cent of respondents answered correctly. Incorrect responses accounted for 12,43 per cent of overall responses. The reference group had the lowest rate of incorrect responses at 9,66 per cent, while the control and test groups have similar incorrect response rates of 22,73 per cent and 22,22 per cent. While the incorrect response rates of the control and test groups are similar, the “do not know” responses vary significantly. There were no “do not know” responses from the control group, while the test group had the highest level of “do not know” responses at 27,78 per cent. Only 7,59 per cent of the reference group selected the “do not know” responses.

Just over half of respondents, 54,33 per cent, understood the principles surrounding long term returns and answered this question correctly. The control group had the highest understanding of this principle, with a correct response rate of 70,83 per cent. The reference group had 53,66 per cent of respondents answering correctly, while only 40 per cent of the test group answered correctly; 39,94 per cent of responses were incorrect, with 50 per cent of the test group answering incorrectly. Of the reference group 39,02 per cent of participants answered incorrectly. The control group had the lowest proportion of incorrect responses at 29,17 per cent and no “do not know” responses. The reference group had 7,32 per cent “do not know” responses and the test group had 10 per cent.

Return variability appears to be well understood by the majority of the sample, with 73,56 per cent of responses being correct. The reference group significantly outperformed the control and test groups, which had only 45,83 per cent and 50 per cent of participants responding correctly, with 80,49 per cent correct responses. The incorrect answers accounted for 18,75

per cent of total responses. Of the reference group, 13,41 per cent of responses were incorrect. The test group had an incorrect response rate of 35 per cent. The control group had the highest incorrect response rate of 41,67 per cent. As with most questions, the test group has the highest proportion of “do not know” responses, at 15 per cent. This is closely followed by the control group at 12,5 per cent, while the reference group only has a “do not know” response rate of 6,1 per cent.

The seventh, eighth and eleventh of the advanced financial literacy questions assess principles of risk diversification. The first question was answered best, with 90,38 per cent of participants answering correctly and the last question had the lowest percentage of correct responses, with only 47,34 per cent of the sample answering correctly. The average correct responses surrounding principles of risk diversification is 67,22 per cent, indicating that majority of the sample understands the principles of risk diversification. The control group had the highest average of correct answers with a 75 per cent correct response rate. The reference group had an average correct response rate of 67,57 per cent, while the test group only saw 55 per cent of respondents, on average, answer questions of risk diversification correctly. The average incorrect response rate is 20,74 per cent of the sample. The average incorrect response rates across the three groups are similar, with the reference group observing 20,01 per cent, the control group observing 22,22 per cent and the test group observing 25 per cent incorrect responses. The “do not know” response rate was 12,42 per cent and the test group remains the highest figure in this group with 20 per cent of respondents selecting the “do not know” response. Only 2,78 per cent of the control group selected the “do not know” responses, while 12,42 per cent of the reference group selected “do not know”.

The final theme assessed in the advanced financial literacy questions was the concept of risk diversification. Questions nine and ten covered this principle. The first question had poor results, with only 30,29 per cent of the total sample answering correctly. It is also worth noting that 35,1 per cent of respondents selected the “do not know” response. These results are contrary to the second question on bond principles, where 76,44 per cent of respondents answered the question correctly and only 9,13 per cent selected the “do not know” response. The average percentage of correct answers is 53,97 per cent. The reference group and control group have similar average results with 53,97 per cent of the reference group answering correctly and 53,17 per cent of the control group answering correctly. The test group is not too far from its counterparts, with an average correct response rate of 47,50 per cent. The “do

not know” response rate for bond principles was 22,12 per cent. The control group had the lowest average of “do not know” responses at only 14,59 per cent. The reference group and the test group had similar average “do not know” responses, at 22,87 per cent and 25 per cent respectively.

The average percentage of correct answers for the advanced financial literacy questions is 67,66 per cent. As with the basic financial literacy questions, the reference group and control group have similar results, with 69,21 per cent and 69,52 per cent correct answers respectively. The difference between the average correct advanced financial literacy responses of the test group in comparison to the control group is similar to the findings in the basic financial literacy questions. At 53,03 per cent of the test group answering correctly, the difference between the test group and control group is 16,5 per cent, similar to the 17 per cent observed in the basic financial literacy questions. The average percentage of incorrect responses is 22,25, which is also similar to the basic financial literacy questions. Again, the test group has the highest percentage of average incorrect responses at 31,16 per cent. The control group has just over 5 per cent less incorrect responses at 25,93 per cent. The average “do not know” response rate is 10,08 per cent. As expected, given the trends with basic financial literacy, the test group have the highest proportion of “do not know” responses. Again, the test group is about three times more likely to select the “do not know” response in comparison to the control group. This could again be a result of the stereotype effect as discussed in the analysis of numeracy results. The control group on average selected “do not know” only 4,55 per cent of the time, while the test group selected the option 15,81 per cent of the time. As with basic financial literacy, when looking at the average results of the three groups, it appears as though the language of assessment does not have a significant impact on the results on individuals, rather there may be other factors which need to be considered. This supports the suggestion that confidence or other factors may have more of an impact on financial knowledge than language.

Overall financial knowledge scores

Above, the accuracy of respondents' answers relating to specific themes affecting financial knowledge across the three analysis groups was analysed. Having assessed the themes individually, it is necessary to determine an overall financial knowledge score. The financial knowledge score has been split into numeracy, basic financial literacy, advanced financial literacy and aggregated financial literacy.

Numeracy

The numeracy block consisted of four questions. Therefore, the lowest score an individual can have is zero and the maximum score is four. Respondents' scores are summarised by their analysis groups in Table 7.

Table 7: Numeracy Mark by Analysis Group (n=240)

	Minimum	Mean	Max	Standard Deviation
Reference Group	0	2,984	4	0,856
Control Group	1	2,667	4	0,832
Test Group	1	2,786	4	0,917
Total	0	2,925	4	0,865

The minimum mark observed in the sample is zero, indicating that at least one respondent incorrectly answered or selected the "do not know" response for all four questions. The maximum mark observed is four, meaning that at least one individual answered all four questions correctly. The average mark is 2.925 with a standard deviation of 0,865. This means that majority of the sample has a score between 2 and 4. The reference group has the lowest minimum score of zero, while the control group and test group have a minimum of one. All three groups observed a maximum score of 4, and there is not a significant difference between the mean score or standard deviations. This is supported by the results observed when assessing the percentage of correct responses for each numeracy theme, as there were no significant differences in the results of the three groups. From the results observed here, there does not appear to be a clear relationship between the language of assessment and the numeracy score of individuals.

Financial Literacy

The basic financial literacy section consists of six questions. Therefore, the lowest score an individual can have is zero and the maximum score is six. Respondents' scores are summarised by their analysis groups in Table 8.

Table 8: Basic Financial Literacy Mark by Analysis Group (n=173)

	Minimum	Mean	Max	Standard Deviation
Reference Group	0	4,333	6	1,093
Control Group	3	4,363	6	0,902
Test Group	1	3,375	6	1,31
Total	0	4,249	6	1,121

The minimum basic financial literacy score for the sample population is zero and the maximum six. The average basic financial literacy mark was 4,249 with a standard deviation of 1,121. This indicates that majority of the respondents obtained a score between 3.0 and 5.0. The average basic financial scores of the reference and control groups are nearly identical with less than a 1,0 per cent difference, with the control group being ahead. The test group had an average score of 3,375, which is approximately 22,65 per cent lower than the reference group and the control group. This was expected, given the results observed for each theme. While on average the test group had lower basic financial literacy, the maximum score is in line with the other two groups. The standard deviation for the test group is also the highest amongst the three groups which indicates that there are larger variances in the scores achieved by the individuals in the test group. The variance in the performance of the test group suggests that the language of assessment may not provide a uniform advantage to respondent, or that there are other factors apart from language which have a more significant impact on basic financial literacy.

The advanced financial literacy section consisted of 11 questions. Therefore, the lowest score an individual can have is zero and the maximum score is 11. Respondents' scores are summarised by their analysis groups in Table 9.

Table 9: Advanced Financial Literacy Mark by Analysis Group (n=173)

	Minimum	Mean	Max	Standard Deviation
Reference Group	0	7,726	11	2,24
Control Group	5	7,727	11	1,579
Test Group	2	6	9	2,28
Total	0	7,566	11	2,221

The minimum advanced financial literacy score for the sample population is zero and the maximum 11. The average advanced financial literacy mark was 7,566 with a standard deviation of 2,221. This indicates that majority of the samples obtained a score between 5.0 and 8,0. The reference and control groups obtained the maximum score of 11,0 while the test group had a maximum score of 9,0. This means that none of the respondents in the test group answered all advanced financial literacy questions correctly. The average advanced financial scores of the reference and control groups are nearly identical with less than a 1 per cent difference. The test group had an average score of 6,0, which is approximately 22,35 per cent lower than the reference group and the control group. The standard deviation is 2,28, which again is the highest among the three groups, further supporting the idea that language may either be disproportionately advantageous to respondents or may have no impact and instead other factors matter more.

Financial knowledge

An overall financial knowledge score can be calculated. This score is determined by aggregating the numeracy and financial literacy scores to find an overall financial knowledge score. Financial knowledge therefore consists of the four numeracy questions and the 17 financial literacy questions. Respondents' scores are summarised by their analysis groups in Table 10.

Table 10: Total Financial Knowledge Mark by Test Group (n=173)

	Minimum	Mean	Max	Standard Deviation
Reference Group	1	15,119	20	3,462
Control Group	11	14,773	19	2,599
Test Group	7	12,188	15	2,903
Total	1	14,803	20	3,408

The minimum financial knowledge score for the sample population is one and the maximum 20, indicating that no respondent was able to answer all the numeracy and financial literacy

questions correctly. The average financial knowledge mark was 14,803 with a standard deviation of 3,408. This indicates that majority of the samples obtained a score between 11,0 and 18,0.

The reference group has the lowest minimum financial knowledge score of one, while the control group has a minimum of 11,0 and the test group has a minimum of seven. The reference group obtained a maximum score of 20,0, while the control group obtained 19,0 and the test group obtained 13,0. The average financial knowledge score for the reference group is 15,119. The control group has an average score 2,29 per cent less than that of the reference group, at 14,773. The test group had an average score of 12,188, which is 19,39 per cent lower than the reference group and 17,5 per cent lower than the control group. The standard deviation is 2,903, which is higher than the control group. This continues to support the idea that language may not be as impactful as hypothesised.

This paper aims to answer whether the language used in the assessment of financial literacy is statistically significant in explaining the dispersion of financial literacy results across different groups. Based on the results observed, it appears that the language of assessment has no impact on the financial knowledge of individuals. No difference between the financial literacy and numeracy results of the reference and control groups was observed. Given that the control group consisted of respondents who had isiXhosa as a home language rather than English, as did the reference group, had the language of assessment been a significant influencing factor in determining the financial knowledge score of an individual, the reference group would have been expected to outperform the control group. To reject the null hypothesis, the test group would have been expected to outperform the control group and display results similar to the reference group. This is not the case, as the test group performed worse than the control and reference groups. This indicates that there may be other factors which contribute more to the dispersion of financial literacy results across language groups. Thus, we cannot reject the null hypothesis.

The impact of financial literacy self-efficacy on financial knowledge

An individual's self-efficacy and confidence around matters of financial literacy has been found to have a strong positive correlation to the financial literacy results of individuals. Individuals who have higher self-efficacy levels generally perform better than those with lower efficacy levels and *vice versa* (Banner & Neubert, 2016; Lusardi et al., 2009; Skagerlund et al., 2018; Stolper & Walter, 2017). To determine a respondent's self-efficacy relating to financial literacy, respondents were given eight statements to assess their perceived financial literacy by, using a five-point Likert scale. Each response was assigned a mark from one to five, and an average score out of five, across the eight questions was determined for each individual to represent their self-efficacy level. The higher the score the higher their perceived financial literacy and therefore confidence (Stolper & Walter, 2017). Table 11 shows the self-efficacy scores of individuals by the summary statistics, based on analysis groups.

Table 11: Self- Efficacy in Financial Literacy by Analysis Group (n=208)

	Minimum	Mean	Max	Standard Deviation
Reference Group	2	3,700	5	0,729
Control Group	2,25	3,750	5	0,781
Test Group	1,25	3,138	4,875	1,180
Total	1,25	3,652	5	0,802

The overall sample has a self-efficacy score of 3,652 with the lowest score being 1,25 and the highest being 5,0. The standard deviation of the sample group was 0,802, which is most similar to the control group. The self-efficacy scores of the reference and control groups are very similar, in line with the financial knowledge scores. The test group had a minimum score of 1,25 and a maximum of 4,875. The average score is the lowest of all the groups, at 3,138, just as the financial knowledge scores are lowest in this group. The test group also had the highest standard deviation at 1,180. This indicates that there is also the highest variation in the self-efficacy of individuals within the test group. This is significant as it supports the significant variation observed with the financial knowledge results.

A Kruskal-Wallis test was conducted to determine the differences in the self-efficacy of the analysis groups. At the 90 per cent confidence level, statistically significant differences (Chi squared= 4.641, p=0.0982, df=2) were found for the analysis groups. This indicates that there

is significant difference between the self-efficacy of the three groups. Multiple regression analyses were also preformed to assess the impact of self-efficacy and the analysis groups of individuals on the components of financial knowledge and the impact of these factors is analysed at the 90 per cent confidence level in the following sections.

Self-Efficacy and numeracy

A multivariate regression analysis showing the relationship between numeracy, analysis group, and self-efficacy is shown in Table 12. All 208 respondents who completed the numeracy block and the self-efficacy assessment are included in this analysis. The model is as follows:

$$\text{Numeracy Score} = \beta_0 + \beta_1 \text{Self Efficacy} + \beta_{2-4} \text{Analysis Group}$$

Where β_0 is the constant, β_1 the coefficient of self-efficacy and β_{2-4} the three analysis groups. The control group is the reference group for the analysis group dummies.

Table 12: Multivariate Regression of Numeracy Scores

	Coefficient	Standard Error	t	p
Self-Efficacy	0,1795	0,0768	2,34	0,010
Test Group	0,1016	0,2664	0,38	0,352
Reference Group	0,3006	0,1893	1,59	0,057
Constant	2,0351	0,3380	6,02	0,000

The multivariate analysis had an F-test value of 3,17 and p-value of 0,0255, providing confidence at the 95 per cent confidence level that the null hypothesis of the model can be rejected and that the regression model has explanatory value in explaining the numeracy results of the sample. The R-squared value of 0,0445 indicates that approximately 4,5 per cent of the variation in numeracy scores is determined by self-efficacy and analysis group of individuals.

The self-efficacy of an individual is seen to have statistical significance in explaining the numeracy score of respondents at the 95 per cent confidence level. There is a positive correlation between self-efficacy and numeracy results, where a 1-point increase in the self-efficacy score of an individual will result in a 0,18-point increase in their numeracy score, thereby indicating that a higher self-efficacy score is linked to higher numeracy scores.

Belonging to the reference group, rather than the test group is observed to have a positive relationship with a respondent's numeracy score, at the 90 per cent confidence level. Determining that belonging to the reference group will increase an individuals numeracy score by 0,3 points.

Self-efficacy and financial literacy

Table 13 shows the results of a multivariate regression analysing the relationship between financial literacy scores, analysis group and self-efficacy. Only the 173 respondents who completed the financial literacy block and the self-efficacy assessment are included in this analysis. The model is as follows:

$$Financial\ Literacy\ Score = \beta_0 + \beta_1\ Self\ Efficacy + \beta_{2-4}\ Analysis\ Group$$

Table 13: Multivariate Regression of Financial Literacy Scores

	Coefficient	Standard Error	t	p
Self-Efficacy	1,5571	0,2567	6,07	0,000
Test Group	-1,7991	0,8735	-2,06	0,021
Reference Group	0,1051	0,6025	0,17	0,431
Constant	6,1989	1,1202	5,53	0,000

The regression analysis on the relationship between financial literacy, analysis group and self-efficacy had a F-test value of 17,37 and a p-value of 0,0000, indicating that this model has explanatory value in determining the factors which affect financial literacy, and can therefore reject the null hypothesis at the 99 per cent confidence level. The R-squared value of this model is 0,2221, indicating that approximately 22 per cent of the variation in financial literacy scores is explained by this model.

Individuals' self-efficacy is statistically significant, at the 99 per cent confidence level, in explaining the variation in financial literacy scores. A positive correlation exists where a 1-point increase in the self-efficacy of an individual results in 1,6-point increase in their financial literacy score. A participant belonging to the test group rather than the control group results is significant at the 90 per cent confidence level in determining individuals' financial

literacy scores. A negative relationship exists where it is observed that belonging to the test group results in a decrease in financial literacy scores of 1,80 points.

Self-efficacy and financial knowledge

Table 14 shows the results of a multivariate regression performed analysing the relationship between financial knowledge, analysis groups and self-efficacy. The 173 respondents who completed the numeracy block and the financial literacy block are analysed in this regression. The regression model is as follows:

$$\text{Financial Knowledge Score} = \beta_0 + \beta_1 \text{Self Efficacy} + \beta_{2-4} \text{Analysis Group}$$

Table 14: Multivariate Regression of Financial Knowledge Scores

	Coefficient	Standard Error	t	p
Self-Efficacy	1,7997	0,2956	6,09	0,000
Test Group	-1,5261	1,0061	-1,52	0,066
Reference Group	0,5038	0,9639	0,73	0,235
Constant	7,9625	1,2903	6,17	0,000

The model has a F-test value of 16,86 and a p-value of 0,0000 providing confidence at the 99 per cent level, that the model has explanatory value in explaining the variation in financial knowledge scores of the sample. The R-squared value of the model is 0,2303, indicating that 23 per cent of the variation in the financial knowledge between respondents is explained by this model.

At the 99 per cent confidence interval, the self-efficacy of a respondent is useful in explaining financial knowledge scores. As expected, given the numeracy and financial literacy results, a positive relationship is observed between self-efficacy and financial knowledge. As with financial literacy a 1-point increase in the self-efficacy of an individual will result in a 1,80-point increase in financial knowledge scores.

Belonging to the test group rather than the control group is significant at the 90 per cent confidence level in explaining the variation of financial knowledge scores. On average an individual in the test group will achieve 1,53 points less than one in the control group, indicating a negative relationship.

By running regression models on the impact of self-efficacy and the analysis groups on the components of financial knowledge, the Kruskal-Wallis findings are supported. It indicates that the self-efficacy of an individual is a significant factor in determining their financial knowledge. This is further supported by the findings of the Spearman's correlation (see Appendix 2) performed which has a coefficient of 0,4482.

Other predictors of Financial Literacy

A multiple regression analysis was performed to understand the relationship between financial knowledge and various factors which may impact the financial knowledge results of individuals. The variance inflation factor for each variable was also calculated to determine how much each of the variables is correlated with other variables. In addition to the variables previously analysed, the relationship between gender, race, high school quintile and high school mathematics and English marks and financial knowledge is analysed. Table 15 provides the output for the multiple regression model run on these factors influencing financial knowledge. The regression model is as follows

$$\text{Financial Knowledge Score} = \beta_0 + \beta_1 \text{ Analysis Group} + \beta_2 \text{ Gender} + \beta_3 \text{ Race} + \beta_4 \text{ Quintile} + \beta_5 \text{ Mathematics Mark} + \beta_6 \text{ English Mark} + \beta_7 \text{ Self - Efficacy}$$

Where: β_0 = The constant, β_1 = The control group, β_2 = Male, β_3 = White, β_4 = Quintile 1-3, β_5 = Mathematics Marks, β_6 = English mark and β_7 = Self- Efficacy

The benchmark group for the groups of analysis is the control group. High school quintiles were reformatted into a binary variable with quintiles 1 – 3 (representing X), which is the benchmark group, and quintiles 4 – 5 (representing Y). Mathematics Mark, English Mark and Self-Efficacy are all continuous variables.

Table 15: Multivariate Regression of Factors Affecting Financial Knowledge(N=106⁸)

	Coefficient	Standard Error	t	P	Variance Inflation Factor
Analysis Group: Test Group	-1,1726	1,0183	-1,15	0,252	1,74
Analysis Group: Reference Group	0,25833	1,1349	0,23	0,820	3,88
Gender: Female	-0,6622	0,6354	-1,04	0,300	1,35
Gender: Non-Binary	4,0646	2,9008	1,40	0,164	1,09
Race: Black	1,2414	1,0280	1,21	0,230	3,61
Race: Other*	-0,2528	0,8175	-0,31	0,758	2,10
Quintile: 4–5	1,1608	0,9650	1,20	0,232	2,05
Mathematics Mark	0,0319	0,0278	1,15	0,255	1,35
English Mark	0,1015	0,0447	2,27	0,025	1,41
Self-Efficacy	1,8438	0,3590	5,14	0,000	1,19
Constant	-3,7109	4,1856	-0,89	0,378	-

⁸ The population size for the multivariate regression has decreased to 106 respondents to exclude any respondents which did not answer any section of the survey which is included in the survey. This is done to ensure the completeness and consistency of the output of the regression analysis.

The number of observations for the model were 106 as the high school marks and school quintile information of 67 individuals was not attainable. The model has an F-score of 6,10 and a p-value of 0,0000, providing confidence at the 99 per cent level that this model is able to explain the financial knowledge results of individuals. The R-squared value of the model is 0,3909, indicating that 39 per cent of the variation in the financial knowledge between respondents is explained by this model.

The following factors are determined to have an impact on the financial knowledge of respondents, at the 99 per cent confidence level: analysis group, gender, English marks and self-efficacy.

As previously discussed, the test group has lower financial knowledge than their counterparts particularly in comparison to the control group. Being in the reference group results in a 2,1-point decrease in the financial knowledge of respondents in comparison to the control group. Females are also observed to have lower financial knowledge than males, observing on average a score of 1,7 points less than their male counterparts. This finding is supported by existing literature which has also found that females typically have lower financial literacy results than males (Bannier & Neubert, 2016; Lusardi et al., 2009, 2014; Lusardi & Mitchell, 2013; Skagerlund et al., 2018; Stolper & Walter, 2017). The final significant factor in explaining the financial knowledge scores is individuals' English marks. A positive relationship exists where a 1 per cent increase in an individual's grade 12 English mark will result in a 0,1-point increase in their financial literacy score. This finding is also supported by the findings of Winstanley et al. (2018) and Lusardi et al (2009), who found that an individual's literacy is a determining factor for their financial knowledge.

Conclusion and areas for future research

Research surrounding financial literacy has found that Black people and other minority groups, across the globe, have consistently been observed to have lower financial literacy scores than their white counterparts (Brown et al., 2018; Chen, 2013; Lusardi & Mitchell, 2011, 2013; Riitsalu & Pöder, 2016; Willows, 2019a, 2019b, 2020). To explain the variation of financial literacy scores of various groups across racial and cultural groups, the extant literature had proposed multiple factors which can be used to explain the financial literacy results of specific groups in direct comparison to others. While these proposed differences are sufficient to explain most of the variation observed across demographic groups, they are often unable to explain differences which are observed across racial and cultural groups. By identifying the common factor in the underperforming groups as English being a non-primary language, this study aimed to test the impact of one of the hypothesised factors which could impact the financial literacy scores of individuals, the language of assessment.

This paper tested the hypothesis that an individual's receiving a financial literacy assessment in their primary language would increase their financial literacy score, indicating that financial literacy disparities are a result of the language used in the assessment of financial literacy. This was not in fact the case. Instead, this paper found that the most significant factor in explaining the variation in the financial literacy results amongst different groups is the self-efficacy of individuals in financial literacy. An individual's perception and belief in their financial literacy abilities is the most significant factors in explaining their financial literacy results. This finding is supported by existing literature such as that of Bannier and Neubert (2016), Lusardi and Mitchell (2013) and Stolper & Walter (2017). This finding is significant as understanding that self-efficacy is powerful in affecting financial literacy provides the opportunity for intervention on a much more significant level than if language had been the more significant factor. The language of financial literacy assessments would always be constrained by the fact that English is the language of business and therefore significant change would be required to the financial and business landscape to affect change which could improve the financial literacy of individuals. As English is the language of business, future research attempting to address financial literacy can therefore look at how an individual's proficiency in English may affect their financial literacy.

For policy makers and organisations which are trying to address financial illiteracy, self-efficacy presents a simpler solution. Self-efficacy can be improved through targeted interventions which address the deficiencies of individuals and improve their confidence

surrounding financial matters. Grassroots interventions which are focused on specific deficiencies can be implemented to improve self-efficacy in financial literacy. The key aspect is that these interventions should not follow a “one size fits all” approach, but instead follow a tailored approach based on the areas of weaknesses for different groups, as is supported by Lusardi and Mitchell (2013).

While this is a novel study in exploring the impact of language on the assessment of financial literacy, it has its limitations. Therefore, researchers can re-perform the study with larger sample groups which are representative of the greater population, to extrapolate the true impact of language on financial literacy assessments. Future research can also look at assessing more than one language in a population so as to observe the cultural effects of the various language groups, helping to isolate the impact of language alone.

Researchers may also want to explore the impact of self-efficacy in financial literacy more, particularly across racial groups to determine the impact of self-efficacy on financial literacy. Observing instances where self-efficacy is improved through various interventions and the resultant impact on financial literacy scores of individuals can help policy makers develop programmes which are more targeted and effective at addressing financial literacy deficiencies and reducing the impact of these deficiencies.

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Appendices

Appendix 1: Survey Questions

Demographic Information

Question	Answers	Source
Please provide your EMPL ID number.		N/A
Which high school did you matriculate from?		N/A
In which province did you matriculate?		N/A
What is your age?	a) 18 b) 19 c) 20 d) 21 e) Other	N/A
What gender do you identify?	a) Female b) Male c) Other d) Prefer not to answer	N/A
What is your race?	a) Asian b) Black c) Coloured d) Indian e) White f) Other (Please specify) g) Prefer not to answer	N/A

What do you consider your primary language? The language in which you have the highest level of understanding.	a) English b) Xhosa c) Other	N/A
Did you take any of the following subjects in high school? (You may select more than one)	a) Accounting b) Business Studies c) Economics d) None	Lusardi & Mitchell 2017
Which of the following subjects did you take?	a) Mathematics b) Mathematical Literacy c) Mathematics and AP Maths	N/A

Numeracy

Theme	Question	Answer	Source
Compounding	Assume you had R100 in a savings account and the interest rate was 2 per cent per year. After 5 years, how much would you have in the account if you left the money to grow?	a) More than R102 b) Exactly R102 c) Less than R102 d) Do not know	(Lusardi & Mitchell, 2011)
Theoretical Probability	In a small lottery, the chance of winning R100 is 1%. What is your best guess about how many people will win the R100 prize if 1000 people each buy a single ticket?	a) 10 people b) 100 people c) 50 people d) Do not know	(Skagerlund et al., 2018)
Conditional Probability	Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 people that are not in the	a) 10% b) 20% c) 25% d) 40%	(Skagerlund et al., 2018)

	choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent	e) Do not know	
Experimental Probability	Imagine we are throwing a loaded die (6 sides). The probability that the die shows a 6 is twice as high as the probability of each of the other numbers. On average, out of these 70 throws how many times would the die show the number 6?	a) 10 times b) 20 times c) 30 times d) 35 times e) Do not know	(Skagerlund et al., 2018)

Financial Literacy

Theme	Question	Answer	Source
Inflation	Imagine that the interest rate on your savings account was 1 per cent per year and inflation was 2 per cent per year. After 1 year, how much would you be able to buy with the money in this account?	a) More than today b) Exactly the same c) Less than today d) Do not know	(Lusardi & Mitchell, 2011)
Diversification	Buying a single company's share usually provides a safer return than a unit trust.	a) True b) False c) Do not know d) Prefer not to answer	(Lusardi & Mitchell, 2011) "Stock mutual fund" changed to "unit trust"
Diversification	Which of the following is an accurate statement about investment returns?	a) Usually, investing R5 000 in shares of a single company is safer than investing R5 000 in a fund which invests in shares of many companies in different industries b) Usually, investing R5 000 in	(Lusardi et al., 2014)

		<p>shares of a single company is less safe than investing R5 000 in a fund which invests in shares of many companies in different industries</p> <p>c) Usually, investing R5 000 in shares of a single company is equally as safe as investing R5 000 in a fund which invests in shares of many companies in different industries.</p> <p>d) Don't know</p>	
Time Value of Money	Assume a friend inherits R10,000 today and his brother inherits R10,000 3 years from now. Who is richer because of the inheritance?	<p>a) My friend</p> <p>b) His brother</p> <p>c) They are equally rich</p> <p>d) Do not know</p>	(Lusardi & Mitchell, 2011) "Sibling" changed to "brother/sister"
Money Illusion	Suppose that in the year 2022, your income has doubled, and prices of all goods have doubled too. In 2022, how much will you be able to buy with your income?	<p>a) More than today</p> <p>b) The same as today</p> <p>c) Less than today</p> <p>d) Do not know</p>	(Lusardi & Mitchell, 2017)
Risk	In general investments that are riskier tend to provide higher returns over time than investments with less risk.	<p>a) True</p> <p>b) False</p> <p>c) Do not know</p>	(Lusardi et al., 2014)
Advanced			

Function of the Share Market	Which of the following statements describes the main function of the share market (also referred to as the “stock market” or “equity market”)?	<ul style="list-style-type: none"> a) The share market helps to predict share earnings b) The share market results in an increase in the price of shares c) The share market brings people who want to buy shares together with those who want to sell shares d) None of the above e) Do not know 	(Lusardi & Mitchell, 2017) “stock” replaced with “share”
Knowledge of shares	Which of the following statements is correct? If somebody buys a share of company B in the share market:	<ul style="list-style-type: none"> a) He owns a part of company B b) He has loaned money to company B c) He is liable for company B’s debts d) None of the above e) Do not know 	(van Rooij et al., 2011)
Knowledge of Collective Investment Schemes	Which of the following statements is most correct?	<ul style="list-style-type: none"> a) Once you invest in a collective investment scheme, i.e., “unit trust,” you cannot withdraw the money in the first year b) Unit trusts can invest in several asset classes, for example; shares/equity, bonds, property, and cash. c) Unit trusts pay a guaranteed rate of return which depends on their past performance d) None of the above e) Do not know 	(Lusardi & Mitchell, 2017) “Mutual fund” replaced with “collective investment scheme” and “unit trust”

Knowledge of Bonds	Which of the following statements is correct? If somebody buys a bond issued by company B:	<ul style="list-style-type: none"> a) They owns a part of company B b) They have loaned money to company B c) They are liable for company B's debts d) None of the above e) Do not know 	(van Rooij et al., 2011)
Long-period Returns	Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?	<ul style="list-style-type: none"> a) Savings accounts / Cash b) Bonds c) Shares / Equity Do not know 	(Lusardi & Mitchell, 2017) Multiple terms given for cash and equity for clarity
Highest Variability	Normally, which asset displays the highest variability of return over time?	<ul style="list-style-type: none"> a) Savings accounts / Cash b) Bonds c) Shares / Equity d) Do not know 	(Lusardi & Mitchell, 2017) Multiple terms given for cash and equity for clarity
Risk Diversification	Complete the sentence. When an investor spreads his or her money among different assets, the risk of losing money should:	<ul style="list-style-type: none"> a) Increase b) Decrease c) Stay the same d) Do not know 	(Lusardi & Mitchell, 2017)
Risk Diversification	True or false? Buying a share of an individual company usually provides a safer return than a general equity unit trust.	<ul style="list-style-type: none"> a) True b) False d) Do not know 	(Lusardi & Mitchell, 2017) "Mutual Fund" replaced with "Unit Trust"
Bond Principles	True or false? If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penalty.	<ul style="list-style-type: none"> a) True b) False c) Do not know 	(van Rooij et al., 2011)
Bond Principles	True or false? Equity/shares are normally riskier than bonds.	<ul style="list-style-type: none"> a) True b) False c) Do not know 	(Lusardi & Mitchell, 2017) Multiple terms given for equity given to ensure clarity
Risk Diversification	If interest rates rise, what should happen to bond prices?	<ul style="list-style-type: none"> a) Rise b) Fall c) Stay the same 	(Lusardi & Mitchell, 2017)

		d) None of the above c) Do not know	

Self-Assessed Financial Literacy

Students should respond to a set of financial literacy perception statements with a seven-point Likert Scale, where ‘1’ represents “strongly disagree” and ‘7’ “strongly agree” on the following themes: debt, saving and investment, and personal finance:

1. I know what makes me a good or bad credit risk.
2. I understand what affects the credit terms I am offered by different lending institutions.
3. I am comfortable with my ability to make decisions about savings instruments based on their fixed and compounded interest rates.
4. I understand the general relationship between risk and reward in investing.
5. I feel confident in my understanding of the differences between bonds, stocks, SA Treasury bills and mutual funds.
6. I feel comfortable with my understanding of the various financial terms that go along with buying a home someday.
7. I understand what personal net worth means.
8. I am confident in my ability to write a monthly budget.

(Mudzingiri et al., 2018)

Appendix 2: Correlations
Spearman's Correlation:

	Numeracy	Financial Literacy	Financial Knowledge	Self-Assessed Financial Literacy	Mathematics Mark	English Mark
Numeracy	1					
Financial Literacy	0,2997	1				
Financial Knowledge	0,5336	0,9608	1			
Self-Assessed Financial Literacy	0,1565	0,453	0,445	1		
Mathematics Mark	0,2965	0,2258	0,2718	0,0688	1	
English Mark	0,2333	0,1265	0,1853	-0,0167	0,3744	1