Assessing the influence of South African investor well-being on risk tolerance

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Thesis accepted for the degree Doctor of Philosophy in Risk Management at the North-West University

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DECLARATION

I declare that:

"**ASSESSING THE INFLUENCE OF SOUTH AFRICAN INVESTOR WELL-BEING ON RISK TOLERANCE**"

is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references, and that this thesis has not previously been submitted by me for a degree at any other university.

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RW Masenya
November 2019
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EDITING LETTER

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To whom it may concern

This is to confirm that I, the undersigned, have language edited the thesis of

for the degree
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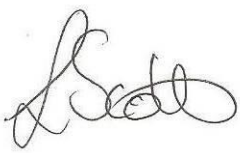
The responsibility of implementing the recommended language changes rests with the author of the thesis.

Yours truly,



Linda Scott

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ABSTRACT

Keywords: *risk tolerance, financial well-being, satisfaction with life, physical activity, structural equation model*

Investment companies have the responsibility to develop and evaluate investors' risk profiles to gain insight into and determine which financial products would best suit their investors' respective needs. It is vital for these investment companies to investigate relevant factors and imply appropriate statistical techniques to measure an investor's risk tolerance as accurately as possible. The primary objective of this study was to assess and model the influence of South African investor well-being (financial well-being, satisfaction with life, and physical activity) on risk tolerance.

In order to attain the primary objective of the study, respective sets of theoretical and empirical objectives were established. The theoretical objectives allowed the researcher to review in-depth discussions on several important concepts including risk tolerance, financial well-being, satisfaction with life and physical activity. Based on the theoretical framework, it can be implied that socioeconomic factors along with the respective elements of investor well-being have an influence on the risk tolerance levels investors are willing to take.

A quantitative research design with a complementary positivist research paradigm was utilised to achieve the empirical aspect of the study. A secondary data analysis (SDA) allowed the researcher to re-examine and interpret the secondary data from a new perspective. The target population were investors who had held an investment portfolio at a reputable South African investment company. The final sample size consisted of 1 065 investors, of which 596 were female and 469 were male.

The following scales' data were investigated and discussed: Grable and Lytton's 13-item risk tolerance scale (GLRTS), Survey of Consumer Finance (SCF), InCharge Financial Distress/Financial Well-being (IFDFW), satisfaction with life scale (SWLS), and the International Physical Activity Questionnaire (IPAQ). Statistical analysis techniques such as factor analysis and structural equation modelling (SEM) were utilised within the study. The data were analysed through the use of the IBM Statistical Package for the Social Sciences™ (SPSS) as well as AMOS™; both Version 25.

The following results regarding the demographic factors, risk tolerance, and investor well-being were established: (i) age has a statistically significant, positive relationship with each element of investor well-being; (ii) income and education both have respective, positive and statistically significant relationships with financial well-being, satisfaction with life, and risk tolerance; (iii) gender's influence on risk tolerance, financial well-being, and satisfaction with life is statistically significant; (iv) race and marital status has no practically significant differences on risk tolerance and investor well-being; and lastly, (v) some place of origin categories have respective large and practically significant effects on risk tolerance, financial well-being, and physical activity.

The main findings of the study suggest the following: (i) risk tolerance has statistically significant and positive relationships with the respective elements of investor well-being; (ii) financial well-being has a positive and statistically significant relationship with satisfaction with life; and (iii) financial well-being, physical activity, gender, and income each have a positive and statistically significant influence on risk tolerance.

The empirical findings of this study may help investment companies and financial institutions to assess their investors' risk tolerances through a different viewpoint. The SEM will enable investment companies and financial institutions to forecast the factors that will influence an investor's risk tolerance level; and ultimately the type of financial products the investor decides to invest in. By forecasting investors' risk tolerances, investment companies and financial institutions will be able to take competitive advantage of the opportunities that occur by providing accurate investment advice and strategies to their clients.

Considering the theoretical and empirical findings of this study, a few implications and recommendations can be offered. Researchers can in future explore other factors that may have an influence on risk tolerance; moreover, different primary data and different research designs can be implemented to test whether the results are similar or different to that of this study. Ultimately, this study adheres to the ethical academic research standards prescribed by the North-West University.

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LIST OF ACRONYMS AND ABBREVIATIONS

AGFI : Adjusted goodness-of-fit model

ANOVA : Analysis of variance

CDC : Centres for Disease Control

CFA : Confirmatory factor analysis

CFI : Comparative fit index

CMIN/DF : Relative chi-square

CR : Composite reliability

EC : Eastern Cape

EFA : Exploratory factor analysis

FS : Free State

GAU : Gauteng

GLRTS : Grable and Lytton's 13-item risk tolerance scale

GFI : Goodness-of-fit index

HI : Higher confidence interval

HMDIC : Housework Moderate last 7 days Inside Categorised

HMDOC : Housework Moderate last 7 days Outside Categorised

HVDC : Housework Vigorous last 7 Days Categorised

IFDFW : InCharge Financial Distress/Financial Well-being scale

IFI : Incremental fit index

IPAQ : International Physical Activity Questionnaire

J : Job

JMDC : Job Moderate last 7 Days Categorised

JVDC : Job Vigorous last 7 Days Categorised

JWDC : Job Walk last 7 Days Categorised

KMO : Kaiser-Meyer-Olkin index

KZN : KwaZulu-Natal

LIM : Limpopo

LO : Lower confidence interval

LOR : Live outside RSA

MPU : Mpumalanga

NC : Northern Cape

NFI : Normal fit index

NW : North West

PCA : Principal component analysis

RFI : Relative fit index

RMDC : Recreation Moderate last 7 Days Categorised

RMSEA : Root mean square error of approximation

RVDC : Recreation Vigorous last 7 Days Categorised

RWDC : Recreation Moderate last 7 Days Categorised

RSA : Republic of South Africa

SCF : Survey of Consumer Finance

SDA : Secondary data analysis

SEM : Structural equation modelling

SPSS : Statistical Package for Social Science

SWB : Subjective well-being

SWLS : Satisfaction with Life Scale

TLI : Tucker Lewis index

TWDC : Transport Walk last 7 Days Categorised

WC : Western Cape

WHO : World Health Organisation

CHAPTER 1: INTRODUCTION, PROBLEM STATEMENT, AND OBJECTIVES OF THE STUDY

1.1 INTRODUCTION

Investors are of the expectation that investment companies should develop, assess and evaluate strategies in order to provide them with guidance in making effective decisions pertaining financial risk (Nobre & Grable, 2015a:18). As such, investment companies make use of certain company specific questions to develop a risk profile for their investors. Usually, these company specific questions focus on measuring investors' risk tolerance levels (Dickason, 2017:2).

Risk tolerance can be described as the maximum amount of uncertainty an individual is willing to take whilst making financial decisions (Grable, 2000:625). Previous literature has found that risk tolerance has an influence on investors' personal financial decisions (Yao *et al.*, 2005:52; Lucarelli & Brighetti, 2010:2). Therefore, risk tolerance is one of the main elements that investment companies assess while developing an investor's risk profile (Van de Venter & Michayluk, 2009:7). Once an investor's risk tolerance has been measured, investment companies are able to assist investors to define investment objectives and goals that are suited to their specific risk profile (Callan & Johnson, 2002:31; Vanguard, 2018:17). Risk tolerance has an overall effect on how investors choose to invest so as to obtain their investment goals and secure their financial well-being.

Financial well-being refers to an individual's satisfaction with his or her financial situation (Prawitz *et al.*, 2006:34). Financial well-being can also be linked to financial distress as its subjective indicator (Prawitz *et al.*, 2006:34). As such, financial distress is a representation of the lowest level of financial well-being, whereas little to no financial distress is a representation of the highest level of financial well-being. An individual's level of financial distress or financial well-being can have an influence on the individual's willingness to take on financial risk (Gutter & Copur, 2011:699). Consequently, the level of risk an individual decides to take given their level of financial well-being, can potentially have an influence on that individual's overall subjective well-being (Cummins, 2000:133; Diener & Biswas-Diener, 2002:119).

Subjective well-being can generally be defined as an individual's cognitive and affective evaluation of his or her life (Diener, 1984:542; Diener *et al.*, 2002:63). Diener and Ryan (2009:391) refer to subjective well-being as an umbrella term that is used to describe the level of an individual's life evaluations based on four domains. The four domains, according to Diener and Ryan (2009:391), are (i) life satisfaction (an individual's global judgement of life); (ii) satisfaction with important domains (e.g. work satisfaction); (iii) positive affect (feeling pleasant emotions and moods); and (iv) negative affect (feeling unpleasant emotions and moods). This study focusses on subjective wellbeing's domain of life satisfaction. Dickason (2017:216) suggests that investment companies include an element of satisfaction with life as it has an influence on the overall risk profile of an investor. Also, an investor's level of life satisfaction may be influenced by an investor's level of physical activity.

Increased levels of physical activity have been found to have a positive influence on an individual's overall physical health and more specifically their mental health (Landers & Arent, 2007:469). Improved mental health increases the probability of individuals to make improved life and financial decisions (Mind, 2018). As such, an investor's level of physical activity may have an influence on how an investor perceives their financial well-being, satisfaction with life and the level of risk they are willing to tolerate.

Ultimately, many factors such as demographics (Grable, 1997:ii), personality (Filbeck *et al.*, 2005:170), and behavioural finance biases (Dickason, 2017:210), have been linked to risk tolerance; however, investor well-being and its potential link to risk tolerance has not yet been tested. For the purpose of the study, investor well-being is used as an umbrella term to reflect an investor's level of financial well-being, satisfaction with life and physical activity.

1.2 PROBLEM STATEMENT

It is important for South African investment companies to consider including suitable factors while risk profiling their potential investors. By utilising suitable factors, investment companies will be able to increase the level of accuracy to which they profile their potential investors (Grable, 1997:4). In general, many investment companies only make use of factors pertaining to risk tolerance and risk personalities during profiling (Dickason,

2017:2). Elements of investor well-being may potentially have an influence on risk tolerance; however, there is a dearth of studies in which those possible links have been tested.

In terms of an individual's financial situation, financial distress and financial well-being have a spill-over effect which influences the type of financial decisions individuals make (Archuleta *et al.*, 2013:50). Since financial distress has a negative spill-over effect, it is important to measure the conceived constructs of financial distress and financial well-being. Prawitz *et al.* (2006:34) developed and validated a scale which measures individuals' overall financial distress and financial well-being. Prior studies that have used the scale have found that certain demographics have an influence on financial well-being (O'Neill *et al.*, 2006:494; Gutter & Copur, 2011:702). De Oliveira *et al.* (2017:5) found that, based on a sample of public workers, financial well-being is moderately related to quality of work life. However, no prior study was found where financial distress and financial well-being was linked to risk tolerance and how it could influence an investor's risk profile.

In literature pertaining to subjective well-being (which relates to satisfaction with life), Statman (2015:26) found that a relationship between subjective well-being and risk tolerance exists. Statman (2015:26) found that individuals who have a low level of subjective well-being tend to tolerate more risk. Dickason (2017:125) found that there is a link between satisfaction with life and risk tolerance; and that the link will ultimately influence the overall risk profile of an investor. However, more research has to be conducted with the aim of testing the relationship between satisfaction with life and risk tolerance; and to test their effect on one another.

Lastly, physical activity is the last element to be included in investor well-being. Many studies have been conducted wherein the *International Physical Activity Questionnaire* was used in order to measure individuals' levels of physical activity (Hagströmer *et al.*, 2006:755; Grimm *et al.*, 2012:64; Kim *et al.*, 2012:440). Physical activity has been proven to have a positive effect on individuals' physical and mental health (Landers & Arent, 2007:469). An individual's better state of mental health can lead to better decision making whether it be in terms of personal life choices or financial decisions. However, no research was found wherein the potential link between physical activity and risk tolerance is tested.

As there is no literature on the effect of investor well-being (financial well-being, satisfaction with life and physical activity) on risk tolerance, this study aims to ascertain the relationship between investor well-being and risk tolerance; as well as to analyse the effect of investor well-being on risk tolerance. In addition to the creation of the link, the study aims to develop a model which displays how levels of investor well-being influences risk tolerance and ultimately the investor's risk profile. If the influence of investor well-being on risk tolerance is significant, it will be of importance for investment companies to consider including elements of financial well-being, satisfaction of life and physical activity in the questions they use to profile their investors.

1.3 OBJECTIVES OF THE STUDY

The following objectives have been formulated for the study:

1.3.1 Primary objective

The primary objective of the study is to develop a model which financial companies can use to profile their investors' risk tolerance more accurately by adding elements of financial well-being, satisfaction with life, and physical activity to existing measures of risk tolerance.

1.3.2 Theoretic objectives

To achieve the primary objective of the study, the following theoretical objectives have been identified:

- Provide a comprehensive theoretical analysis relating to risk tolerance; and
- Contextualise a theoretic framework for financial well-being;
- Discuss theories and concepts pertaining to satisfaction with life; and
- Provide a theoretic analysis on physical activity.

1.3.3 Empirical objectives

To achieve the primary objective of the study, the following empirical objectives have been identified:

- Report on the level of risk tolerance and investor well-being of the sample;
- Analyse the respective relationships between age, income, education, investor well-being and risk tolerance;
- Examine gender's influence on investor well-being and risk tolerance;
- Explore the respective mean differences between race, marital status, place of origin, investor well-being, and risk tolerance;
- Investigate the relationship between investor well-being and risk tolerance; and
- Construct a structural equation model which depicts the influence of investor well-being on risk tolerance.

1.4 RESEARCH DESIGN AND METHODOLOGY

The study consists of a literature review and an empirical study. A quantitative research design through the utilisation of secondary data analysis (SDA) is implemented within the study. Hakim (1982:1) defines SDA as "any further analysis of an existing dataset which presents interpretations, conclusions or knowledge additional to, or different from, those produced in the first report on the inquiry as a whole and its main results". Simplified, a SDA refers to the examination of an existing dataset, which has previously been gathered by another researcher, usually for a different research question (Heaton, 2003:285).

The secondary data analysed in this study has already been captured and the details regarding the nature of the data is discussed in Section 4.2.

1.4.1 Literature review

A holistic literature review pertaining to investor well-being and risk tolerance is established in order to support the empirical section of this study. Secondary sources such as journal articles, newspaper articles, financial magazines, and the Internet are used to analyse and substantiate the literature sources.

1.4.2 Empirical study

The empirical portion of the study constitutes the following subsections:

1.4.2.1 Target population, sampling frame and sampling method

The target population for this study are investors from a reputable investment company in South Africa. The investment company was selected based on the fact that it is one of the major investment companies in South Africa (BusinessTech, 2017). The selected investment company attains funds from investors and delivers professional management services; thereby achieving business goals such as investments, insurance, and asset management. The sampling frame of the study consists of investors who were obtained from the reputable South African investment company. The investors were obtained through purposive sampling. The investors who participated in the study are from places across the nine South African provinces.

1.4.2.2 Sample size

The questionnaire was distributed by the reputable investment company in the beginning of May 2018. The responses were obtained during the last week of May 2018. The South African investment company distributed the questionnaire to 4 800 of its investors. Ultimately, the study's final sample size consisted of 1 065 South African investors. Based on the final sample, the majority of investors are: above the age of 50; married; from all the nine provinces of South Africa; earn between R100 001 and R200 000 per annum; and have at least a diploma. Also, the dataset includes 469 female investors and 596 male investors.

1.4.2.3 Measuring instrument and data collection method

The questionnaire was composed of various sections relating to risk. Section A consisted of demographics. Section B consisted of three scales—namely the InCharge Financial Distress/Financial well-being scale, Grable and Lytton's 13-item risk tolerance scale and the Survey of Consumer Finances risk tolerance measurement item. The purpose of Section B was to measure investors' level of financial well-being and risk tolerance. Section C consisted of a set of questions which were used to measure investors' behavioural finance biases. Section D made use of the Satisfaction with Life scale in order to measure investors' subjective well-being. Section E used the Big Five Personality domains in order to measure investors' personalities. Lastly, Section F included the International Physical Activity Questionnaire in order to measure investors' level of

physical activity. However, only the following sections were used in order to fulfil this study's primary objective:

- **Demographic information**

A demographic section was included in the questionnaire in order to obtain the following information regarding the sample: age, gender, race, marital status, annual income, place of origin, and highest level of education.

- **Survey of Consumer Finances (SCF)**

The SCF is a subjective, single-item question which reports on an individual's financial risk tolerance (Grable & Lytton, 2001:43.). The SCF has been criticized for its one-dimensional approach towards measuring risk tolerance. In order to confirm the concurrent validity of the SCF measure, it is suggested that the SCF measure is used alongside other measures of risk tolerance (Grable & Lytton, 2001:51). As such, the study also includes a 13-item risk tolerance scale in order to measure investor's risk tolerances as accurately as possible.

- **Grable and Lytton's 13-item risk tolerance scale (GLRTS)**

The GLRTS assesses an individual's financial risk tolerance to manage financial decision-making procedures to reach their financial goals (Grable & Lytton, 1999:163). The GLRTS scale consists of 13-items which allow for an investor's risk tolerance to be measured from a multidimensional perspective (Grable & Lytton, 1999:163). The items included in the scale focus on three main factors; namely (i) investment risk, (ii) risk comfort and experience, as well as (iii) speculative risk (Grable & Lytton, 1999:177). As such, a more holistic representation of the investors' risk tolerance is attained.

- **International physical activity questionnaire (IPAQ)**

The IPAQ measures an individual's physical activity levels (Hagströmer *et al.*, 2006:755). The questionnaire measures physical activity in terms of the five following aspects: (i) job; (ii) transport; (iii) housework, house maintenance, and family care; (iv) recreation, sport, and leisure time; as well as (v) time spent sitting physical activities (Hagströmer *et al.*, 2006:756). The scale's results can be reported in categories wherein an individual's level of physical activity can be categorised as low, moderate, or high (Hagströmer *et al.*, 2006:756).

- **InCharge Financial Distress/Financial Well-being scale (IFDFW)**

The IFDFW scale measures a latent construct which represents responses to an individual's financial state. The scale presents an individual's state of finance on a range extending from overwhelming financial distress/lowest level of financial well-being to no financial distress/highest level of financial well-being (Prawitz *et al.*, 2006:34).

- **Satisfaction with life scale (SWLS)**

The SWL scale assesses an individual's satisfaction with his or her life as a whole (Diener *et al.*, 1985:71). The nature of the data provided by the SWL scale is normative.

The final questionnaire was electronically sent to the selected South African investment company which uploaded the questionnaire onto a system that the company uses to interact with their clients. As such, the electronic questionnaire was distributed to the participants via the company's system. The data was collected by the South African investment company.

1.4.2.4 Statistical analysis

Both descriptive and inferential statistics will be executed to analyse the data and fulfil this study's empirical objectives.

1.4.2.4.1 Descriptive statistics

Quinlan *et al.* (2015:359) define descriptive statistics as the primary transformation of raw data in a concise manner with the aim of describing fundamental characteristics such as central tendency, variability and distribution. This study will implement descriptive statistics such as percentages, means, and standard deviation in order to provide a snapshot of the quantitative data of the study.

1.4.2.4.2 Inferential statistics

Inferential statistics refer to the use of statistical methods to deduce or infer the properties of a population. A data sample drawn from the population based on the investigation thereof (Urdan, 2011:2). Simply stated, inferential statistics are used to draw predictions and conclusions about specific data which is exposed to random predictions (Urdan,

2011:3). Inferential statistics are also concerned with the precision and reliability of the inferences it helps to draw (Groebner *et al.*, 2011).

- **T-tests**

A t-test is a technique which is applied when comparing mean values of two sets of numbers (Pallant, 2007:103). The comparison provides a statistic which is used to evaluate whether the difference between two means is statistically significant (Urdan, 2011:93).

- **Correlation**

Correlation is a common form of data analysis since it underlies many other analyses. A correlation analysis is implemented to define the strength and direction of the linear relationship between two selected variables (Pallant, 2007:126). The correlation coefficients obtained from the correlation analysis conducted will be tested for statistical significance (Urdan, 2011:85).

- **Analysis of variance (ANOVA)**

The study implements ANOVAs to compare the means of two or more groups (independent variable) on one dependent variable to determine if the group means are significantly different from each other (Urdan, 2011:105).

- **Exploratory factor analysis (EFA)**

Factor analysis allows the researcher to reduce a large set of variables down to a smaller, more manageable number of dimensions or factors (Pallant, 2007:179). Specifically, EFAs were implemented to explore the grouping or clustering of variables to identify underlying patterns within the IFDFW, SWLS, and IPAQ (Cohen, 1988).

Confirmatory factor analysis (CFA)

A CFA refers to a multifaceted and sophisticated set of methods used to confirm specific hypotheses or theories pertaining to the structure underlying a set of variables (Urdan, 2011:177). Once the CFA on GLRTS was implemented, a reliability analysis was conducted.

- **Reliability**

Reliability refers to the extent to which a scale produces consistent results when it is repeatedly used for measurement (Malhotra, 2010:318). Cronbach's alpha will be used to test the reliability of the scale. Cronbach's alpha is measured between zero and one (Pallant, 2007:6). When working with humans, a set of items which have a Cronbach's alpha level of 0.60 or higher is considered acceptably reliable (Malhotra, 2012:320).

- **Structural equation modelling (SEM)**

SEM refers to a statistical analysis method wherein the researcher specifies *a priori* how a set of variables should be organised and then tests to see how well this specified model fits with the observed data (Urdan, 2011:182). Figure 1.1 illustrates the six-step process involved in SEM.

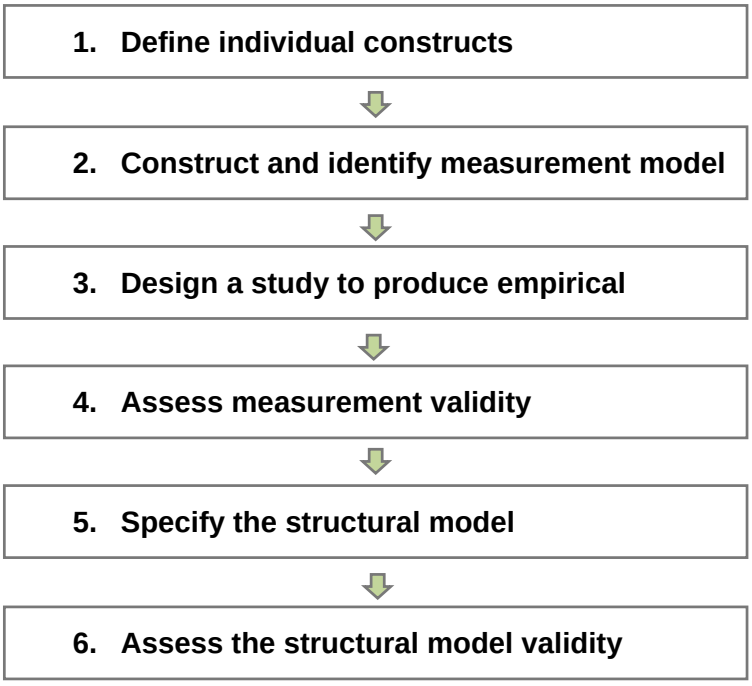

Figure 1. 1: The six-stage process of SEM

Source: Hair *et al.* (2010:654) and Malhotra (2010:729)

- **Effect sizes**

Effect sizes are calculated in order to determine whether the effect between certain variables is significant in practice. The effect sizes of the linear modelling will be measured by Cohen's d-values: d≤0.4 as small with little or no significant difference, 0.5≤0.8 medium that tended towards practically significant difference and d≥0.8 large with

practically significant difference. Only medium and large effects sizes as well as the p≤0.05 of the linear models which showed a significant effect were considered for analysis (Cohen, 1988:25-27).

Table 1.1 provides a list of this study's empirical objectives as well as the corresponding descriptive and inferential statistics to be implemented in the study.

Table 1. 1: Empirical objectives and statistics

Empirical objectives	Statistics
1. Report on the level of risk tolerance and investor well-being of the sample	Descriptive
2. Analyse the respective relationships between age, income, education, investor well-being and risk tolerance	Descriptive, Correlation
3. Examine gender's influence on investor well-being and risk tolerance	Descriptive, T-test
4. Explore the respective mean differences between race, marital status, place of origin, investor well-being, and risk tolerance	ANOVA, Cohen's d
5. Analyse the effect of investor well-being on risk tolerance	Correlation
6. Construct a model which depicts the influence of investor well-being on risk tolerance	SEM

Source: Author compilation

The quantitative data will be analysed using the IBM Statistical Package for Social Sciences™ (SPSS) Version 25 (IBM SPSS, 2018), and AMOS™, Version 25 for Microsoft Windows (IBM SPSS Amos, 2018).

1.5 CONTRIBUTION OF THE STUDY

The contribution of the study is focussed towards academia as well as practitioners in risk management and investment. Firstly, the study aims to create the following links between risk tolerance and investor (i) financial well-being, (ii) satisfaction with life, and (iii) physical activity. As such, the literature surrounding these links will be a contribution to research studies in risk management and investment. Furthermore, the literature contributed will be developed from a South African perspective. Therefore, the study will provide insight into how South African investors' financial well-being, satisfaction with life, and physical activity influences risk tolerance, and ultimately their risk profiles.

Based on the findings, a SEM will be developed wherein it is presented what kind of relationship investor well-being has with risk tolerance. In detail, the relationship between risk tolerance and the elements of investor well-being will be presented in the SEM. The SEM will also reflect which of the elements of investor well-being have the largest effect on risk tolerance. As such, it will be clear to see which element of investor well-being will have an influence on an investor's risk profile. The SEM can be viewed as a practical contribution towards risk and investment companies who would be interested in it to profile their investors.

1.6 ETHICAL CONSIDERATIONS

The study conforms to the ethical standards of academic research recommended by the North-West University (NWU, 2016). The necessary permission to conduct this study was obtained from the investment company concerned.

The investment company concerned was responsible for screening the participants. As such, the researcher has no knowledge of the client database of the investment company. Furthermore, no identifying marks were placed on the responses received. As a result, the anonymity of the participants is guaranteed.

The researcher only received the raw data from the investment company involved; therefore, the information obtained through the responses of the participants will remain confidential. The investment company which collected the data indicated that they had no issue with the data being published as long as the investment company is not mentioned in any way.

1.7 CHAPTER OUTLINE

This study will comprise of the following chapters:

Chapter 1: Introduction, problem statement and objectives of the study – provides a brief introduction to the study. Furthermore, the problem statement, theoretical and empirical objectives, as well as the quantitative research design and methodology are described.

Chapter 2: Literature review: Risk, risk profile and risk tolerance – this chapter conducts an in-depth analysis on existing literature regarding risk, risk profile and risk tolerance. Additionally, risk tolerance measuring instruments and factors which have been found to influence risk tolerance are discussed.

Chapter 3: Literature review: Financial well-being, satisfaction with life, and physical activity – This chapter analyses investor well-being in terms of financial well-being, satisfaction with life, and physical activity.

Chapter 4: Research design and methodology – this chapter provides the methodological process which was followed during the implementation of the study. Additionally, statistical methods to analyse the collected data are included in the discussion.

Chapter 5: Results and findings – presents the empirical study's results and findings. The statistical analysis involving descriptive statistics, mixed modelling, and SEM are included in this chapter. Furthermore, the SEM representing the influence of investor well-being on risk tolerance are also be presented and explained in this chapter of the study.

Chapter 6: Conclusion and recommendations – concludes the research process with an overview of the research journey and provide recommendations for future research. Limitations and implications (if any) for further research are also outlined.

CHAPTER 2: LITERATURE REVIEW: RISK, RISK PROFILES, AND RISK TOLERANCE

2.1 INTRODUCTION

In Chapter 2, the study aimed to fulfil its first theoretic objective which was to *provide a comprehensive theoretical analysis relating to risk tolerance*. The literature review in Chapter 2 focuses on three main topics, namely (i) risk, (ii) risk profiles, and (iii) risk tolerance. Section 2.2 commences with a discussion on the definition of risk. Subsequently, previous studies conducted on risk prior the 2000s are discussed as well as existing literature on risk from 2000 to 2018 are analysed.

Section 2.3 entails defining a risk profile suiting this study's purpose and exploring the various compositions of which risk profiles can exist in. The importance of risk profiling during an investor's investment journey is discussed. Section 2.3 provides the definitions of risk tolerance and reviews existing literature on risk tolerance. The existing literature on risk tolerance are covered from the perspective of the following themes: (i) behaviour towards risk and decision-making; (ii) risk tolerance measures; (iii) explaining and predicting investor behaviour; and (iv) factors related to risk tolerance. Lastly, the synopsis of the chapter is provided in Section 2.4.

2.2 RISK

Risk is a fundamental concept for most fields of research and practice. In terms of the financial literature, it is important to define and understand risk as it has a dominant presence in financial products and how investors choose to invest (Gorter & Bikker, 2011:1). The following section provides a detailed review on the definitions of risk as well as a definition, which is applicable to this study.

2.2.1 Defining risk

Ramudzuli (2016:11) mentions that risk is about the actions that individuals dare to take and that the actions taken are dependent on how much freedom these individuals have to make such decisions. Mabalane (2015:7) states that risk (as well as the perception thereof), whether in the realms of professional practice, education or in a social context,

is an important aspect of decision-making and in everyday life. One of the ways that risk is present, from a financial perspective, is in the risk profiles of investors. Risk is considered a broad concept, therefore, there is a lack of consensus when it comes to providing a universal definition for risk (Aven, 2011:28). The discussion of risk definitions has been divided into two categories, namely risk discussions prior to the 2000s and risk discussions from 2000 to 2018.

2.2.1.1 Discussions on risk prior 2000s

One of the first authors to discuss the concept of risk was John Haynes in 1895. Haynes (1895:409) defined risk as a chance of damage or loss. Furthermore, Haynes (1895:409) states that if there is any uncertainty whether or not the performance of a certain action will produce a harmful result, it means the performance of that action is the assumption of a risk. Wood Jr (1964:85) states the use of the term uncertainty does not form part of Haynes' definition of risk, rather it emphasises the chance aspect of risk. Therefore, Haynes' definition of risk is based on the possibility of damage or loss and not necessarily on uncertainty.

Willet's book, *The Economic Theory of Risk and Insurance*, which was released in 1901, is regarded as the first scholarly treatment of risk and insurance (Houston, 1964:512). Willett (1951:6) defines risk with reference to the degree of uncertainty about the occurrence of a loss. Based on the definition, risk is the objective correlative of the subjective uncertainty. As such, uncertainty is considered as exemplified in terms of external world events, of which subjective uncertainty is approximately an accurate interpretation (Willett, 1951:6). Willet used terms such as chance, uncertainty, objective and subjective during the process of defining risk (Wood Jr, 1964:87).

Knight (1921:233) based the definition of risk on uncertainty; however, from an aspect that is concerned about the economic aspects of risk and uncertainty (Houston, 1964:513). Based on this definition, uncertainties were first classified as either measurable or immeasurable (Knight, 1921:233). Wood Jr (1964:88) mentions that measurable uncertainty is an objective occurrence, which is referred to as risk and immeasurable uncertainty is a subjective occurrence referred to as uncertainty. Based on Knight's definition, not all risks can be defined as a chance of loss, since not all risks can

be measured (Wood Jr, 1964:88). Pfeffer (1956:42) states that risk and uncertainty are counterparts of one another and that risk is measured by objective probability while uncertainty is measured by a subjective degree of belief. Wood Jr (1964:89) mentions that Pfeffer's analysis of uncertainty indicates that uncertainty is a state of mind, which varies from one individual to the next and from time to time.

Kaplan and Garrick (1981:12) state that the concept of risk includes both uncertainty and some type of loss or damage that might be experienced. Moreover, it is considered that risk – and not uncertainty – is a subjective concept (Kaplan and Garrick (1981:12). Trickey (2018:21) suggests that there are two types of risk, namely perceived risk, which is subjective and absolute risk, which is objective. However, the notion of absolute risk will always end up being somebody else's perceived risk. Ultimately, risk analysis is based on three questions: (i) what can occur or go awry; (ii) how likely is it to occur; and (iii) if it does occur, what are the consequences (Holton, 2004:22; Dickason, 2017:9).

Renn (1998:50) mentions that all concepts of risk have one thing in common, which is the distinction between possibility and reality. As such, risk is often associated with the likelihood that an undesirable state of reality may transpire due to individual activities or natural events (Renn, 1998:51). Table 2.1 provides a summary of the risk definitions that were found in the literature dating prior the 2000s.

Table 2. 1: Definitions of risk (prior 2000s)

Year	Author	Definition of risk
1895	John Haynes	The word risk signifies chance of damage or loss.
1901	Allen H. Willet	Risk is defined as the degree of uncertainty pertaining to a situation wherein a loss occurs, and not the degree of probability that it will happen.
1921	Frank H. Knight	Measurable uncertainty is referred to as risk.
1956	Irving Pfeffer	Risk refers to a mixture of hazards which are measured by probability. Uncertainty is a state of the world and is measured by the degree of disbelief.
1981	Stanley Kaplan and B. John Garrick	Risk is a group of scenarios, of which each has a probability and a consequence.
1998	Ortwin Renn	Risk is the possibility that single occurrences or events lead to consequences which affect elements of what individuals choose to value.

Source: Author compilation

The following section focusses on risk definitions from 2000 to 2018.

2.2.1.2 Discussions on risk throughout 2000 – 2018

Garland (2003:4) defines risk as estimations of possible events. Moreover, risk is described as the product of future-oriented assessments that an individual makes in the face of uncertainty, as well as the possibilities that the risk holds for the individual (Aven & Renn, 2009:1-2). Risk always exists in the context of uncertainty (Gifford, 2010:304) and that risk begins where certain knowledge ends. In other words, risk occurs when certainty regarding a situation is no longer present and uncertainty regarding the situation arises. Garland (2003:5-9) also mentions that risks are conditional, reactive, continually calculated and compensated and interactive.

Risks are relationships of possible adversity, which are calculated (Moles, 2016:20) and assessed by an individual for some specific purpose using certain means (Artzner *et al.*, 1999:3). Therefore, the notion of a risk is considered thoroughly conditional. Risk is considered reactive since it responds to the attitudes and actions that individuals adopt towards it (Maurutto & Hannah-Moffat, 2006:448). Risks are also continually calculated and compensated since many individuals have the tendency to first weight up the benefits and costs of their situation before behaving accordingly (Garland, 2003:7). Garland (2003:8) states that the risks individuals take depend on the actions of others; as such, risk is intensely interactive and otherwise profoundly social.

Holton (2004:22) states that risk comprises two factors, namely uncertainty and exposure. Moles (2016:28) refers to uncertainty as a situation of not knowing whether a proposition is true or false. Exposure, on the other hand, refers to a situation wherein an individual is open to a proposition and is concerned whether or not the proposition is true Holton (2004:22). Similarly to Kaplan and Garrick (1981), Holton's definition of risk is based on what situation could happen; how likely it is for the situation to occur and what the consequences would be if that certain situation occurs.

Hillson (2004:6) defines risk as a situation wherein the occurrence of uncertainty could affect one or more objectives. In this sense, these objectives refer to personal objectives such as health and financial well-being, project objectives such as delivering on time and within a budget, as well as business objectives such as to increase profit and market share (Hillson, 2004:6). Hillson and Murray-Webster (2004:2) define risk as uncertainty

that matters, since uncertainty that is without any consequence does not pose a risk or threat.

Aven and Renn (2009:2) state that risk refers to the uncertainty and severity of the consequences of an activity with respect to something which individuals value, for example, their financial well-being. Wood Jr (1964:87) mentions that uncertainty is not real; it is a construct of human imagination to cope with possible future consequences that can become real. Therefore, it can be concluded that one of the key factors of risk, uncertainty, is also in this definition regarded as a subjective occurrence (Aven & Renn, 2009:8). This definition of risk is not only based on uncertainty and consequences but the severity of the consequence as well.

Dinu (2014:2458) defines risk as the possibility of loss. In this case, the determination of risk is based on information or a long experience that could allow an individual to perform some estimates of the probability of its consequences (Dinu, 2014:2458). In general, risk means the probability of possible loss or eventual losses (Vanguard, 2018:5), which individuals aim to prevent or diminish through various risk-minimising strategies. Financial advisors perceive risk as an unfavourable outcome, a probability of loss, however, still attached to a gain (Carr, 2014:5). Moreover, Dinu (2014:2458) mentions that in the area of investment, risk is recognised if it is compounded with an additional gain that can be forecast with some probability.

Moles (2016:16) confers that risk has the connotation of danger, hazard, the chance of loss, an entity that can lead to profit or loss, the amount of a loss, a gamble or a bet. Moles (2016:16) defines risk as the chance of a deviation from an expected outcome. In this case, probabilities are attached to risk so that risk can be quantified and expressed as a number, value, or parameter (Ragheb, 2018). Moreover, risk is concerned with not only probabilities (or the extent) of potential losses but with deviations from an expected outcome (Candor Holdings, 2018). Therefore, it is the extent to which the actual outcome deviates from the expected outcome that makes a situation risky. Additionally, Ricciardi (2008:86) mentions that there is a psychological meaning to risk, which is the state of uncertainty or hesitation that occurs in a situation with advantageous and adverse consequences.

Patersons (2018) states that risk is categorised broadly as the likelihood an outcome or investment's actual return differs from the expected outcome or return. Risk consists of the likelihood of losing some or all of an original investment (Patersons, 2018). Vanguard (2018:5) states that technically, risk means the possibility of various outcomes that result from a given action. Moreover, investors usually perceive risk as being the prospect of an undesirable outcome such as a financial loss or failing to meet an investment objective (Vanguard, 2018:5).

Table 2.2 provides a summary of the various definitions of risk (from 2000 – 2018) as discussed above.

Table 2. 2: Definitions of risk (2000 – 2018)

Year	Author	Definition of risk
2003	David Garland	Risks are estimates of possible events.
2004	Glyn A. Holton	Risk is exposure to a proposition of which an individual is uncertain.
2004	David Hillson	Risk is defined as an uncertainty which may result in a positive or negative effect on one or numerous objectives.
2009	Terje Aven and Ortwin Renn	Risk is the uncertainty regarding and severity of the consequences of an activity that is linked to something individuals' value
2014	Ana Maria Dinu	Risk is the possibility of loss.
2016	Peter Moles	Risk is the probability of a deviation from an expected outcome.
2018	Patersons	Risk is the probability an investment's actual return will not be the same as the expected return.

Source: Author compilation

Ultimately, the abovementioned discussion provides a lengthy analysis on the various definitions of risk that are available in previous literature. The discussion entails definitions of risk prior to the 2000s as well as definitions of risk that were found in the literature that dated from 2000 to 2018.

For the purpose of this study, risk is simply defined as the possibility of a financial loss (Vanguard, 2018:5). In other words, the possibility that an investor's return on a financial product or investment is lower than the expected return, is what is regarded as risk in this study. In this context, risk also applies to a situation wherein an investor's investment portfolio earns lower returns than the returns expected by the investor or their financial advisor.

As such, risk plays an important role in an investor's risk profile. In terms of risk profiling, the ultimate goal for a financial advisor is to determine the level of risk an investor can

and is willing to take on during the purchase of financial products or investments. The following section provides a discussion on risk profile pertaining to the terms used during risk profiling, the definition of risk profile as well as the importance of risk profiling.

2.3 RISK PROFILE

Risk profiles include various levels of financial risks, which an investor, with the help of a financial advisor, needs to consider when making financial decisions aimed at achieving the financial objectives and level of financial well-being that the investor set (Barclays, 2018; Fidelity Investments, 2018; Vanguard, 2018). There is an extremely important emphasis put on risk profiles and assessing investors' risk tolerances during the financial planning process (Carr, 2014:31).

As such, financial advisors face a challenging task in developing, assessing and evaluating strategies to help investors make appropriate and effective financial decisions that entail risk (Nobre & Grable, 2015b:18). What makes the task more difficult is that there are an overabundance of terms that are used to describe investor's risk attitudes (Nobre & Grable, 2015b:18). These terms are not only inconsistently applied, but also similar enough to each other to create confusion. The purpose of this section is to first differentiate between these risk terms as they play a vital role in risk profiling, then to provide a definition for risk profile and lastly, to discuss the importance of risk profiling.

2.3.1 Risk terms used to define a risk profile

It is often difficult for financial advisors to describe and define aspects of a risk profile to an investor. This is due to the fact that financial advisors use risk terms such as risk tolerance, risk perception, risk preference and risk need interchangeably (Nobre & Grable, 2015b:18). Since these terms play a pivotal role in the development of an investor's risk profile, it is important to first differentiate and appropriately define these risk terms. The purpose of Table 2.3 is to provide a brief clarification on the terminology that is used to create an investor's risk profile.

Table 2. 3: Clarification of risk terms

Risk term	Definition	Author(s)
Risk knowledge	An investor's understanding or aptitude of risk as well as the risk-return trade-off.	Patersons (2018)
Risk capacity	Objective evaluation of an investor's financial ability to withstand a risk.	Brayman *et al.* (2017:74)
Risk composure	An investor's propensity to act in a reliable manner in the presence of risk. An investor's real-life decisions in financial situations. This is sometimes referred to as *risk appetite* or *risk propensity.*	Cordell (2001:36), Carr (2014:28), Klement (2018:37)
Risk need	Amount of risk an investor needs to take in order to reach a financial objective. Also referred to as *risk required*. This is typically based on an expected required rate of return.	Kruger (2014), Nobre and Grable (2015b:19), Ryack *et al.* (2016:54)
Risk perception	An investor's subjective evaluation, which is based on a cognitive appraisal of the riskiness of a decision outcome. In other words, an individual's subjective view of risk.	Klement (2018:37)
Risk preference	An investor's general feeling toward or against taking a specific risk, regardless of whether the feeling is objectively true or false. It can also be described as an individual's choice to engage in risk.	Carr (2014:28), Nobre and Grable (2015b:19)
Risk tolerance	An investor's willingness to engage in a risky behaviour in which possible outcomes can be negative. Sometimes referred to as *risk attitude* in some literature.	Hallahan *et al.* (2004:57), Brayman *et al.* (2017:74)
Risk aversion	The inverse of risk tolerance. In other words, an investor's natural preference to avoid making a risky decision when given the opportunity.	Carr (2014:29)

Source: Author compilation

Since a brief clarification of risk terms used during risk profiling is provided, the next section is aimed at providing a discussion regarding the various definitions of risk profile and to provide a general definition of risk profile that is suitable for this study.

2.3.2 Risk profile definition and compositions

When investors are offered a choice between financial products that entail risk, they tend to favour the product that makes the most returns with the least amount of risk (Nobre & Grable, 2015b:18). The willingness of accepting risk differs from investor to investor; therefore, financial advisors use risk profiles to guide them in advising investors in making appropriate financial decisions. Typically, financial advisors use the term "risk profile" as a blanket term to describe the investor traits and various other aspects that need to be considered when identifying suitable financial products for the investor (Klement, 2015:2).

Cordell (2001:36-40) proposes that risk capacity, risk knowledge, risk attitude and risk propensity are the aspects that need to be considered when compiling an investor's risk profile. These four aspects have an influence on an investor's level of risk tolerance (Dickason, 2017:17). As such, an investor's decision to change, adapt or terminate a risky behaviour is all dependent on the investor's identified levels of risk capacity, risk knowledge, risk attitude and risk propensity (Dickason, 2017:17). Therefore, Cordell (2001) is of the opinion that those aspects need to be evaluated during risk profiling since they have an influence on risk tolerance and, ultimately, an influence on the level of risk an investor will decide to take on. Figure 2.1 illustrates the composition of a risk profile as defined by Cordell (2001).

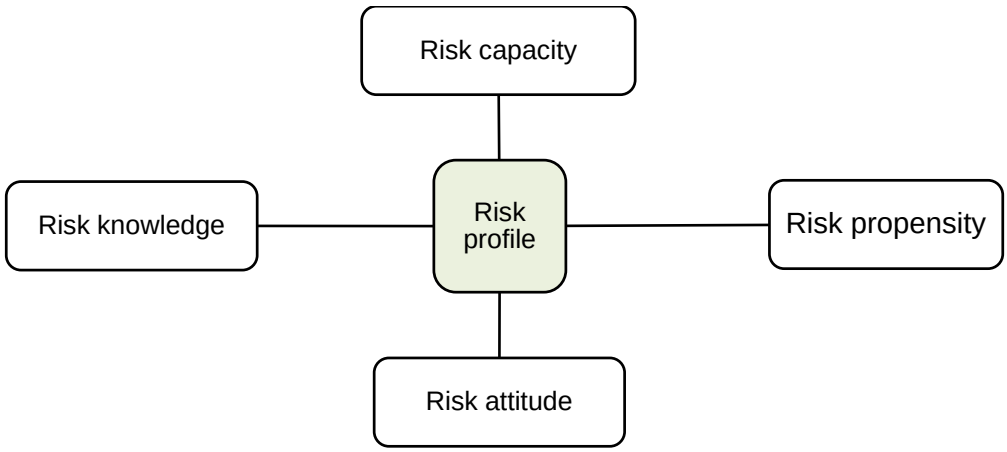

Figure 2. 1: Risk profile composition 1

Source: Cordell (2001:36-40)

Kitces (2006:56) and Barclays (2018) describe a risk profile as constituting two aspects, namely risk capacity and risk tolerance. Risk capacity refers to an investor's financial ability to sustain risk (Barclays, 2018) and is measured in terms of an investor's asset base, liquidity needs, as well as time horizon (Kitces, 2006:56). Risk capacity helps determine how long or how severely an investor could afford to miss their targeted financial goals and still be able to fund their future financial objectives. Moreover, risk tolerance examines the investor's willingness to bear the risk of earning lower returns in return for the possibility to earn higher returns (Kitces, 2006:56). Kitces (2006:56) is of the opinion that the combination of an investor's risk capacity and risk tolerance is what constitutes a risk profile, which a financial advisor can use to recommend appropriate

financial solutions for the investor. Figure 2.2 is an illustration of a risk profile as defined by Kitces (2006) and Barclays (2018).

Figure 2. 2: Risk profile composition 2

Source: Kitces (2006:56) and Barclays (2018)

Adajania (2013), Kruger (2014) and Vanguard (2018:15) state that a risk profile is constructed by three aspects, namely risk capacity, risk tolerance and risk required. In this case, risk capacity entails analysing an investor's balance sheet, flow of income, net worth, *et cetera* (Kruger, 2014). The purpose of analysing an investor's personal financial factors is to determine how much financial risk the investor can take on. Secondly, an

investor's risk tolerance is evaluated to establish the investor's willingness to take on risk. Adajania (2013) mentions that risk tolerance is a psychological analysis wherein a financial advisor should use their own intuitive skills, observation and understanding to better perceive the investor's mentality towards risk. Lastly, an investor's risk required should be evaluated to determine what level of risk needs to be taken over a certain time horizon in order for the investor's financial goals to be met (Grable, 2000:629).

Kruger (2014) mentions that both risk capacity and risk required are financial aspects, which a financial advisor can calculate through the use of software, which is recommended by the company the financial advisor works for. On the other hand, an investor's risk tolerance is a psychological factor, which is best measured through the use of a psychometric test (Grable & Lytton, 1999:163). Additionally, Kruger (2014) states that risk capacity, risk tolerance and risk required be assessed separately in order for the financial advisor to do a comparison. Should there be a mismatch between the factors, it is the financial advisor's duty to guide an investor through the trade-off decisions that are required to reach an optimal solution.

Vanguard (2018:16) mentions that it is important for a financial advisor to fully understand an investor's risk tolerance, as that is the main focus during risk profiling. An investor's risk tolerance can in some cases clash with an investor's risk capacity. In such a case, it is the financial advisor's duty to take time to counsel the investor by explaining the consequences of the conflict between the two aspects (Vanguard, 2018:16). Figure 2.3 illustrates a risk profile composition based on the risk profile definitions of Adajania (2013), Kruger (2014) and Vanguard (2018).

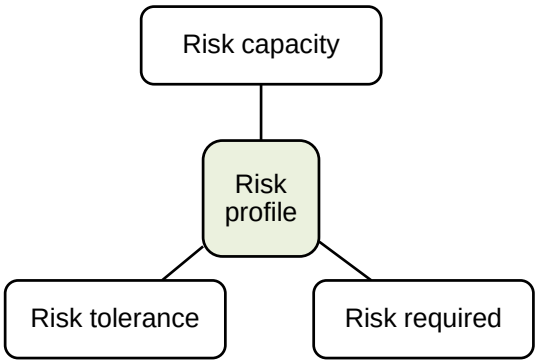

Figure 2. 3: Risk profile composition 3

Source: Adajania (2013), Kruger (2014) and Vanguard (2018:16)

Carr (2014:125) determined that an investor's risk profile is comprised of risk tolerance, risk perception and risk need. Risk tolerance specifically refers to the maximum quantity of uncertainty an investor is willing to accept when making a financial decision (Cordell, 2001:72). Risk perception is included in a risk profile as it is primarily a cognitive activity, which involves the accurate appraisal of risk, both externally and internally (Brayman *et al.*, 2017:74). Lastly, risk preference is included in a risk profile as it refers to an investor's psychological propensity to take a certain level of risk in return for a potential reward and this plays an important role during risk profiling (Carr, 2014:73-74). Figure 2.4 is a diagram of the composition of a risk profile as described above.

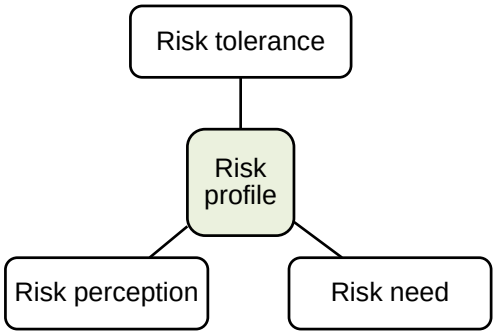

Figure 2. 4: Risk profile composition 4

Source: Carr (2014:125)

Nobre and Grable (2015b:20) define a risk profile as an amalgamation of relatively stable risk aspects, which help in shaping an investor's risk-taking behaviour. Figure 2.5 is an illustration of the relatively stable aspects an investor's risk profile consists of as suggested by Nobre and Grable (2015b) as well as Brayman *et al.* (2017).

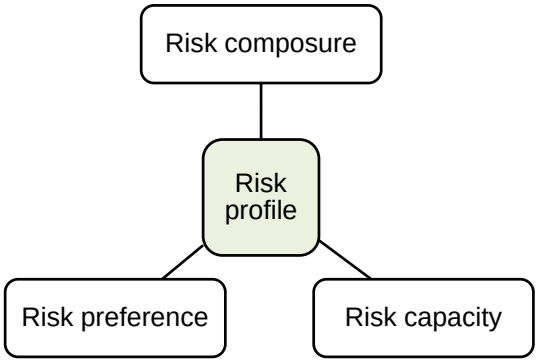

Figure 2. 5: Risk profile composition 5

Source: Nobre and Grable (2015b:20); Brayman *et al.* (2017)

According to (Nobre & Grable, 2015b:20), the selected aspects – risk composure, risk preference and risk capacity – are considered to be fairly stable over time and across situations. Aspects such as risk need and risk perception are considered more variable and based on the decision-making environment (Krishna, 2017). However, both risk need and risk perception can be combined with risk profile in order to better understand the process financial advisors and investors use to make risky financial decisions (Masthead, 2016).

Similarly, Brayman *et al.* (2017:72) acknowledge that an investor's risk profile is assumed to consist of a combination of objective and subjective attributes. These attributes consist of a set of relatively stable factors that a financial advisor should take into consideration before advising an investor on risky financial products (Nobre & Grable, 2015b:20). Klement (2015:3) refers to objective factors as aspects, which can be measured, such as risk capacity and time horizon. Alternatively, subjective factors refer to concepts such as risk perception and risk preference, of which both are based on an investor's idiosyncratic evaluations of the riskiness of a situation or choice (Brayman *et al.*, 2017:72-73). Carr (2014:5) also mentions that objective factors are relatively easy to measure and evaluate, whereas, subjective factors within a risk profile are more difficult to measure and evaluate.

Alternatively, Klement (2015:3) is of the opinion that the mixture of risk capacity and risk aversion establishes what the finance industry refers to as a risk profile. In this case, risk capacity applies to an investor's objective ability to take on financial risk (Krishna, 2017). Furthermore, risk capacity is based on impartial economic conditions such as an investor's investment horizon, income, wealth, liquidity needs, tax rates and other factors (Klement, 2015:3; Masthead, 2016). Risk aversion is understood as the combination of psychological traits and emotional responses that determine an investor's willingness to take on financial risk (Roszkowski & Grable, 2005:67; Carr, 2014:29). Moreover, risk aversion is based on the extent of psychological or emotional pain an investor undergoes when faced with a financial loss (Klement, 2018:3). Figure 2.6 illustrates the composition of a risk profile as defined above.

Figure 2. 6: Risk profile composition 6

Source: Klement (2015:3)

As discussed in the aforementioned paragraphs, a risk profile can be composed by various combinations of risk aspects. The combination of risk aspects of a risk profile is dependent on the financial advisor or company that sets up the risk profile. As such, only the risk aspects that the financial advisor or company deem important to measure when risk profiling an investor are included in a profile. Table 2.4 provides a summary of the various combinations of risk aspects, which various authors have deemed to be part of a risk profile.

Table 2. 4: Risk profile aspects

Author and year	Risk profile aspects
Cordell (2001)	Risk capacity, risk knowledge, risk propensity and risk attitude
Kitces (2006)	Risk capacity + risk tolerance
Barclays (2018)	
Adajania (2013)	Risk capacity + risk tolerance + risk required
Kruger (2014)	
Vanguard (2018)	
Carr (2014)	Risk tolerance + risk perception + risk need
Nobre and Grable (2015b)	Risk capacity + risk composure + risk preference
Brayman *et al.* (2017)	
Klement (2015)	Risk capacity + risk aversion

Source: Author compilation

In terms of this study, a basic risk profile consists of an investor's risk capacity and risk tolerance (Kitces, 2006:56; Barclays, 2018). As illustrated in Table 2.4, most compositions of risk profile include the risk aspect of risk capacity. The reason is that it is important to first determine whether or not an investor has the financial ability to withstand risk (Barclays, 2018). If the investor has the appropriate level of risk capacity, a financial advisor will focus on analysing one of the most important aspects of risk profiling, which

is risk tolerance (Nobre & Grable, 2015b:18). Once the risk tolerance of an investor has been accurately identified, the financial advisor's likelihood to provide the investor with appropriate financial advice will be increased (Carr, 2014:1).

2.3.3 Importance of risk profiling

Risk profiling is the procedure of finding the optimum level of financial risk an investor is able to take while taking into consideration their risk capacity and risk tolerance (Masthead, 2016). In other words, risk profiling refers to the procedure of determining the appropriate financial or investment strategy while taking risk into account (Krishna, 2017). Roszkowski and Davey (2010:42) state that the evaluation of an investor's risk profile is usually accepted as a prerequisite to the development of a sound financial plan for the investor. Therefore, during financial planning, investors are first required to undergo risk profiling before any financial advice is given to them. As such, minimal protection is nonetheless implemented for the investor.

Generally, investors feel that they have an accurate sense of what level of financial risk they should and are willing to take (Carr, 2014:34). However, in many cases, an investor's preferences and needs differ from the actual financial decisions they make (Carr, 2014:1). This is due to investors having no concept of the amount of risk they should be taking with respect to their financial plans (Rattiner, 2005:42). These investors merely have an idea of what their financial objectives are. Therefore, it is a financial advisor's duty to first assess an investor's risk profile as accurately as possible (Klement, 2018:2).

Once an investor's risk profile has been analysed, a financial advisor can align the investor's financial objectives and goals with financial products of the appropriate risk level (Callan & Johnson, 2002:36). A financial advisor should only recommend certain financial products to an investor who can and is willing to tolerate the risks associated with those financial products (Carr, 2014:4). Moreover, the potential rewards must justify the amount of risk the investor tolerates with the financial products selected (Carr, 2014:4).

Financial advisors have fiduciary and suitability responsibility to evaluate an investor's level of risk with respect to the individual's financial plan (Morse, 1998:281). The fiduciary standard plays an important role in the code of conduct of financial advisors. The fiduciary

standard implies that when a financial advisor provides financial advice to an investor, they need to act in the best interest of the investor (Carr, 2014:3). In other words, a financial advisor should not be subjective when providing an investor with financial advice (Finke & Langdon, 2012:1). If a financial advisor mismanages risk in terms of an investor's risk profile and it leads to unsatisfactory financial results, the financial advisor may be exposed to facing a legal claim by the unsatisfied investor (Masthead, 2016).

Since a financial advisor assesses an investor's risk profile at the beginning of the financial planning process, it is vital that the profiling is done accurately (Carr, 2014:34). If an investor's risk profile is not appropriately analysed, it may lead to the rest of the financial planning process not being accurate (Vanguard, 2018:16). An incorrect analysis of an investor's risk profile could result in unmet financial objectives and decreased financial satisfaction for the investor in the case of negative outcomes.

Ultimately, when it comes to financial planning, the importance of risk profiling is undeniable. Through accurate risk profiling, an investor's financial decisions will be more likely to fit their financial needs and personalities (Carr, 2014:1). As such, the probability of the investor experiencing a successful financial outcome will be increased (Nobre & Grable, 2015b:20).

In general, risk tolerance is considered an essential risk aspect in shaping the formation of an investor's personal financial planning and investment recommendations (Grable, 2018:18). Therefore, understanding risk tolerance is a significant process when giving financial planning advice. The following section provides an in-depth discussion on risk tolerance in terms of the definition, the factors that influence it and the importance thereof.

2.4 RISK TOLERANCE

Risk tolerance is considered a vital factor, which has an influence on a wide range of personal financial decisions (Snelbecker *et al.*, 1990). Hanna and Lindamood (2004) mention that risk tolerance is recognised as a principle factor of choice behaviour throughout investments such as asset allocation, wealth accumulation, insurance and retirement plans.

Risk tolerance affects the manner in which financial advisors advise investors to allocate their financial resources over the short- and long-term in order for them to obtain their goals and secure their financial well-being (Grable, 2000:629). Also, risk tolerance differs from investor to investor; as such, investors act differently when making financial decisions (Masenya, 2017:26).

Investors with a high risk tolerance are expected to financially behave differently to investors with a low risk tolerance (Masenya, 2017:26). It is commonly anticipated that high risk tolerant investors accept higher levels of financial risk compared to investors with a low risk tolerance (Grable, 1997:13). The following section provides a discussion on the definition of risk tolerance; thereafter, the importance of risk tolerance is briefly discussed and an analysis of the past literature on risk tolerance is provided.

2.4.1 Defining risk tolerance

Harlow and Brown (1990:51) define risk as the extent to which an investor is willing and able to accept the likelihood of an uncertain result to an economic decision. Moreover, Harlow and Brown (1990:51) mention that a measure of risk tolerance is beneficial in summarising the perception of an investor about the trade-off between risk and the return required for bearing that risk.

Irwin Jr (1993:7) defines risk tolerance as an individual's willingness to engage in financial behaviours of which the results are uncertain and the chance of a detectable negative outcome is present. Similarly, Grable (2000:625) refers to risk tolerance as the maximum amount of uncertainty an individual is willing accept when faced with making a financial decision.

Hallahan *et al.* (2004:57) state that risk tolerance is an individual's attitude toward accepting risk and that risk tolerance is a vital notion which has consequences for both financial advisors and investors. For investors, risk tolerance is one factor, which helps in determining the appropriate asset composition in the investor's composition (Patersons, 2018). For financial advisors, the determined risk tolerance of an investor can be useful in the asset composition of the investor's portfolio, which can be set optimally in terms of risk and return relative to the needs of the investor (Hallahan *et al.*, 2004:57). For the purpose of the study, risk tolerance refers to the maximum amount of uncertainty that an

investor is willing to accept when making a financial decision (Grable, 2000:625). Moreover, the terms risk tolerance and financial risk tolerance are used interchangeably but refer to the same concept of risk tolerance as defined for this study.

A financial advisor is expected to make vital financial choices regarding an investor's investment products, asset allocation and/or fund accumulation strategies (Dickason, 2017:11). The financial decisions implemented are based off the investor's determined risk tolerance (Dickason, 2017:11). As such, it is important that a financial advisor investigates and understands an investor's risk profile, specifically the investor's risk tolerance.

2.4.2 Review of existing literature on risk tolerance

There is a wide and varied amount of existing literature on risk tolerance, which is discussed in several disciplines such as social and economic sciences (Brighetti *et al.*, 2010:5). According to Brighetti *et al.* (2010:5), there are four main issues that have been considered in the literature regarding risk tolerance, namely (i) how to explain investors' decision making and behaviour towards risk, (ii) how to measure risk tolerance; (iii) how to explain and predict investor behaviour when taking investment portfolio choices and obtaining performances; and (iv) which factors may explain investor's level of risk tolerance.

2.4.2.1 Behaviour towards risk and decision-making

The first stream of studies is widespread and continuing to develop. This is specifically regarding the input from neuroscience/psychology, since the significant improvement in neuroimaging techniques such as functional magnetic resonance imaging or positron emission tomography are still new (Brighetti *et al.*, 2010:5). The results from the study provided confirmation of a new model of psychological functioning that places rationality and emotion side-by-side to a third factor, which is the counterfactual thinking and the wandering mind.

2.4.2.2 Risk tolerance measurements

A number of researchers have called for the conduction of formal processes and examinations to the financial risk tolerance assessment process; however, there seems to be a lack of agreement on how to conduct it best (Grable & Lytton, 1999; Yook & Everett, 2003; Roszkowski & Grable, 2005). Due to its subjectivity, risk tolerance is a difficult concept to measure in practice (Masenya, 2017:27). Methods for measuring risk tolerance have been devised by many researchers from various fields of research; nonetheless, the recommended procedures differ based in part on the academic or professional background of the assessor (Grable & Joo, 2000).

Roszkowski and Grable (2005:30) state that the formal valuation of risk tolerance can take on many forms. Grable (2008:8) suggests that in practice, risk tolerance tends to be measured through six different methods, namely (i) personal or professional judgement; (ii) heuristics; (iii) observation; (iv) single-item questions; (v) risk scales; and (vi) mixed measures.

First, Brighetti *et al.* (2010:5) is of the opinion that personal or professional judgement can be used to measure and assess risk tolerance; however, it tends to be strongly biased due to the subjectivity of the individual who is assessing the risk tolerance. As a result, the measurement and assessment of the risk tolerance may not be as accurate as possible. Grable (2008:8) states that investors who rely on personal or professional judgement tend to use one of four methods to assess risk tolerance, namely to:

- assume that others have the same risk tolerance as them; or
- perceive that others are less risk tolerance; or
- predict that others have slight differences in risk tolerance than them; or
- rely on stereotypes to arrive at a judgement regarding the assessed risk tolerance.

Roszkowski and Grable (2005) mentioned that the literature regarding the use of personal or professional judgement risk has not proved to be an accurate measure to use when assessing risk tolerance.

The second method, which can be used to measure and assess risk tolerance, is heuristics. A heuristic refers to a basic regulation that results in a mental shortcut to

resolve a problem (Grable, 2008:8). Mabalane (2015:21) mentions that heuristics methods assume a strong association between socio-economic and demographic factors and financial risk tolerance. An example of a heuristic pertaining to risk assessment is that risk tolerance decreases with age – the older the individual, the lower their tolerance for risk (Van de Venter *et al.*, 2012:795). Another example of a heuristic is when an individual associates general risk-taking behaviours, such as skydiving, with a willingness to take financial risks such as investments (Grable, 2008:8).

Although heuristics are used in practice, creating judgements about an investor's risk tolerance based on demographic factors does not automatically align itself to or explain actual investor behaviour (Grable & Lytton, 1999). When risk tolerance is measured and assessed through the use of heuristics, there is a high likelihood that miscalculations and inappropriate clustering of investors could occur (Brighetti *et al.*, 2010:5). Grable (2008:8) mentioned that the literature on the topic of heuristic validity indicates that very few heuristic rules can be used reliably.

The third method to analyse risk tolerance is by objectively evaluating an individual's current investment approach and inferring risk tolerance from observation (Grable, 2008:9). An example of this method would be if a financial advisor assumes that an investor who has a majority of investment assets in certificates of deposit, has a low risk tolerance (Hoevenaars *et al.*, 2008:2942). Alternatively, the same concept applies to a financial advisor who assumes that an investor has a risk tolerance since the majority of the investor's investment assets are held in equities (Fidelity Investments, 2018). According to Cordell (2001), this method of risk tolerance analysis is questionable. This is specifically the case if outside information is not known prior to the judgement and the judgement would not have included the effect of other risk tolerance influencing factors into consideration (Grable, 2008:9).

The fourth option available to measure and analyse risk tolerance is the use of risk scales. During the 1980s and 1990s, the development of more accurate risk tolerance scales became an important research topic for researchers and practitioners (Grable & Lytton, 1999:164-166). Moreover, Grable (2008:11) notes that the literature from that timeframe concluded that a scale, at minimum, must gauge an individual's attitude toward and behaviour regarding the following dimensions: (i) general risk-taking propensities; (ii)

gambles and speculations; (iii) losses and gains; (iv) experience or knowledge; (v) comfort; and (vi) speculation.

Grable and Lytton (1999) grouped these diverse dimensions into three core risk tolerance dimensions, namely (i) investment risk; (ii) comfort and experience; and (iii) speculation. The Grable and Lytton (1999) 13-item risk tolerance scale is publicly available and has been tested and proven to offer acceptable levels of validity and reliability (Brighetti *et al.*, 2010:6). Moreover, the 13-item risk tolerance scale designed to measure the multidimensional nature of risk tolerance.

In some cases, a scale is not accessible for use or demands too much time to administer. In such a situation, the fifth method, single-item questions, can be used to measure risk tolerance (Brighetti *et al.*, 2010:5). One of the most widely-used, single-item question used to measure risk tolerance is the Survey of Consumer Finances (SCF) risk tolerance item.

Chen and Finke (1996:96) mention that the SCF single-item risk tolerance measure, along with other single-item risk tolerance measures, may not be a good proxy for individual's true risk aversion. Similarly, Brighetti *et al.* (2010:5) note that the measure is often affected by some distortions. Hanna and Lindamood (2004:32) found that historical response patterns show that a large percent of individuals answering the question have no risk tolerance. Grable (2008:9) states that this skewed response pattern towards no risk tolerance creates conflict with actual risk-taking behaviours, which are observed in everyday financial situations. Moreover, Grable and Lytton (1999) are of the opinion that the SCF single-item question does not completely epitomise the spectrum of financial risk tolerance; rather, the item is most closely related to investment choice attitudes (Brighetti *et al.*, 2010:5).

The sixth method to measuring and assessing risk tolerance is to use a combination of the approaches discussed above. Grable (2008:11) notes that a dearth of the literature supports the idea that the use of multiple measures may lead to increased precise descriptions of an individual's risk tolerance. The idea of triangulation, where an answer to a multifaceted question is derivative from numerous perspectives utilised in social

sciences has indicated that a combination of approaches may produce valuable results (Grable & Lytton, 1999; Grable, 2008:11).

2.4.2.3 Explaining and predicting investor behaviour

Some streams of research focus on risk tolerance and how it could be used to explain or predict individuals' behaviour when making portfolio decisions and gaining performances (Brighetti *et al.*, 2010:7). Grable and Lytton (2003:257) conducted a study to test the accuracy of their risk assessment instrument (Grable & Lytton, 1999), when analysing the individuals' actual investment behaviours. They utilised an Internet-based survey and collected 378 responses, of which 303 cases were valid. In this study, Grable and Lytton (2003) found a positive relationship between risk tolerance and the investment behaviour of individuals. Moreover, the results indicated some qualms regarding the capacity of some demographic and socioeconomic factors to describe financial risk tolerance (Brighetti *et al.*, 2010:8). As such, Grable and Lytton (2003) suggest that researchers use psychosocial constructs when analysing risk tolerance.

Moreover, Grable *et al.* (2009:396) analysed a sample of 1 740 internet risk-assessment survey respondents in order to test how accurate self-assessment of risk tolerance is and whether or not self-assessed financial risk tolerance is linked with investment risk-taking behaviour. The study found that self-classification of risk tolerance is positively associated with individuals' actual risk-taking investing behaviours (Grable *et al.*, 2009).

Lo and Repin (2002:323) recorded the emotional responses of 10 traders during live trading sessions through the use of psycho-physiological measures. Lo and Repin (2002) found that all the traders, including the most experienced, displayed substantial emotional responses throughout risky market occasions. As such, it suggests that trading skills may be associated to specific psycho-physiological factors, which in turn may influence an individual's willingness to take risk (Dickason, 2017:55).

An additional innovation in the metric of risk tolerance was introduced during a different study. Kimball *et al.* (2007) proposed a proxy for risk tolerance on the foundation of the responses to proposed income gambles in the Health and Retirement Study. The study consisted of 11 616 respondents and the results suggested that the risk tolerance proxy informs the differences in asset allocation choices (Kimball *et al.*, 2007).

Hoffman *et al.* (2010) used an amalgamation of transaction and survey data concerning 5 500 of the largest online brokerage in the Netherlands; the results indicated a support for the behavioural approach to portfolio theory. Hoffman *et al.* (2010) took into consideration the latent heterogeneity amongst investors pertaining to their preferences and views that form the fundamental drivers of their behaviour. Ultimately, it was found that investors who rely on the use of fundamental analysis deem to be more risk tolerant, overconfident and generally perform better than investors that rely on technical analysis (Fuertes *et al.*, 2012:18).

Brighetti *et al.* (2010:2) conducted a study wherein they test the emotional side of risk-taking behaviour. Moreover, a test is conducted to determine whether individuals financially act like they are supposed to, by comparing unbiased risk tolerance and biased risk tolerance to actual financial choices (Dickason & Ferreira, 2018:1). In this case, objective risk is acquired from psycho-physiological responses of individuals taking risk and subjective risk tolerance is attained through a psychometrically validated questionnaire (Brighetti *et al.*, 2010:2). Based on the findings of the study, it can be established that risk tolerance has a clear influence on financial decision making (Zheng, 2013:6-7).

2.4.2.4 Factors related to risk tolerance

The following sections discuss how demographic factors including age, gender, race, marital status, income and education affect risk tolerance.

- **Age and risk tolerance**

One of the most widely utilised demographic factors for distinguishing between levels of risk tolerance is age (Anbar & Eker, 2010a). Grable (1997:14) mentions that financial advisors use age as a proxy for the time remaining until an investor's financial assets are needed to meet their financial goals and objectives. Moreover, financial advisors additionally use age as a measure of an investor's ability to recoup from financial losses (Grable, 1997:14). It is commonly accepted that when compared to younger investors, older investors have less time to recuperate from losses, therefore, have a lower tolerance to risk (Masenya, 2017:310).

In general, Wallach and Kogan (1961) are considered the first researchers to have conducted a study on the affiliation between age and risk tolerance. In the experimental study, Wallach and Kogan (1961) used choice dilemmas, which specified that older individuals were less risk tolerant than younger individuals. Grable (1997:27) stated that this finding was responsible for generating an amplified research interest on this topic, which lead to a multitude of other studies.

Throughout the early 1970s, researchers strayed from testing the relationship between age and risk tolerance through choice dilemmas and started to test the relationship through the use of other experimental designs, survey methods and objective measures (Grable, 1997:27). During the 1980s, the use of increasingly refined statistical methods coupled with a renewed research interest in life-cycle analysis manifested an altering point in age/risk tolerance (McInish, 1982:125; Morin & Suarez, 1983:1201). Researchers focusing on age and risk tolerance continued to investigate age relationships by implementing survey methods, life-cycle effects and objective measures in the 1990s.

In a study implemented by Sung and Hanna (1996a:227), data from both the 1983 and 1986 SCF was used to implement an ordered profit analysis, wherein willingness to take financial risks was set as the dependent variable. In the study, Sung and Hanna (1996a) found that older individuals were more risk tolerant than younger individuals. Moreover, Pålsson (1996) conducted a study by using survey data from 7 000 Swedish households and also found that increasing age was correlated with decreasing risk tolerance. These findings were reported on and widespread acceptance thereof lead to a substantial consensus among financial advisors pertaining to age and risk tolerance (Grable, 1997:28). The consensus reached is that as an investor's ages, the risk-free assets in their portfolio should be increased (Reichenstein, 1996). Mabalane (2015:69), Ramudzuli (2016:86) and Dickason (2017:159) concluded, based on the various South African samples used in their studies respectively, that age has no significant effect on risk tolerance.

In contrast, Jianakoplos and Bernasek (1998:981) found a negative relationship between age and risk tolerance. Similarly, Hallahan *et al.* (2004:57) found a negative, non-linear relationship between age and risk tolerance, wherein risk tolerance decreased with age until a certain point at which risk tolerance starts to rise again. Ultimately, the consensus

in the literature pertaining to age and risk tolerance is that older individuals are less risk tolerant than younger individuals. The reason for this finding is that when compared to older investors, younger investors have more time to accumulate wealth and to recover from any losses (Finke & Huston, 2003; Hallahan *et al.*, 2004).

- **Gender and risk tolerance**

Gender (male or female) has been considered a significant risk tolerance classification aspect since more men than women are inclined to fit the personality trait referred to as "thrill/sensation seeker" (Grable, 1997:13), which makes men prone to taking on increased levels of risk. Gendered studies have been a growing phenomenon in the field of risk and financial research. Slovic (1966:169) states there is a predominant belief which implies that males should and do take on greater risks than females. This statement was later confirmed by Blume (1978), who conducted a study on the relationship between gender and risk tolerance.

During the 1990s, researchers continued to find that males were more willing to take on financial risks than females were (Grable, 1997:24). Hawley and Fujii (1993:197), Sung and Hanna (1996b) along with Xiao and Noring (1994:25) each used a version of data obtained from the SCF to implement regression type analyses, where risk tolerance was defined as the dependent variable and gender (among other variables) was operationalised as an independent variable. Within their respective studies, it was concluded that males were more risk tolerant that females as they take more financial risks. These researchers have thus concluded that males are more willing than females to take on financial risks (Hawley & Fujii, 1993:197; Xiao & Noring, 1994:25; Sung & Hanna, 1996b:11).

It is generally agreed upon that gender can be used to categorise investors into financial risk tolerance categories; however, according to Grable (1997:25), researchers have not reached a consensus on this topic. A number of empirical studies have found that there are no differences between the risk tolerances of males and females. Haliassos and Bertaut (1995) along with Schooley and Worden (1996) each used a version of data obtained from the SCF (1983 and 1989, respectively) to conduct regression analyses and both found that gender does not influence risk tolerance. Moreover, Pålsson (1996),

based on a sample of 7 000 households, found that risk tolerance did not systematically change according to gender.

In later research, Hanna and Lindamood (2004:27) tested the willingness of married couple households to take on financial risk associated with investments. In their study, Hanna and Lindamood (2004:27) found that, compared to their husbands, the wives were much less willing to take financial risk associated with investments. Grable and Roszkowski (2007:795) implemented a study wherein they made use of a 12-item questionnaire to test the risk tolerance levels of males and females. The 12-item questionnaire made use of a four-point rating scale, which forced participants to choose a certain extreme. Grable and Roszkowski (2007:795) found that males tend to overestimate their risk tolerances while females tend to underestimate their risk tolerances.

Casanovas and Merigò (2012:9681) analysed the dissimilarities between males and females in financial decisions in terms of various contexts that are also associated with risk namely, social life, health, gambling (hypothetical financial product) and leisure time. In their study, Casanovas and Merigò (2012:9681) also discovered that males were more risk tolerant than females across all the mentioned risk contexts, except for financial decisions relating to the health and leisure risks.

Fisher and Yao (2017:191) implemented a study with the purpose of exploring gender dissimilarities in financial risk tolerance using a dataset from the SCF. The results of their study suggest that gender dissimilarities in risk tolerance are described by gender dissimilarities in the individual determining factors of financial risk tolerance (Fisher & Yao, 2017:191). Moreover, the individual variables that moderate the relationship between gender and high-risk tolerance are net worth and income uncertainty. In conclusion, it is generally accepted that males are more risk tolerant than females when it comes to taking on financial risk associated with investments and other financial products.

Mabalane (2015:72), Ramudzuli (2016:87) and Dickason (2017:160) concluded from their respective studies that South African males are more risk tolerant than South African

females. As such, it is generally accepted in South Africa that males are more likely to tolerate increased levels of risk compared to their female counterparts.

- **Race and risk tolerance**

Zhong and Xiao (1995:107) along with Sung and Hanna (1996a:227) mention that different cultural values, tastes and preferences have an effect on risk tolerance of individuals. These tastes, cultural values and inclinations may be grouped in terms of race and its ultimate effect on risk tolerance. There is a consensus among researchers in personal finance that White individuals have a higher risk tolerance than individuals who are non-White (Zhong & Xiao, 1995:107; Grable, 1997:84; Yao *et al.*, 2005:51). Grable (1997:15) states the following points as some of the reasons for non-White individuals being low risk tolerant in terms of financial risk:

- non-White individuals may not have equal exposure to banks and other financial institutions as White individuals;
- individuals who are classified as minorities may be exposed to non-traditional investment opportunities;
- many non-White cultures are inclined to focus on the past or the present rather than on future-oriented financial goals; and
- generally, White individuals may possess greater confidence in their analytical and decision-making skills.

Haliassos and Bertaut (1995:1110), Hawley and Fujii (1993:197), as well as Sung and Hanna (1996b:14) each used the 1983 and 1986 SCF to conduct logit and probit analyses of multistage area-probability samples to test the relationship between race and risk tolerance. The results of the abovementioned studies indicated that White individuals have a higher probability of taking investment risks (Sung & Hanna, 1996b); as such, White individuals tend to have a high tolerance for risk pertaining to financial decisions.

Yao *et al.* (2005:54) used a combination of the 1983, 1989, 1991, 1995, 1998 and 2001 SCF databases to analyse the effect of race on financial risk tolerance of African, Hispanic and White individuals. The study found that, compared to White individuals, African and Hispanic individuals are less probable to be eager to take on some financial risk, after controlling the influences of other variables (Yao *et al.*, 2005:51). However, Yao *et al.*

(2005:51) also found that African and Hispanic individuals were more likely to take on substantial financial risk compared to White individuals. The possible explanation therefore is that African and Hispanic individuals aspire to reduce the gap in the living standard or income inequality (Mabalane, 2015:34). Yao *et al.* (2005:51) suggest that financial educators along with government agencies ought to aim at improving investor education on investments and financial risk. More specifically, with the focus on racial and ethnic groups to endorse improved investment decisions to help minorities reach their financial goals.

Masenya (2017) conducted a mixed methods study on South African students' potential to invest. In the qualitative phase of the study, Masenya (2017:92-93) interviewed student investors and through the use of a thematic analysis discovered that African student investors were more risk tolerant towards financial risk than Coloured and White student investors. This finding is opposing the findings in the literature based on race and risk tolerance. Nevertheless, from the quantitative phase of the study, Masenya (2017) found that African students where less risk tolerant than White students.

Alternatively, Dickason (2017:163) found that African participants, when compared to Asian, coloured and White participants, were willing to take on increased financial risks. Another study conducted in South Africa by Leigh (1986:17), found that African individuals tend to have a higher risk tolerance than White individuals. Similarly, Wilson (2016:20) also found that non-White individuals take on more financial risks than White individuals.

Ultimately, researchers and financial advisors commonly accept the idea that there is a relationship between race and risk tolerance (Yao *et al.*, 2005; Mabalane, 2015:34). Grable (1997:36) mentions that in research, when other factors are controlled, White individuals are considered to have a higher risk tolerance than non-White individuals.

- **Marital status and risk tolerance**

Grable (1997:14) mentions that financial advisors consider marital status (i.e. never married, married, separated, divorced and widowed) an effective element in differentiating among investors' risk tolerance levels for two main reasons. First, when compared to married individuals, it is anticipated that single individuals have less to lose by accepting greater risk (Brighetti *et al.*, 2010:18; Fisher & Yao, 2017:192). This is

because it is commonly accepted that single individuals generally do not have the responsibility of taking care of other dependents. Secondly, it is assumed that married individuals are more vulnerable to social risk (Grable, 1997:14). Roszkowski *et al.* (1993) state that social risk refers to the possible loss of esteem from the viewpoints of colleagues, if an investment choice leads to increased risk of loss.

Yao and Hanna (2005:68) mention that the results from previous literature are not consistent whether married couples are risk tolerant than single individuals. In some situations, it was found that non-married individuals prefer increased financial risk compared to married individuals. The results from the research conducted respectively by Hallahan *et al.* (2004:71), Grable and Joo (2004:78), as well as Yao *et al.* (2004:123) also supports the notion that single individuals are more risk tolerant than married individuals.

Some researchers have suggested that married individuals were prone to risk-taking propensities (Haliassos & Bertaut, 1995). Their proposed reason is that married individuals have greater risk taking inclinations because of shared income and double human capacity, which may encourage these married individuals to invest in riskier assets (Anbar & Eker, 2010a:507). More studies throughout the early 2000s found that married individuals were more risk tolerant than single individuals (Grable, 2000:61; Hallahan *et al.*, 2003:485; Watson & McNaughton, 2007:54).

Mabalane (2015:73) found, based on a South African sample, that there was no statistical significance between financial risk tolerances and being married or single. Similarly, in a study conducted in South Africa by Dickason (2017:166), it was found that there was no significant difference between marital status and risk tolerance.

Ultimately, based on the findings of previous studies that covered the relationship between marital status and risk tolerance, it is difficult to confidently hypothesise about the expected effect of marital status on risk tolerance (Grable, 1997:32). Regardless, it is still widely accepted among financial advisors that single individuals are more risk tolerant when compared to married individuals (Grable, 1997:32; Anbar & Eker, 2010a:507).

- **Income and risk tolerance**

MacCrimmon and Wehrung (1986) are of the opinion that upper income individuals are prone to take greater risk compared to individuals with lower incomes. Financial advisors have the assumption that increased levels of income are connected with access to more direct resources (O'Neill, 1996:4), which suggests that increased income levels lead to increased risk tolerance levels (Grable, 1997:15).

It is commonly believed that individuals who earn higher incomes are prone to have high levels of risk tolerance. Cohn *et al.* (1975:605) conducted a study by using an amalgamation of regression analysis, multiple discriminant and chi-square analyses to investigate the link between income and risk tolerance. The results from the study indicated that risk tolerance relatively rises with income and wealth.

A significant amount of other studies also found that individuals who earn higher incomes are more risk tolerant compared to individuals who earn lower levels of income (Sung & Hanna, 1996b; Grable, 2000; Finke & Huston, 2003; Anbar & Eker, 2010a). Anbar and Eker (2008) are of the opinion that the reason an individual who earns a higher income tends to be more risk tolerant than an individual who earns a lower income, is that higher income earners can afford to incur the losses that result from risky investments. On the other hand, low income earners tend to be less risk tolerant since it may be harder to recover from their financial losses as it may take longer to accrue the same money to make investments (Masenya, 2017:33).

Contrarily, Hawley and Fujii (1993) found a negative association between income and risk tolerance. In other words, the results from their study indicated that high levels of income are linked to low risk tolerances and alternatively, lower levels of income are associated with higher levels of risk tolerance (Hawley & Fujii, 1993). Moreover, Pålsson (1996) estimated a regression analysis to examine the degree to which risk tolerances change given different household characteristics; among the household characteristics was income. The results of the study indicated that variations in income did result in systematic changes in risk tolerance (Pålsson, 1996).

Mabalane (2015:80-81) found that in numerous countries, including South Africa, higher financial risk tolerances are associated with higher income levels of individuals. Similarly,

Dickason (2017:169) discovered that an increased annual income was related to an individual's increased risk tolerance. As such, it can be concluded from a South African perspective that risk tolerance has a positive relationship with income levels.

Based on some of the results in the literature pertaining to income and risk tolerance, Grable (1997:35) recommends that caution is applied when creating hypotheses regarding income as a distinguishing and categorising element in establishing levels of an individual's risk tolerance. Regardless, Grable (1997:35) suggests that a hypothesis proposing that income is positively linked with risk tolerance seems appropriate.

- **Education and risk tolerance**

Grable (1997:15) mentions that it is contended by some that higher education levels (i.e. formal attained academic training) permits an individual to analyse risk and benefits more cautiously than an individual with less education. MacCrimmon and Wehrung (1986) found that individuals with a higher education are prone to taking risk and as such, financial advisors assume that increased levels of education are linked to increased levels of risk tolerance (Finke & Huston, 2003; Hallahan *et al.*, 2004).

Haliassos and Bertaut (1995) implemented a study wherein the results depicted that education is an important element in overcoming the difficulties regarding stockholding. Moreover, the results suggested that individuals who have not attended college were less likely to own stocks than individuals who at least have a college degree (Haliassos & Bertaut, 1995). Sung and Hanna (1996b) found that education was statistically significant in establishing an individual's willingness to assume greater risk. Similarly, Zhong and Xiao (1995) conducted an analysis using data from the 1989 SCF and reported that increased levels of education were linked to increased ownership of stocks and bonds. Masenya (2017:32) mentions that one of the reasons that may explain the positive association between education and risk tolerance is that education is required so that an individual is able to assess and understand the inherent risks of investments.

Regardless of many researchers finding a positive relationship between education and risk tolerance, there have been some studies, which suggested the opposite (Masenya, 2017:32). McInish (1982:125) carried out a study in which a regression analysis was used to test the relationship between risk tolerance and various demographic factors. The

results from the study proposed that there was a positive relationship between education and risk tolerance; however, education coefficients were insignificant in any of the regressions (McInish, 1982). Hallahan *et al.* (2004:54) conducted a study on factors relating to risk tolerance and found that education was an insignificant determinant of an individual's attitude towards risk.

The results from a study conducted in South Africa indicated that higher levels of financial risk tolerance are associated with higher levels of education attained (Mabalane, 2015:77). Ramudzuli (2016:88-89) found that in South Africa, individuals who have a certificate, honours or masters tend to be more risk tolerant. Moreover, individuals with diplomas, degrees and Bachelor of Technology degrees tend to be less risk tolerant.

In conclusion, numerous researchers have come to the deduction that high risk tolerance levels are commonly related with individuals who have accomplished higher education levels (Zhong & Xiao, 1995; Sung & Hanna, 1996b). Grable (1997:38) suggests that a positive relationship between higher levels of education attained and increased risk tolerance is reasonable; however, this relationship is not definite and supplementary research is necessary. Table 2.5 provides a summary of the assumed relationships between demographics and risk tolerance.

Table 2. 5: A summary of assumed relationships between risk tolerance and demographics

Demographic factor	Low risk tolerant	High risk tolerant	Source(s)
Age	Older	Younger	Wallach and Kogan (1961), Pålsson (1996), Jianakoplos and Bernasek (1998)
Gender	Female	Male	Hawley and Fujii (1993), Xiao and Noring (1994), Sung and Hanna (1996b), (Grable, 1997)
Race	Non-Whites	Whites	Zhong and Xiao (1995), Grable (1997), Yao *et al.* (2005)
Marital status	Married	Single	Grable (1997), Yao and Hanna (2005), Hallahan *et al.* (2004)
Income	Low	High	Sung and Hanna (1996b), Grable (2000), Finke and Huston (2003), (Anbar & Eker, 2010a)
Education	Less	More	Zhong and Xiao (1995), Sung and Hanna (1996b), (Masenya, 2017)

Source: Author compilation

2.5 SYNOPSIS

It was important to provide an in-depth discussion on risk, risk profiles, and risk tolerance to create an understanding how these three aspects influence an investor during his or her investment journey. Risk is mainly based on uncertainty and the probability of loss, and each investor profile has financial and investment risk unique to that investor. Hence, it is important to create a risk profile for an investor when undergoing financial planning. By identifying the correct factors to measure an investor's risk tolerance, the probability of the investor experiencing a successful financial outcome is increased.

Risk tolerance is a vital risk aspect to consider during the formation of an investor's personal financial planning and investment recommendations. As such, it is important for financial institutions and investment companies to understand risk tolerance and its underlying influencing factors when giving financial advice.

Four main issues have been considered in the literature regarding risk tolerance, namely (i) how to explain investors' decision making and behaviour towards risk; (ii) how to measure risk tolerance; (iii) how to explain and predict investor behaviour when taking investment portfolio choices and obtaining performances; and (iv) which factors may explain investor's level of risk tolerance. This study's research mainly falls in the category of factors which may help explain an investor's level of risk tolerance. As depicted in the literature review, financial institutions and researchers usually consider the influence of investor's demographics on their level of risk tolerance.

A few factors, which previous research has proven to have an influence on risk tolerance include age, gender, race, marital status, level of education and annual income. However, this study does not mainly focus on investigating the influence of South African investors' demographic variables on risk tolerance. The study mainly focuses on investigating the influence of investor's financial well-being, satisfaction with life, and physical activity on physical activity. Therefore, it is important to explore present literature on financial well-being, satisfaction with life, physical activity and their respective positive linkages with risk tolerance in Chapter 3.

CHAPTER 3: FINANCIAL WELL-BEING, SATISFACTION WITH LIFE, AND PHYSICAL ACTIVITY

3.1 INTRODUCTION

The purpose of Chapter 2 was to provide a literature review relating to risk, risk profiles and risk tolerance. Subsequently, Chapter 3 aims to discuss the following theoretical objectives that were created for this study:

- Contextualise a theoretic framework for financial well-being;
- Discuss theories and concepts pertaining to satisfaction with life; and
- Provide a theoretic analysis on physical activity.

The layout of Chapter 3 was formed with the theoretical objectives in mind. The layout for the discussion will be presented as follow:

- Section 3.2 focuses on defining financial well-being, analysing the various subjective and objective methods applied to measure financial well-being, and investigates existing literature on financial well-being;
- Section 3.3 encompasses the definition of satisfaction with life, argues the importance of life satisfaction judgements, and examines existing literature of life satisfaction;
- Section 3.4 entails a definition for physical activity, the evaluation of different objective and subjective methods used to measure physical activity, and analyses the results of studies on physical activity;
- Section 3.5 provides an analysis on the possible links between the respective elements of investor well-being and risk tolerance; and
- Section 3.6 provides the synopsis of the findings from the literature review of investor well-being and risk tolerance.

3.2 FINANCIAL WELL-BEING

Previous research has highlighted various definitions of financial well-being (Porter, 1990; Joo, 2008; Rath *et al.*, 2010; Sorgente & Lanz, 2017). According to Rea (2017:11), researchers have attempted to reach an agreement regarding the most suitable definition that could be used across different studies; however, the literature reflects inconsistent

theoretical language around financial well-being. Since there is a growing interest in financial well-being, it is vital that a common understanding of the concept is obtained in order to advance a unified frame of knowledge thereof (Brüggen *et al.*, 2017:229). Consequently, research outcomes on financial well-being will be more comparable and interchangeable across varying disciplines.

The purpose of this section is to discuss various definitions and meanings of financial well-being and related terms. Moreover, to analyse the various manners in which financial well-being can be measured. Lastly, to provide an overview of the different studies that have been conducted on financial well-being.

3.2.1 Defining financial well-being and related terms

Financial well-being can be viewed as a good and positive financial condition that consists of objective and subjective components (Rea, 2017:11), or a combination of both (Porter, 1990). According to Sorgente and Lanz (2017:283), objective financial well-being entails the physical resources that an individual owns when the balance amid entry (e.g. income) and exit (e.g. debt) is considered. Assets (e.g. job benefits, savings account, health insurance, education) that are owned by the individual are also considered as material resources (Sorgente & Lanz, 2017:283). Objective financial well-being can be defined as the effective management of an individual's economic life (Rath *et al.*, 2010:154). More specifically, Jansen van Vuren (2015:20) argues that objective financial well-being can be regarded as the means in which individuals regulate their money, make preventive savings, establish financial goals, construct wealth management tools and obtain financial assurance.

In the other hand, subjective financial well-being evolves from the simplicity of an individual's contentment or general satisfaction with his/her financial situation (Joo, 2008:22), to the individual's complex perception regarding his/her material and non-material belongings (De Oliveira *et al.*, 2017:2). An individual's complex perception includes the individual's awareness of opportunities, sense of physical security and sense of impartiality of the reward distribution system (Hayhoe & Wilhelm, 1998; De Oliveira *et al.*, 2017:2). Sorgente and Lanz (2017:283) suggest that there are two theoretical dimensions of subjective financial well-being, namely experience and evaluation. Simply stated, experience involves an individual's perception or description of his/her own financial condition (Hayhoe & Wilhelm, 1998; De Oliveira *et al.*, 2017:2), whereas, evaluation refers to the judgement an individual conducts of his/her own financial experience (Sorgente & Lanz, 2017:283). Figure 3.1 illustrates the different components of financial well-being**.**

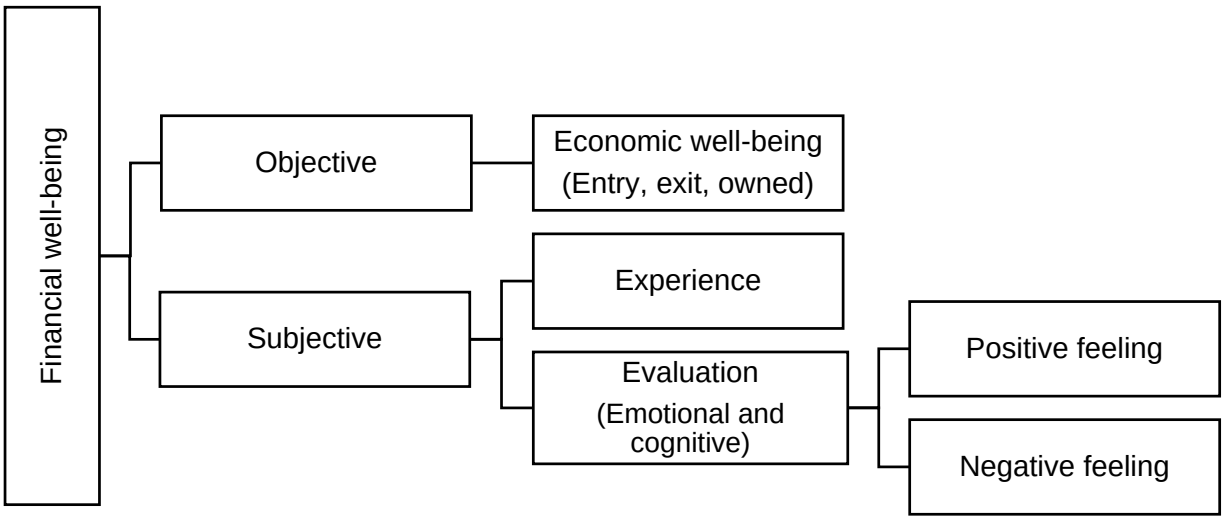

Figure 3. 1: Components of financial well-being

Source: Sorgente and Lanz (2017:284)

Additionally, subjective financial well-being can be perceived and measured from positive feeling and negative feeling aspects (O'Neill *et al.*, 2006:489; Prawitz *et al.*, 2006:35). Various terminologies are used in research to describe the positive feeling aspect of subjective financial well-being including perceived economic well-being (Walson & Fitzsimmons, 1993), personal financial wellness (Joo & Garman, 1998; Rutherford & Fox, 2010), financial health (Norvilitis & MacLean, 2010), financial satisfaction (Kim, 2001; Joo & Grable, 2004) and perceived income adequacy (Danes & Rettig, 1993).

Alternatively, there are terms utilised to reflect the negative feeling aspect of subjective financial well-being, namely financial or economic strain (Mills *et al.*, 1992; Aldana & Lijenquist, 1998), financial distress (Freeman *et al.*, 1993; Bailey *et al.*, 1998; Kim & Garman, 2003), economic distress (Voydanoff, 1984) and debt stress (Drentea, 2000). Table 3.1 provides brief definitions of the terms that are often interchangeably used in research to refer to financial well-being from positive and negative feeling aspects.

Lastly, financial well-being can be defined as a notion that consists of objective and subjective components, which are attributable to the assessment of an individual's current financial situation. Porter (1990:22) defined financial well-being as including objective and subjective components of financial circumstances, which are appraised against criteria of comparison to form an individual's judgement of his/her financial situation. Similarly, Taft *et al.* (2013:64) describe financial well-being as being a function of both physical and emotional factors of an individual's financial position as well as the individual's feeling of satisfaction with his/her financial status.

Table 3. 1: Concepts related to financial well-being

Concept	Definition	Source
Financial well-being	*Objective:* The effective management of an individual's economic life. Also referred to as economic well-being.	Rath *et al.* (2010)
	Subjective: An individual's happiness or general satisfaction with his/her financial situation. Also referred to as financial satisfaction.	Joo (2008)
	Combination: An individual's sense of his/her financial situation is formulated in terms of objective and perceived attributes. These attributes are criticised against standards of comparison to develop evaluated attributes of that financial situation.	Porter (1990), Cox *et al.* (2009)
Perceived economic well-being	An individual's perception of his/her economic situation compared to his/her necessary and desired economic situation. In other words, perceived economic well-being is an individual's subjective assessment of overall economic survival.	Walson and Fitzsimmons (1993), Hayhoe and Wilhelm (1998), Joo (1998)
Financial wellness	A multidimensional concept that involves financial satisfaction, as well as the objective status of financial situation, financial attitudes and financial behaviour. Also known as a measure of financial health.	Norvilitis and MacLean (2010), Joo (2008), Spann (2014)

Concept	Definition	Source
Financial satisfaction	A sub-aspect of life satisfaction and focusses on an individual's contentment with, or freedom from worry regarding his/her financial situation. Corresponds with the subjective side of financial well-being.	Joo and Grable (2004), Xiao *et al.* (2009)
Financial distress	A situation of physical or mental strain which includes stress relating to financial matters. Financial distress is a consequence of a lack of financial well-being. Also referred to as financial worry or economic distress.	Prawitz *et al.* (2006), Jansen van Vuren (2015)
Financial strain	Also referred to as economic strain.	Mills *et al.* (1992), Aldana and Lijenquist (1998)
Debt stress	An individual's worry about his/her amount of debt. Specifically, the individual's viewpoint of stress created by personal debt and worry about his/her ability to settle debt.	Drentea (2000)

Source: Author compilation

With reference to this study, the focus lies on the measurement and interpretation of subjective financial well-being (Prawitz *et al.*, 2006); therefore, financial well-being is perceived as a subjective phenomenon. As such, financial well-being includes positive feelings that emanate from an individual's analysis of his/her financial situation (Sorgente & Lanz, 2017:283). However, as suggested by Prawitz *et al.* (2006:36), this study will also use the term "financial distress" to refer to the negative feelings which emanate from an individual's assessment of his/her financial situation. The following section elaborates the various manners in which financial well-being can be measured, namely through objective, subjective and combination measures.

3.2.2 Measuring financial well-being

Financial well-being has been investigated in various academic fields including economics, financial planning and counselling, consumer decision making, services marketing and developmental psychology (Brüggen *et al.*, 2017:229). Various measures have been used to quantify financial well-being; however, there is no universal measurement with regard to financial well-being (Morrison, 2009:27). As mentioned in Section 3.2.1, general financial well-being definitions as well as their measures can be clustered into three groups, namely objective measures, subjective measures and combination measures.

3.2.2.1 Objective measures

Some measures suggest that only the objective component of financial well-being makes a contribution towards an individual's assessment of his/her current financial situation (Rath *et al.*, 2010:154; Jansen van Vuren, 2015:20). Rath *et al.* (2010:154) explain that objective financial well-being is the effective management of an individual's economic life, where individuals with high objective financial well-being are those who manage their personal finances well and spend their money wisely. Many measures have been used to quantify financial well-being; however, it is debatable what the most appropriate measure is (Morrison, 2009:27).

Common objective measures of financial well-being include income, expenditure, debt, assets and combinations of these measures such as debt/income ratio and net worth (Hira & Mugenda, 1998:76; Drake, 2004:15; Xiao, 2016:9; Rea, 2017:11). Greninger *et al.* (1996:57) used financial information, ratios and benchmarks as objective measures of financial well-being. Alternatively, Morrison (2009:27) used household income, household consumption and the ratio of the two to determine financial well-being. Prawitz *et al.* (2006:34) mentions that objective measures such as household income measure facets of the financial situation itself rather than an individual's feeling about the situation.

Morrison (2009:27) mentions that objective measures such as income and consumption are readily available. Consequently, objective measures of financial well-being are often used during research as they are straightforward, readily available and easier to measure (Prawitz *et al.*, 2006:35). During objective measuring of financial well-being, subjective measures are excluded and individuals' feelings and attitudes regarding their financial situation are not considered (Joo & Grable, 2004:40). As such, no light is shed on individuals' psychological well-being, stress, or satisfaction associated with their financial condition (Morrison, 2009:27).

Hira and Mugenda (1998:76) advise against only concentrating on objective measures and overlooking subjective factors. Correspondingly, Prawitz *et al.* (2006:35) argues that objective measures of financial well-being are ineffectual in evaluating the need for suitable intervention. As an example, two individuals with the same level of income are likely to have varying insights regarding their financial condition (Prawitz *et al.*, 2006:35);

however, objective measures do not allow the researcher to identify that difference in perceptions. Consequently, it is not only objective situations that influence an individual's psychological well-being but also some internal subjective assessment regarding control over situations that appear to be vital when measuring financial well-being (Mullis, 1992:132).

3.2.2.2 Subjective measures

Some researchers have derived their definitions of financial well-being based on subjectivity (Joo, 2008:22; De Oliveira *et al.*, 2017:2; Sorgente & Lanz, 2017:283), therefore, assess financial well-being by making use of subjective measures. Archuleta *et al.* (2013:51) mentions that subjective financial well-being refers to the measurement of an individual's overall level of satisfaction with his/her financial situation. Similarly, (Brüggen *et al.*, 2017:230) stated that definitions, which are subjective in nature are founded on how an individual views his/her financial situation rather than how it is objectively denoted.

Prawitz *et al.* (2006) highlight numerous measures, which describe feelings of one's financial condition in positive and negative aspects. Some of the measures covering the positive aspects of financial well-being include perceived economic well-being, financial satisfaction, financial wellness, financial health and perceived income adequacy (Danes & Rettig, 1993; Walson & Fitzsimmons, 1993; Joo & Garman, 1998; Kim, 2001; Norvilitis & MacLean, 2010; Rutherford & Fox, 2010). Alternatively, the negative aspects of financial well-being have been measured by financial or economic strain, financial stress, economic distress and debt stress (Voydanoff, 1984; Aldana & Lijenquist, 1998; Bailey *et al.*, 1998; Drentea, 2000).

One of the most common subjective measures of financial well-being is financial satisfaction (Lown & Ju, 1992:105; Joo & Grable, 2004:25; Xiao *et al.*, 2014:415). Moreover, satisfaction of certain types of financial resources such as income satisfaction, saving satisfaction and satisfaction with level of living can also be used as subjective measures of financial well-being (Hira & Mugenda, 1998:76; Xiao, 2016:9). Income satisfaction refers to an individual's evaluations of the amount of money he/she earns or receives from regular income sources (Drake, 2004:16-17).

Danes and Rettig (1993) explained that perceived income adequacy refers to an individual's perception pertaining to the degree that income will meet financial demands and that varies between individuals. Some individuals with the same income may perceive levels of income adequacy differently depending on the standard of living they hope to obtain (Morrison, 2009:28).

Financial distress or financial worry is also often used as a subjective measure of financial well-being (Garðarsdóttir & Dittmar, 2012:473). Kim and Garman (2003:31) focused on financial distress by including the individual's perceived capacity to fulfil expenses, satisfaction with savings and investment, as well as the tendency to worry about debt to measure subjective financial well-being. Similarly, Hira and Mugenda (1998:76) mention that an individual's perception of his/her past and future financial outcomes and satisfaction with his/her overall economic condition (e.g. debt, savings and income) can be used as a proxy for subjective financial well-being.

In essence, subjective measures show that individuals may have a different assessment of their financial well-being based on numerous, differing influencing factors such as their life stages (Malone *et al.*, 2010), or their risk tolerances (Nobre & Grable, 2015a:18). Individuals may experience differing levels of subjective financial well-being irrespective of their objective financial position (Prawitz *et al.*, 2006:35). As such, subjective measures of financial well-being provide a richness that objective measures do not (Porter, 1990:22). Subjective measures help researchers evaluate not only how an individual perceives his/her financial condition, but also how it affects the individual as well as his/her family (Prawitz *et al.*, 2006:35).

3.2.2.3 Combination measures

Porter (1990:22) and Taft *et al.* (2013:64) view financial well-being as a notion which consists of both objective and subjective components, which contribute to the assessment of an individual's current financial situation. By using both objective and subjective measures to assess financial well-being, researchers can construct a holistic and multifaceted view on an individual's financial well-being. Objective measures of the financial situation (e.g. debt-to-income ratio) offer objective proof of where an individual is situated financially (Greninger *et al.*, 1996:57; Joo & Grable, 2004:40), whereas

subjective measures of financial well-being assist researchers examine individuals' views regarding and responses to their financial condition (Brüggen *et al.*, 2017:229).

In cohesion, Gudmunson and Danes (2011:644) as well as Danes and Yang (2014:53) describe financial well-being as being reflective of both objective and subjective components; moreover, each of those conceptual components should be treated as two different constructs. A number of differing combinations of objective and subjective measures can be used to measure financial well-being. Specifically, Danes and Yang (2014:53) used net worth and income to measure objective component of financial well-being as well as income adequacy to measure the subjective component of financial well-being. Similarly, Shim *et al.* (2009b:708) used level of debt as an objective measure of financial well-being in combination with the individual's satisfaction with his/her current financial status as a subjective measure of financial well-being.

One of this study's main purposes is to report on the level of investor well-being, of which subjective well-being is a component, originating from one's personal financial conditions (Prawitz *et al.*, 2006:36). Therefore, this study only focusses on the subjective component of financial well-being as well as the measures thereof. The literature proposes that a subjective approach toward financial well-being is more comprehensive as it allows researchers to capture non-financial issues (Brüggen *et al.*, 2017:229). Hence, a subjective approach is more appropriate than an objective approach to define and measure a multifarious personal concept such as financial well-being.

3.2.3 Studies on financial well-being

The concept of financial well-being is quite broad and the literature on the topic suggests that financial well-being is informed by numerous factors.

Table 3. 2: Studies on financial well-being

Authors	Purpose of study	Results of study
Lea *et al.* (1995)	Investigate various psychological and behavioural factors which are assumed to be the cause or effects of debt	Individuals' multiple psychological and behavioural factors affect debt and vice-versa
Hayhoe *et al.* (2000)	Analyse individuals' affective credit perception and gender influenced credit purchasing	Affective credit perception predicts the way individuals make purchases and gender differences in the relationship

Authors	Purpose of study	Results of study
		between financial practices and financial stress are balanced
Norvilitis *et al.* (2003)	Examine the relationship between money attitudes, locus of control, impulsivity, life satisfaction, stress and credit card debt of individuals	Individuals who have greater mental resilience, an internal locus of control and less impulsiveness tend to perceive their financial situation more positively
Grable and Joo (2004)	Analyse the effects of environmental and biopsychosocial factors on financial risk tolerance	Financial behaviours, such as risk tolerance affecting how an individual saves, spends and invest, are significantly related to financial well-being.
Grable and Joo (2006)	Examine money management behaviours and financial outcomes of individuals	The relationship between race, credit card debt, financial behaviours and financial stress suggests that Black individuals are affected more than individuals of other races
Xiao *et al.* (2006)	Examine positive financial behaviours of consumers who utilise credit counselling services from a behavioural economic viewpoint	Individuals who apply healthy financial behaviours are more likely to experience less financial stress and increase their financial satisfaction
Davtyan (2010)	Investigate the perceptions of individuals towards their own financial well-being and the degree to which these perceptions predict their money management behaviours	Individuals' perceptions of financial well-being positively correlated with fiscally prudent behaviours and lower levels of financial well-being predicted greater engagement in the education of personal finance
Malone *et al.* (2010)	Investigate the financial well-being of women	Educated older females had a higher income and contributed a greater level of money to the household. Moreover, these women were inclined to have positive viewpoints of their financial situation
Rutherford and Fox (2010)	Assess individuals' financial wellness in terms of objective determinants including income and credit debt, financial situation satisfaction, financial behaviours and their subjective perceptions	Individuals' financial wellness is dependent of their credit card management, financial satisfaction, spending behaviour, healthcare coverage, planning horizon and their attitude towards financial risk
Serido *et al.* (2010)	Consider the role of parents in their children's development of financial independence by the time the children are old enough to enter college	Parents need to educate their children on the financial topics as it affects their financial, psychological and personal well-being once they are in college
Gutter and Copur (2011)	Investigate the relationship between financial behaviours and financial well-being of individuals. The demographic and financial characteristics, financial education, as well as financial dispositions were controlled	Individuals' budgeting, saving, compulsive buying, and risky credit card behaviours were notably linked to financial well-being when demographic information, financial characteristics, financial dispositions and financial characteristics are controlled for

Authors	Purpose of study	Results of study
Shim *et al.* (2012)	Examine the effect of saving and future-oriented financial behaviours on young adults' well-being	Perceived behavioural control and financial planning horizon has an effect on behavioural intention, actual behaviour as well as life satisfaction
Campara *et al.* (2017)	Analyse overall life satisfaction and financial well-being of low-income individuals	Individuals are satisfied with overall life; however, are concerned about and feel uncomfortable with the debts they have

Source: Author compilation

One of the most common determinants of financial well-being is level of debt, specifically credit card debt (Davtyan, 2010:19). Researchers have found evidence that higher levels of credit card debt have been associated with greater financial and psychological stress (Lea *et al.*, 1995; Grable & Joo, 2006), which in turn, tends to influence individuals' self-assessment of financial health in a negative manner (Sallie Mae, 2009). Similarly, Campara *et al.* (2017:182) found that low income individuals who were concerned about and felt uncomfortable with their amount of debt experienced lower levels of financial well-being.

One's perception of financial well-being can also be influenced by various psychological variables. Norvilitis *et al.* (2003) found that individuals who demonstrate greater mental resilience, less impulsiveness and an internal locus of control tend to have more positive views on their financial conditions. Moreover, the shaping of an individual's perception of financial well-being is affected by his/her comparative financial judgements (Davtyan, 2010:20). Leach *et al.* (1999) revealed that individuals with a positive comparative financial judgement (i.e. individuals who consider themselves economically better than their peers) tended to have favourable perceptions on their financial conditions. Conversely, individuals who experienced negative comparative financial judgement (i.e. individuals who consider themselves economically better than their peers) reported weaker perceptions of financial well-being (Davtyan, 2010:20).

Xiao *et al.* (2006), Shim *et al.* (2009b), as well as Gutter and Copur (2011) focused on examining the relationship between behavioural factors and perceptions of financial well-being. Davtyan (2010:20) states there is evidence that suggests that behavioural factors influence perceptions of financial well-being. Hayhoe *et al.* (2000) found an inverse relationship between responsible money management practices and perceptions of financial stress. Shim *et al.* (2012) established that young adults have a healthy attitude

towards financial behaviours when they were presumable to participate in healthy financial behaviours, which affects their overall satisfaction with life. Moreover, healthy financial practices such as credit management, spending behaviour, cash management and saving were positively associated to overall life satisfaction (Xiao *et al.*, 2009; Rutherford & Fox, 2010).

Similarly, a study conducted by Malone *et al.* (2010:63) focused on assessing the association between healthy financial behaviours, financial satisfaction, financial well-being as well as overall satisfaction with life. The study's results indicated that healthy financial behaviours in young adults have been positively associated with financial satisfaction, financial well-being and overall satisfaction with life (Xiao *et al.*, 2009:53; Malone *et al.*, 2010:63; Serido *et al.*, 2010:453; Shim *et al.*, 2013:128). In addition, Gutter and Copur (2011:699) as well as Joo and Grable (2004) found that financial behaviours such as budgeting, saving, compulsive purchasing and risky credit card behaviours were ominously associated to financial well-being.

Financial well-being studies conducted in South Africa tend to focus on employee cost. The results from a study conducted by Vosloo (2014:34) suggest that employees with higher financial well-being will contribute to better the performance of the entity. Moreover, the findings indicate that the link between remuneration satisfaction and financial well-being was strong among employees with higher financial efficacy. Similarly, Jansen van Vuren (2015:xi) found that personal financial well-being has a direct impact on both productivity and absenteeism in the workplace.

Ultimately, previous research on financial well-being indicates that the interplay between circumstances and responses informs an individual's perception of financial well-being (Hayhoe & Wilhelm, 1998; Shim *et al.*, 2009b; Malone *et al.*, 2010). In other words, an individual's perception of financial well-being is suggested to be the function of the individual's economic circumstances (i.e. debt) and the individual's response to his/her economic circumstances (i.e. risky financial behaviours) (Davtyan, 2010:20-21). Moreover, mediating variables such as the individual's inherent psychological characteristics (i.e. impulsiveness, resilience, etc.) as well as comparative judgement of self against peers play a role in the perception an individual creates of his/her financial well-being (Leach *et al.*, 1999; Norvilitis *et al.*, 2003; Davtyan, 2010:20-21).

3.3 SATISFACTION WITH LIFE

Subjective well-being (SWB) is an umbrella term that is used to define an individual's level of well-being experience based on the subjective assessment of his/her life (Diener & Ryan, 2009:391). More specifically, SWB consists of the affective-emotional components and a cognitive-judgemental component (Arrindell *et al.*, 1999:816). The two affective-emotional components of SWB are often referred to as the positive affect and the negative affect (Pavot & Diener, 1993:164). Positive affect refers to the experience of many pleasant emotions and moods, such as joy and excitement (Lawrence & Jersey, 1988:375), whereas negative affect denotes the experience of unpleasant emotions and moods such as sadness, anxiety, depression and other distressing psychological symptoms (Headey & Wooden, 2004:25).

Alternatively, the cognitive-judgemental component of SWB is known as life satisfaction (Diener *et al.*, 1985:71) and is considered a distinct construct, which represents the global evaluation of the quality of an individual's life as a whole (Arrindell *et al.*, 1991:117). Only life satisfaction is defined, discussed and analysed in order to fulfil the theoretical and empirical objectives of this study. The following sections provide definitions of life satisfaction as found in the literature, explains the nature of life satisfaction as well as the significance of life satisfaction judgements. Lastly, the results on studies which focus on life satisfaction are presented and discussed.

3.3.1 Defining life satisfaction

It is vital to first provide a simple understanding pertaining to the concept of "satisfaction" before the definitions of life satisfaction are discussed (Mafini, 2015:12). In basic terms, satisfaction refers to the realisation of one's desires and goals (Graham, 2014:7). Alternatively, satisfaction may be conceptualised in terms of happiness (Diener, 2000:34), or a stable optimistic state of mind (Steel *et al.*, 2008:138), or gratification and stability (Fowler & Christakis, 2008:2338). Mafini (2015:12) is of the opinion that these different conceptualisations of satisfaction provide a connection between satisfaction itself and the achievement or gratification of aspirations or needs.

The notion of life satisfaction was first presented by Neugarten *et al.* (1961:134) and has since been covered in research across various fields of study. In the literature,

researchers have defined life satisfaction in many different ways. Diener *et al.* (1985:71) define life satisfaction as an individual's global assessment of his/her own life. Likewise, Saris *et al.* (1996) view satisfaction of life as an individual's overall positive assessment of the quality of his/her life. While the concept of life satisfaction encompasses some aspects of quality of life, Veenhoven (2014) suggests that life satisfaction refers more to an individual's satisfaction with his/her life regardless of whether or not he/she is living what is considered the good life.

The concept of life satisfaction can also refer to an individual's conscious, cognitive criticism of the quality of his/her life (Headey & Wearing, 1992:6). An individual's cognitive assessment regarding life satisfaction allows him/her to evaluate his/her own level of life satisfaction centred around a presumed standard set of criteria that meets the individual's expectations (Lewis *et al.*, 2011:250). On the other hand, Hong and Giannakopoulos (1994:547) are of the opinion that life satisfaction specifically denotes an individual's emotional reaction to life in general. Similarly, Özer and Sackes (2011:514) explain that the emotional reaction an individual makes outside of his/her work life is what can be perceived as life satisfaction.

The concept of life satisfaction is often interchangeably utilised with happiness and subjective well-being (De Coning, 2016:29-30). Happiness refers to the meaningful and pleasant sensation of life for a long period of time and is determined by satisfaction of incremental innate needs (Myers & Diener, 1997:4; Hergenhahn, 2005:475). Alternatively, subjective well-being refers to an individual's cognitive and affective analysis of his/her life (Diener, 2012); however, subjective well-being consists of the component of life satisfaction.

Life satisfaction is an entirely subjective construct (Pavot & Diener, 1993) and believed to be the most steady component of subjective well-being presumed that the positive and negative affective domains are commonly unsteady with rapid changes (Bateman, 2014:19). Judge *et al.* (1998) are of the opinion that life satisfaction denotes to an general evaluation of one's life, rather than one's current feelings as implied by subjective well-being (Saris *et al.*, 1996). However, some researchers have conceptualised life satisfaction as an attitude or feeling at a certain time (Diener *et al.*, 1999).

De Coning (2016:30) explains that the conceptualisation of life satisfaction as a feeling at a certain time does not refute the conceptualisation of life satisfaction as a general appraisal since these assessments can occur at varying points in time. For example, an individual might not be satisfied with his/her life at present, but is satisfied with his/her past and forthcoming path – as such, the individual might experience high life satisfaction after considering these appraisals based on different points in time (Saris *et al.*, 1996; Diener *et al.*, 1999). Rojas and Veenhoven (2013) mention that both an individual's overall evaluation of life and his/her happiness independently contribute towards his/her experienced level of life satisfaction. For the purposes of this study, life satisfaction is accepted as being, 'a global evaluation of an individual's quality of life considering his/her chosen criteria'.

3.3.2 The importance of life satisfaction judgements

Pavot and Diener (2008:140) are of the opinion that previous research on establishing the nature of life satisfaction judgements would be insignificant if the validity and use of those judgements could not be determined. Some researchers have questioned the value of life satisfaction measures in the assessment of SWB. However, many are inclined to emphasise the assessment of the affective components of SWB (Cummins, 2000:113; Headey & Wooden, 2004:24; Krueger & Schkade, 2008:1833).

Kahneman (1999:3) implied that happiness is pre-eminently conceptualised as the experience of the most pleasure over time. Objective happiness can be defined by the average of utility over a certain time period. This logic suggests that the best measure of SWB involves the continual sampling of affective states through several explicit moments (Pavot & Diener, 2008:140). Moreover, it is recommended that the reporting of affective states be realised closest to the moment of the experience as possible.

Diener (2000:34) and Scollon *et al.* (2003:5) presented assessment methodologies that deliver optimum measurement of objective happiness from a hedonistic viewpoint. Based on this viewpoint, general assessments such as life satisfaction judgements are likely to have memory and integration errors as the standard of SWB is presumed to be pleasant moments (Pavot & Diener, 2008:140).

Other researchers adopted a more holistic method to conceptualising happiness. The essence of SWB is viewed as including reflective, global judgements of life overall (Diener, 2012; Meyer & Dunga, 2014). As such, SWB comprises positive effects and other aspects of life such as engagement with life and meaning (Peterson *et al.*, 2005:25-26). Measures of life satisfaction are beneficial as they permit individuals to establish their own inclusion criteria in the judgement process and to weight them in the method they deem appropriate (Pavot & Diener, 2008:140).

Moreover, the information considered by individuals is not limited to affective experiences only, but includes non-affective information such as the individual's success at reaching valued life goals (Diener *et al.*, 2003:188-189). It is noteworthy to mention that individuals can weigh their experiences of emotions differently. Adding up emotions does not result in a precise assessment of how individuals appraise their lives since many individuals may differentially value dissimilar positive emotions (Pavot & Diener, 2008:140-141). Additionally, life satisfaction can be influenced when individuals feel successful or unsuccessful in vital domains of life, even when these domains do not significantly influence affect.

Diener and Fujita (2005) presented evidence that individuals who reported high life satisfaction levels, after regulating a measure of daily satisfaction, regarded themselves (and by others) as being advanced in desirable characteristics such as social skills and health. As such, it may be suggested that life satisfaction evaluations can offer significant supplementary predictive power (Pavot & Diener, 2008:141). Lastly, empirical evidence designates that the experience of SWB and life satisfaction may be advantageous in key life domains such as the quality of social relationships, results in physical health and positive mental health. As such, the importance of life satisfaction judgement is deemed significant.

3.3.3 Studies on life satisfaction

A dearth of the literature focuses on the effect of investor well-being on life satisfaction. The following table provides a brief summary of the purpose of previous research conducted on life satisfaction and what their results suggested.

Table 3. 3: Studies on life satisfaction

Author(s)	Purpose of study	Results of study
Diener *et al.* (1999)	Review theories of subjective well-being that stress dispositional influences, goals, adaptation and coping strategies	Individuals' temperament and cognitions, culture, goals and adaptation coping efforts moderate the influence of life circumstances and event of subjective well-being
Shim *et al.* (2009b)	Define and investigate a conceptual model pertaining to the potential precursors and consequences of financial well-being in young adults	The precursors concerning finance were linked to financial well-being which, in turn, was associated with young adults' overall life satisfaction, psychological health and physical health
Başţuğ and Duman (2010)	Examines the level of life satisfaction based on level of physical activity	A significant difference has been found between levels of life satisfaction of individuals who are physically active and those who are physically inactive
Swart (2011)	Examine managers' orientations to happiness as well as the relationship thereof to organisational and individual outcomes	Life satisfaction had a robust and direct positive influence on job satisfaction and orientations to happiness has a robust and direct effect on life satisfaction
Mafini (2015)	Examine the impact of socio-economic factors on the life satisfaction of individuals who live in varying townships in the southern region of Gauteng	Individuals from Sebokeng and Sicelo were dissatisfied with their lives and individuals from Sharpeville showed slightly higher life satisfaction levels
De Coning (2016)	Examine the relations between life-, job- and wage satisfaction	In terms of satisfaction with life, gross wage and wage satisfaction do not recompense for a dissatisfying job
Campara *et al.* (2017)	Analyse overall life satisfaction and financial well-being of low-income individuals	The most representative cluster from the study consists of beneficiaries with high life satisfaction and low financial well-being
Dickason and Ferreira (2019)	Establish male and female investors' risk tolerance level when taking life satisfaction levels into consideration	Female investors had a lower life satisfaction level compared to their male counterparts

Source: Author compilation

Previous researchers have found that many factors affect an individual's level of satisfaction with life (Başţuğ & Duman, 2010:4892; Bateman, 2014:20; Dickason & Ferreira, 2019:67). Such factors include one's financial well-being, health status, psychological well-being, as well as the consequences of an individual's level of risk tolerance in certain life domains. Shim *et al.* (2009b) found that individuals' financial well-being relates to their overall life satisfaction, health status and psychological well-being. Specifically, financial well-being has robust support for its significant contributions

towards how an individual perceives his/her overall satisfaction with life based on his/her economic status (Gutter & Copur, 2011).

For example, an early study by Diener *et al.* (1991) suggests that if an individual experiences low levels of life satisfaction, he/she tends to be more pessimistic and reluctant to put in effort to improve his/her financial well-being. Similarly, Bateman (2014:20) mentions that individuals who experience low life satisfaction levels have a higher possibility of developing psychopathological symptoms, which may negatively influence the manner in which he/she deals with his/her finances.

In South Africa, Swart (2011:26) found that life satisfaction had a robust, direct and positive effect on job satisfaction. Similarly, De Coning (2016:27) found robust, direct relations between wage-, job- and life satisfaction based on a South African sample. Additionally, the findings suggested that gross wage was associated to wage satisfaction. Alternatively, there were no direct associations found between gross wage and job satisfaction, as well as gross wage and life satisfaction. The results from a study conducted by Mafini (2015:iii) indicate that the most imperative socio-economic factor in forecasting life satisfaction is employment status. Moreover, the study provided a comparison of inclinations in life satisfaction amongst township inhabitants who are an essential cohort of society in South Africa.

3.4 PHYSICAL WELL-BEING

Physical activity has been viewed as one of the most vital habitual behaviours, which strongly contribute to a healthy life by improving mental health, preventing diseases and other health benefits (Kim *et al.*, 2012:440). The term physical activity is used to describe complex behaviours, which differ in durations, intensities and frequencies (Grimm *et al.*, 2012:64). The following sections focus on defining physical activity as well as the domains related to physical activity. Moreover, both objective and subjective measures of physical activity are covered. Lastly, the literature on physical activity is presented and discussed.

3.4.1 Defining physical activity and related domains

Physical activity can be described as any action which includes human movement and results in physiological attributes, such as higher energy expenditure and better physical

fitness (Gabriel *et al.*, 2012:15). Similarly, Skaal (2015:2) mentions that any bodily movement manufactured by skeletal muscles, which results in the expenditure of energy is considered physical activity. Physical activity is universally perceived as an important avenue to accomplish better quality of life, good health and greater overall well-being (Pate *et al.*, 1995:402; Thangavhuelelo, 2013:14).

Bouchard *et al.* (2006:3) emphasise that diverse dimensions of physical activity can be expressed through frequency, intensity, duration and type of physical activity. Frequency refers to how often an individual partakes in physical activity, such as during a day or a week. Intensity can be described as the strenuousness of the physical activity an individual engages in. Duration is the time an individual use during one physical activity session. Type of physical activity refers to the different kinds of activities that an individual can partake in such as walking, jogging, or strength training. As such, physical activity can also be defined as complex behaviours of varying durations, intensities and frequencies (Grimm *et al.*, 2012:64).

Booth (2000:116) mentions that physical activity can take place in five different domains, namely (i) occupational; (ii) transport or moving from place-to-place; (iii) household chores; (iv) gardening or yard work; and (v) leisure-time physical activity. Some consider the household chores and gardening or yard work physical activities as one domain (Hagströmer *et al.*, 2006:756). These five domains of physical activity are applied to this study and discussed below (Booth, 2000:116-118; Burnett & Baker, 2001:7; Al-Hazzaa, 2006:60; Hallal *et al.*, 2012:8-13; Kelly, 2012:20; Malema, 2018:12).

- **Occupational**

Occupational physical activity refers to any human action wherein energy is expended in a work environment. Relatively few occupations demand a high rate of energy expenditure; however, other occupations involve physically demanding work. The latter is more likely to have a significant impact on prevalence estimates from physical activity measurements.

- **Transport or moving from place-to-place**

The most common forms of individual-powered transport are walking and cycling. Walking is considered a universally accessible and inexpensive form of physical activity which was

proven to be an essential portion of total physical activity among adult populations. Individuals may walk or cycle for varying reasons and under different conditions. Some individuals may walk or cycle for recreational or health-related reasons and others may engage in the same activities as ways of transport to get from one place to the next. Walking or cycling may comprise carrying heavy items and/or moving over difficult terrain, which may result in a superior rate of energy expenditure.

- **Household chores**

Household chores refer to physical activity that is restricted to various actions in and around the home. The dimension of physical activity regarding household chores may differ from dusting and tidying to walking extended distances while carrying a substantial load of water or fuel. It is important to estimate accurately the energy associated with each major household chore or to determine, which household chores may be categorised as light, moderate, or vigorous intensity physical activity.

- **Gardening or yard work**

Gardening and yard work are another domain of physical activity. The concept of gardening and yard work may be understood differently by individuals. Some individuals may understand gardening and yard work as a leisure-time activity, whereas, others may consider it as work or part as one's occupational activities. Gardens and yards come in different shapes and sizes. As such, the amount of time and effort as well as the intensity of the physical activity required to maintain these gardens and yards varies substantially among individuals. The way the gardens and yards are maintained has a significant impact on the amount of effort or energy needed for the completion of a certain task. For example, mowing the lawn may be done with an unpowered mower, powered mower, or a ride-on mower.

- **Leisure-time**

The last of the five domains of physical activity is leisure-time physical activity. Leisure-time physical activity can be defined as any activity participated in away or free from family and work obligations. Moreover, leisure-time physical activities are usually engaged in for amusement purposes, gaining diverse experiences to expand, enjoyment, or/and to exercise individual capacity. Leisure-time physical activity has been linked to many

different benefits including psychological well-being, promoting character building and boosting confidence and self-esteem.

Alternatively, Ross (2001:98) suggests that physical activity can be classified into three main domains, namely (i) active recreation which consists of dance, sport, informal play, and exercise; (ii) active transportation which consists of walking, jogging, and cycling; as well as (iii) activity during paid or domestic work such as mowing the lawn and washing the dishes. Kruger *et al.* (2006:1143) suggest that there are four commonly recognised and interconnected domains of physical activity, namely occupational, household, transportation and lifestyle. The World Health Organisation (2018) suggests that physical activity, for adults between the ages of 18 and 64, consists of recreational or leisure time activity, transportation (e.g. walking and cycling), household chores, occupation, play, games and sports or planned exercise.

In addition to the various domains of physical activity, another facet of the human movement spectrum that has gained a growing amount of interest is sedentary behaviour (Hallal *et al.*, 2012:15). Sedentary behaviour is usually described as an individual's time spent sitting (Hallal *et al.*, 2012:252). Sedentary behaviour can occur in many different physical activity domains such as at work, while commuting and during leisure-time (Kganakga, 2018:49-50).

3.4.2 Measures of physical activity

There are large sources of measures available for the assessment of physical activity. Tlhongolo (2008:13) mentions that physical activity measures can be grouped into five categories, namely behavioural observations, calorimetry, motion sensors, physiological markers (e.g. heart rate) and questionnaires (e.g. interviews, recall questionnaires, diaries). Physical activity measures can be applied either objectively (directly) or subjectively (indirectly) (Guthold *et al.*, 2010:18-19; Butte *et al.*, 2012:10). Objective measures include doubly labelled water, motion sensors, calorimetry and observations (Tudor-Locke & Myers, 2001:91; Nybacka *et al.*, 2016:3-4), whereas subjective measures include physiological markers, fitness measures, self-report questionnaires and surveys (Armstrong & Welsman, 2006:1068; Steene-Johannessen *et al.*, 2016:235). The selected physical activity measure should be socially acceptable, minimally influence the

individual's physical activity pattern and not be a burden to the participants (Armstrong & Welsman, 2006:1069).

Physical activity is usually examined from tasks that are executed during identifiable segments of daily life (i.e. domains) or the analysis of the occurrence of the activity during nonworking hours (Kruger *et al.*, 2006:1143). In order to measure physical activity as accurately as possible, Armstrong and Welsman (2006:1067-1068) suggest that the frequency, duration, intensity and mode of the activity should be monitored.

3.4.2.1 Objective measures

Objective measures of physical activity offer a distinctive benefit over subjective measures. For example, objective measures are not influenced by the biases of subjective measures such as self-report physical activity questionnaires (Hallal *et al.*, 2012:13). Moreover, objective measures of physical activity deliver trustworthy information on patterns of physical activity within a specific day or over numerous days (Van Niekerk, 2014:55).

Hoos *et al.* (2004:1426) mention that the most common objective physical activity measures used for research purposes include doubly labelled water and motion sensors (e.g. accelerometers, pedometers, etc.):

- **Doubly labelled water**

Doubly labelled water is considered to be the utmost precise and objective method to measure an individual's energy expenditure (Costello *et al.*, 2018:1170) and is perceived as the golden standard for the authentication of other instruments measuring physical activity (Koebnick *et al.*, 2005:303; Van Oort, 2014:55).

Specifically, doubly labelled water entails the implementation of an oral dose of water encompassing certain isotopes of hydrogen and oxygen per kilogram body mass (Westerterp, 2017:1277). The amount of isotopes that are measured in urine excreted after a 24-hour period is the equivalent of the quantity of metabolic carbon dioxide eliminated by the individual's body (Van Niekerk, 2014:55; Wilson *et al.*, 2017:236). Subsequently, the metabolic carbon dioxide is used to approximate an individual's expenditure of energy (Warms, 2006:80). It should be noted that an individual's energy

expenditure is a physiological result of physical activity; as such, the attempts to use doubly labelled water as a validated measure of physical activity are limited (Armstrong & Welsman, 2006:1074).

Researchers regard doubly labelled water as a powerful method for the accurate measurement of an individual's total energy expenditure (Hagströmer *et al.*, 2006:759; Maddison *et al.*, 2007:3); however, the method has several limitations. Doubly labelled water is an expensive measurement of physical activity, which is not feasible for larger populations and has limited applicability (Tlhongolo, 2008:14; Van Niekerk, 2014:55).

Moreover, doubly labelled water does not offer information pertaining to the type, intensity, frequency and duration of physical activity performed by an individual (Armstrong & Welsman, 2006:1073; Hagströmer *et al.*, 2006:759). Tlhongolo (2008:14) and Van Niekerk (2014:55) mention that the double labelled water measure of physical activity is scarce, necessitates special equipment and highly trained personnel to administrate the test. Lastly, the requirement for the gathering of urine samples limits its usefulness for individuals with disabilities who may have incontinence or make use of urinary gathering equipment (Warms, 2006:80).

- **Motion sensors**

Motion sensors were mainly developed in response to the invasiveness of direct observation and the complication of monitoring heart rate (Puyau *et al.*, 2002:152; Van Oort, 2014:16). Motion sensors are considered more suitable for physical activity quantification in characteristically sedentary populations (Tudor-Locke & Myers, 2001:91-92).

There are two main types of motion sensors, namely pedometers and accelerometers. Pedometers are used to measure ubiquitous, ambulatory and other structured physical activities objectively (Schneider *et al.*, 2003:1780). Alternatively, accelerometers are used to measure dynamic activities of the body including the intensity and pattern thereof (Hoos *et al.*, 2004:1425). Specifically, accelerometers can be used to characterise the frequency, intensity, duration and total volume of physical activity performed throughout the day (Grimm *et al.*, 2012:65). Van Niekerk (2014:57) mentions that accelerometers are universally acknowledged as valid measures of physical activity.

Motion sensors are affordable and considered adequate to measure physical activity (Van Niekerk, 2014:58). Accelerometers and pedometers are characteristically worn on the waist where vertical motion transpires (Tudor-Locke & Myers, 2001:92; Butte *et al.*, 2012:8). The common issues reported regarding motion sensors are that the responses are influenced by factors such as walking speed, movement style, mode and location of attachment, as well as the amount of soft tissue at the attachment site (Tlhongolo, 2008:16).

3.4.2.2 Subjective measures

Subjective measures every so often offer comprehensive information regarding individuals' physical activity, are easy to administer and cost-efficient, which make them an ideal physical activity measure to use for large population studies (McVeigh & Norris, 2012:43). Since subjective measures depend on self-reporting of one's physical activity, they are subject to both response bias and recall bias (Hallal *et al.*, 2012:254; Van Niekerk, 2014:53).

Particularly, subjective measures of physical activity have restricted precision at capturing activities that are unstructured and of light intensity (Lee *et al.*, 2011:84; McVeigh & Norris, 2012:43). It is vital to measure total physical activity, which includes unstructured and light intensity activities since, compared to moderate-to-vigorous physical activity, it may have a greater effect on several health outcomes (Lee *et al.*, 2011:84; Van Niekerk, 2014:53).

- **Physical activity questionnaires**

Physical activity questionnaires are highly used methods to estimate physical activity (Van Oort, 2014:16). Tlhongolo (2008:15) mentions that physical activity questionnaires are best for establishing activities that are easily remembered, such as programmed exercise, sport or recreation activities. The use of self-reporting questionnaires to measure individuals' physical activity has bought forth some limitations (Van Oort, 2014:15).

One of the main boundaries accompanying physical activity questionnaires is that some questionnaires do not consider the intensity, frequency and duration of the physical activity that is measured (Tlhongolo, 2008:15). Alternatively, other physical activity

questionnaires fail to capture the lower end of the physical activity traits of sedentary populations (Tudor-Locke & Myers, 2001:92). Moreover, existing self-report physical activity questionnaires are subject to inaccuracy and social acceptance (Warms, 2006:81). Tlhongolo (2008:15) mentions that language, culture and gender are also other factors that affect the results of physical activity questionnaires.

The use of questionnaires to measure physical activity also brings many advantages. The administration of physical activity questionnaires is simple, brief and inexpensive (Martínez-González *et al.*, 2005:921; Armstrong & Welsman, 2006:1070). Moreover, physical activity questionnaires are considered a reliable method to use during large epidemiological studies (Warms, 2006:80). Tlhongolo (2008:16) suggests that the questionnaire used to capture essential physical activity constructs should be as short as possible since participants tend not to take the time to read many words.

3.4.3 Studies on physical activity

Physical activity is linked to a range of health benefits, which positively contribute to general well-being and quality of life (Tlhongolo, 2008:12; Van Oort, 2014:22). Table 3.4 provides a brief list of previous research conducted with physical activity as the main focus.

Table 3. 4: Studies on physical activity

Author(s)	Purpose of study	Results of study
Fox (1999)	Provide a new perspective on the literature of public health promotion; also, to examine proof for physical activity and dietary interactions influencing mental well-being	Exercise is efficient in the treatment of clinical depression as well as the improvement of cognitive function
Dunn *et al.* (2001)	Investigate scientific indication for a dose-response relationship between physical activity, anxiety and depression disorders	Low-, moderate- and vigorous-intensity exercise may diminish symptoms of depression and anxiety
Brosse *et al.* (2002)	Conduct a critical review of the indication that exercise is effective in treating depression in adults	Evidence provides significant support that exercise attributes to diminishing depressive indicators in both healthy and clinical populations
Berlin *et al.* (2006)	Discuss the general definition, psychometric properties and use of activity measures, as well as their advantages and disadvantages; also	The best option for an activity monitor is the one that is within the researcher's budget, has inter-instrument and test-retest

Author(s)	Purpose of study	Results of study
	to provide recommendations regarding the usage of selected activity monitor in research or clinical settings	reliability and has been validated in a population of interest for the activity that the researcher wishes to measure
Warms (2006)	Review ways to measure physical activity, provides advantages and disadvantages and discuss the difficulty of measuring individuals who move differently	Before selecting a physical activity monitor, it is important to determine a research question for the study, analyse the characteristics of the population of interest; also to understand how the measures work and what their strengths and weaknesses are
Biddle and Asare (2011)	Synthesise reviews which examine the link between physical activity and depression, anxiety, self-esteem and cognitive functioning in individuals	Associations amongst physical activity and mental health is present; however, research designs are frequently too weak, and influences tend to be small-to-moderate
Du Toit *et al.* (2011)	Determine the connection between physical activity and academic achievement in an urban South African primary school child	A positive connection between physical activity and academic achievement was established
Ojiambo *et al.* (2012)	Compare objectively measured habitual physical activity and sedentary time in youths from rural to urban areas of Kenya	Youth from rural areas in Kenya are significantly more active than adolescents from urban areas in Kenya
Suija *et al.* (2013)	Estimate the connotation between physical activity and depressive symptoms among young adults	Physical activity is inversely related to the occurrence of depressive symptoms among young adults
Thangavhuelelo (2013)	Establish leisure-time physical activity and psychological well-being status of employees at an executive level and determine the association between leisure-time physical activity and psychological well-being of employees at an executive level in selected African countries	Executive employees exhibit low leisure-time physical activity and no participation in high physical activity; moreover, executive employees tend to experience low psychological well-being
Van Oort (2014)	Establish objectively measured habitual physical activity patterns of pregnant women	Habitual physical activity that was objectively determined did not meet the stated guidelines for pregnant women

Source: Author compilation

There is evidence that both an individual's self-perceptions of health and his/her financial situation play important roles in general life satisfaction (Tenney, 2018:7). In addition, there is evidence that suggests a positive relationship between an individual's health and their financial well-being (Vera-Toscano *et al.*, 2006; Tenney, 2018:16). Similarly, in a

South African study, Van Oort (2014:22) found that physical activity not only results in physical benefits, but also improves psychological health and provides benefits regarding one's well-being.

These health benefits are obtained only through regular participation of physical activity (Warms, 2006:78). It is commended that individuals engage in 30 minutes of moderate-intensity on most days of the week in order to achieve any health benefits, such as increased mental and physical health (Berlin *et al.*, 2006:1137). The lack or absence of physical activity can have harmful effects on an individuals' overall health and well-being (Dunn *et al.*, 2001:587; Brosse *et al.*, 2002:741).

There is confirmation that being physically active is strongly related with mental health and that poor mental health is partly attributed to being physically inactive (Fox, 1999:418; Thangavhuelelo, 2013:21). Biddle and Asare (2011:894) found that physical activity reduces depression as well as anxiety, improves self-esteem and increases cognitive functioning. Similarly, Du Toit *et al.* (2011:32) found a negative relationship between physical activity and depressive symptoms. In other words, increased levels of physical activity lead to decreased symptoms of depression within individuals (Suija *et al.*, 2013:4).

Most adults do not meet the minimum requirements of physical activity wherein health benefits are believed to transpire (Cameron *et al.*, 2007). Peeters *et al.* (2012:654) mention that some obstructions to participation in physical activity include transportation (i.e. cars, busses and trains), occupational commitments, not enough time, social obligations, low motivation, fatigue, injuries, or crowded gyms. Ojiambo *et al.* (2012:121) found that urbanisation leads to decreasing levels of physical activities, partly because of growth in sedentary behaviour during occupational and domestic activities as well as insufficient leisure time available for physical activity. Murray (2014:681) suggests that crime and a lack of safety in vulnerable communities contributes towards individuals' lack of participation in physical activity.

3.5 INVESTOR WELL-BEING AND RISK TOLERANCE

Investor well-being consists of financial well-being, satisfaction with life and physical activity. It is essential to review the literature that indicates that there may be a relationship between each of investor's well-being components with risk tolerance. In other instances,

there may be relationships amongst the components of investor well-being, which, in turn, may influence risk tolerance. This section provides a brief analysis on the different effects that investor well-being has amongst its own components and with risk tolerance.

Section 3.5.1 specifically focusses on the relationship between financial well-being and risk tolerance. Section 3.5.2 provides a brief discussion on the relationship between satisfaction with life and risk tolerance. Lastly, Section 3.5.3 provides the findings of the literature that focussed on the relationship between physical activity and risk tolerance.

3.5.1 Financial well-being and risk tolerance

Financial well-being is connected, both directly and indirectly, to financial risk tolerance (Grable & Joo, 2004). Varying levels of risk tolerance may result in different financial decisions and outcomes. As such, the differences may lead to different levels of financial well-being experienced (Gutter & Copur, 2011:701). Risky financial practices such as reckless credit card usage have been correlated with greater financial distress (Prawitz *et al.*, 2006:35).

Shim *et al.* (2009a) discovered that participants who exhibited risky financial behaviours (i.e. delinquency in paying bills, borrowing against credit cards, taking out payday loans, etc.) were more likely to have negative perceptions towards financial well-being as well as physical health. Similarly, Brown *et al.* (2005) found that financial well-being is important to both personal health and overall well-being. Vera-Toscano *et al.* (2006) found a positive relationship between health and satisfaction with one's financial situation.

3.5.2 Satisfaction with life and risk tolerance

Individuals with higher levels of life satisfaction tend to be those with job security, high monthly income, increased financial stability and good financial management (Bechtold, 2004:ii; Diener, 2012). These individuals tend to be more willing to tolerate risk when making financial decisions. Alternatively, poor individuals lack enough resources to enable them to have an income that could impact their lives in a meaningful way (Meyer & Dunga, 2014:164). As such, poor individuals tend to take on lower amounts of financial risk and experience low levels of life satisfaction (Meyer & Dunga, 2014:168; Dickason & Ferreira, 2019:67).

An investor's investment goals are determined not only by his/her risk tolerance but also through the incorporation of other factors such as financial well-being, current life style and his/her desired level of life satisfaction (Marx *et al.*, 2013). Diener (2000) suggests that investors are more likely to be satisfied with their life when they experience more pleasant than unpleasant emotions pertaining to their investment activities. In other words, an investor's life satisfaction tends to increase when he/ she experiences positive emotions regarding good investment decisions (Dickason & Ferreira, 2019:67).

In a South African study conducted by Dickason and Ferreira (2019:66), it was found that the more investors are unsatisfied with their lives, the less they will be inclined to take on investments that are high-risk in nature. In other words, low satisfaction with life is associated with low risk tolerance levels. Moreover, Dickason and Ferreira (2019:67) mention that an investor's investment decisions may potentially be influenced if there are deviations between the investor's current level of life satisfaction and his/her desired level of life satisfaction.

3.5.3 Physical activity and risk tolerance

Chaddock *et al.* (2012:38) conducted a research review on the influence of physical activity and fitness on cognitions and brain health. The results indicated that an active lifestyle and greater levels of aerobic fitness are positively linked with greater cognitive abilities, brain structure and brain function (Salmon, 2001:33; Skaal, 2015:36). Better brain function can help investors to think more rationally throughout the process of deciding what products to invest in and how to deal with their losses when the markets are volatile and negatively affecting their investments.

The process of investment can be highly stressful and overwhelming for many individuals. Aldana *et al.* (1996:315) and Thangavhuelelo (2013:3) found that regular engagement in physical activity can be an effective approach in helping individuals cope with high stress levels and anxiety. Similarly, Dhurup (2012:622) found a positive correlation between physical activity and stress management. As such, frequent physical activity can help investors manage the stress and anxiety that is associated with the process of investment.

Ultimately, Baird *et al.* (2010:2) suggest that a change in an investor's level of physical well-being, financial well-being and subjective well-being may affect the investor's life satisfaction judgements over time. Diener *et al.* (1985) point out that there is a strong correlation between one's physical well-being, health and life satisfaction. Baştuğ and Duman (2010:4892) conducted a study wherein they assessed individuals' level of life satisfaction based on the individuals' level of physical activity. It was found that there is a significant variance between the life satisfaction levels of individuals who participated in physical activity and individuals who were physically inactive (Baştuğ & Duman, 2010:4892). Individuals who engage in physical activity tend to have a greater level of life satisfaction, whereas individuals' who were physically inactive usually experienced low levels of life satisfaction.

3.6 SYNOPSIS

The following important concepts relating to investor well-being were defined: financial well-being, life satisfaction and physical activity. Financial well-being refers to a subjective phenomenon, which includes positive feelings that emanate from an individual's analysis of his/her financial situation. However, this study also uses the term "financial distress" to refer to the negative feelings, which emanate from an individual's evaluation of his/her financial situation. Satisfaction with life is an individual's global assessment of his/her quality of life according to his/her chosen criteria. Lastly, physical activity is defined as any action that involves human movement and results in physiological attributes, such as higher energy expenditure and better mental health.

The concepts of financial well-being and physical activity can be measured through objective measures, subjective measures, or by the use of a combination of both types of measures. The nature and importance of life satisfaction and life satisfaction judgement highlighted that they can have an influence of how investors take on financial risk and perceive their involvement in physical activity. Moreover, the relationships between investor well-being and risk tolerance were discussed.

Ultimately, it can be suggested that investor well-being may have an influence (direct or indirect) on an investor's view of financial risk and how he/she decides to tolerate financial risk, which affects the manner in which his/her investment risk profiles are constructed. A

high level of financial well-being, combined with a high level of satisfaction of life and participation in physical activity (which improves one's mental health and cognitive function), can motivate investors to assess their finances and be more open to accept more risk.

The next chapter provides a discussion on the research design and methodology, which was used to achieve this study's objectives.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This chapter unpacks the concepts pertaining to the research design and methodology used to execute this study. This study followed a basic secondary data analysis (SDA) using the raw data provided by a reputable South African investment company. More insight is provided in Section 4.2 regarding the sampling procedure and strategies, data collection methods, pilot testing and data preparation that the investment company applied to gather and prepare the raw data. As such, Section 4.2 solely focuses on the origin of the primary data.

Section 4.3 discusses in detail the SDA process and application performed during this study. This section also explicates the advantages and disadvantages related to the application of an SDA, as well as the execution of the statistical processes conducted for the SDA.

Figure 4.1 illustrates the outline of the chapter. The chapter is structured in accordance to three main sections: (i) Section 4.2 provides an overview of research paradigms and research designs; (ii) Section 4.3 provides insight into the origin of the primary data (raw dataset) and (iii) Section 4.4 gives a detailed discussion of the SDA that was applied for this study.

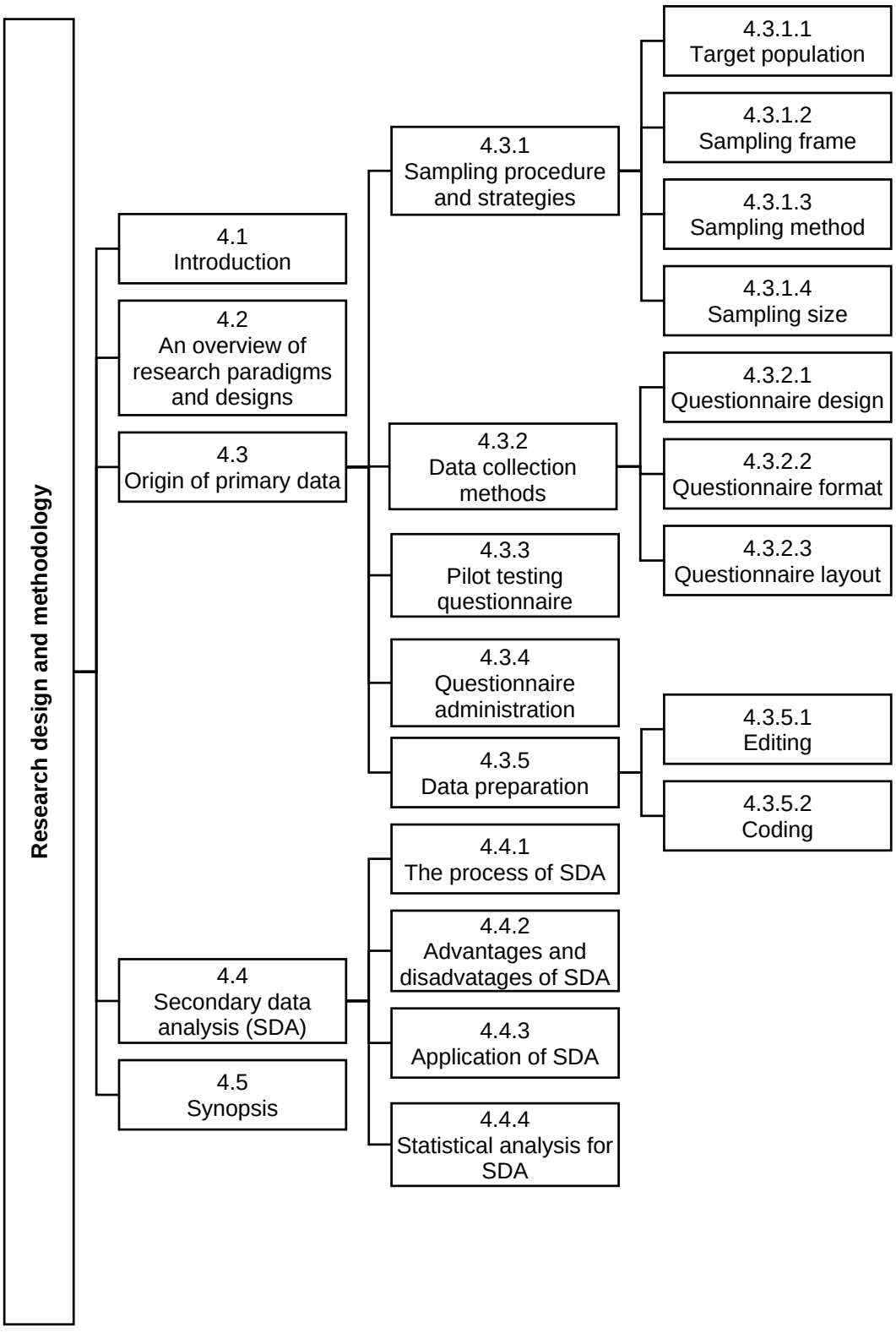

Figure 4. 1: Chapter 4 outline

Source: Author compilation

4.2 AN OVERVIEW OF RESEARCH PARADIGMS AND RESEARCH DESIGNS

Research paradigms are a representation of the ways in which researchers build knowledge through understanding reality and by gathering information on the examined phenomenon (Tracy, 2013:38). Strydom *et al.* (2011:513) mentions that research paradigms are also referred to as a framework or viewpoint based on researchers' conventions and philosophies regarding the social world.

On the other hand, research designs are strategies and procedures that researchers implement to collect, analyse, interpret and report data to accomplish study objectives (Creswell & Plano Clark, 2011). Research designs are grouped into three main categories, namely quantitative, qualitative and mixed methods. Research designs are essential since they guide researchers in establishing logical methodological decisions and descriptions for their study (Fouché *et al.*, 2011:142). Table 4.1 provides an overview of research paradigms and their complementary research designs.

Table 4. 1: An overview of research paradigms and research designs

Paradigm	Ontology	Epistemology	Axiology	Research design
Positivism	Objective, independent and external of social factors	Credible data can only be provided by observable phenomena	Etic and value-free Study is conducted in a value-free way wherein the researcher is independent of the data	Quantitative
Post-positivism	Objective and is independent of human subjectivity regarding beliefs or knowledge of existence Interpreted through social conditioning	Credible data can only be given by observable phenomena Focus lies on explaining within a context(s)	Etic and value-laden Research produced is value-laden. Researcher is prejudiced by world beliefs, cultural practices and upbringing	Quantitative or qualitative
Interpretivism	Subjective, socially constructed and subject to change	Social phenomena and subjective meanings Focus is placed on the details of situation, the reality regarding the details, motivating actions and subjective meanings	Emic and value bond Research implemented is value bond. Researcher plays a role in what is being researched is subjective as it cannot be separated	Qualitative
Pragmatism	External view selected to best obtain and answer to research question	Credible data are provided by either or both observable and subjective phenomena Focus is placed on practically applied research, integrating different perspectives to contribute to interpretation of data	Etic-emic Values play a great role in the interpretation of the results. Researcher is adopting both objective and subjective viewpoints	Mixed methods (quantitative and qualitative)

Source: Adapted from Guba and Lincoln (2005), Hallebone and Priest (2009) and Saunders *et al.* (2009)

As seen from Table 4.1, three types of research designs (respectively complimenting certain research paradigms) were taken into consideration for this study. The following discussion gives insight into the following research designs: qualitative research designs, quantitative research designs and mixed methods research designs (Creswell & Plano Clark, 2011).

- **Qualitative research design**

Qualitative studies refer to unstructured research of which its analytical goal is to produce exclusive insights and deliver direction for future research (Stebbins, 2001). Kumar (2005:12) mentions that qualitative studies are used to explore, observe and describe the nature of a specific event, concern, or phenomenon. Bricki and Green (2002) along with Quinlan *et al.* (2015) state that qualitative research designs are used to explicitly observe social interaction from which individuals' experiences, understanding and perceptions in relation to a certain issue are elicited.

Qualitative studies make use of a small group of participants in an attempt to obtain a richer description of the phenomenon in question (Fouché & Delport, 2011:65; Ritchie *et al.*, 2013:72). Qualitative data are typically gathered through procedures such as interviews and focus groups (Quinlan, 2011:286). Qualitative data are non-numerical (visual, textual, or verbal) and emphasise meaningful interpretations, classifications and other expressive descriptions (Kondracki *et al.*, 2002:224). Subsequently, the data are analysed through methods such as a thematic analysis and the results thereof are used to create an intricate and holistic view of a social phenomenon (Braun & Clarke, 2012:57). This study's existing dataset does not consist of a small sample and non-numerical data. Also, no qualitative interviews were applied to obtain the data; therefore, the qualitative research design was not applicable to use to address the research phenomena in this study.

- **Quantitative research design**

Maree (2011:145) defines quantitative research design as a method that systematically and objectively makes use of numerical data that has been obtained from a sample with the aim of generalising the findings to a larger population. Weinreich (2009) mentions that quantitative research designs aim to test theories, determine facts, demonstrate relationships between variables and predict outcomes. Quantitative research designs are

implemented to objectively and reliably quantify and measure individuals' knowledge, attitudes and opinions (Masenya, 2017:38).

Researchers who apply quantitative research designs make use of tools such as questionnaires to collect numerical data (Delport & Roestenburg, 2011:171). Thereafter, the data are analysed through various statistical analyses. This study used numerical data that was captured using questionnaires. Moreover, a rather large sample was obtained with the goal of being able to generalise the findings to an even larger population of investors. This study tests theories, determines facts, illustrates the relationships between variables and predicts outcomes through the application of a SDA. As such, a quantitative research design was applied to this study.

- **Mixed methods research design**

Kumar (2005:12) found that in some research study designs, there is a need to combine qualitative and quantitative methods to construct what is known as a mixed methods research design. Östlund *et al.* (2011:370) state the importance and value of mixed methods research designs has progressively been acknowledged over the years. The reason therefore is that mixed methods research designs have the potential to capitalise on the respective strengths of qualitative and quantitative research designs (Greene, 2008:20). Johnson and Onwuegbuzie (2004:15) mention that mixed methods research designs enable researchers to produce holistic and clearer answers to questions of phenomena that are complex in nature. Since this study does not make use of any qualitative research design, there was no use in applying a mixed methods research design to obtain its objectives. This study solely applied a quantitative research design.

Ultimately, this study was conducted in accordance with the principles of the positivist research paradigm. As such, a quantitative research design was implemented through the use of an SDA to address this study's empirical objectives. Before the process and application of the SDA can be explained, it is important to first discuss the origin of the primary data used during the SDA.

4.3 ORIGIN OF PRIMARY DATA

Primary data refers to original data gathered for a certain research purpose by using measures that fit the research problem best (Hox & Boeije, 2005:593). Primary data are

continuously collected, and new data are included to the existing library of social knowledge. In some instances, the data are offered to other researchers for reuse by the general research community. As such, the data are referred to as secondary data. In terms of this study, the primary data were collected with the purpose of understanding the following contextual and financial factors of an investment company's clients: demographics, financial well-being, risk tolerance, behavioural finance, subjective well-being, personality measures, short-term investment intentions, long-term investment decisions and physical activities.

A questionnaire (Appendix 4.1) relating to the abovementioned concepts was constructed and sent to a reputable South African investment company. The company distributed the questionnaire to its investors to complete. The investors are individuals who hold investments such as unit trusts, offshore investments, tax-free savings and online trades at a South African investment company. The following sections explicate the sampling procedures and strategies (Figure 4.1) of the primary data.

4.3.1 Sampling procedure and strategies

A sampling procedure is defined as the process of selecting a segment of the entire population (Onwuegbuzie & Collins, 2007:282). The sampling procedure of the primary data consisted of sampling strategies, data collection method, pre-testing of the questionnaire, administration of the questionnaire, preliminary data analysis and statistical analysis. Sampling strategies refer to an explanation of how decisions relating to the study's sample were applied (Cant *et al.*, 2005:165). It is vital that a researcher selects the correct sample (Marshall, 1996:522) since it is rarely possible, realistic, or ethical to investigate a complete population. Sampling strategies are covered with mention of the target population, sampling frame, sampling methods and sample size. The following discussion provides insight into each of the aforementioned factors as well as which methods were applied during the collection of the primary data.

4.3.1.1 Target population

Kitchenham and Pfleeger (2002:17) say that a target population applies to a group of individuals, which would best provide objective opinions to answer the research questions within the study. Zikmund and Babin (2013:312) explain that these individuals or groups

have a common set of characteristics and possess information that the researcher needs. Berndt and Petzer (2011:171) note that research would be considered ineffective and misleading if a study's target population is inadequately selected. When the target population are selected incorrectly, the researcher will not collect data that best addresses the research phenomenon (Masenya, 2017:47-48).

In terms of the primary data, the target population respondents were the best as they had an investment portfolio at a reputable South African investment company. Some of the investments held by the target population at this company include unit trusts, offshore investments, tax-free savings and online trades. Obtaining the data through the questionnaire enabled the company to enhance the service delivery to their clients by ascertaining, which factors either hinder or enable the investors to increase their return on investment, or which additional investments they have to add to or remove from their respective portfolios.

4.3.1.2 Sampling frame

Unrau *et al.* (2007:279) define a sampling frame as a smaller section of a defined target population. Marshall (1996:522) advocates that sampling frames are used since it is considered unpractical, cost ineffective, time consuming and inefficient to study whole populations. Moreover, Strydom (2011:224) mentions that information, which is yielded from a sampling frame, is considered more accurate than information that is yielded from an entire population. The choice of a reputable South African investor firm was based on non-probability, purposive sampling, which is explained in the following section.

4.3.1.3 Sampling method

Cant *et al.* (2005:165) state that sampling methods denote to the means in which a study's sample is obtained. Sampling methods can be classified into two main categories, namely probability and non-probability sampling (Maree *et al.*, 2011:172). With probability sampling, each individual in a population has the same known chance to be included in a sample (Iacobucci & Churchill, 2010:285). Alternatively, with non-probability sampling, each individual's likelihood of being included in a sample is unknown (Malhotra, 2010:376). Table 4.2 provides the definitions of the two main sampling methods along with the sub-categories and their definitions.

Table 4. 2: Sampling methods defined

Sampling methods		Definition
Probability	Simple random sampling	From the population, each individual theoretically has the same likelihood of being selected for a sample.
	Stratified random sampling	Population divided into mutually exclusive groups so that sample will have a fair representation of varying groups from population.
	Systematic sampling	The first individual is solely selected randomly from the population; subsequent individuals are established on a specific interval, which is based on a required sample percentage.
	Cluster sampling	A two-stage process in which a random sample of cluster is drawn; thereafter, a random sample of components within each cluster is drawn.
Non-probability	Purposive sampling	Sample that has been obtained solely built on a researcher's judgement of what components best represent the traits of the population.
	Snowball sampling	Initial respondents are asked to classify supplementary individuals who have similar traits and are willing to engage in the study.
	Quota sampling	Occurs when characteristic individuals are selected out of a specific subgroup.
	Convenience sampling	Individuals who a researcher has easy access to.

Source: Adapted from Kitchenham and Pfleeger (2002:19), Cant *et al.* (2005:166), McDaniel and Gates (2010:335), Quinlan (2011:210), and Strydom (2011:228)

The sampling method applied to collect the primary data's sampling frame was non-probability, purposive sampling. Monette *et al.* (2005:148) along with Grinnell and Unrau (2008:153) refer to purposive sampling as a process wherein a sample is composed of elements that contain the most characteristic, representative or typical traits of the population that serve the purpose of the study best. Purposive sampling is also known as judgement sampling (Rubin & Babbie, 2005:247). The researcher collecting the primary data decided on purposive sampling, since she knew that the most representative sample would be investors who hold investments at a reputable South African company.

4.3.1.4 Sampling size

The quantity of individuals pulled out from the target population to engage in a study to draw conclusive findings is known as the study's sample size (Berndt & Petzer, 2011:182). A sample size for a quantitative study should have a typical distribution of characteristics similar to the population from which they were extracted (Marlow & Boone, 2005). Moreover, a sample size for a quantitative study should be quite large as it

increases precision, which in turn improves the likelihood of recognising significant differences between the groups (Remler & Van Ryzin, 2011:281). As such, researchers used a large, representative sample to generalise their findings to the larger population (Strydom, 2011:226).

The reputable South African investment company concerned determined the final sample size of the primary data. In the beginning of May 2018, the South African investment company distributed the questionnaire to 4 800 of its investors. The responses were obtained during the last week of May 2018. Ultimately, the primary data's final sample size consists of 1 065 South African investors of which 596 are female and 469 are male. This sample size is considered sufficient. Based on the final sample, the majority of investors were: (i) female; (ii) above the age of fifty; (iii) married; (iv) from the Gauteng province; and (v) earned between R200 000 and R400 000 per annum.

4.3.2 Data collection methods

Data are known as information or evidence that researchers gather to acquire an improved understanding of a social phenomenon (Struwig & Stead, 2010:41). The method a researcher applies in gathering data from the respondents of a specified sample is referred to as a data collection method (Malhotra, 2010:228). Quantitative data collection methods make use of numerical measurements to address a study's empirical objectives (Zikmund & Babin, 2013:134). Numerical measurements refer to structured observations, structured interviews, questionnaires, scales, indexes and checklists (Delport & Roestenburg, 2011:171). The two common data collection methods that are utilised in quantitative studies are observations and the survey method.

Observations refer to a data collection method wherein a researcher systematically records actual behavioural patterns of individuals, objects and occurrences as they happen (Malhotra, 2010:237) without questioning or communicating with the observed respondent (Zikmund & Babin, 2013:190). Malhotra (2010:237) mentions that observation methods are evaluated for gathering data that are biased, as researchers are not aware of an individual's motives, attitude, or preferences when obtaining data (Marais, 2013:56).

Alternatively, the survey method provides a snapshot of a situation at a given point by making use of a structured questionnaire to collect quantitative data from a specified

sample (Marais, 2013:56; Zikmund & Babin, 2013:185). Delport and Roestenburg (2011:186) mention that questionnaires are one of the most commonly used instruments in quantitative research. Questionnaires refer to a set of questions and other items, which are designed to solicit information that can later be used for analysis (Leedy & Ormrod, 2005:3). The structure of a questionnaire refers to the extent to which standardisation is imposed during the process of data collection (Maree *et al.*, 2011:155). The design, format and layout of a questionnaire has to be constructed according to certain principles so that the criteria of reliability and validity can be ensured (Dickason, 2017:84). The following sections provide details on how the questionnaire in Appendix 4.1 was constructed.

4.3.2.1 Questionnaire design

Roets (2013:13) states that a questionnaire is considered the anchor of most survey methods; therefore, it is essential that researchers dedicate sufficient time and strategic thinking to the design thereof. It is important that the appearance of the questionnaire is professional as it will have on impact on the willingness of a respondent to answer the questionnaire (Iacobucci & Churchill, 2010:221). To warrant trustworthy feedback, the questionnaire should not go beyond twenty minutes when administered(McDaniel & Gates, 2007:353).

A decent questionnaire design can be warranted by setting well-defined goals, which specify the type of information the study obliges (Malhotra, 2010:336). The research questions used in the questionnaire should be directed at a single issue or subject matter and state the information required clearly (Berndt & Petzer, 2011:186). As such, it is vital that every question is phrased appropriately to ensure that respondents understand them clearly (Welman *et al.* (2005:176). Cant *et al.* (2005:155) mention that poorly worded questions will elicit inaccurate answers or result in the questions not being answered at all. The questions used in the questionnaire (Appendix 4.1) to gather the primary data were brief and simple to ensure that the questionnaire is kept clear, concise and easy to follow (Quinlan *et al.*, 2015:273). The appropriate steps were implemented to ensure that the wording of the questions in the questionnaire was appropriate (Pallant, 2007:10). The language used in the questionnaire was kept straightforward in order to accommodate

respondents whose first language is not English. The questionnaire was designed in a manner wherein the respondents could complete it in less than 20 minutes.

4.3.2.2 Questionnaire format

A questionnaire format denotes to the amalgamated arrangement of sets of questions into a methodical instrument and the extent of freedom given to the respondents in providing their answers (Czinkota & Ronkainen, 2010:258). Parasuraman (1991:367) notes that the nature of these questions can be either unstructured or structured. Unstructured questions refer to questions that are open-ended, which allow respondents to write a word, phrase, or comment in an open space that has been provided on the questionnaire (Maree *et al.*, 2011:161). As such, respondents are able to supply honest, detailed and satisfactory answers to the unstructured questions (Van Deventer, 2013:74).

Alternatively, structured questions are also known as closed-ended questions, which provide a set of responses for respondents to choose from (Marais, 2013:58). Additionally, respondents are expected to choose one, sometimes multiple, responses that best reflect the respondent's outlook or attitude (Cant *et al.*, 2005:151). Structured questions are easy and quick to answer, allow for sensitive questions to be answered with less difficulty and make it possible for simpler coding and statistical analysis (Berndt & Petzer, 2011:187). Structured questions may also be presented as a scale wherein the respondents are asked to rate their agreement or disagreement regarding a certain item (Malhotra, 2010:344).

Van Deventer (2013:73) mentions that the analysis of unstructured questions is more complex, compared to the analysis of structured questions. Moreover, unstructured questions are usually used to produce research hypotheses, whereas structured questions are used to assess research hypotheses. Delport and Roestenburg (2011:193) are of the opinion that the questionnaire format is based on what type of questionnaire it is, where it will be administered and by whom it will be completed. McDaniel and Gates (2010:201) recommend that structured questions be used in self-administered questionnaires as it is deemed more effective compared to the use of unstructured questions. The questionnaire in Appendix 4.1 consists of close-ended questions from Section A to Section F.

4.3.2.3 Questionnaire layout

The layout of the questionnaire in Appendix 4.1 is presented in Table 4.3. The questionnaire consisted of six sections and 11 measuring variables. Table 4.3 explicates the inclusion of each measuring variable into the questionnaire (Appendix 4.1).

Table 4. 3: Questionnaire layout

Section	Measuring instruments	Reason for inclusion
A	*Demographics*	To gather the investors' general background information including age, gender, race, marital status, annual income, religion, highest level of education and place they originate from.
B	*Financial decision maker question*	To determine who is responsible for making financial decisions in the investors' households.
	InCharge Financial Distress/Financial Well-being scale	To determine investors' financial state on a scale ranging from overwhelming financial distress/lowest level of financial well-being to no financial distress/highest level of financial well-being.
	13-item risk tolerance scale	To report on the investors' financial risk tolerance from a multidimensional perspective of a 13-item risk tolerance scale.
	Survey of Consumer Finances	To report on the investors' financial risk tolerance from the perspective of a subjective, single-item risk tolerance question.
C	*Behavioural finance*	To categorise the investors according to psychological theories which explain the different financial biases that affect their risk tolerances and investment decisions.
D	*Satisfaction with life scale*	To briefly assess the investors' general sense of satisfaction with their respective lives.
E	*Big-Five personality domains*	The personality measure aims to assess investors' personality traits based on five main categories, namely: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness.
	Short-term investment intentions	These subscales were included in the questionnaire to measure investors' short-term investment intentions and long-term investment decisions.
	Long-term investment decisions	
F	*International Physical Activity Questionnaire*	To measure investors' physical activity levels from the domains in which physical activity may take place, namely job-related physical activity; transportation; housework and family care; recreation, sport and leisure time physical activity; as well as time spent sitting.
D	*Satisfaction with life scale*	To briefly assess the investors' general sense of satisfaction with their respective lives.

Source: Author compilation

The following points explicate the structure of the questionnaire used in the primary study (Appendix 4.1).

- **Demographics**

Section A aimed at obtaining the sample's demographic information. The only demographic information used for this study are age, gender, race, marital status, annual income, highest level of education and the places the investors originate from. As such, it is possible to determine whether demographics have an influence on investors' financial well-being, risk tolerance, satisfaction with life and physical activity.

- **Financial well-being**

Section B comprises of the InCharge Financial Distress/Financial Well-being (IFDFW) scale. The IFDFW scale is an eight-item, subjective, self-report measure of financial distress/financial well-being. The purpose of the IFDFW scale is to measure investors' level of distress and well-being, which emanates from their personal financial condition (Prawitz et al., 2006:36). The IFDFW scale measures a latent construct that is presented as a continuum, which extends from negative to positive feelings about and reactions to the investor's financial condition (De Oliveira *et al.*, 2017:2).

More specifically, the scale includes four items that represent a sense of an investor's current state of financial well-being and four items that characterised an investor's reaction to his or her current state of financial well-being (Prawitz *et al.*, 2006:43). The IFDFW was proved to be internally consistent and reliable, which indicated that the instrument is measuring only one latent construct (O'Neill *et al.*, 2006:491). As such, it is a valid and reliable instrument that can be used by financial practitioners, researchers and other interested parties.

- **Risk tolerance**

Section B includes the SCF and the 13-item risk tolerance scale in order to measure investors' financial risk tolerance levels. The assessment of financial risk tolerance, during the process of risk profiling, is extremely important (Klement, 2018:1). In financial planning and counselling, there are two main risk tolerance measures that are used, namely the SCF and the 13-item risk tolerance scale (Kuzniak *et al.*, 2015:179). The SCF is a subjective, single-item risk tolerance question, which reports on the investors'

financial risk tolerance. Alternatively, the 13-item risk tolerance scale by Grable and Lytton (1999:163) is used to measure financial risk tolerance from a multidimensional perspective. These risk tolerance measures are widely used due to the scales' public availability, easy administration and relative ease for respondents to answer (Gilliam *et al.*, 2010:31).

The SCF has been a popular risk tolerance measure over the years; however, it has not gone without criticism. Chen and Finke (1996:94) conclude that the SCF was a better indicator of an investor's financial situation and not a good proxy for risk tolerance. Grable and Lytton (2001:43) conducted a study wherein they tested the concurrent validity of the SCF item and compared it to the 13-item risk tolerance measure. It was noted in the study that the SCF item was most likely, within the wider concept of financial risk tolerance, a proxy for the more narrow aspect of investment choice attitudes or financial experience (Gilliam *et al.*, 2010:31). Moreover, Grable and Lytton (2001) suggest that researchers should include both measures when analysing risk tolerance and that they should use caution when interpreting the SCF item's results. It is also noted that researchers should keep in mind that the SCF item does not adequately represent the full spectrum of financial risk tolerance.

Gilliam *et al.* (2010:30-31) conducted a study wherein the main objective was to determine the degree to which the SCF and the 13-item risk tolerance scale, respectively, are associated with the investors' portfolio allocation. A sample of 328 respondents completed the 38-question, web-based survey. The results of the study suggested that both scales were related with preference for risky or non-risky asset allocation; however, it was concluded that the 13-item risk tolerance scale has greater explanatory power (Gilliam *et al.*, 2010:39-40).

Kuzniak *et al.* (2015:177) assessed the reliability and validity of the 13-item risk tolerance scale by analysing data, which was collected for the timeframe 2007 to 2013. The study found that the 13-item risk tolerance scale was reliable and valid and remained robust since the scale was first introduced in 1999. The Cronbach α of the study was 0.77, which deems the scale acceptably reliable (Malhotra, 2010:320).

- **Satisfaction with life**

The satisfaction with life scale (SWLS) was developed by Diener *et al.* (1985:71) to represent a multi-item scale, which assesses overall life satisfaction as a cognitive-judgemental process. The scale has since been heavily utilised as a measure of the life satisfaction component of subjective well-being (Arrindell *et al.*, 1999:816). The SWLS does not consider associated constructs such as loneliness or positive affect (Diener *et al.*, 1985:71). Moreover, the SWLS does not assess life satisfaction domains such as finances or health (Pavot & Diener, 1993:164); however, it allows subjects to integrate and weigh those domains in whatever way they choose.

The scale consists of five items pertaining to life satisfaction that are presented in a seven-point Likert scale question format (Krueger & Schkade, 2008:1835). The questionnaire (Appendix 4.1) had the midpoint choice of the SWLS removed from the scale. The scale was presented in a six-point Likert scale question format. Consequently, respondents were forced to choose whether they agree or do not agree with each of the SWLS items. Respondents answered by indicating their agreement with each item through placing the appropriate number in the line preceding that item (McDaniel & Gates, 2010:274).

The SWLS possesses favourable psychometric properties, including high internal consistency and high temporal reliability (Arrindell *et al.*, 1999:816-817). Diener *et al.* (1985:71) found that the SWLS scores moderately to highly correlate with other measures of subjective well-being and associate predictably with unambiguous personality characteristics. The SWLS also accommodates the assessment of individuals from different backgrounds (Arrindell *et al.*, 1991:117).

- **International Physical Activity Questionnaire (IPAQ)**

The IPAQ is a comparable and uniform self-report instrument for measuring habitual physical activity of populations from different countries and socio-cultural backgrounds (Maddison *et al.*, 2007:1). The development of the IPAQ by the International Consensus Group on Physical Activity Measurement with support from the World Health Organisation (WHO) and the US Centers for Disease Control and Prevention (CDC), commenced in 1998-1999 (Booth, 2000:116; Al-Hazzaa, 2006:59; Kim *et al.*, 2012:440). Widespread reliability and validity testing was undertaken across 12 countries during 2000 (Al-Hazzaa, 2006:60). The final results suggest that the IPAQ has acceptable measurement

properties (Hagströmer *et al.*, 2006:755), which allow the instrument to be used in many settings and in different languages.

The IPAQ covers five domains of physical activity namely, job-related, transportation, housework/gardening and caring for family, recreation, sport and leisure time physical activity as well as time spent sitting (Booth, 2000:116-118; Grimm *et al.*, 2012:67). There are two variants of the IPAQ available, namely the short form and long form (Al-Hazzaa, 2006:59-60); moreover, there are two formats thereof, namely self-administered and telephonic (Kim *et al.*, 2012:440).

The short form IPAQ only questions three specific types of activity undertaken in the four domains and consists of nine items (Hagströmer *et al.*, 2006:755). The specific types of activity assessed include walking, moderate-intensity activities and vigorous-intensity activities (Booth, 2000:119; Al-Hazzaa, 2006:60). The items included in the short form IPAQ were structured to provide separate scores on walking, moderate-intensity and vigorous-intensity activities (Kim *et al.*, 2012:441). Alternatively, the long form IPAQ questions the specific types of activities undertaken within each of the five domains in further detail and consists of 31 items (Booth, 2000:116-118; Hagströmer *et al.*, 2006:755). Between the two variants of IPAQ, only the long form IPAQ used in the questionnaire (Appendix 4.1) is able to provide estimates on specific domains. The following section provides insight into the pilot testing of the questionnaire used to obtain the primary data.

4.3.3 Pilot testing of questionnaire

All data gathering instruments should be exposed to a pilot test to assist in approximating how the questionnaire will perform under actual circumstances (Quinlan *et al.*, 2015:279). A pilot test refers to the process of testing a questionnaire to identify and eliminate potential problems (Zikmund & Babin, 2013:63). Pilot tests help cultivate and advance research instruments, frame questions and adjust research procedures (Creswell, 2013:373). Malhotra (2010:345) is of the opinion that pilot tests help researchers to evaluate questions' difficulty, wording and sequence as well as determining the overall form and layout of the questionnaire.

The reputable South African investment company prohibited the original researcher from conducting a pilot study in order to prevent their database from being accessed twice (Dickason, 2017:99). The agreement between the primary researcher and the investment company was to access their database for the distribution of the questionnaires only once. This study was approved without the original questionnaire being pilot tested. The reason, therefore, is that the main measuring instruments used for this study's SDA have all been deemed valid and reliable during previous research (Booth, 2000; Grable & Lytton, 2001; Diener *et al.*, 2002; Prawitz *et al.*, 2006).

4.3.4 Questionnaire administration

The main survey was conducted by a reputable South African investment company during May 2018 by means of a self-administered questionnaire (Appendix 4.1). Prior to the main survey, the original researcher had contacted the investment company to ask for permission to survey their database. Upon agreement, the original researcher electronically sent the investment company a copy of the questionnaire (Appendix 4.1).

The investment company was responsible for screening the respondents; therefore, the original researcher had no knowledge of the client database of the investment company. In addition, as a way of guaranteeing the anonymity of their clients, the investment company ensured that no identifying marks were placed on the self-administered questionnaires. Moreover, the information obtained through the responses of the respondents will remain confidential. The investment company distributed the questionnaire to 4 800 of its investors and received 1 065 completed questionnaires. Thereafter, the investment company electronically sent the raw data to the primary researcher. The investment company, which collected the data, indicated that they had no issue with the data being published if the company's name was not mentioned in any way.

4.3.5 Data preparation

Data preparation refers to the process wherein the data are edited, coded and tabulated (Iacobucci & Churchill, 2010:350). It is important that the raw data, which was obtained from the questionnaire, undergoes preparation before it is analysed through statistical techniques (Kumar *et al.*, 2002:356). As such, the data's information content can be

captured and analysed (Iacobucci & Churchill, 2010:350). The two main aspects that are essential to the data preparation process are editing and coding (Zikmund & Babin, 2013:64).

4.3.5.1 Editing

Editing allows the researcher is to increase the accuracy and precision of the information obtained through the questionnaire (Malhotra, 2010:453). Editing is defined as the process of going through the questionnaires and ensuring that each are filled out appropriately and completely (Cant *et al.*, 2005:189). Through editing, the researcher identifies and eliminates responses that are incomplete, inconsistent, ambiguous, or illegible (Cant *et al.*, 2005:189). After editing, the researcher will be left with legible data that can be appropriately coded (Malhotra, 2010:423).

4.3.5.2 Coding

Once data have been edited, they have to be coded in order for them to be deemed useful (Zikmund & Babin, 2013:363). Coding involves respectively assigning a number or a code to responses on each question of the edited data (Malhotra, 2010:425). Coding allows researchers to make sense of the captured data (Kolb, 2008:198), which in turn, leads to an enhanced analysis and interpretation thereof. The primary dataset was edited and coded so that it was ready to be used to conduct various statistical procedures.

The following sections provide detail on how the primary data were used to execute the SDA and, in turn, to address the empirical objectives of this research. The section entails the discussion on the process of an SDA; the application and statistical analyses of the SDA; the ethics processes applied in this research; as well as the advantages and disadvantages of the implementation of an SDA.

4.4 SECONDARY DATA ANALYSIS (SDA)

An SDA refers to the process of reanalysing previously collected and analysed data in which the researcher had no direct control or involvement (Alston & Bowles, 2003:186; Royse, 2004:211; Walliman, 2006:52). SDAs are valuable in the sense that they provide an opportunity to: (i) bring new perspectives to existing data; (ii) allow for the elements of

the data that have not been fully analysed to be used; (iii) execute research with new empirical objectives, which differ from the original research questions when the researcher collected the primary data; and (iv) use as a source when comparing newly collected data (Ritchie & Lewis, 2003:61). Before conducting an SDA, it is vital that the researcher determines the quality of the primary data to ensure that the original source of the data can be trusted (Salkind, 2000:190). SDAs can be conducted in both qualitative and quantitative studies.

In terms of qualitative studies, a content analysis is performed on existing material by applying a sampling technique that extracts the main themes from the mass of existing information regarding a certain research phenomenon (Strydom & Delport, 2011:384). Alternatively, for quantitative studies, an existing dataset is reanalysed with various statistical procedures to address the relevant research questions (Strydom & Delport, 2011:384). Both content analysis and existing data analysis are considered SDAs. The data used during an SDA should be of fairly recent origin in order to be useful for further analysis (Bechhofer & Paterson, 2000:62). The data used for this SDA was obtained during May 2018 and is, therefore, considered appropriate for use.

4.4.1 Advantages and disadvantages of SDA

Before the SDA was conducted, the researcher took time to evaluate some of the major advantages and disadvantages associated to the implementation of an SDA. Table 4.4 provides a brief summary of some of the advantages and disadvantages associated with an SDA.

Table 4. 4: Advantages and disadvantages of SDA

Advantages	Disadvantages
Avoids the process of data collection which results in the researcher saving costs, time and inputs (Neuman, 2003:320).	The researcher must spend time examining the dataset in order to understand the data (Heaton, 2003:286). The dataset may be in an unaccustomed format that the researcher needs to adapt to.
Multidisciplinary as the same dataset can be analysed by different disciplines and observed from different perspectives to gain a better understanding of social issues (Strydom & Delport, 2011:386).	There may be prejudices in the existing documents based on the dataset (Strydom & Delport, 2011:387). The researcher should ensure to understand the dataset and eliminate any prejudices.
The data are verified and the findings of the SDA can be complementary to, or contrasted	The fact that a different researcher is working with the dataset may mean that the

Advantages	Disadvantages
with other research to confirm or reject previous findings and identify trends (Ritchie & Lewis, 2003:61; Royse, 2004:212).	confidentiality and anonymity aspect thereof could possibly be compromised (Strydom & Delport, 2011:388).
An SDA allows a researcher to study past events and issues in retrospect (Strydom & Delport, 2011:386).	The sampling procedure or sample size of the dataset may result in certain subgroups not to be included for analysis (Heaton, 2003:286). As such, it is possible that the sample size is not a depiction of the national population.
An SDA is an independent procedure that can be conducted on an exploratory, descriptive and an exploratory level (Alston & Bowles, 2003:187).	There is a limitation to using the available data as the researcher can only work with what data are available on the dataset (Alston & Bowles, 2003:189).

Source: Author compilation

4.4.2 The process and application of SDA

After deeming an SDA appropriate for the purpose of this study, the researcher ensured that the process of applying an SDA was followed accordingly. Grinnell (2001:335-342) and Johnston (2014:620-624) suggests that the following six steps be implemented when a researcher makes use of an SDA during their study: formulate the research problem, formulate the research questions, conduct a pilot study, reprocess the data, analyse and interpret the data and write a report on the results.

The disadvantages were kept in mind during the implementation of the SDA for this study. The researcher ensured that the data were understood accordingly; prejudices were eliminated, and the confidentiality and anonymity of the investors were not compromised. Moreover, the sample size of this study was sufficient, and the researcher had sufficient data to address the primary objective of this study. Table 4.5 provides detail on the process and application of the SDA.

Table 4. 5: Process and application of SDA

SDA	Description	Application
Step 1: Formulate the problem	When an SDA is used within research, it is essential that the researcher formulates a research problem for the study before they acquaint themselves with the existing data (Patton, 2002:293). As such, it is prevented that the researcher formulates a research problem merely to use a particular existing dataset. According to Strydom	It is important for investment companies to consider various elements that possibly affect their investor's risk tolerances. An investor's risk tolerance influences the manner in which their risk profile is shaped. Regardless, in existing literature, there is no model available that displays how levels of investor

SDA	Description	Application
	and Delport (2011:384), an existing dataset should not be used merely because it exists, is convenient, or inexpensive. The researcher's broad conceptualisation of the research problem should be completed and then be refined as the research progresses.	well-being (i.e. financial well-being, satisfaction with life and physical activity) influences their risk tolerances.
Step 2: Formulate the research questions	Once the research problem has been set, the next step for the researcher is to formulate the research questions for the study. The research questions should be related to the hypotheses, objectives and goals of the study. Once the research questions have been formulated, the researcher should determine the nature and scope of the investigation; and implement a pilot study.	*Research question based on primary objective:* Does investor well-being, which consists of financial well-being, satisfaction with life and physical activity, have an effect on their level of risk tolerance?
		Research questions based on theoretical objectives: In general, what are the theories and concepts that respectively pertain to risk, risk profiling and risk tolerance? In general, what are the theories and concepts that respectively relate to financial well-being, satisfaction with life and physical activity?
		Research questions based on empirical objectives: What are the respective levels of South African investors' well-being and risk tolerance? What influence do demographic factors have on South African investors' level of risk tolerance? What is the relationship between and effect of investor well-being on risk tolerance? What structural equation model can be constructed to depict the influence of investor well-being on risk tolerance?
Step 3: Conduct a pilot study	During the pilot study, the researcher should acquaint him/herself with the existing theory on the subject of the study. It is important that the researcher have discussions with experts to determine whether the study envisaged will contribute to the field of study. Subsequently, the researchers should acquaint themselves with the existing dataset and establish whether it would be appropriate to use to answer the research problem and research questions.	Firstly, the researcher acquainted herself with previous literature surrounding risk, risk profiling and risk tolerance. Subsequently, the researcher analysed the existing theory on investor well-being, which consists of financial well-being, life satisfaction and physical activity. The researcher identified a gap in the literature: no previous study had assessed the influence that investor well-being has on risk tolerance. There are potential links between financial well-being, life satisfaction,

SDA	Description	Application
		physical activity and risk tolerance that can be investigated. Thereafter, the researcher considered different existing datasets and the most appropriate one was used to address the study's research problem and research questions.
Step 4: Reprocess the data	Once the researcher has completed the first three steps, it is important that they analyse the existing dataset to ensure that it is valid and reliable to use for their study. It is also the researcher's responsibility to identify which variables from the existing dataset should be investigated. At this point, the reprocessing of the data occurs. In many cases, not all of the existing data from the first study is applicable to the secondary study; therefore, the data should be reduced where necessary so that it fits the purpose of the secondary analysis. The data being used for the secondary analysis should be critically viewed. In other words, the researcher should be aware of the purpose of the original study, who was responsible for the data collection of that study and determine whether the data are still relevant.	The researcher analysed the data with the help of a statistician. The existing dataset was deemed valid and reliable. The data were critically investigated and reduced to fit the purpose of the secondary analysis. Therefore, not all of the existing data from the original questionnaire (Appendix 4.1) was applicable to this study. Only the information regarding the investors' demographics, financial well-being, life satisfaction, physical activity and risk tolerance were included in this study.
Step 5: Analyse and interpret the data	Once the reprocessing of the data has been completed, the researcher should ensure that the data objectively responds to the formulated research questions. The findings of the SDA can also be compared to the findings of the original study and that of other researchers with similar studies. As such, it will be possible for the researcher to identify relationships or to develop new hypotheses.	The researcher, risk specialist and statistician determined that the reprocessed dataset objectively responded to the formulated research questions. The results are analysed and interpreted accordingly through a statistical analysis that is discussed in Section 4.4.4. Moreover, the findings of the SDA are compared to other studies that are somewhat similar to this one.
Step 6: Write a report	In the final step, the researcher should report the results of the SDA. A structured scientific report on the study will substantiate the transferability and verifiability of the study and contribute to the field of research. The following section provides insight into some of the advantages and disadvantages a researcher has to consider before applying an SDA to their study.	The results and findings of the SDA are reported in Chapter 5.

Source: Author compilation

4.4.3 Ethical considerations

The study conforms to the ethical standards of academic research recommended by the North-West University (NWU, 2016). The compulsory permission to conduct this study was acquired from the investment company concerned. The investment company concerned was responsible for screening the respondents. As such, the researcher had no knowledge of the client database of the investment company. Furthermore, no identifying marks were placed on the responses received. As a result, the anonymity of the respondents was guaranteed. The researcher only received the raw data from the investment company involved; therefore, the information obtained through the responses of the respondents will remain confidential. The investment company, which collected the data indicated that they had no issue with the data being published as long as the investment company was not mentioned in any way.

4.4.4 Statistical analysis for SDA

The data of this study were examined using the IBM Statistical Package for the Social Sciences™ (SPSS) Version 25 (IBM SPSS, 2018) and AMOS™ Version 25 for Microsoft Windows (IBM SPSS Amos, 2018). The statistical methods applied during this study are presented and briefly discussed in the ensuing sections.

4.4.4.1 Reliability and validity

Researchers often prefer to use standardised measuring instruments when general scales or constructs need to be measured (Maree *et al.*, 2011:215). In order for the measuring instruments to be standardised, they have to be reliable and valid. Reliability and validity are an indication that the measurement instrument is of high quality and a means to measure the trustworthiness of the research undertaken (Cant *et al.*, 2005:234). Moreover, reliability and validity affect the following aspects of research (Cant *et al.*, 2005:234): the degree to which the researcher can gain knowledge regarding the phenomenon under question; the degree of the probability of achieving statistical significance in the data analysis; and the degree to which noteworthy conclusions can be depicted from the data.

As such, it is important that reliable and valid measuring instruments are used when surveying a certain sample in order to ensure that the survey results are trustworthy (Cant *et al.*, 2005:234). Failure of testing the reliability and validity of a scale or construct may result in inefficient findings of a research study regarding a certain phenomenon (Struwig & Stead, 2010:130). The following sections provide further insight into reliability and validity.

- **Reliability**

Zikmund and Babin (2013:301) refer to reliability as an indicator of a scale's internal consistency. In other words, reliability is the extent to which a scale achieves dependable results if repeatedly measured (Remler & Van Ryzin, 2011:118). Reliability can be assessed by determining the association between scores that were obtained by the different administrations of the scale (Malhotra, 2010:318). Higher connotation reflects the scale's consistency in terms of results and is therefore considered reliable (Hair *et al.*, 2010:166). Figure 4.2 is an illustration of the different approaches that can be applied to measure reliability.

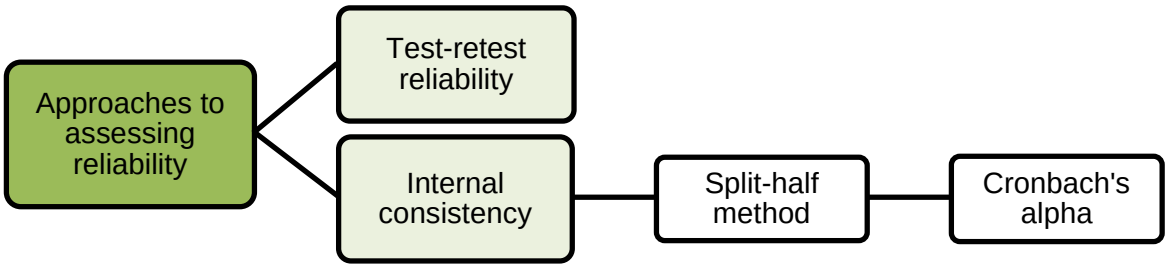

Figure 4. 2: Approaches for assessing reliability

Source: Zikmund and Babin (2013:302)

Test-retest reliability is defined as the implementation of the same scale to the same respondents on two separate occurrences to test for stability (Zikmund & Babin, 2013:302). If the scale is administered in similar conditions over time, it is expected that the test should obtain similar results, which reflect the scale's stability and repeatability (Hair *et al.*, 2010:165). The intermission between the two tests should not be too short as it might result in the respondents remembering the questions. This may lead to the problem of reactivity or memory effect, which could result in falsely high reliability (Struwig

& Stead, 2010:131). Researchers should also be aware that the assessment of test-retest reliability is expensive and time-consuming.

Alternatively, internal consistency reliability refers to the extent to which individual questions of a construct are associated with each other (Malhotra, 2010:319). Internal consistency reliability is only concerned with the internal consistency of the set of items that the scale consists of (Hair *et al.*, 2010:166). The split-half method is considered the simplest measure of internal consistency reliability (Iacobucci & Churchill, 2010:259). The items that the instrument consists of are split into two in order to create two separate instruments. There are three methods that can be applied to split the items (Struwig & Stead, 2010:132):

- **Split-half method 1:** Even-numbered can be grouped to form the first instrument and odd-numbered items can be used to create the second instrument;
- **Split-half method 2:** First half of the items form the first instrument and the second half items form the second instrument;
- **Split-half method 3:** Items are randomly assigned to the two instruments.

Subsequently, the scores of the two instruments are compared through the use of correlation. McDaniel and Gates (2010:256) mention that one issue with the split-half method is that the manner wherein the scale items are split leads to varying correlations.

The Cronbach's alpha is utilised to deal with the problems that transpire with the split-half method (Malhotra, 2010:319). The Cronbach alpha is used to calculate the average correlation of the varied ways of splitting the scale items (Malhotra, 2010:319). The Cronbach's alpha ranged from zero to one, where (Hair *et al.*, 2010:166; Remler & Van Ryzin, 2011:122):

- a value above 0.60 is considered acceptable scale reliability;
- a value between 0.70 and 0.80 is considered good scale reliability; and
- a value between 0.80 and 0.95 is considered a very good scale reliability.

The Cronbach's alpha and inter-item correlations were applied to analyse the reliability of the scales (GLRTS, IFDFW, SLWS, and IPAQ) used in this study. The following

paragraphs focus on the importance of validity to ensure the results of the study are accurate and valid.

- **Validity**

A decent research scale should be consistent and accurate. While reliability is concerned with the consistency of the scale, validity is concerned with the accuracy thereof (Zikmund & Babin, 2013:303). Validity refers to the degree to which the scale is scored candidly and represents a concept (Welman *et al.*, 2005:142). Validity can establish whether or not a scale is measuring what it is supposed to measure (Hair *et al.*, 2010:166). There are three varied approaches that researchers can utilise to assess the validity of a scale. Figure 4.3 illustrates the three different approaches to measure validity, namely content validity, criterion validity and construct validity.

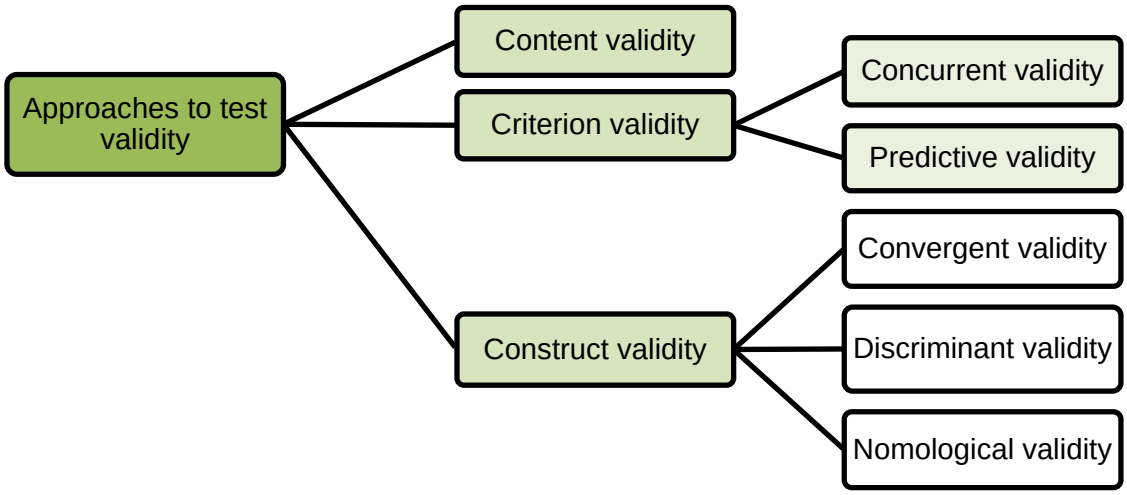

Figure 4. 3: Approaches to test validity

Source: Malhotra (2010:320); McDaniel and Gates (2010:256)

Content validity, also known as face validity (Parasuraman, 1991:442), is termed as a measure which allows a researcher to systematically assesses how well the items of a scale embody the measurement at task (Zikmund & Babin, 2013:320). Kumar (2005:180) mentions that content validity is evaluated prior to data are collected to warranty that the scale includes items to represent all relevant aspects of the construct. Content validity is considered a subjective measure due to its reliance on the researcher's instinct and assessment to estimate the validity of the scale (Malhotra, 2010:320). Moreover, content validity is not considered sufficient to be used alone to measure a scale's validity due to

its subjective nature (McDaniel & Gates, 2007:279). A more formal assessment can be obtained by evaluating criterion validity.

Criterion validity refers to the assessment of the degree to which a scale performs as expected compared to other variables that were selected as meaningful criteria (Malhotra, 2010:320). Criterion variables can include demographic and psychographic characteristics, attitudinal and behavioural actions, or related scores obtained from former measurement instruments (Malhotra, 2010:320). Zikmund and Babin (2013:304) mention that criterion validity can be separated into two sub-groups, namely concurrent validity and predictive validity. Concurrent validity refers to the assessment of the degree to which a relationship between the scale and the criterion variables exist; however, it occurs in the same interval (Struwig & Stead, 2010:140). Alternatively, predictive validity is the assessment of the degree to which a current item on a scale can be utilised to predict a future criterion variable (McDaniel & Gates, 2007:281).

Construct validity can be described as a form of validity, which addresses the question of which characteristic or construct is being measured (Pallant, 2007:7). Construct validity can be explored by either convergent validity, discriminant validity or nomological validity (Malhotra, 2010:321). Convergent validity refers to investigation of the scale's related relationships with other constructs (Welman *et al.*, 2005:143), whereas discriminant validity refers to the examination of the scale's unrelated relationship with other constructs (Iacobucci & Churchill, 2010:258). Alternatively, nomological validity is the evaluation of a scale's relation to dissimilar, yet associated, measures in a theoretically predicted method (Zikmund & Babin, 2013:259).

4.4.4.2 Descriptive statistics

Descriptive statistics refer to the rudimentary alteration of raw data in a concise manner. Moreover, descriptive statistics describe essential characteristics such as central tendency, variability, as well as distribution (Quinlan *et al.*, 2015:359). Descriptive statistics are intertwined with frequency distributions and both are commonly used to summarise data that have been captured (Zikmund & Babin, 2013:411). The most popular descriptive statistics include means, which are measures of location; variability, which

refers to standard deviations; as well as skewness and kurtosis, which are measures of shape (Malhotra, 2010:484).

Table 4.6 provides the different descriptive statistics as well as brief definitions thereof.

Table 4. 6: Descriptive statistics

Measures	Techniques of the measures
Measures of location	*Mean:* Value which depicts the average score that is achieved after all the scores are added up and divided by the sample size (Welman *et al.*, 2005:233).
	Median: The value that represents the middle of the highest and lowest scores after the data have been sorted from high to low (McDaniel & Gates, 2010:410).
	Mode: Measure of central tendency that identifies which value occurs the most (Struwig & Stead, 2010:158).
Measures of variability	*Range:* Value which is determined by deducting the smallest value from the largest value in the sample (Malhotra, 2010:487).
	Variance: The variance can never be negative; it is reflected by the calculation of the mean square deviation of the total values from the mean (Zikmund & Babin, 2013:342).
	Standard deviation: Value which replicates a distribution's spread or variability by using the square root of the variance of a distribution (Remler & Van Ryzin, 2011:253).
Measures of shape	*Skewness:* Value reflects the extent of deviation from the mean in one direction or the other (Struwig & Stead, 2010:159).
	Kurtosis: Value depicts the peakedness or flatness of a curve distribution. Zero represents normal kurtosis for a distribution (Pallant, 2007:56).

Source: Author compilation

This study analysed the frequencies and percentages, as well as the mean, standard deviation, skewness and kurtosis of the scales in Chapter 5. These descriptive statistics were used to report of the level of risk tolerance and well-being of the investors. Section 4.4.4.3 provides insight into the different inferential statistics available to help interpret data as well as the ones applied to achieve the empirical objectives set for this study.

4.4.4.3 Inferential statistics

Urdan (2011:2) describes inferential statistics as the use of statistical methods to deduce or infer the properties of a population by breaking down properties of a data sample drawn from it. Inferential statistics are thus utilised to draw predictions and conclusions regarding specific data, which are exposed to random predictions (Urdan, 2011:3). Groebner *et al.* (2011) mention that inferential statistics are also concerned with the accuracy and

reliability of the inferences it helps to draw. The inferential statistics applied to this study are presented in the following discussion.

- **Significance tests**

It is vital for researchers to test which outcomes are noteworthy and which are not before reporting on the findings thereof (Zikmund & Babin, 2013:373). Significance tests allow researchers to use hypothesis testing to establish whether a statement pertaining to a specific population can be proved or disproved by implementing an empirical study (Berndt & Petzer, 2011:253). Researchers set a null hypothesis (H_0) and an alternative hypothesis (H_1) during hypothesis testing (Maree *et al.*, 2011:203). The alternative hypothesis states what will occur if the null hypothesis is rejected (Malhotra, 2010:490). The following significance tests were applied to the study: T-tests, effect sizes, analysis of variance (ANOVA) and correlation.

T-tests can be utilised for drawing conclusions according to the means of the specific population under study (Maree *et al.*, 2011:225). The t-statistic consents that the variable is distributed normally and that the mean is known (Malhotra, 2010:504). Zikmund and Babin (2013:394) mention that there are two types of t-tests that can be used to investigate the differences between means, namely the independent sample t-test and the paired-sample t-test.

The independent sample t-test refers to the situation where the variance between the mean scores acquired from two independent samples of the target population are examined (Urdan, 2011:93). Alternatively, the paired-sample t-test can be defined as the situation wherein the variables between the mean scores obtained by two observations from the same respondents are investigated (Hair *et al.*, 2013:288). T-tests were used to analyse the effect of investors' gender on risk tolerance. ANOVAs and their respective effect sizes were also implemented and interpreted in this study.

An ANOVA refers to a statistical technique that is used to investigate differences among means for more than two independent samples (Urdan, 2011:105). Specifically, ANOVA tests whether the groups have varying mean scores (Maree *et al.*, 2011:229). There are two vital values applied in ANOVA, namely the test-statistics (F-value and p-value) to identify significant variances (Remler & Van Ryzin, 2011:307). There are two types of

ANOVA, namely the one-way ANOVA (one factor) and the two-way ANOVA (two or more factors) (Malhotra, 2010:531). ANOVAs were utilised to examine the respective inherent variance within the groups between: (i) race, investor well-being and risk tolerance, (ii) marital status, investor well-being and risk tolerance, as well as (iii) place of origin, investor well-being and risk tolerance. Subsequently, effect sizes were evaluated to establish whether the difference between the means are practically significant.

The Cohen's D-statistic helps investigate whether the difference in the means from the t-tests is practically significant by estimating the effect size thereof (Hair *et al.*, 2013:312). Pallant (2007:208) suggests that the following guidelines be implemented when interpreting effect size: $0.20 \leq d < 0.50$ signifies a small, practically non-significant effect; $0.50 \leq d < 0.80$ signifies a medium-sized effect moving towards practical significance; and $0.80 \leq d$ signifies a large effect that has reached practical significance.

Lastly, one of the most communal forms of data analysis is correlation, since it underlies numerous other analyses. Correlation refers to the statistical process used to determine whether two variables are related (Leedy & Ormrod, 2010:273; Remler & Van Ryzin, 2011:261). Correlation aims to measure the strength and direction of the linear association between two quantitative variables (Pallant, 2007:126). There are various correlation measures that can be implemented including Pearson's product-moment correlation coefficient (*r*) and Spearman rank order (rho) (Struwig & Stead, 2010:140).

Pearson's coefficient measures the extent to which there is a linear association concerning two interval-scaled variables (Kumar *et al.*, 2002:411). Moreover, Pearson's coefficient can be utilised with a singular continuous variable and a singular dichotomous variable (Urdan, 2011:88). The Spearman rank order is created to be utilised with ordinal or ranked data and is specifically useful when the data is not satisfactory in terms of the criteria for the Pearson correlation (Pallant, 2013:133). Hair *et al.* (2013:320) mention that the Spearman rank coefficient refers to a non-parametric measure of correlation, which uses ranks to compute the correlation among ordinal variables. The Spearman rank coefficient is suggested for use when two variables are measured by means of ordinal scales (Urdan, 2011:89).

The correlation coefficient (*r*) ranges from -1 to +1 (Chandra & Sharma, 2013:34). A value of -1 to zero suggests a negative relationship which indicates that if the value of one variable increases, the value of the other variable will decrease (Zikmund *et al.*, 2013:562). Alternatively, a value of zero to +1 is an indication of a positive relationship which suggests that as the value of one variable increases, so does the value of the other variable (Malhotra & Peterson, 2006:497). If the correlation coefficient is equal to zero it means that there is no correlation present (McDaniel & Gates, 2007:530). Correlation coefficients from the analysis are also tested for statistical significance (Urdan, 2011:85). Non-parametric Spearman correlations were applied to analyse the respective relationships between age, income, education, risk tolerance, and investor well-being.

- **Exploratory factor analysis (EFA)**

Researchers make use of factor analysis to reduce a great set of variables down to smaller, manageable amount of factors (Pallant, 2007:179). The most common method of factor analysis is principle components analysis. In principle components analysis, the quantity of variables are diminished to establish the minimum quantity of factors that will account for maximum variance in the data. As such, the principle components analysis takes the total variance within the data into consideration (Malhotra, 2010:643).

There are various methods that can be employed to determine the optimal factor solutions, these methods comprise of: (i) establishing the quantity of factors consistent with previous knowledge of the expected quantity of variables, (ii) retaining all components with an Eigenvalue greater than one, or (iii) establishing the quantity of factors to retain using the scree plot method (Van Deventer, 2015:145). Following factor extraction, factor rotation is utilised to avoid the difficulty in inferring and naming the factors based on their factor loadings (Pallant, 2010:185). This study implemented an exploratory principle components analysis to establish the underlying factors of the IFDFW, SWLS, and IPAQ.

- **Confirmatory factor analysis (CFA)**

Urdan (2011:177) defines a CFA as a multifaceted and sophisticated set of techniques used to confirm certain hypotheses or theories related to the structure underlying a set variables. Moreover, a CFA is a complicated process that forms part of a larger set of

statistical techniques, collectively known as structural equation modelling (Section 4.10.3.3).

Urdan (2011:177) delivers a brief introduction to the concept of CFA and states that the following steps are the basic steps in performing a CFA. First, the researcher needs to have a good estimation of how variables in the study, such as a set of survey items, should go together. It is necessary that the researcher's estimation be tested with some statistics. Thereafter, the researcher organises the items in accordance to strong theoretical rationale (Blunch, 2008:111).

Once the researcher has developed a hypothesis about which items should indicate (i.e. load on) which factors, a CFA can be implemented to test the researcher's hypothesis (Urdan, 2011:177). The CFA analysis will result in a set of fit statistics; of which, a brief explanation of the various fit statistics is provided in Section 4.10.3.3. These fit statistics provide information about how well the researcher's proposed factor model fits the actual data which has been collected (Hair *et al.*, 2010:665-672). It is expected that all items will all load strongly on their respective factors and weakly on the other factors; if so, the CFA will result in strong fit statistics (Byrne, 2010:106). Alternatively, if the CFA produces weak fit statistics, the researcher will need to modify the proposed model in an effort to improve the model fit. A CFA was implemented to on the GLRTS to investigate how well the model fits the data.

- **Structural equation modelling (SEM)**

SEM refers to a set of statistical models that aim to clarify relationships between multiple variables (Hair *et al.*, 2010:634). Shook *et al.* (2004:397) mention that through the utilisation of SEM, a series of dependent relations can be analysed simultaneously, while also examining multiple depended variables. SEM encompasses creating measurement models to describe latent variables and subsequently creating relationships or structural equations between the latent variables (Schumacker & Lomax, 1996:63). Series regression equations represent the causal processes under study and the structural relationships may be displayed pictorially, which provides a clear graphic conceptualisation of a specific theory (Byrne, 2010:3). It is important that the SEM analysis be based on an underlying theory (Byrne, 2010:4). SEM has come to be a

popular multivariate approach and researchers tend to use it since it offers a conceptually appealing way to examine theory (Hair *et al.*, 2010:653).

Hair *et al.* (2010:654) and Malhotra (2010:729) note that the subsequent six-stage procedure applies in SEM:

Stage 1: Define individual constructs

A prerequisite before implementing SEM and obtaining valuable results is a sound theory (Hair *et al.*, 2010:655). Measurement theory provides an indication of how constructs are represented; alternatively, structural theory specifies a relationship between constructs (Malhotra, 2010). Subsequently, structural theory is used to create hypotheses. A proper theoretical framework propositions a theoretical relationship among the study's constructs, namely risk tolerance, financial well-being, satisfaction with life and physical activity.

Stage 2: Develop and specify the measuring model

During Stage 2, each latent construct to be encompassed in the model is recognised and the measured observed variables (items) are assigned to latent constructs (Hair *et al.*, 2010:656). Malhotra (2010:729) mentions that the measurement model is specified after the constructs have been identified and their observed variables measured. The measured variables can either be indirectly observed (latent), or directly observed (indicators). Moreover, indirectly observed variables can either be independent (exogenous) or dependent (endogenous).

Stage 3: Design a study to produce empirical results

There are essential aspects to consider during Stage 3. First, the adequacy of the sample size needs to be assessed; thereafter, an estimation method has to be selected and lastly, a missing data approach must be selected Hair *et al.* (2010:657-662). The required sample size for SEM is influenced by numerous factors including the complexity of the model, estimation technique, amount of missing data, amount of average error variance among the measured variables, as well as the multivariate distribution of the data (Malhotra, 2010:730). Table 4.7 indicates the minimum sample sizes based on the nature of the SEM.

Table 4. 7: Minimum sample sizes for SEM

Size	Constructs of model	Items	Communalities
100	Five of less	More than three	High (0.6 or higher)
150	Seven or less (No under identified constructs)	-	Modest (0.5)
300	Seven or less (Multiple under identified constructs)	-	Lower (0.45 and lower)
500	More than seven	Fewer than three	Lower (0.45 and lower)

Source: Hair *et al.* (2010:662)

Stage 4: Assess measurement model validity

The most fundamental stage in SEM testing is the assessment of the measuring model's validity (Hair *et al.*, 2010:664). Blunch (2008:111) and Byrne (2010:106) mention that a numerous fit indices must be computed and measured to evaluate how well the data suits the hypothesised theoretical model. Measurement validity is depended on two aspects, namely to identify acceptable levels of the goodness-of-fit for the measurement model and to find specific evidence of construct validity (Malhotra, 2010:731-732). The goodness-of-fit provides an indication of how well the specified model duplicates the observed covariance matrix amid the indicator items (Pallant, 2010:105). The fit measures may vary depending on if they are measuring absolute fit, incremental fit, or parsimonious fit (Malhotra, 2010:731).

Absolute fit indices provide a signal of how well a hypothesised model matches the study's empirical data (Malhotra, 2010:731). Absolute fit indices include the goodness-of-fit index, adjusted goodness-of-fit index and badness-of-fit index, which measures error of deviation, root mean square residuals, standardised root mean square residuals and root mean square error of approximation (Malhotra, 2010:731; Pallant, 2013:103).

Incremental fit indices investigates how well the specified model suits the sample data relative to an alternative model, which is utilised as a baseline model (Hair *et al.*, 2010:666-669). Malhotra (2010:732) notes that incremental fit indices comprise the normal fit index, non-normal fit index, comparative fit index, Tucker Lewis index and relative non-centrality index.

Lastly, parsimony fit indices evaluate fit relative to model complexity and is useful in assessing competing models (Malhotra, 2010:733). Parsimony of fit indices include the

parsimony goodness-of-fit index and the parsimony normal fit index (Malhotra, 2010:733). Moreover, Hair *et al.* (2010:662) mention that a parsimony fit measure can be enhanced either by an improved fit or by a simpler model. Ultimately, a model is considered to fulfil criteria of goodness-of-fit by meeting certain values as presented in Table 4.8.

Table 4. 8: Goodness-of-fit indices

Indices	Abbreviation	Fit criteria
Relative chi-square	CMIN/DF	≤ 5
Goodness-of-fit index	GFI	≥ 0.90
Adjusted goodness-of-fit index	AGFI	≥ 0.90
Comparative fit index	CFI	≥ 0.90
Normal fit index	NFI	≥ 0.90
Tucker Lewis index	TLI	≥ 0.90
Root mean square error of approximation	RMSEA	≤ 0.08

Source: Hair *et al.* (2010:665-672) and Malhotra (2010:731-733)

Stage 5: Specify the structural model

During Stage 2, the establishment and specification of the measurement model is completed and during Stage 4, its validity is assessed. A critical step in SEM is to identify the structural model as soon as the validity of the measurement model is assessed. In Stage 5, the structural model is identified by assigning relationships from one construct to another (Hair *et al.*, 2010:673). This is done based on the proposed theoretical model. As such, the dependence relationships are established and the relationships between constructs are determined.

Stage 6: Assess the structural model validity

The final stage during SEM is to evaluate the validity of the structural model specified in Stage 5. Hair *et al.* (2010:673) mentions that during this stage, efforts are made to evaluate the validity of the proposed structural model as well as its corresponding hypothesis theoretical relationships. The efforts made to test the proposed model's validity include investigating the fit, comparing the proposed structural model as well as testing the structural relationships and hypothesis (Malhotra, 2010:736).

A SEM was applied in order to analyse the effect of investor well-being on risk tolerance and to construct a model wherein the influence of investor well-being on risk tolerance is depicted.

4.5 SYNOPSIS

Chapter 4 covered the research design and methodology that was utilised in this study. The chapter started with an overview of the research paradigms and designs that can be applied in studies. The positivism, post-positivism, interpretivism and pragmatism research paradigms were briefly discussed. Moreover, the qualitative, quantitative and mixed-methods research designs were covered. This study applied a positivist research paradigm, quantitative research design and made use of a SDA as its research method.

The origin of the primary data were presented in detail by discussing its sampling procedure and strategies, data collection methods, pilot testing of questionnaire, questionnaire administration and data preparation. The reputable South African investment company and original researcher made use of purposive sampling to obtain the final sample size of 1 065 investors. The data collection method used to capture the data, which was analysed through an SDA, was a self-administered questionnaire that was made available online by the investment company. The investment company did not allow the original researcher to conduct a pilot test on the questionnaire by accessing their database. The database was only accessed once when the investment company made the questionnaires available online.

The SDA process, advantages and disadvantages, as well as the application thereof were also presented. The study only focuses on demographics, risk tolerance, financial well-being, satisfaction with life and physical activity. The statistical analyses applied to this study include both descriptive and inferential statistics. The study made use of significance tests, confirmatory factor analysis, as well as structural equation modelling. Chapter 5 focuses on the results and findings of this study.

CHAPTER 5: RESULTS AND FINDINGS

5.1 INTRODUCTION

This study aimed to fulfil its primary objective which was to *develop a model that financial advisors can use to profile investors' risk tolerances*.

The model includes the following aspects: (i) financial well-being, (ii) satisfaction with life, and (iii) physical activity to existing measures of risk tolerance. Chapter 5 provides a discussion on the results of the empirical study. The analysis and interpretation are presented in accordance with the empirical objectives as presented in Chapter 1:

- Report on the level of risk tolerance of the sample;
- Analyse the effect of demographic factors on risk tolerance;
- Report on the level of investor well-being;
- Determine the relationship of investor well-being on risk tolerance;
- Analyse the effect of investor well-being on risk tolerance; and
- Construct a structural equation model which depicts the influence of investor well-being on risk tolerance.

This chapter aims to: (i) address the above-mentioned empirical objectives, and (ii) make recommendations that will have practical implications for how investors' risk tolerances are measured and influence their risk profiles. The following sections discuss the analysis and interpretations for this study:

- Section 5.2 commences with a discussion on the reliability and validity of the risk tolerance, financial well-being, satisfaction with life, and physical activity scales;
- Section 5.3 describes the demographic information of the sample;
- Section 5.4 elaborates on the descriptive statistics of the data;
- Section 5.6 delves into the factor analyses conducted;
- Section 5.6 covers the analyses of the data's inferential statistics;
- Section 5.7 provides the structural equation model (SEM); and
- Section 5.8 provides a synopsis of the chapter.

5.2 RELIABILITY AND VALIDITY

The validity of a scale denotes whether the scale signifies the true construct of interest by measuring what is intended to be measured (Remler & Van Ryzin, 2011:106). Alternatively, reliability refers to the degree to which a scale produces consistent results if repeated (Cant *et al.*, 2005:234). This section provides insight into the Cronbach's alpha and average inter-item correlations of the scales used for this study to ensure the reliability and validity thereof.

The Cronbach alpha tests was conducted to determine whether a multi-question Likert scale survey is reliable (Roets, 2013:64). The Cronbach alpha coefficient ranges from zero to one wherein a coefficient closer to one is preferred. Hair *et al.* (2010:166) suggest that the following stipulations be taken into account when analysing a scale's Cronbach alpha:

- a coefficient above 0.60 translates into acceptable scale reliability;
- a coefficient of 0.70 to 0.80 reflects good reliability; and
- a coefficient of 0.80 to 0.95 portrays very good reliability.

On the other hand, the average inter-item correlations test the scale's internal reliability and construct validity (Pallant, 2007:98). The recommended range for average inter-item correlations is between 0.15 and 0.50 (Roets, 2013:64). Average inter-item correlations less than 0.15 suggest that the items are not well correlated and do not measure the same construct or notion very well. Alternatively, average inter-item correlations exceeding 0.50 are an indication that the items are so closed as to be almost repetitive.

The constructs measured in this study are risk tolerance and investor well-being which consists of financial well-being, satisfaction with life, and physical activity (Appendix 5.1). Each of these constructs were measured respectively by specific scales. Table 5.1 provides the reliability statistics including the Cronbach alpha and average inter-item correlations of each scale that was used to measure the respective constructs.

Table 5. 1: Reliability statistics of scales

Constructs	Scales	Cronbach's alpha	Cronbach's alpha based on standardised items	N	Average inter-item correlations
Risk tolerance	SCF	N/A	N/A	1	N/A
Risk tolerance	GLRTS1	0.605	0.594	13	0.101
Risk tolerance	GLRTS	0.677	0.689	12	0.156
Financial well-being	IFDFW	0.952	0.955	8	0.728
Satisfaction with life	SWLS	0.893	0.894	5	0.629
Physical activity	IPAQ	0.765	0.765	10	0.246

Source: Author compilation

The researcher created a code book (Appendix 5.1) which include the questions used to address the empirical objectives. The codebook applies to: Sections A (demographics), B (risk tolerance and financial well-being), D (satisfaction with life) and F (physical activity). The SCF scale consists of only one question, therefore, no reliability statistics have previously been reported (Grable & Lytton, 2001; Gilliam *et al.*, 2010:41). The reliability scales for the constructs (risk tolerance, financial well-being, satisfaction with life, and physical activity) as illustrated in Table 5.1 are explained in detail below.

The GLRTS1 produced an acceptable Cronbach alpha coefficient value of 0.605, however the GLRTS1's average inter-item correlations of 0.101 suggest that the items of the scale are not well correlated and do not measure the same idea very well. Therefore, GLRTS1's first item (G1) was removed and its new code, GLRTS which consists of items G2-G13, produced a higher Cronbach alpha coefficient of 0.677 (Appendix 5.1). The GLRTS' average inter-item correlations of 0.156 are deemed sufficient (Table 5.1) and were (only the GLRTS) used throughout the inferential statistics.

IPAQ produced a good scale reliability score with a Cronbach alpha of 0.765. IPAQ's average inter-item correlation of 0.246 lies between the recommended scores of 0.15 and 0.50; which suggests that the scale has sufficient internal consistency. The other two scales produced very good reliability scores. IFDFW and SWLS respectively produced Cronbach alpha coefficients of 0.952 and 0.893. The IFDFW and SWLS' respective average inter-item correlations of 0.728 and 0.629 exceed the recommended range of 0.15 and 0.50; which suggests that the scales' items are almost repetitive. Section 5.3 focuses on the demographic information of the sample.

5.3 DEMOGRAPHIC INFORMATION

This section provides a report on the demographic information of the sample. Malhotra (2010:350) mentions that demographic information is comprised of socio-economic and demographic characteristics. These demographic characteristics enabled the researcher to classify the respondents of the study and to better understand the results obtained from the study (Masenya, 2017:123). Table 5.2 provides an overview of the sample that participated in the study. The sample of this study consisted of 1 065 respondents who are South African investors from one of South Africa's major investment companies (BusinessTech, 2017). Table 5.2 summarises the frequencies and percentages of the demographic variables of the respondents—the percentage were rounded off to one decimal. Figures 5.1-5.7 expands on the demographic data illustrated in Table 5.2.

Table 5. 2: Demographic variables' frequencies and percentages

Items	Demographic variable		Frequency (*f*)	Percentage (*%*)
A1	*Age*	16 – 34	199	18.7
		35 – 49	387	36.3
		50+	479	45.0
A2	*Gender*	Male	469	44.0
		Female	596	56.0
A3	*Race*	African	169	15.9
		White	715	67.1
		Coloured	88	8.3
		Asian	93	8.7
A4	*Marital status*	Single – staying on my own	198	18.6
		Single – staying with my parents	56	5.3
		Not married but staying together	110	10.3
		Married	577	54.2
		No longer married	124	11.6
A5	*Annual income*	R100 000 or less	159	14.9
		R100 001 – 200 000	190	17.8
		R200 001 – 300 000	189	17.7
		R300 001 – 400 000	165	15.5
		R400 001 – 500 000	88	8.3
		R500 001 – 600 000	76	7.1
		R600 001 – 700 000	41	3.8
		R700 001 or more	157	14.7
A6	*Highest level of education*	Secondary school education	1	0.1
		High school education	38	3.6
		Diploma	231	21.7
		Undergraduate degree	373	35.0
		Honours degree	168	15.8
		Master's degree	142	13.3

Items	Demographic variable		Frequency (*f*)	Percentage (%)
		Doctoral degree	99	9.3
		Other	13	1.2
A7	*Place of origin*	Gauteng	439	41.2
		Kwa-Zulu Natal	164	15.4
		Western Cape	280	26.3
		Northern Cape	10	0.9
		Eastern Cape	54	5.1
		Free State	26	2.4
		Mpumalanga	28	2.6
		Limpopo	18	1.7
		North-West	31	2.9
		Live outside RSA	15	1.4

Source: Author compilation

The following sections discuss the demographic data of the investors (age, gender, race, marital status, annual income, highest level of educations, and place of origin).

5.3.1 Age

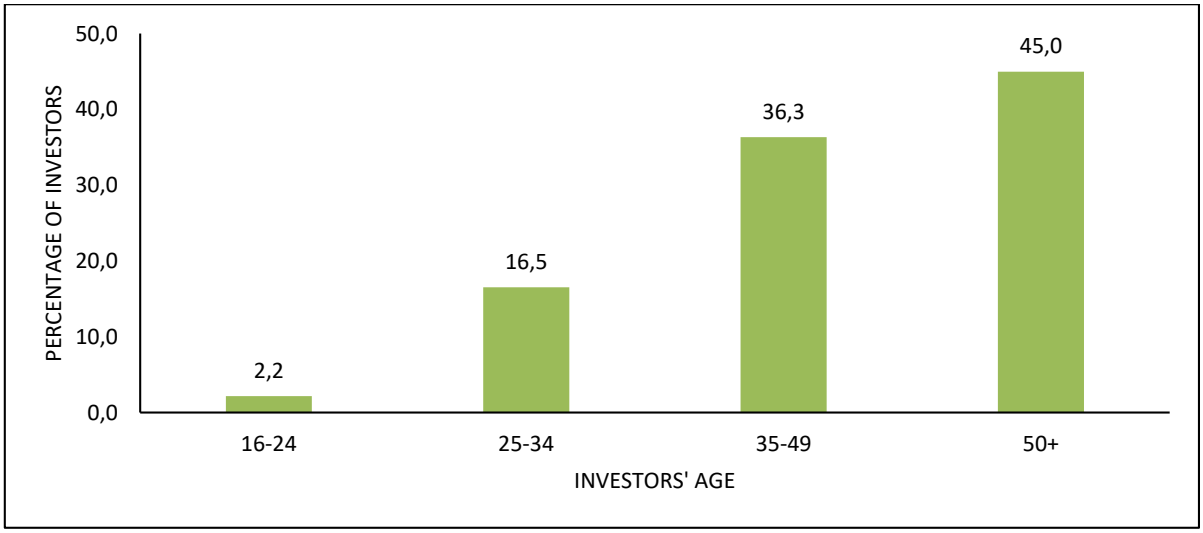

Figure 5. 1: Investors' age

As presented in Table 5.2 and Figure 5.1, age was divided into three main categories, namely: 16-34 years old; 35-49 years old; and 50+ years old. The first category represents the younger respondents of the sample. There was 18.7 per cent of respondents between the ages of 16 and 34. The 35-49 years old category has the second-largest representation of 36.3 per cent. Lastly, the category of 50+ years old had the largest

respondent representation of 45 per cent. As such, the majority of investors from this study's sample were older than fifty.

5.3.2 Gender

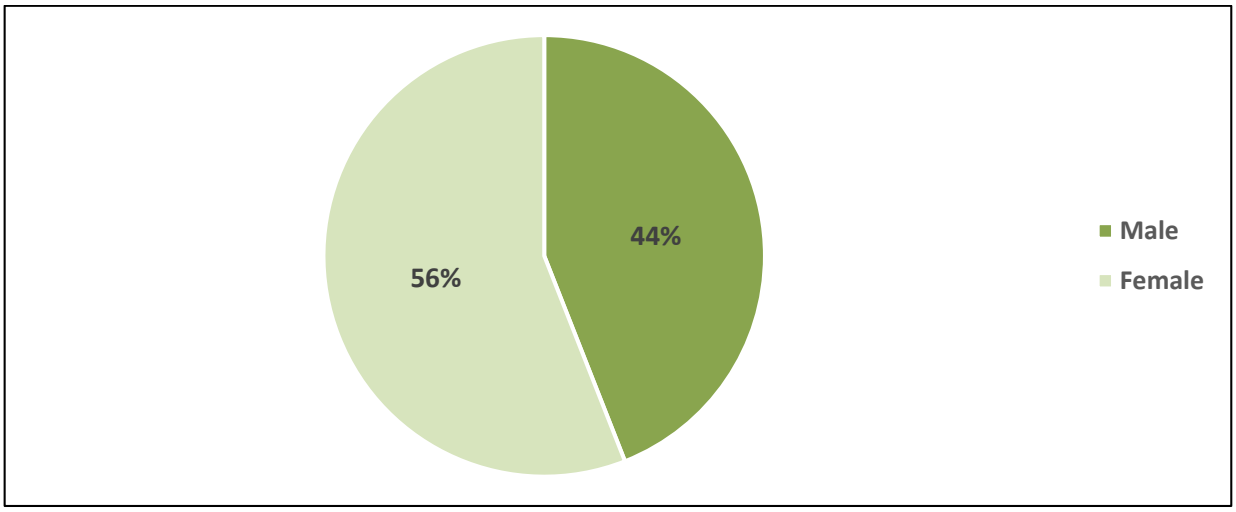

Figure 5. 2: Investors' gender

There are two gender categories used in this study, namely: male and female. In terms of gender composition, as illustrated in Figure 5.2, the sample comprised 44 per cent males; and 56 per cent female respondents. As such, the majority of this study's sample were female respondents.

5.3.3 Race

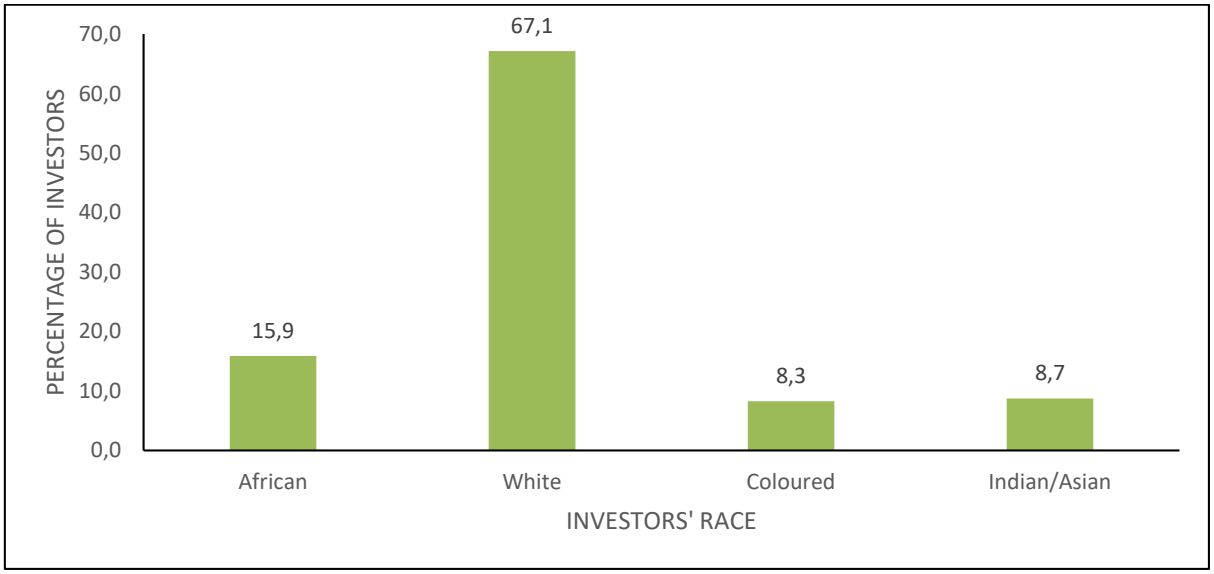

Figure 5. 3: Investors' race

The race options included in the questionnaire were African, White, Coloured, Asian and other. As illustrated in Table 5.2 and Figure 5.3, the sample consisted of 15.9 per cent African; 67.1 per cent White; 8.3 per cent Coloured; and 8.7 per cent Asian respondents. As such, the sample's race was not well distributed or representative of the racial demographics in South Africa.

5.3.4 Marital status

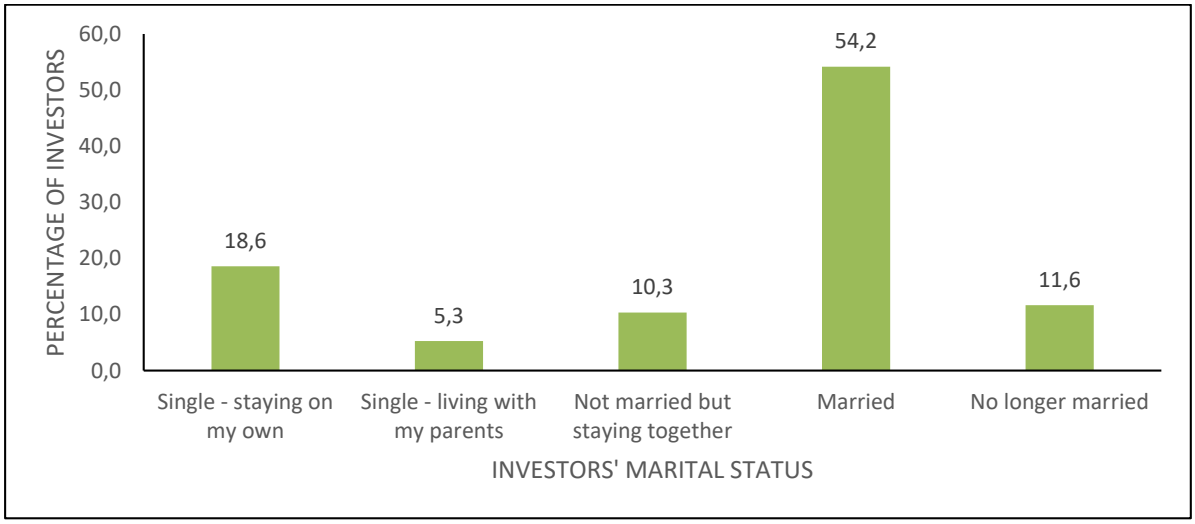

Figure 5. 4: Investors' marital status

Five marital status categories were included in the questionnaire, namely single – staying on my own; single – living with my parents; not married but staying together; married; and no longer married. As illustrated in Figure 5.4, the sample consists of 18.6 per cent of the respondents that are single and live on their own; 5.3 per cent of respondents indicated that they are single and live with their parents; 10.3 per cent of respondents indicated that they are not married, but living together; 54.2 per cent of them indicated that they are married; and 11.6 per cent were no longer married. As depicted in Table 5.2, it can be concluded that the majority of respondents from this sample are married.

5.3.5 Income

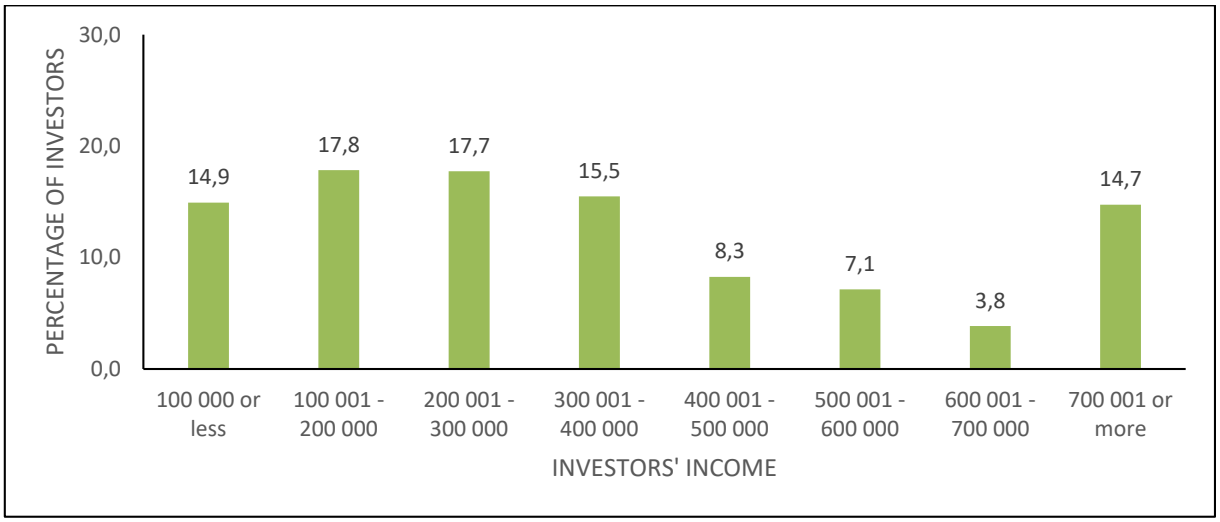

Figure 5. 5: Investors' income

This study made use of eight income categories; namely R100 000 or less; R100 001 – R200 000; R200 001 – R300 000; R300 001 – R400 000; R400 001 – R500 000; R500 001 – R600 000; R600 001 – R700 000; and R700 001 or more. Table 5.1 shows that the majority (17.8%) of the sample earn between R100 001 – R200 000 per annum. The second-largest income category of the sample is R200 001 – R300 000, which has a sample representation of 17.7 per cent. The third-largest income category is R300 001 – R400 000 with a sample representation of 15.5 per cent.

The rest of the sample's distribution of income categories are presented as follows in descending percentages: 14.9 per cent for R100 000 or less; 14.7 per cent for R700 001 or more; 8.3 per cent for R400 001 – R500 000; 7.1 per cent for R500 001 – R600 000; and a mere 3.8 per cent for the income category of R600 001 – R700 000. The last income category, which indicates respondents who earn more than R700 001 has a sample representation of 14.7 per cent. It can be concluded that most respondents from this study earn between R100 001 and R200 000 per annum.

5.3.6 Education

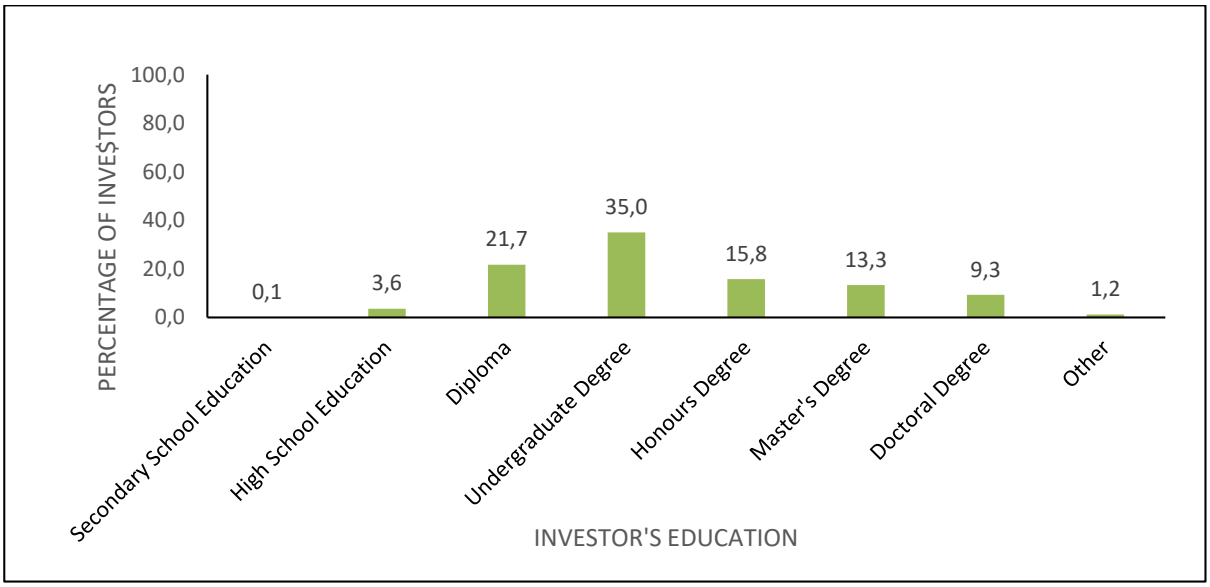

Figure 5. 6: Investors' education

There are eight categories of level of education presented in this study, namely secondary school education; high school diploma; diploma; undergraduate degree; honours degree; master's degree; and doctoral degree. In South Africa, the youth literacy rate (aged 15-34) is 93.9 per cent, whereas, South Africa's adult literacy rate (aged 35-64) is 79.3 per cent (StatsSA, 2019). Figure 5.6 shows that most respondents have an undergraduate degree (35%). The second-largest category of level of education is diploma with a sample representation of 21.7 per cent. Respondents with an honours degree represented 15.8 per cent of the sample.

The sample's distributions for the rest of the level of education categories are presented in descending percentage order: 13.3 per cent for those with a master's degree; 9.3 per cent for those with a doctoral degree; 3.6 per cent with a high school education; 1.2 per cent with other forms of education; and a mere 0.1 per cent for those with secondary school education. It can be concluded that the majority of the respondents have an undergraduate degree.

5.3.7 Place of origin

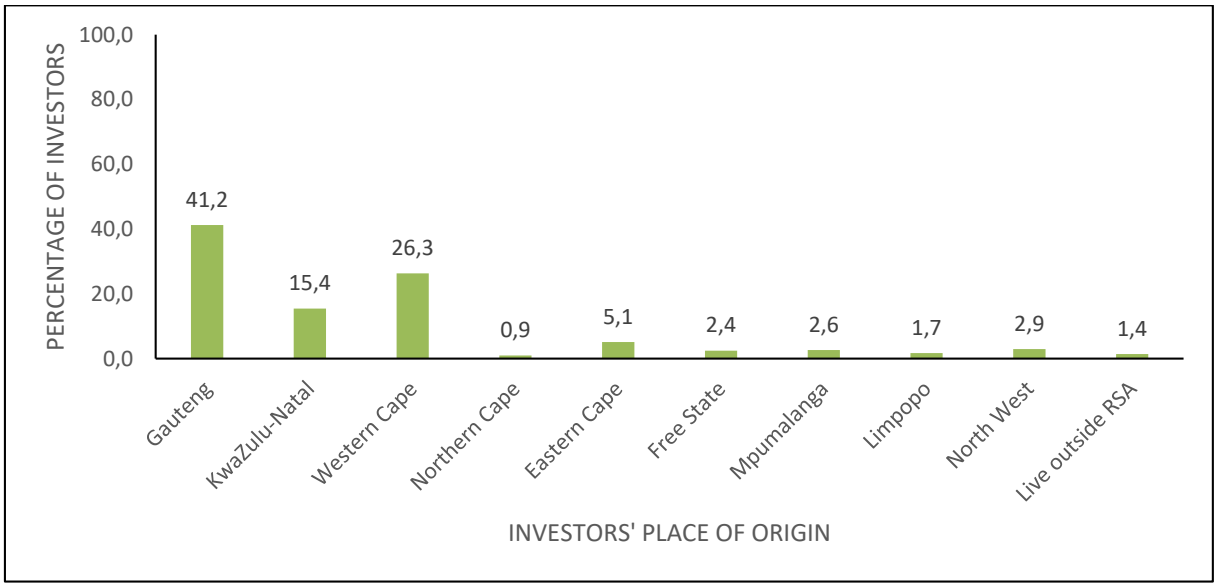

Figure 5. 7: Investors' place of origin

There are nine province categories included in this study as well as an option for respondents who live outside South Africa. As such, the options are Gauteng, KwaZulu-Natal; Western Cape, Northern Cape, Eastern Cape, Free State, Mpumalanga, Limpopo, North West, and live outside RSA. Based on Table 5.2 and Figure 5.7, the sample consists of 41.2 per cent of respondents from Gauteng; 26.3 per cent from the Western Cape; 15.4 per cent from KwaZulu-Natal; 5.1 per cent from the Eastern Cape; 2.9 per cent from North-West; 2.6 per cent from Mpumalanga; 2.4 per cent from Free State; 1.7 per cent from Limpopo; 1.4 per cent from outside RSA; and 0.9 per cent from the Northern Cape. It can be concluded that most of the sample is from the Gauteng province in South Africa. StatsSA (2019) indicates that the majority (24.1%) of South Africa's population live in Gauteng, which may serve as an explanation to why most of the study's respondents originate from there.

5.3.8 Snapshot of the demographic information

Table 5.3 provides a snapshot of the demographic information of the respondents of this study. The snapshot consists only of the categories that comprise of the largest sample presentation per demographic factor included in Section A of the questionnaire.

Table 5. 3: Snapshot of the sample's demographic information

Demographic factor	Description	Frequency (*f*)	Percentage (%)
Age	50+ years	479	45
Gender	Female	596	56
Race	White	715	67.1
Marital status	Married	577	54.2
Income	R100 001 – R200 000	190	17.8
Education	Undergraduate degree	373	35
Place of origin	Gauteng	439	41.2

Source: Author compilation

Based on all the demographic data presented in Section 5.3, the following conclusion can be made: most of the respondents in this study were over the age of 50; female; White; married; earned between R100 001 and R200 000 per annum; had an undergraduate degree and were located in the Gauteng province in South Africa.

5.4 DESCRIPTIVE STATISTICS

This section provides information on the descriptive statistics of the scales included in the questionnaire (Appendix 4.1). More specifically, these descriptive statistics showcase the systematic and objective information that was collected from the research sample based on the questionnaire that was distributed (Creswell & Plano Clark, 2011:30). The descriptive statistics are presented in two main sections: 5.4.1 focuses on investors' risk tolerance level based on the results from the SCF and GLRTS, and 5.4.2 discusses the results from investors' well-being—financial well-being, overall life satisfaction, and physical activity. Investors' well-being was measured respectively by using the IFDFW scale, SWLS, and IPAQ.

5.4.1 Investors' risk tolerance level

In order to address the first empirical objective, *what are the samples' level of risk tolerance?* Section B of the questionnaire (Appendix 4.1) were used, which include two risk tolerance scales, namely the SCF and GLRTS.

The SCF consists of a single risk tolerance question and respondents were presented with four different options to choose an answer from (Grable & Lytton, 2001:43). Table 5.4 presents the frequency and percentage distribution of the responses for the SCF.

Table 5. 4: SCF frequencies and percentages (item)

SCF items	Frequency (*f*)	Percentage (*%*)
No risk	323	30.3
Average risk - average return	446	41.9
Above-average risk - above-average return	210	19.7
Substantial risk and return	45	4.2
Total	**1 024**	**96.1**
Missing values	41	3.9
Total	**1 065**	**100**

Source: Author compilation

Table 5.4 shows that 41.9 per cent of investors tend to take average risk in hope of average returns. Moreover, 30.3 per cent of investors choose not to take risks when making financial decisions. These investors choose rather to play it safe with their finances. Investors, who take above average risk to achieve possibly above-average returns represent 19.7 per cent of the sample. Lastly, 4.2 per cent of investors are considered high-risk takers as they have indicated that they tend to take substantial risks in the hope of substantial financial returns.

Alternatively, in order to ensure that the SCF's results are reliable, the GLRTS was included in Section B to measure investors' risk tolerance from a multidimensional perspective. Respondents were presented with 13-items, with corresponding multiple options, to measure their risk tolerance. The scale's items do not have the same multiple-choice options or rating assigned to them. Ultimately, the GLRTS measures risk tolerance from three important constructs, namely: (i) investment risk, (ii) risk comfort and experience, as well as (iii) speculative risk (Grable & Lytton, 1999:177). Table 5.5 provides the descriptive statistics of the individual risk constructs that the GLRTS measured.

Table 5. 5: GLRTS descriptive statistics

GLRTS (constructs and items)				GLRTS Scale			
Constructs	*Items*	*N*	*Mean*	*Min.*	*Max.*	*Mean*	*Std. dev.*
Investment risk	G4, G5, G8, G11 & G12	1 065	2.0466	1.00	3.33	2.055	0.398
Risk comfort and experience	G3, G6, G7 & G13	1 065	1.9016				
Speculative risk	G2, G9 & G10	1 065	2.2172				

Source: Author compilation

The highest mean statistic (2.2172) was obtained from the GLRTS for the speculative risk construct. This result suggests that investors tend to take average speculative risk. The mean statistic for risk comfort and experience is 1.9016, which suggests that investors have an average level of risk comfort and experience. Lastly, the 2.0466 mean statistic of investment risk indicates that investors tend to take on an average level of risk to secure average returns when making investment decisions.

In terms of the overall GLRTS, the minimum score of one represents the lowest possible level of risk tolerance which respondents could have selected. Alternatively, the maximum score of 3.33 represents the highest possible level of risk tolerance that can be experienced. The scale's mean of 2.055 suggests that the majority of investors have an average level of risk tolerance. The low standard deviation of the scale proposes that there is a high level of agreement among the respondents that they take on the average level of risks in return for average returns.

Table 5. 6: GLRTS skewness and kurtosis

GLRTS items	N	Skewness		Kurtosis	
		Statistic	*Std. Error*	*Statistic*	*Std. Error*
G2	1 065	.203	.075	-1.097	.150
G3	1 065	.312	.075	-1.270	.150
G4	1 065	.377	.075	-.786	.150
G5	1 065	.444	.075	-.796	.150
G6	1 065	.161	.075	.076	.150
G7	1 065	.623	.075	.007	.150
G8	1 065	-.266	.075	-.562	.150
G9	1 065	.519	.075	-1.734	.150
G10	1 065	-.982	.075	-1.037	.150
G11	1 065	.333	.075	-.973	.150
G12	1 065	.460	.075	-.737	.150
G13	1 065	1.151	.075	1.300	.150
GLRTS	**1 065**	**0.278**	**.075**	**-0.634**	**.150**

Source: Author compilation

In Table 5.6, N represents the number of respondents who completed the GLRTS. There are 1 065 investors who completed the GLRTS. In order for a scale's data to be regarded as being normally distributed, its skewness statistics have to range between -2 to +2. The skewness for the GLRTS is 0.278 which indicates that the scale's data can be considered normally distributed data.

Eleven of the scale's 13 items' data are positively distributed. This is an indication that the majority of the respondents' frequent scores on these items are clustered at the lower or more negative scores. In other words, most investors have low risk tolerance. Alternatively, only items G8 and G10 are positively distributed; as such, respondents' frequent scores on these items are clustered at the higher or more positive scores. This is an indication that only a few investors have high financial risk tolerance.

The GLRTS' kurtosis of -0.634 which is less than zero and means that the data for the scale's 13 items have a platykurtic distribution. In other words, the data distribution is relatively flat due to respondents' responses on the extremes of the constructs' Likert scale. Overall, this study's investors have an average level of risk tolerance when it comes to their finances. The GLRTS' results correspond with the results obtained from the SCF single-item risk tolerance question.

5.4.2 Investors' well-being level

The remainder of empirical objective one is addressed in this section. Investor well-being consists of an investor's level of financial well-being, satisfaction with life, and physical activity. The questionnaire (Appendix 4. 1) included three scales to measure the different aspects of investor well-being. The IFDFW scale measured investors' level of financial well-being; SWLS measured investors' level of life satisfaction; and IPAQ was included to measure investors' level of physical activity. Table 5.7 an overview of the frequencies and percentages of investor well-being based on the scales' different levels of well-being.

Table 5. 7: Investors' level of well-being

IFDFW	**Frequency (*f*)**	**Per cent (%)**
Low	400	37.6
Moderate	434	40.8
High	231	21.7
Total	1 065	100.0
SWLS	**Frequency (*f*)**	**Per cent (%)**
Low	267	25.1
Moderate	716	67.2
High	82	7.7
Total	1 065	100.0
IPAQ	**Frequency (*f*)**	**Per cent (%)**
Low	638	59.9
Moderate	385	36.2
High	6	0.6

Sub-total	1 029	96.6
Missing values	36	3.4
Total	1 065	100.0

Source: Author compilation

As presented in Table 5.7, 40.8 per cent of investors experience a moderate level of financial well-being. Furthermore, 37.6 per cent of investors experience low financial well-being, whereas, only 21.7 per cent of investors experience high financial well-being. In terms of life satisfaction, the majority of investors (67.2%) are moderately satisfied with their lives overall. Investors experiencing low levels of life satisfaction represent 25.1 per cent of the sample and only 7.7 per cent have a high level of life satisfaction. Lastly, in terms of physical activity, 59.9 per cent of investors have a low physical activity level. Alternatively, 36.2 per cent of investors are moderately physically active, whereas, a mere 0.6 per cent have a high level of physical activity.

5.4.3.1 Financial well-being

The IFDFW scale items focus of various factors of financial well-being from a subjective standpoint ranging from the investor's general level of financial stress to their confidence level in being able to pay for an unexpected emergency (Prawitz *et al.*, 2006). Table 5.8 presents the results of the frequencies and percentages recorded per item of the IFDFW scale.

Table 5. 8: IFDFW frequencies and percentage (items)

IFDFW1: What do you feel is the level of your financial stress today?		
	Frequency (f)	*Per cent (%)*
Overwhelming stress	466	43.8
High stress	252	23.6
Low stress	306	28.7
No stress at all	41	3.8
IFDFW2: How satisfied you are with your present financial situation?		
	Frequency (f)	*Per cent (%)*
Dissatisfied	626	58.8
Satisfied	439	41.1
IFDFW3: How do you feel about your current financial situation?		
	Frequency (f)	*Per cent (%)*
Feel overwhelmed	324	30.4
Sometimes feel worried	538	50.5
Not worried	164	15.4
Feel comfortable	39	3.7

IFDFW4: How often do you worry about being able to meet normal monthly living expenses?		
	Frequency (f)	*Per cent (%)*
Worry all the time	332	31.2
Sometimes worry	413	38.8
Rarely worry	245	23.0
Never worry	75	7.0
IFDFW5: How confident are you that you could find the money to pay for a financial emergency that costs about R10 000?		
	Frequency (f)	*Per cent (%)*
No confidence	302	28.3
Little confidence	251	23.6
Some confidence	290	27.2
High confidence	222	20.8
IFDFW6: How often does this happen to you? You want to go out to eat, go to a movie or do something else and don't go because you can't afford to?		
	Frequency (f)	*Per cent (%)*
All the time	353	33.1
Sometimes	347	32.6
Rarely	244	22.9
Never	121	11.4
IFDFW7: How frequently do you find yourself just getting by financially and living paycheck to paycheck?		
	Frequency (f)	*Per cent (%)*
All the time	487	45.7
Sometimes	291	27.4
Rarely	212	19.9
Never	75	7.0
IFDFW8: How stressed do you feel about your personal finances in general?		
	Frequency (f)	*Per cent (%)*
Overwhelming stress	284	26.7
High stress	457	42.9
Low stress	291	27.4
No stress at all	33	3.1

Source: Author compilation

Nearly half of investors (43.8%) felt overwhelmingly stressed with regards to their finances at the point the survey was undertaken, whereas only 3.8 per cent felt no stress at all. In terms of investors' present financial situation, 58.8 per cent of investors are dissatisfied therewith, while 41.1 per cent are satisfied with their present financial situation. Moreover, 50.5 per cent of investors responded that they sometimes feel worried about their current financial situation. A mere 3.7 per cent of investors feel comfortable about their current financial situation.

In addition, 38.8 per cent of investors sometimes worry about being able to meet their normal monthly living expenses. Only 7 per cent of investors never worry about being

able to meet their normal monthly living expenses. In the situation that a financial emergency of approximately R10 000 occurs, 28.3 per cent of investors indicated that they had no confidence that they could be able to pay for the emergency. Alternatively, only 20.8 per cent of investors had high confidence in their ability to have the financial means to pay for a financial emergency.

Furthermore, 33.1 per cent of investors specified that they are willing to participate in social activity, but they cannot afford it all the time. Only 11.4 per cent of investors can financially afford to go out, therefore they never experience missing out in engaging in social activities.

Nearly half of investors (45.7%) get by living paycheck to paycheck, while a mere 7 per cent are financially comfortable to support their lifestyles. Lastly, 42.9 per cent of investors feel highly stressed about their personal finances in general, whereas only 3.1 per cent feel no financial stress at all (Table 5.8). Table 5.9 provides the descriptive statistics of the IFDFW scale in terms of its respective items and the scale.

Table 5. 9: IFDFW descriptive statistics

Items							Scale			
No.	N	Mean	Skewness		Kurtosis		*Min.*	*Max.*	*Mean*	*Std. dev.*
			Stat.	*Std. Error*	*Stat.*	*Std. Error*				
IFDFW1	1 065	5.0789	.000	.075	-.598	.150				
IFDFW2	1 065	4.6977	.091	.075	-.871	.150				
IFDFW3	1 065	4.4657	.483	.075	-.164	.150				
IFDFW4	1 065	4.7540	.337	.075	-.790	.150	1.00	10.00	4.842	2.317
IFDFW5	1 065	5.6432	-.090	.075	-1.382	.150				
IFDFW6	1 065	4.9324	.353	.075	-.992	.150				
IFDFW7	1 065	4.2300	.522	.075	-.893	.150				
IFDFW8	1 065	4.9352	-.033	.075	-.820	.150				
IFDFW	**1 065**	**4.8421**	**.190**	**.075**	**-.840**	**.150**				

Source: Author compilation

Based on the results presented in Table 5.9, the respective means, as well as the skewness and kurtosis statistics of the IFDFW scale's items, correspond with the results presented in Table 5.8. IFDFW's skewness of 0.190 suggests that the data are normally distributed. Six of the scale's items (IFDFW1, 2, 3, 4, 6 and 7) are positively distributed which suggests that respondents' frequent scores on these items are clustered at the lower or more negative scores. As such, it can be interpreted that most investors

experience low financial well-being. The IFDFW scale has a kurtosis of -0.840 which means the data for the IFDFW scale's 8 items are a platykurtic distribution.

The scale's items had options ranging from 1 to 10 for the investors to choose from; with 1 representing the complete dissatisfaction and 10 representing complete satisfaction. The IFDFW scale's mean of 4.842 suggests that investors are dissatisfied with their financial situation. The low standard deviation of 2.317 indicates that there is a high level of agreement among the respondents that they are overall experiencing a low level of financial well-being.

5.4.3.2 Satisfaction with life

This section focusses on the presentation and discussion of the results from the SLWS' frequency and percentage per scale item analysis (Diener *et al.*, 1985).

Table 5. 10: SLWS frequency and percentage (items)

SWLS1: In most ways, my life is close to ideal		
	Frequency (f)	*Per cent (%)*
Strongly disagree	106	10.0
Disagree	158	14.8
Slightly disagree	196	18.4
Slightly agree	365	34.3
Agree	195	18.3
Strongly agree	45	4.2
Total	**1 065**	**100**
SWLS2: The conditions of my life are excellent		
	Frequency (f)	*Per cent (%)*
Strongly disagree	89	8.4
Disagree	160	15.0
Slightly disagree	175	16.4
Slightly agree	354	33.2
Agree	228	21.4
Strongly agree	59	5.5
Total	**1 065**	**100**
SWLS3: I am satisfied with life		
	Frequency (f)	*Per cent (%)*
Strongly disagree	63	5.9
Disagree	126	11.8
Slightly disagree	136	12.8
Slightly agree	342	32.1
Agree	313	29.4
Strongly agree	85	8.0
Total	**1 065**	**100**
SWLS4: So far, I have gotten the important things I want in my life		

	Frequency (f)	*Per cent (%)*
Strongly disagree	61	5.7
Disagree	111	10.4
Slightly disagree	128	12.0
Slightly agree	324	30.4
Agree	334	31.4
Strongly agree	107	10.0
Total	**1 065**	**100**
SWLS5: If I could live my life over, I would change almost nothing		
	Frequency (f)	*Per cent (%)*
Strongly disagree	160	15.0
Disagree	225	21.1
Slightly disagree	233	21.9
Slightly agree	217	20.4
Agree	186	17.5
Strongly agree	44	4.1
Total	**1 065**	**100**

Source: Author compilation

In most ways, 34.3 per cent of investors slightly agreed that their lives are close to ideal, whereas, a mere 4.2 per cent of investors strongly agree that their lives are close to ideal. There are 33.2 per cent of investors who slightly agreed that the conditions of their lives are excellent; and only 5.5 per cent who strongly agreed that the conditions of their lives are excellent. In terms of life satisfaction, 32.1 per cent of investors slightly agreed that they are satisfied with their lives, while 8 per cent strongly agreed that they are satisfied with their lives.

Moreover, 31.4 per cent of investors indicated that they have achieved the important things they want in their lives so far,, whereas only 10 per cent strongly agreed to have obtained important things in their lives so far. Lastly, 21.9 per cent of investors slightly agree that they would change almost nothing if they could live their lives over. Alternatively, a mere 4.1 per cent of investors would change almost nothing if they could start their lives over. Based on these results, the following reasoning can be applied to categorise how satisfied investors are with their lives in general:

- low life satisfaction for investors who selected the “strongly disagree” and “disagree” options on each item;
- moderate life satisfaction for investors who opted for the “slightly disagree” and “slightly agree” options on each item; and

- high life satisfaction for investors who opted for the “agree” and “strongly agree” options on each item.

Based on the abovementioned and the results from the SWLS, most investors chose the “slightly disagree” and “slightly agree” on each item. Therefore, it can be concluded that investors have a moderate level of life satisfaction overall.

Table 5.11 provides the descriptive statistics of the SWLS’ items skewness and kurtosis values, as well as the scale’s minimum, maximum, mean, and standard deviation.

Table 5. 11: SLWS descriptive statistics

Items							Scale			
No.	**N**	**Mean**	**Skewness**		**Kurtosis**		*Min.*	*Max.*	*Mean*	*Std. dev.*
			Stat.	*Std. Error*	*Stat.*	*Std. Error*				
SWLS1	1 065	3.4883	-.298	.075	-.677	.150	1.00	6.00	3.6377	1.3512
SWLS2	1 065	3.6094	-.330	.075	-.677	.150				
SWLS3	1 065	3.9117	-.558	.075	-.399	.150				
SWLS4	1 065	4.0141	-.621	.075	-.299	.150				
SWLS5	1 065	3.1653	.094	.075	-1.009	.150				
SWLS	**1 065**	**3.6377**	**-.015**	**.075**	**-1.098**	**.150**				

Source: Author compilation

Based on the results presented in Table 5.11, the respective means, as well as the skewness and kurtosis statistics of the IFDFW scale’s items, correspond with the results presented in Table 5.10. The skewness value of -0.15 lies between -2 and +2; therefore, the data are normally distributed. The data from four of the five items (IFDFW1-IFDFW4) are negatively distributed, which is an indication that the majority of the respondents’ frequent scores are clustered at the higher or more positive scores. This result suggests that investors experience moderate to high levels of life satisfaction. The kurtosis of -1.098 suggests that the data for the SLWS are distributed in a platykurtic manner.

The scale’s items had options ranging from 1 to 6 for the investors to choose from; with 1 representing “strongly disagree” and 6 representing “strongly agree”. The SWLS’ mean of 3.6377 suggests that investors are moderately satisfied with their lives. The low standard deviation of 1.3512 proposes that there is a high level of agreement among the respondents that they are overall experiencing a moderate level of life satisfaction.

5.4.3.3 Physical activity

This section focusses on the analysis of the investors' employment status, the frequency and percentages regarding IPAQ's items, as well as IPAQ's descriptive statistics.

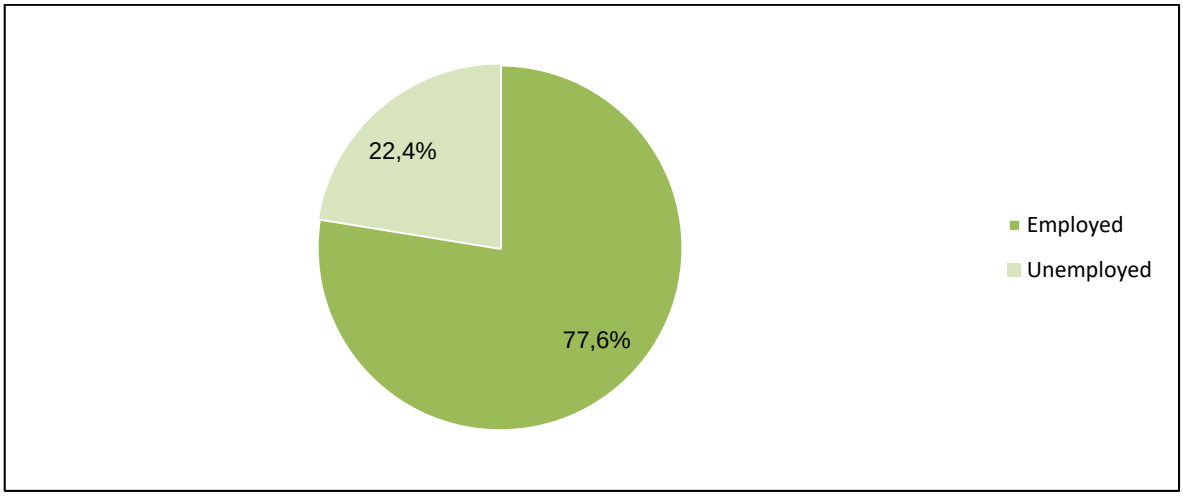

Figure 5. 8: Investors' employment status

Source: Author compilation

As presented in Figure 5.8, 77.6 per cent of investors are employed and 22.4 per cent are unemployed. Only the employed investors (77.6%) could respond to IPAQ's three items pertaining to job-related physical activity, namely JVDC, JMDC and JWDC. Table 5.12 presents the results from IPAQ's frequency and percentage per item.

Table 5. 12: IPAQ frequency and percentage (items)

JVDC - Job Vigorous last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	371	34.8
2	78	7.3
3	82	7.7
4	77	7.2
5	54	5.1
6	164	15.4
Sub-total	826	77.6
Missing values	239	22.4
Total	1 065	100.0
JMDC - Job Moderate last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	347	32.6
2	78	7.3
3	98	9.2

4	87	8.2
5	52	4.9
6	164	15.4
Sub-total	826	77.6
Missing values	239	22.4
Total	1 065	100.0
JWDC - Job Walk last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	283	26.6
2	53	5.0
3	69	6.5
4	67	6.3
5	37	3.5
6	317	29.8
Sub-total	826	77.6
Missing values	239	22.4
Total	1 065	100.0
TWDC - Transport Walk last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	286	26.9
2	114	10.7
3	132	12.4
4	124	11.6
5	55	5.2
6	354	33.2
Total	1 065	100.0
HVDC - Housework Vigorous last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	601	56.4
2	162	15.2
3	120	11.3
4	61	5.7
5	38	3.6
6	83	7.8
Total	1 065	100.0
HMDOC - Housework Moderate last 7 days Outside? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	272	25.5
2	208	19.5
3	200	18.8
4	134	12.6
5	64	6.0
6	187	17.6
Total	1 065	100.0
HMDIC - Housework Moderate last 7 days Inside? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	256	24.0
2	220	20.7
3	196	18.4
4	131	12.3
5	55	5.2

6	207	19.4
Total	1 065	100.0
RWDC - Recreation Walk last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	348	32.7
2	166	15.6
3	196	18.4
4	106	10.0
5	49	4.6
6	200	18.8
Total	1 065	100.0
RVDC - Recreation Vigorous last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	674	63.3
2	97	9.1
3	90	8.5
4	83	7.8
5	45	4.2
6	76	7.1
Total	1 065	100.0
RMDC - Recreation Moderate last 7 Days? Categorised		
Day(s) per week	*Frequency (f)*	*Per cent (%)*
1	777	73.0
2	91	8.5
3	75	7.0
4	62	5.8
5	21	2.0
6	39	3.7
Total	1 065	100.0

Source: Author compilation

As presented in Table 5.12, the majority of investors engage in vigorous (34.8%), moderate (32.6%), or low-level physical activity (26.6%) at work at least once a week. Moreover, 33.2 per cent of investors have indicated that for six days a week, they participate in a low-level physical activity, namely walking. In terms of general housework, 56.4 per cent of investors take part in vigorous level physical activity once a week. Additionally, 25.5 per cent of investors participate in moderate-level physical activity outside the house (i.e. garden work) once a week, whereas, 24 per cent of investors engage in moderate level physical activities inside the house (i.e. cleaning) once a week.

In terms of recreational and leisure-time activities, 32.7 per cent of investors partake in moderate-level physical activity once a week. Investors (32.7%) engage in low-level physical activity once a week during leisure-time, while 63.3 per cent of investors engage in vigorous level physical activity once a week during recreational and leisure time. Lastly,

73 per cent of investors participate in moderate-level physical activity at least once a week during recreational and leisure-time. Very few investors partake in any vigorous level physical activities six days a week. Table 5.13 provides the descriptive statistics of the IPAQ.

Table 5. 13: IPAQ descriptive statistics

Item(s)	N	Min.	Max.	Mean	Std. Dev.	Skewness		Kurtosis	
						Statistic	*Std. Error*	*Statistic*	*Std. Error*
JVDC	826	1.00	6.00	2.8269	2.00189	.547	.085	-1.327	.170
JMDC	826	1.00	6.00	2.8923	1.97788	.490	.085	-1.339	.170
JWDC	826	1.00	6.00	3.5726	2.19701	-.045	.085	-1.759	.170
TWDC	1065	1.00	6.00	3.5728	2.04246	-.012	.075	-1.609	.150
HVDC	1065	1.00	6.00	2.0817	1.57157	1.383	.075	.719	.150
HMDOC	1065	1.00	6.00	3.0667	1.77817	.442	.075	-1.111	.150
HMDIC	1065	1.00	6.00	3.1221	1.79863	.426	.075	-1.157	.150
RWDC	1065	1.00	6.00	2.9455	1.85388	.524	.075	-1.126	.150
RVDC	1065	1.00	6.00	2.0197	1.59787	1.384	.075	.575	.150
RMDC	1065	1.00	6.00	1.6629	1.29777	2.029	.075	3.204	.150
IPAQ	1065	1.00	6.00	2.7566	1.03720	0.400	0.075	-0.387	0.150

Source: Author compilation

The minimum days a week that investors could indicate for participating in any sort of physical activity is one, whereas six is the maximum number of days per week that investors could select to represent their weekly engagement in physical activity. The mean of IPAQ (2.7566) suggests that investors partake in physical activity at least two to three days a week. IPAQ's low standard deviation of 1.03720 proposes that there is a high level of agreement among the respondents regarding the level of physical activity they experience.

5.5 FACTOR ANALYSIS

A principal component factor analysis with Oblimin rotation was implemented to identify how investors' financial well-being, life satisfaction, and physical activity influence risk tolerance. The factor analysis was performed on all the construct-related items, namely:

- Section A: risk tolerance (GLRTS);
- Section A: financial well-being (IFDFW);
- Section C: satisfaction with life (SWL); and
- Section F: physical activity (IPAQ).

Before conducting the factor analysis, it is important to first assess the suitability of the dataset for factor analysis using sample size determination, the Kaiser-Myer-Olkin (KMO), and Bartlett's test of sphericity. Pallant (2013:190) recommends that the sample size should be more than 150 and there should be a ratio of at least five cases per variable. The sample size of this study of 1 065 yielded a ratio of thirty cases for each variable. The KMO index and Bartlett's test of sphericity were generated by IBM SPSS™ software to assess the factorability of the dataset. The KMO index ranges from zero to one. Ferreira (2019:146) mentions that KMO values have five ranges, namely:

- smaller than 0.5 is considered inadequate;
- greater than 0.5 to 0.7 is considered average;
- greater than 0.7 to 0.8 is considered good;
- greater than 0.8 to 0.9 is considered great; and
- greater than 0.9 is considered superb.

Malhotra (2010:638) mentions that, as a measure of sampling adequacy, the KMO value should be 0.5 or greater for the sample to be considered adequate for factor analysis. On the other hand, Bartlett's test of sphericity should be significant ($p < 0.05$) for the factor analysis to be appropriate (Pallant, 2013:190). The factor extraction method applied was a principal component analysis (PCA) with Oblimin with Kaiser normalisation. Factor loadings greater than 0.30 were used as a threshold for the extraction of factors. All the items loaded into factors had absolute value scores of 0.4.

The KMO and Bartlett's test of sphericity results obtained on the three sections of the questionnaire that consisted of construct-related items are presented in Table 5.14.

Table 5. 14: KMO and Bartlett's test of sphericity (All four scales)

KMO and Bartlett's Test		GLRTS	IFDFW	SWLS	IPAQ
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.820	0.946	0.875	0.752
Bartlett's Test of Sphericity	Approx. Chi-Square	1287.976	8613.709	3133.415	2230.204
	df	66	28	10	45
	Sig.	0.000	0.000	0.000	0.000

Source: Author compilation

The respective values of the KMO index were for risk tolerance (0.820), financial well-being (0.946), life satisfaction (0.875), and physical activity (0.752). These KMO index values all exceed the recommended value of 0.5 (Malhotra, 2010:293). More specifically, the KMO index value for physical activity (0.752) is considered good, the KMO index values for risk tolerance (0.820) and life satisfaction (0.875) are considered great; and the KMO index value of financial well-being (0.946) is considered superb. The Bartlett's test of sphericity for all four constructs was significant at $p < 0.000$. These results imply that the notion of the variables being unrelated is rejected; alternatively, these results strongly suggest this study's data are suitable for factor analysis. Only for the GRLTS an additionally CFA was conducted due to the low variance in the data. The other items (IFDFW, SWLS, and IPAQ) EFA variance was sufficient.

5.5.1 Factor analysis on Section A: Risk tolerance (GLRTS)

The dataset was not suitable for an exploratory factor analysis regarding risk tolerance as the variance of 23.830 per cent was too low. Therefore, a CFA was conducted on the GLTRS. The pattern matrix for GLRTS is presented in Table 5.15 and the CFA pattern matrix in Figure 5.9 and the Goodness-of-Fit for the model on risk tolerance in GLRTS (Table 5.16).

Table 5. 15: Pattern matrix for GLRTS

Item(s)	Component
	Risk tolerance
G2	0.515
G3	0.326
G4	0.556
G5	0.518
G6	0.606
G7	0.218
G8	0.533
G9	0.352
G10	0.261
G11	0.582
G12	0.631
G13	0.531
Cronbach alpha	**0.639**

Source: Author compilation

As presented in the pattern matrix in Table 5.15, the items of Section A, specifically the GLRTS, of the questionnaire clustered into one factor according to the Kaiser criteria. The KMO index of 0.820 indicated sufficient data to conduct a factor analysis. Eight items clustered into *risk tolerance*. Most of the factors showed a factor loading of ≥0.4. The Bartlett's test of sphericity showed a statistical significance at $p < 0.000$ for this analysis with an approximate chi-square of 1287.976 and a df of 66. The Eigenvalue is used to determine how many components (factors) to extract and its value should be greater than one. The GLRTS produced a Cronbach alpha of 0.639 for the *risk tolerance* component which suggests average reliability. Figure 5.9 Illustrates the CFA for GLRTS.

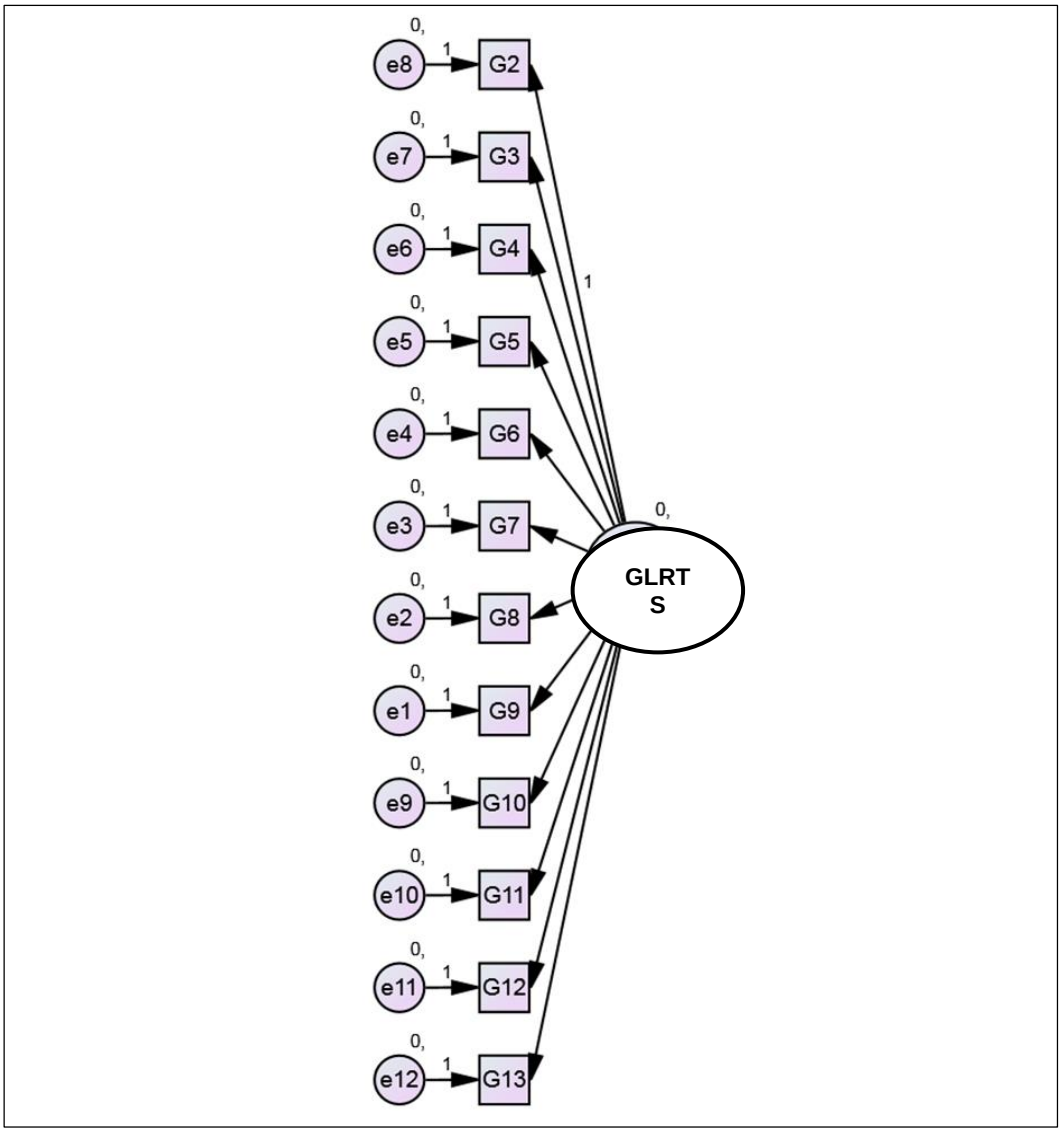

Figure 5. 9: Pattern matrix of confirmatory factor analysis on GLRTS (Risk Tolerance)

Table 5.16 summarises standardised regression weights of the relationship between risk tolerance and GLRTS.

Table 5. 16: Standardised regression weights of the relationship between Risk Tolerance and GLRTS

GLRTS	Standardised Regression Weights	p-value
G8←Risk Tolerance	0.452	***
G7← Risk Tolerance	0.169	***
G6← Risk Tolerance	0.534	***
G5← Risk Tolerance	0.440	***
G4← Risk Tolerance	0.481	***
G3← Risk Tolerance	0.257	***
G2← Risk Tolerance	0.426	***
G9← Risk Tolerance	0.278	***
G10← Risk Tolerance	0.201	***
G11← Risk Tolerance	0.506	***
G12← Risk Tolerance	0.565	***
G13← Risk Tolerance	0.444	***

Source: Author compilation

The standard regression coefficients indicate a positive relationship between risk tolerance and the items (G2 to G13) in GLRTS (p=0.000 for all items). The goodness-of-fit (CFI) statistics calculated the proportions of variance accounted for by the model as illustrated in Figure 5.9. The goodness-of-fit measures for the GLRTS and risk tolerance encompassed:

- Chi-square test statistics divided by the degrees of freedom (CMIN/DF) value of 3.225, which is smaller than 5, indicated a good fit (Mueller, 1996);
- CFI value of 0.902, which is indicative of an acceptable overall model fit (Mueller, 1996);
- RMSEA value of 0.046 is smaller than 0.1 which indicate an acceptable fit (Blunch, 2008).

5.5.2 Factor analysis on Section A: Financial well-being (IFDFW)

It was ensured that the dataset regarding financial well-being was suitable for factor analysis. The component matrix for IFDFW is presented in Table 5.17.

Table 5. 17: Component matrix for IFDFW

Item(s)	Component
	Financial well-being
FWB8	0.931
FWB4	0.917
FWB3	0.902
FWB7	0.868
FWB2	0.861
FWB1	0.855
FWB6	0.836
FWB5	0.812
Cronbach alpha	**0.952**

Source: Author compilation

The KMO index of 0.946 indicated sufficient data to conduct a factor analysis. Most of the factors have a factor loading of ≥0.8 and Bartlett's test of sphericity indicated a significance of $p < 0.000$ for this factor analysis.

The extracted factor, FWB1, explains 76.333 per cent of the IFDFW's variance. Ultimately, the factors for the IFDFW scale were all clustered into one component according to the Kaiser criteria; along with an excellent Cronbach alpha of 0.952, this is an indication the IFDFW is a highly reliable scale for measuring investors' perception of their *financial well-being*.

5.5.3 Factor analysis on Section C: Satisfaction with life (SWLS)

Table 5.18 provides the component matrix for SLWS. The dataset was determined to be suitable for factor analysis on satisfaction with life.

Table 5. 18: Component matrix for SWLS

Item(s)	Component
	Satisfaction with life
SWL2	0.883
SWL3	0.882
SWL1	0.873
SWL4	0.803
SWL5	0.751
Cronbach alpha	**0.893**

Source: Author compilation

The KMO index of 0.875 showed sufficient data to conduct a factor analysis and Bartlett's test of sphericity produced a significance of $p < 0.0000$ for this analysis. The desired results were obtained as s*atisfaction with life* came out as a single component. Table 5.26 provides the SWLS' communalities and total variance explained.

The extracted factor explains 70.553 per cent of the SWLS' total variance. Overall, a high Cronbach alpha of 0.893 was also observed which makes the SWLS a reliable tool for measuring how investors view their overall s*atisfaction with life*.

5.5.4 Factor analysis on Section F: Physical activity (IPAQ)

Table 5.19 provides the pattern matrix for the IPAQ.

Table 5. 19: Pattern matrix for IPAQ

Item(s)	Component(s)	
	General physical activity	Recreational physical activity
HMDOC	0.768	
HMDIC	0.755	
JMDC	0.753	
JWDC	0.645	
JVDC	0.617	
HVDC	0.513	0.286
TWDC	0.446	
RVDC		0.863
RMDC		0.806
RWDC		0.568
Cronbach alpha	**0.774**	**0.627**

Source: Author compilation

As presented in the pattern matrix in Table 5.19, the items of IPAQ were clustered into two components according to the Kaiser criteria. The criteria determined that items with Eigenvalues exceeding one should be extracted. The KMO index of 0.752 suggested sufficient data to conduct factor analysis on physical activity. There are seven items clustered in *general physical activity*, whereas there are three items clustered in *recreational physical activity*. The items clustered in *general physical activity* focus of physical activities pertaining to the investors' job, transportation, housework, house maintenance, and caring for a family. The items clustered in *recreational physical activity* solely focus on recreation, sport, and leisure-time physical activity. Most of the items

indicated a factor loading of ≥0.4. The Bartlett's test of sphericity produced a significance of $p < 0.0000$ for this factor analysis.

The two extracted factors have a cumulative variance of 49.4 per cent. The Cronbach alpha of 0.774 produced for *general physical activity* which suggests an acceptable level of reliability and is fit to be used to measure investors' *general physical activity*. Alternatively, a Cronbach alpha of 0.627 was produced for *recreational physical activity* which is an indication of a relatively acceptable level of reliability.

5.6 INFERENTIAL STATISTICS

Correlations, t-test statistics and analysis of variance (ANOVA) were computed to determine the effect of demographic factors namely age, gender, race, marital status, income, education, and provincial origin have on an investor's risk tolerance level. Specifically, nonparametric correlations were applied to analyse the respective relationships between age, income, education, and risk tolerance, financial well-being, satisfaction with life, and physical activity. T-test statistics were implemented to observe whether gender has any impact on investors' risk tolerance, financial well-being, satisfaction with life, and physical activity. Ultimately, ANOVAs were applied to investigate the inherent variance within the groups between race, marital status, place of origin, and risk tolerance, financial well-being, and physical activity.

5.6.1 Demographics, risk tolerance, and investor well-being

In order to address the second empirical objective, *the respective relationships between age, income, education, risk tolerance, and investor well-being,* non-parametric Spearman correlations were applied.

The correlations were used to test the relationship between investor's demographic characteristics namely, age, income, education and their risk tolerance and well-being. The correlation results are presented in Table 5.20. A two-tailed significance level can be assumed at a one per cent significance level.

Table 5. 20: Correlation between age, income, education, risk tolerance and investor well-being

Scale(s)	Spearman Correlation	Age	Income	Education
GLRTS	Correlation Coefficient	0.057	.212**	.141**
	Sig. (2-tailed)	0.061	0.000	0.000
	N	1065	1065	1052
IFDFW	Correlation Coefficient	.237**	.359**	.259**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	1065	1065	1052
SWLS	Correlation Coefficient	.138**	.266**	.215**
	Sig. (2-tailed)	0.000	0.000	0.000
	N	1065	1065	1052
IPAQ	Correlation Coefficient	.081**	-0.055	-0.050
	Sig. (2-tailed)	0.008	0.071	0.105
	N	1065	1065	1052
**. Correlation is significant at the 0.01 level (2-tailed).				
*. Correlation is significant at the 0.05 level (2-tailed).				

Source: Author compilation

5.6.1.1 Age, risk tolerance, and investor well-being

As suggested by Table 5.20, age has a positive relationship with risk tolerance and the respective aspects of investor well-being (financial well-being, satisfaction with life, and physical activity). However, the relationship between age and risk tolerance suggests that the older the investor is, the higher the risk they tend to tolerate; however, this result is not statistically significant. Grable (2000:625-630) and Van de Venter *et al.* (2012:795) found a significant positive relationship between age and risk tolerance, whereas Anbar and Eker (2010b:510) found no significant relationship between age and risk tolerance.

Alternatively, age's respective relationships with financial well-being, satisfaction with life, and physical activity are all statistically significant at the $p < 0.01$ level and positive in nature. The correlations between age and financial well-being as well as age and satisfaction with life yielded positive small linear associations ($r = 0.10 – 0.29$). As such, it can be suggested that an increase in an investor's age results in an increase in the investor's overall financial well-being, satisfaction with life, and physical activity. Similarly to this study's results, Taft *et al.* (2013:63) found that age positively correlates with financial well-being. Moreover, the findings by Huber (2014) and De Ree and Alessie (2011:1) suggest that life satisfaction decreases around middle age and increases in older

age. It is generally accepted that younger individuals have higher physical activity levels compared to older individuals.

5.6.1.2 Income, risk tolerance, and investor well-being

Income respectively has a statistically significant ($p < 0.01$) positive relationship with risk tolerance, financial well-being, and satisfaction with life (Table 5.20). This result suggests that an increase in an investor's level of income will result in respective increases in an investor's risk tolerance, financial well-being, and satisfaction with life. In terms of risk tolerance and satisfaction with life, income yielded a positive small linear association (r = 0.10 – 0.29). The association between income and financial well-being deemed to be moderate (r = 0.30 – 0.49). It is generally accepted that individuals who earn higher incomes are those who are likely to be highly risk tolerant (Anbar & Eker, 2008:507; Masenya, 2017:33). Lastly, it was evidenced that income and physical activity have a negative relationship that is not statistically significant.

5.6.1.3 Education, risk tolerance, and investor well-being

Education has positive and statistically significant ($p < 0.01$) relationships with risk tolerance, financial well-being, and satisfaction with life (Table 5.20). In other words, the more educated an investor is, the higher their level of risk tolerance (Zhong & Xiao, 1995), financial well-being (Joo & Grable, 2004; Taft *et al.*, 2013:63), and satisfaction with life; and vice-versa. Respectively, education yielded small positive linear associations (r = 0.10 – 0.29) with risk tolerance, financial well-being, and satisfaction with life. Alternatively, education has a negative relationship with physical activity; however, this result is deemed not statistically significant. Norman *et al.* (2002:670) found that individuals with higher education have lower total physical activity than those with elementary school education.

5.6.1.4 Gender, risk tolerance and investor well-being

To address the third empirical objective, *examine gender's influence on risk tolerance and investor well-being*, an independent sample t-test was conducted to observe whether gender has any impact on investors' risk tolerance and well-being. Table 5.21 presents

the results of the independent t-tests results on gender, risk tolerance, and investor well-being.

Table 5. 21: T-tests on gender, risk tolerance and investor well-being

Scale(s)	Gender	N	Mean	Std. deviation	p-value	Effect size
GLRTS	Male	469	25.7655	4.7954	0.000	0.47
	Female	596	23.4883	4.5242		
IFDFW	Male	469	43.3881	17.7543	0.000	0.45
	Female	596	35.0772	18.3347		
SWLS	Male	469	18.9360	5.4827	0.000	0.23
	Female	596	17.6007	5.7278		
IPAQ	Male	469	2.8131	1.0309	0.114	0.10
	Female	596	2.7121	1.0408		

Source: Author compilation

The p-values of the Levene's test for equality variance pertaining to gender and risk tolerance; gender and financial well-being; as well as gender and satisfaction with life are all less than the suggested alpha of 0.05 (Table 5.21). This result is an indication that gender's influence on risk tolerance, financial well-being, and satisfaction with life is statistically significant ($p < 0.05$). Pallant (2007:208) recommends that the following principles be applied to interpret effect size: $0.20 \leq d < 0.50$ signifies a small, practically non-significant effect; $0.50 \leq d < 0.80$ signifies a medium-sized effect moving towards practical significance; and $0.80 \leq d$ signifies a large effect that has reached practical significance. Therefore, gender's influence on risk tolerance, financial well-being, and satisfaction with life has a small, practically non-significant effect.

Grable and Roszkowski (2007) found that men tend to overestimate their risk tolerances while women are prone to underestimate their risk tolerance levels. Taft *et al.* (2013:69) found no significant difference between gender and financial well-being. Alternatively, Kongarchapatara *et al.* (2014:340) found that women are more satisfied with their lives than men in the early and later stages of life. Lastly, this study found that gender does not have a statistically or practically significant influence on an investor's level of physical activity.

5.6.1.5 Race, marital status, place of origin, risk tolerance, and investor well-being

ANOVAs were applied to address the fourth empirical objective, *Explore the respective mean differences between race, marital status, place of origin, risk tolerance, and investor well-being*.

Specifically, one-way ANOVAs were implied to determine if the differences exerted by the demographic variables (race, marital status, and place of origin), risk tolerance, and investor well-being are significant. Table 5.22 reports on the mean, standard deviation, and p-value pertaining to race, risk tolerance, and investor well-being.

Table 5. 22: Descriptive statistics on race, risk tolerance, and investor well-being

Scale(s)	Race	N	Mean	Std. deviation	p-value
GLRTS	African	169	25.4734	4.92934	0.036*
	White	715	24.2881	4.72384	
	Coloured	88	24.3409	4.52804	
	Indian/Asian	93	24.4086	5.00920	
	Total	1065	24.4911	4.77916	
IFDFW	African	169	35.5089	17.07481	0.000**
	White	715	40.5231	18.64876	
	Coloured	88	34.2500	18.09251	
	Indian/Asian	93	35.1183	18.90011	
	Total	1065	38.7371	18.53838	
SWLS	African	169	16.4615	5.80025	0.000**
	White	715	18.7287	5.49450	
	Coloured	88	17.5795	5.77892	
	Indian/Asian	93	17.7527	5.88043	
	Total	1065	18.1887	5.65761	
IPAQ	African	169	2.9544	1.04653	0.015*
	White	715	2.7221	1.03242	
	Coloured	88	2.8487	1.08409	
	Indian/Asian	93	2.5753	0.96723	
	Total	1065	2.7566	1.03720	
**. Significant at the 0.01 level.					
*. Significant at the 0.05 level.					

Source: Author compilation

Table 5.22 respectively reports on the results from the ANOVA and effect sizes relating to the differences in race and risk tolerance, financial well-being, satisfaction with life, and physical activity. African investors (M = 25.4734; SD = 4.92934) tend to have a higher risk tolerance compared to their White, Coloured, and Indian/Asian counterparts. White investors (M = 40.5231; SD = 18.64876) appear to experience higher levels of financial well-being compared to investors of other races. Moreover, White investors (M = 18.7287;

SD = 5.49450) seem to be more satisfied with life in general compared to their counterparts from different racial backgrounds. Masenya (2017:28) mentions that if all factors are held constant, White individuals tend to have higher risk tolerances than their counterparts of other races. The means from IPAQ are leaning towards being homogenous; however, it seems that African investors (M = 2.9544; SD = 1.04653) tend to be more physically active than White, Coloured, and Indian/Asian investors. The abovementioned differences are statistically significant with respective p-values of 0.036, 0.000, 0.000, and 0.015. Table 5.23 provides the ANOVA results regarding race, risk tolerance, and investor well-being.

Table 5. 23: ANOVA race, risk tolerance, and investor well-being

		Sum of Squares	df	Mean Square	F	Sig.
GLRTS	Between Groups	195.140	3	65.047	2.863	0.036*
	Within Groups	24107.025	1061	22.721		
	Total	24302.165	1064	-		
IFDFW	Between Groups	7031.580	3	2343.860	6.934	0.000**
	Within Groups	358634.805	1061	338.016		
	Total	365666.385	1064	-		
SWLS	Between Groups	762.948	3	254.316	8.104	0.000**
	Within Groups	33294.117	1061	31.380		
	Total	34057.065	1064	-		
IPAQ	Between Groups	11.266	3	3.755	3.516	0.015*
	Within Groups	1133.364	1061	1.068		
	Total	1144.631	1064	-		
**. Significant at the 0.01 level.						
*. Significant at the 0.05 level.						

Source: Author compilation

Based on Table 5.23, investors' races have respective statistical differences with their risk tolerance, financial well-being, satisfaction with life, and physical activity. Specifically, the respective differences between race and risk tolerance (f = 2.863, p = 0.036) as well as race and physical activity (f = 3.516, p = 0.015) are statistically significant at the p < 0.05 level.

The respective differences between race and financial well-being (f = 6.934, p = 0.000) as well as satisfaction with life (f = 8.104, p = 0.000) are statistically significant at the p < 0.01 level. Table 5.24 provides the effect sizes of race on risk tolerance and investor well-being.

Table 5. 24: Race effect sizes

Scale(s)	Race	Effect sizes		
		African	White	Coloured
GLRTS	African			
	White	0.24		
	Coloured	0.23	0.01	
	Indian/Asian	0.21	0.02	0.01
IFDFW	African			
	White	0.27		
	Coloured	0.07	0.34	
	Indian/Asian	0.02	0.29	0.05
SWLS	African			
	White	0.39		
	Coloured	0.19	0.20	
	Indian/Asian	0.22	0.17	0.03
IPAQ	African			
	White	0.22		
	Coloured	0.10	0.12	
	Indian/Asian	0.36	0.14	0.25

Source: Author compilation

Pallant (2007:208) suggests that the following guidelines be implemented when interpreting effect size: $0.20 \leq d < 0.50$ signifies a small, practically non-significant effect; $0.50 \leq d < 0.80$ signifies a medium-sized effect moving towards practical significance; and $0.80 \leq d$ signifies a large effect that has reached practical significance. As presented in Table 5.18, there are no practically significant differences between (i) race and financial well-being, (ii) race and satisfaction with life, and (ii) race and physical activity. Table 5.25 presents the ANOVA results of marital status, risk tolerance, and investor well-being.

Table 5. 25: Descriptive statistics on marital status, risk tolerance, and investor well-being

Scale(s)	Marital status	N	Mean	Std. deviation	p-value
GLRTS	Single - staying on my own	198	24.8586	4.58204	0.109
	Single - living with my parents	56	24.3214	5.21225	
	Not married but staying together	110	24.1273	4.43942	
	Married	577	24.6568	4.86770	
	No longer married	124	23.5323	4.68770	
	Total	1065	24.4911	4.77916	
IFDFW	Single - staying on my own	198	38.2273	18.91536	0.041*
	Single - living with my parents	56	33.5714	16.31046	
	Not married but staying together	110	37.1545	18.08653	

Scale(s)	Marital status	N	Mean	Std. deviation	p-value
	Married	577	40.1334	18.62433	
	No longer married	124	36.7903	18.40876	
	Total	1065	38.7371	18.53838	
SWLS	Single - staying on my own	198	17.7071	6.05265	0.003**
	Single - living with my parents	56	16.3571	5.72531	
	Not married but staying together	110	18.4818	5.61736	
	Married	577	18.6880	5.48164	
	No longer married	124	17.2016	5.54506	
	Total	1065	18.1887	5.65761	
IPAQ	Single - staying on my own	198	2.7587	1.06464	0.919
	Single - living with my parents	56	2.6974	1.11512	
	Not married but staying together	110	2.8240	1.10529	
	Married	577	2.7594	1.00283	
	No longer married	124	2.7068	1.06499	
	Total	1065	2.7566	1.03720	

Source: Author compilation

As presented in Table 5.25, it is statistically non-significant (p = 0.109) for investors who are single and staying on their own (M = 2.48586; SD = 4.58204) to be more likely to engage in higher levels of risk tolerance compared to their counterparts. Married investors (M = 40.1334; SD = 18.62433) tend to experience higher levels of financial well-being compared to their counterparts; and this finding was proven to be statistically significant (p = 0.041). Moreover, it is statistically significant (p = 0.003) for married investors (M = 18.6880; SD = 548.164) to experience increased satisfaction with life levels. Lastly, unmarried investors who stay together (M = 2.8240; SD = 1.10529) are slightly more physically active compared to their counterparts; however, this finding was proven to be statistically non-significant (p = 0.919). Table 5.26 details the ANOVA results of marital status on risk tolerance and investor well-being.

Table 5. 26: ANOVA marital status, risk tolerance, and investor well-being

		Sum of Squares	df	Mean Square	F	Sig.
GLRTS	Between Groups	172.766	4	43.191	1.897	0.109
	Within Groups	24129.399	1060	22.764		
	Total	24302.165	1064	-		
IFDFW	Between Groups	3416.252	4	854.063	2.499	0.041*
	Within Groups	362250.133	1060	341.745		
	Total	365666.385	1064	-		
SWLS	Between Groups	507.927	4	126.982	4.012	0.003**
	Within Groups	33549.138	1060	31.650		
	Total	34057.065	1064	-		

		Sum of Squares	df	Mean Square	F	Sig.
IPAQ	Between Groups	1.009	4	0.252	0.234	0.919
	Within Groups	1143.622	1060	1.079		
	Total	1144.631	1064	-		
**. Significant at the 0.01 level.						
*. Significant at the 0.05 level.						

Source: Author compilation

In conclusion, as presented in Table 5.26, no statistical differences were found between investors' marital status and risk tolerance as well as investors' marital status and physical activity. Authors, namely Sung and Hanna (1996a:227-228) as well as Dickason (2017:20-21) found that married individuals tend to be less risk tolerant than their unmarried counterparts. A statistical difference at the significance level of $p < 0.01$ was found between investors' marital status and their satisfaction with life ($f = 4.012$, $p = 0.003$). Similarly, Chipperfield and Havens (2001:176) found that married men's life satisfaction was increased; however, married women's life satisfaction was on the decline. Additionally, statistically significant differences were found between investors' marital status and their financial well-being ($f = 2.499$, $p = 0.041$) at a significance level of $p < 0.05$.

Table 5.27 provides results regarding the effect sizes of marital status on risk tolerance and investor well-being.

Table 5. 27: Marital status effect sizes

Scale(s)	Race	Effect sizes			
		Single – own	Single – parents	Not married staying together	Married
GLRTS	Single - own				
	Single - parents	0.10			
	Not married staying together	0.16	0.04		
	Married	0.04	0.06	0.11	
	No longer married	0.28	0.15	0.13	0.23
IFDFW	Single - own				
	Single - parents	0.25			
	Not married staying together	0.06	0.20		
	Married	0.10	0.35	0.16	
	No longer married	0.08	0.17	0.02	0.18
SWLS	Single - own				
	Single - parents	0.22			

Scale(s)	Race	Effect sizes			
		Single – own	Single – parents	Not married staying together	Married
	Not married staying together	0.13	0.37		
	Married	0.16	0.41	0.04	
	No longer married	0.08	0.15	0.23	0.27
IPAQ	Single - own				
	Single - parents	0.05			
	Not married staying together	0.06	0.11		
	Married	0.00	0.06	0.06	
	No longer married	0.05	0.01	0.11	0.05

Source: Author compilation

As shown in Table 5.27, marital status produced Cohen's d-values that are smaller than 0.50 (Pallant, 2007:208). The effect sizes produced by the GLRTS and IPAQ are statistically non-significant due to their respective p-values of 0.109 and 0.919 (Table 5.19 and Table 5.20). The Cohen's d-value (d = 0.25; p = 0.041) of single investors staying with parents and single investors staying on their own signifies a small, practically non-significant effect on financial well-being. Unmarried investors staying together with single investors staying with parents produced a Cohen's d-value of 0.20 (p = 0.041) which also signifies a small, practically non-significant effect on financial well-being.

The results suggest that marital status has a statistically significant (p = 0.003 – Tables 5.25 and 5.26) yet small, practically non-significant effect on satisfaction with life:

- Investors who are single and staying on their own along with single investors staying with parents (d = 0.22);
- Investors who are married and staying together along with investors who are staying with parents (d = 0.37);
- Married investors with investors who are single and staying with parents (d = 0.41);
- No longer married investors with investors who are not married yet staying together (d = 0.23); and
- No longer married investors with married investors (d = 0.27).

Overall, marital status respectively has a small and practically non-significant effect on investors' risk tolerance, financial well-being, satisfaction with life, and physical activity.

Table 5.28 presents the descriptive results regarding the place of origin, risk tolerance, and investor well-being.

Table 5. 28: Descriptive statistics on place of origin, risk tolerance, and investor well-being

Scale(s)	Place of origin	N	Mean	Std. deviation	p-value
GLRTS	Gauteng	439	24.5626	4.75520	0.000**
	KwaZulu-Natal	164	24.4207	4.78877	
	Western Cape	280	24.4786	4.64583	
	Northern Cape	10	23.7000	6.96100	
	Eastern Cape	54	24.0556	4.26666	
	Free State	26	25.2308	4.12124	
	Mpumalanga	28	23.4286	5.26645	
	Limpopo	18	26.3333	4.57615	
	North West	31	21.8710	4.89041	
	Live outside RSA	15	29.4000	4.54816	
	Total	1065	24.4911	4.77916	
IFDFW	Gauteng	439	38.0159	18.26460	0.187
	KwaZulu-Natal	164	39.4878	19.31479	
	Western Cape	280	40.0321	19.12520	
	Northern Cape	10	46.3000	23.03644	
	Eastern Cape	54	34.5926	17.11175	
	Free State	26	40.2692	16.66987	
	Mpumalanga	28	40.6071	18.26622	
	Limpopo	18	31.9444	13.73048	
	North West	31	35.6774	18.16294	
	Live outside RSA	15	45.6667	14.75837	
	Total	1065	38.7371	18.53838	
SWLS	Gauteng	439	18.0456	5.78794	0.776
	KwaZulu-Natal	164	18.0549	5.69173	
	Western Cape	280	18.4571	5.46920	
	Northern Cape	10	20.1000	6.22629	
	Eastern Cape	54	17.1852	5.95288	
	Free State	26	18.8077	4.93979	
	Mpumalanga	28	18.6786	5.59135	
	Limpopo	18	17.8889	5.34557	
	North West	31	18.0645	6.37670	
	Live outside RSA	15	19.8000	3.68782	
	Total	1065	18.1887	5.65761	
IPAQ	Gauteng	439	2.6165	1.01989	0.008**
	KwaZulu-Natal	164	2.8695	1.05428	
	Western Cape	280	2.8233	1.02233	
	Northern Cape	10	2.2114	0.58885	
	Eastern Cape	54	3.0444	0.99821	
	Free State	26	2.8055	1.15015	
	Mpumalanga	28	2.8556	1.03818	
	Limpopo	18	3.0659	1.28208	
	North West	31	2.7161	0.96906	
	Live outside RSA	15	3.1448	1.14265	

Scale(s)	Place of origin	N	Mean	Std. deviation	p-value
	Total	1065	2.7566	1.03720	

Source: Author compilation

Table 5.28 shows that it is statistically significant (p = 0.000) for investors who reside outside RSA (M = 29.4000; SD = 4.54816) to tolerate higher levels of risk. Moreover, it is statistically significant for investors outside RSA (M = 3.1448; SD = 1.14265) to engage in higher physical activity levels. Findings which suggest that investors who reside outside RSA (M = 45.6667; SD = 14.75837) experience increased financial well-being; and investors from the Northern Cape (M = 20.1000; SD = 6.22629) are highly satisfied with life were both deemed statistically insignificant with respective p-values of 0.187 and 0.776. Table 5.29 provide the ANOVA results regarding place of origin, risk tolerance and investor well-being.

Table 5. 29: ANOVA place of origin, risk tolerance, and investor well-being

		Sum of Squares	df	Mean Square	F	Sig.
GLRTS	Between Groups	700.807	9	77.867	3.481	0.000**
	Within Groups	23601.358	1055	22.371		
	Total	24302.165	1064	-		
IFDFW	Between Groups	4289.827	9	476.647	1.392	0.187
	Within Groups	361376.558	1055	342.537		
	Total	365666.385	1064	-		
SWLS	Between Groups	180.742	9	20.082	0.625	0.776
	Within Groups	33876.323	1055	32.110		
	Total	34057.065	1064	-		
IPAQ	Between Groups	23.764	9	2.640	2.485	0.008**
	Within Groups	1120.867	1055	1.062		
	Total	1144.631	1064	-		
**. Significant at the 0.01 level.						
*. Significant at the 0.05 level.						

Source: Author compilation

Ultimately, as displayed in Table 5.29, no statistical differences were found between investors' place of origin and their financial well-being or their satisfaction with life. Respective statistical differences at level p < 0.01 were found between investors' place of origin and their risk tolerance (*f* = 3.481, p = 0.000) as well as investors' place of origin and their physical activity (*f* = 2.485, p = 0.008).

Table 5.30 provides the effect sizes results pertaining to place of origin on risk tolerance and investor well-being.

Table 5. 30: Place of origin effect sizes

Scale(s)	Place of origin	Effect sizes								
		GAU	KZN	WC	NC	EC	FS	MPU	LIM	NW
GLRTS	GAU									
	KZN	0.03								
	WC	0.02	0.01							
	NC	0.12	0.10	0.11						
	EC	0.11	0.08	0.09	0.05					
	FS	0.14	0.17	0.16	0.22	0.28				
	MPU	0.22	0.19	0.20	0.04	0.12	0.34			
	LIM	0.37	0.40	0.40	0.38	0.50	0.24	0.55		
	NW	0.55	0.52	0.53	0.26	0.45	0.69	0.30	0.91	
	LOR	1.02	1.04	1.06	0.82	1.18	0.92	1.13	0.67	1.54
IFDFW	GAU									
	KZN	0.08								
	WC	0.11	0.03							
	NC	0.36	0.30	0.27						
	EC	0.19	0.25	0.28	0.51					
	FS	0.12	0.04	0.01	0.26	0.33				
	MPU	0.14	0.06	0.03	0.25	0.33	0.02			
	LIM	0.33	0.39	0.42	0.62	0.15	0.50	0.47		
	NW	0.13	0.20	0.23	0.46	0.06	0.25	0.27	0.21	
	LOR	0.42	0.32	0.29	0.03	0.65	0.32	0.28	0.93	0.55
SWLS	GAU									
	KZN	0.00								
	WC	0.07	0.07							
	NC	0.33	0.33	0.26						
	EC	0.14	0.15	0.21	0.47					
	FS	0.13	0.13	0.06	0.21	0.27				
	MPU	0.11	0.11	0.04	0.23	0.25	0.02			
	LIM	0.03	0.03	0.10	0.36	0.12	0.17	0.14		
	NW	0.00	0.00	0.06	0.32	0.14	0.12	0.10	0.03	
	LOR	0.30	0.31	0.25	0.05	0.44	0.20	0.20	0.36	0.27
IPAQ	GAU									
	KZN	0.24								
	WC	0.20	0.04							
	NC	0.40	0.62	0.60						
	EC	0.42	0.17	0.22	0.83					
	FS	0.16	0.06	0.02	0.52	0.21				
	MPU	0.23	0.01	0.03	0.62	0.18	0.04			
	LIM	0.35	0.15	0.19	0.67	0.02	0.20	0.16		
	NW	0.10	0.15	0.10	0.52	0.33	0.08	0.13	0.27	
	LOR	0.46	0.24	0.28	0.82	0.09	0.29	0.25	0.06	0.38

Source: Author compilation

The effects sizes produced by the IFDFW and SLWS are statistically non-significant with respective p-values of 0.187 and 0.776 (Tables 5.28 and 5.29); however, there are effect

sizes that are medium-sized moving towards large effect sizes in IFDFW (Table 5.30). The results in Table 5.25 were found in terms of the statistically significant (p = 0.000 – Table 5.28 and 5.29) GLRTS which represents risk tolerance; investors from:

- Limpopo with Eastern Cape have a medium-sized practical effect (d = 0.50) on risk tolerance;
- Limpopo with Mpumalanga have a medium-sized practical effect (d = 0.55) on risk tolerance;
- North-West with Gauteng have a medium-sized effect (d = 0.55) on risk tolerance;
- North-West with KwaZulu-Natal have a medium-sized practical effect (d = 0.52) on risk tolerance;
- North-West with Western Cape have a medium-sized practical effect (d = 0.53) on risk tolerance;
- North-West with Free State have a medium-sized practical effect (d = 0.69) on risk tolerance;
- North-West with Limpopo have a large practical effect (d = 0.91) on risk tolerance;
- Live Outside RSA with Gauteng have a large practical effect (d = 1.02) on risk tolerance:
- Live Outside RSA with KwaZulu-Natal have a large practical effect (d = 1.04) on risk tolerance;
- Live Outside RSA with Western Cape have a large practical effect (d = 1.06) on risk tolerance;
- Live Outside RSA with Northern Cape have a large practical effect (d = 0.82) on risk tolerance;
- Live Outside RSA with Eastern Cape have a large practical effect (d = 1.18) on risk tolerance;
- Live Outside RSA with Free State have a large practical effect (d = 0.92) on risk tolerance;
- Live Outside RSA with Mpumalanga have a large practical effect (d = 1.13) on risk tolerance;
- Live Outside RSA with Limpopo have a medium-sized practical effect (d = 0.67) on risk tolerance; and

- Live Outside RSA with North-West have a large practical effect (d = 1.54) on risk tolerance.

The following results in Table 5.25 were found in terms of the statistically significant (p = 0.008 – Table 5.28 and 5.29) IPAQ which represents physical activity; investors from:

- Northern Cape with KwaZulu-Natal have a medium-sized practical effect (d = 0.62) on physical activity;
- Northern Cape with Western Cape have a medium-sized practical effect (d = 0.60) on physical activity;
- Northern Cape with Eastern Cape have a large practical effect (d = 0.83) on physical activity;
- Northern Cape with Free State have a medium-sized practical effect (d = 0.52) on physical activity;
- Northern Cape with Mpumalanga have a medium-sized practical effect (d = 0.62) on physical activity;
- Northern Cape with Limpopo have a medium-sized practical effect (d = 0.67) on physical activity;
- Northern Cape with North-West have a medium-sized practical effect (d = 0.52) on physical activity; and
- Northern Cape with Live Outside RSA have a large practical effect (d = 0.82) on physical activity.

In conclusion, the investors' place of origin has a statistical and practical effect on their overall risk tolerance and physical activity. The following section is focussed on addressing the relationship between risk tolerance and investor well-being.

5.6.2 Risk tolerance and investor well-being

Empirical objective number five, *Investigate the relationship between risk tolerance and investor well-being,* is addressed in Section 5.6.2.

A correlation analysis was conducted to examine the potential relationships between risk tolerance and the aspects of investor well-being, namely financial well-being, satisfaction

with life, and physical activity. Table 5.31 presents the results from the correlations analysis on risk tolerance and investor well-being.

Table 5. 31: Correlations on risk tolerance and investor well-being

Scale(s)	Spearman Correlation	GLRTS	FWB	SWLS	IPAQ
GLRTS	Correlation Coefficient	1.000	.197**	.104**	.097**
	Sig. (2-tailed)	-	0.000	0.001	0.001
	N	1065	1065	1065	1065
IFDFW	Correlation Coefficient	.197**	1.000	.610**	0.031
	Sig. (2-tailed)	0.000	-	0.000	0.311
	N	1065	1065	1065	1065
SWLS	Correlation Coefficient	.104**	.610**	1.000	0.008
	Sig. (2-tailed)	0.001	0.000	-	0.783
	N	1065	1065	1065	1065
IPAQ	Correlation Coefficient	.097**	0.031	0.008	1.000
	Sig. (2-tailed)	0.001	0.311	0.783	-
	N	1065	1065	1065	1065
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Source: Author compilation

Investors' risk tolerance has a positive relationship with each of investor well-being's aspects (financial well-being, satisfaction with life, and physical activity). As presented in Table 5.31, risk tolerance has level 0.01 statistically significant relationships with each aspect of investor well-being, namely financial well-being ($p < 0.01$); satisfaction with life ($p < 0.01$); and physical activity ($p < 0.01$). This result suggests that an increase in investor risk tolerance may result in an increase in investor well-being; and vice-versa. However, the relationships between risk tolerance and investor well-being yielded small linear associations ($r = 0.10$-0.29).

In addition, financial well-being was found to have a statistically significant relationship with life satisfaction ($p < 0.01$). Moreover, the relationship between financial well-being and satisfaction with life yielded large linear associations ($r > 0.5$). This result suggests that an increase in financial well-being will result in an increase in satisfaction with life; and vice-versa. No relationship was found between financial well-being and physical activity nor was a relationship found between satisfaction with life and physical activity.

5.7 STRUCTURAL EQUATION MODELLING

The sixth and final empirical objective, *construct a structural equation model which depicts the influence of investor well-being on risk tolerance,* is addressed in Section 5.7.

The study's sample size of 1 065 investors was considered sufficient for conducting a SEM through the use of AMOS™ Version 25. The overriding empirical objective was to construct a forecasting model to identify risk tolerance by analysing investor well-being; which consists of their level of financial well-being, life satisfaction, and physical activity Figure 5.10 illustrates the SEM (adapted from original) influence of *investor well-being on risk tolerance*.

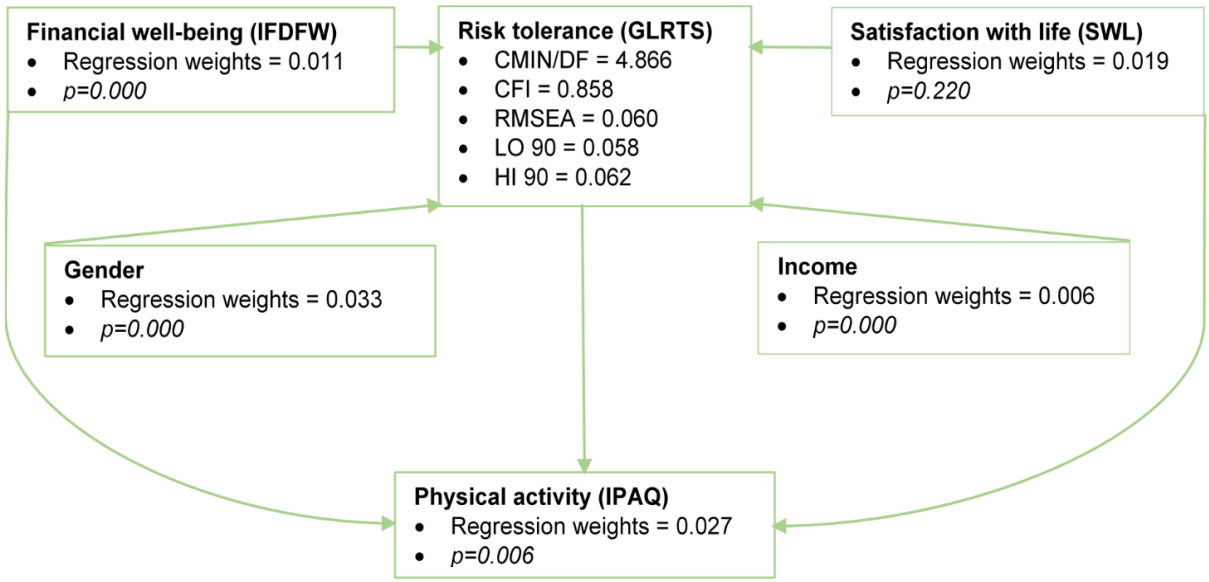

Figure 5. 10: Structural equation model of investor well-being on risk tolerance

Source: Author compilation

Table 5.32 provides the regression weights and correlations between risk tolerance, investor well-being, income, and gender.

Table 5. 32: Regression weights and correlations between risk tolerance, investor well-being, gender and income

Risk tolerance	Regression Weights	p-value
Risk tolerance ← physical activity	0.027	0.006
Risk tolerance ← financial well-being	0.011	0.000
Risk tolerance ← satisfaction with life	0.019	0.220
Risk tolerance ← gender	0.006	0.000
Risk tolerance ← income	0.033	0.000

Source: Author compilation

As seen from the regression weights in Table 5.32, there is a positive relationship between risk tolerance and: (i) physical activity, (ii) financial well-being, (iii) satisfaction with life, (iv) gender, and (v) income. The goodness-of-fit (CFI) statistics calculated the proportions of variance accounted for by the model as illustrated in Figure 5.10. The goodness-of-fit measures for the GLRTS and risk tolerance encompassed:

- Chi-square test statistics divided by the degrees of freedom (CMIN/DF) value of 4.866, which is smaller than 5, indicated a good fit (Mueller, 1996);
- CFI value of 0.858, which is indicative of an acceptable overall model fit (Mueller, 1996); and
- RMSEA value of 0.060 is smaller than 0.1 which indicate an acceptable fit (Blunch, 2008).

5.8 SYNOPSIS

Chapter 5 provided a lengthy discussion on the results and findings of the statistical analyses that this study applied to reach its empirical objectives. Section 5.2 provides an analysis on the reliability and validity of the scales used in this study, namely GLRTS to measure risk tolerance, IFDFW to measure financial well-being, SWLS to analyse investors' satisfaction with life, as well as the IPAQ to capture the investors' level of physical activity. All the scales were found to be reliable due to the relatively high Cronbach's alphas they respectively produced. Section 5.3 delved into the demographic information of the sample.

In a summary, the sample majorly consisted of investors who are 50+ year old White females who are married, earn between R100 001 and R200 000 per annum, hold an undergraduate degree and are based in the Gauteng province in South Africa. Section

5.4 provided the descriptive statistics of the sample and the results were presented per scale used in the study. The descriptive statistics were produced for the GLRTS, IFDFW scale, SLWS, and IPAQ were discussed based on frequencies, percentages, means, skewness, and kurtosis values. It was found that most investors experience an average level risk tolerance, moderate level financial well-being, moderate level life satisfaction, and low levels of physical activity. Section 5.5 covered the inferential statistics of the data. The inferential statistics applied include correlations, t-tests and ANOVAs; the following results were found:

- age has a positive relationship with risk tolerance;
- age has a positive relationship with each aspect of investor well-being, namely financial well-being, satisfaction with life, and physical activity;
- income has a positive relationship with risk tolerance, financial well-being, and satisfaction with life;
- income has a negative relationship with physical activity that is not statistically significant;
- education has a positive relationship with risk tolerance, financial well-being, and satisfaction with life;
- education has a negative relationship with physical activity that is not statistically significant;
- gender has an influence on risk tolerance, financial well-being, and satisfaction with life;
- gender does not have a statistically significant influence on physical activity;
- there are statistical differences between race and risk tolerance, race and financial well-being, race and satisfaction with life, race and physical activity;
- no statistical differences were found between marital status and risk tolerance;
- no statistical differences were found between marital status and physical activity;
- statistical differences were found between marital status and life satisfaction;
- statistical differences were found between marital status and financial well-being;
- no statistical differences were found between the place of origin and financial well-being;

- no statistical differences were found between the place of origin and satisfaction with life;
- statistical differences were found between the place of origin and risk tolerance; and
- statistical differences were found between place of origin and physical activity.

Further analysis relating to correlations between the scales showed that relationships between the following constructs exist:

- risk tolerance has statistically significant positive relationships with financial well-being, satisfaction with life, and physical activity; and
- financial well-being has a statistically significant positive relationship with life satisfaction.

Section 5.6 focussed on interpreting the EFA and CFA on risk tolerance and respective elements of investor well-being. The CFA produced acceptable KMO indexes and Bartlett's test of sphericity results for the following scales: IFDFW, SWLS, and IPAQ. IPAQ produced two components, while GLRTS, IFDFW and SWLS respectively produced singular components. The last section of Chapter 5, Section 5.7, focussed on presenting and interpreting the structural equation model (SEM) of risk tolerance and investor well-being. Basically, it was found that financial well-being, physical activity, gender, and income have statistically significant positive influences on risk tolerance. Only satisfaction with life was found to have a negative, non-significant influence on risk tolerance.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

Chapter 6 provides an overall synopsis of the study in terms of the theoretical and empirical objectives obtained. The main findings of the empirical objectives are discussed to accentuate the main contributions of the study. Moreover, Chapter 6 provides recommendations, which were derived from the study's findings. Limitations pertaining to the study are presented as well as suggestions for future research endeavours. Lastly, concluding remarks of the research journey are provided.

6.2 OVERVIEW OF STUDY

Chapter 1 provides an introduction and problem statement pertaining to this study's focus on investor well-being and risk tolerance. Moreover, three different sets of empirical objectives were provided, namely primary, theoretical and empirical objectives. An outline of the research design and methodology is provided with the focus on the literature review and empirical study to be implemented. Lastly, Chapter 1 provides a brief discussion on the contribution of the study, ethical considerations and chapter outline. The theoretical objectives presented in Chapter 1 were discussed and analysed in Chapter 2 and Chapter 3.

Chapter 2 introduced the concepts of risk (Section 2.2) and risk profiling (Section 2.3) prior to the concept of risk tolerance being discussed. The theoretical analysis on risk included the analysis of research prior to the 2000s as well as the literature on risk between 2000 and 2018. The concept of risk profiling was dealt with by first differentiating between terms used to define a risk profile. Thereafter, a definition and different compositions for risk profiles were presented and the importance of risk profiling was mentioned.

The first theoretical objective of providing a comprehensive theoretical analysis relating to the concept of risk tolerance was attained in Chapter 2. Section 2.4 focused on defining risk tolerance and reviewing existing literature on risk tolerance in terms of the following aspects: behaviour towards risk and decision making, risk tolerance measurements, explaining and predicting investor behaviour and factors related to risk tolerance.

Chapter 3 addressed the second theoretical objective by contextualising a theoretical framework for financial well-being (Section 3.2). Financial well-being was examined by first providing a definition thereof and subsequently analysing the objective, subjective and combination measures of financial well-being. Moreover, prior studies on financial well-being were analysed and discussed. The third theoretical objective of providing a discussion on theories and concepts relating to satisfaction with life (Section 3.3.) was also presented in Chapter 3.

Satisfaction with life was defined from different perspectives and analysis on the importance of life satisfaction judgements followed; thereafter, previous studies on life satisfaction were examined. The last theoretical objective was studied in Chapter 3, wherein the definition of physical activity (Section 3.4) and its related domains were investigated. Additionally, objective and subjective measures and previous studies on physical activity were presented. Lastly, prior studies on the aspects of investor well-being and risk tolerance were examined in Section 3.5.

Chapter 4 focused on highlighting the research design and methodology, which was implemented in gathering and analysing this study's empirical portion. Chapter 4 consists of the following sections: Section 4.2 is an overview of research paradigms and research designs; Section 4.3 entails details surrounding the origin of the primary data; and Section 4.4 solely focused on the details surrounding SDA applied in this study. Chapter 4 provided supporting arguments for using the SDA, sampling design, sample size and research instrument used. In summary, this study made use of a quantitative research design paired with a positivist research paradigm. The sample size of 1 065 was deemed sufficient for factor analysis and structural equation modelling. The respondents are investors from a reputable South African investment company. A self-structured questionnaire was used to gather the data.

Chapter 5 entails a detailed report on the quantitative analysis performed in this study. The chapter commenced with reliability and validity tests conducted on the financial well-being, satisfaction with life, physical activity and risk tolerance scales (Section 5.2). All the scales were deemed reliable and valid. The demographic information of the sample was presented in Section 5.3; moreover, the majority of the sample are white females, over the age of 50 years old, married, earn between R100 001 and R200 000 per annum,

hold an undergraduate degree and are located in Gauteng. Descriptive statistics were covered in Section 5.4 whereas inferential statistics were analysed in Section 5.5. The last two sections, namely Section 5.6 and Section 5.7 respectively entailed the CFA and SEM of the study.

6.3 FINDINGS OF THE STUDY

The primary objective of this study was to develop a SEM, which financial companies can use in order to profile their investors' risk tolerance by adding elements of financial well-being, satisfaction with life and physical activity to existing measures of risk tolerance. In order to achieve the primary objective, the following empirical objectives were formulated in Chapter 1 and achieved in Chapter 5.

6.3.1 Empirical objective 1: Report on the sample's risk tolerance and investor well-being levels

Through the application of descriptive statistics on the risk tolerance and investor well-being scales, this objective was attained in Section 5.4.1 and Section 5.4.2. The descriptive statistics on SCF suggested that investors take an average risk for average return. Similarly, the results from the GLRTS imply that most investors have an average risk tolerance level. On the other hand, it was found that most investors experience moderate levels of financial well-being, feel highly stressed about their personal finances and are overall dissatisfied with their financial situation. In terms of satisfaction with life, investors also experience a moderate level of life satisfaction. Many investors indicated that they slightly agree with being satisfied with their lives. The physical activity results inferred that overall investors have low levels of physical activity.

6.3.2 Empirical objective 2: Analyse the respective relationships between age, income, education, risk tolerance and investor well-being

Section 5.5.1 entailed the second empirical objective. Nonparametric Spearman correlation was implemented to test the relationship between age, income, education, risk tolerance and investor well-being. Age was found to have a positive relationship with risk tolerance, financial well-being, satisfaction with life and physical activity. Hence, it can be assumed that an increase in age may result in an increase in risk tolerance, financial well-

being, life satisfaction and physical activity. Income has positive relationships with risk tolerance, financial well-being and satisfaction with life, respectively. Moreover, it was determined that income has a non-significant, negative relationship with physical activity.

Education has positive relationships with risk tolerance, financial well-being and life satisfaction, respectively. As such, an increase in education level may result in an increase in risk tolerance, financial well-being and overall life satisfaction and *vice versa*. Additionally, education was determined to have a non-significant negative relationship with physical activity.

6.3.3 Empirical objective 3: Examine gender's influence on risk tolerance and investor well-being

In Section 5.5.2, an independent sample t-test was applied to examine whether gender has any influence on risk tolerance and investor well-being. Gender was found to have a statistically significant influence on risk tolerance, financial well-being and satisfaction with life. Nevertheless, the influence that gender respectively has on risk tolerance, financial well-being and life satisfaction was found to be practically insignificant.

6.3.4 Empirical objective 4: Explore the respective mean differences between race, marital status, place of origin, risk tolerance and investor well-being

One-way ANOVAs were implemented to determine if there are mean differences between race, marital status, place of origin, risk tolerance and investor well-being. The results suggest that there are statistically significant differences between race and risk tolerance; race and financial well-being; race and satisfaction with life; as well as race and physical activity. No statistically significant differences were found between marital status and risk tolerance, nor were any statistically significant differences found between marital status and physical activity.

Alternatively, statistically significant mean differences were found between marital status and satisfaction with life as well as marital status and financial well-being. No statistically significant differences were found between place of origin and financial well-being, nor place of origin and satisfaction with life. Statistically significant differences were found

between place of origin and risk tolerance as well as between place of origin and physical activity.

6.3.5 Empirical objective 5: Investigate the relationship between risk tolerance and investor well-being

Correlation analyses were conducted in Section 5.5.4 to investigate the potential relationships between risk tolerance and investor well-being. Statistically significant positive relationships were found between risk tolerance and each investor's well-being aspects. Additionally, a statistically significant relationship was found between financial well-being and satisfaction with life. No relationship was found between financial well-being and physical activity, nor was a relationship found between life satisfaction and physical activity.

6.3.6 Empirical objective 6: Construct a structural equation model which depicts the influence of investor well-being on risk tolerance

Section 5.7 focused on the construction of a SEM, which depicts the influence investor well-being has on risk tolerance. Overall, it was determined that financial well-being has a positive, statistically significant influence on risk tolerance. In other words, an increase in financial well-being may result in an increase in risk tolerance and *vice versa*. Satisfaction with life has a negative influence on risk tolerance; however, this result was found to be non-significant. As such, it can be inferred that a decrease in satisfaction with life may not necessarily result in an increase in risk tolerance and vice-versa.

Physical activity has a positive and statistically significant influence on risk tolerance. Therefore, it can be assumed that an increase in physical activity level may result in an increase in the level of risk being tolerated. In terms of demographics, it was found that respectively, gender and income have positive and statistically significant influences on risk tolerance.

6.4 CONTRIBUTION OF THE STUDY

The following results contribute to the existing South African literature on risk tolerance, financial well-being, satisfaction with life and physical activity:

- age has a positive relationship with risk tolerance, financial well-being, satisfaction with life and physical activity;
- income has a positive relationship with risk tolerance, financial well-being and satisfaction with life; however, income has a non-significant negative relationship with physical activity;
- education has a positive relationship with risk tolerance, financial well-being and satisfaction with life; however, income has a non-significant negative relationship with physical activity;
- gender has an influence on risk tolerance, financial well-being and satisfaction with life; yet gender has no significant influence on physical activity;
- there are statistical differences between race and risk tolerance, race and financial well-being, race and satisfaction with life, race and physical activity;
- statistical differences were found between marital status and life satisfaction, also between marital status and financial well-being;
- statistical differences were found between the place of origin and risk tolerance and between the place of origin and physical activity;
- risk tolerance has statistically significant positive relationships with financial well-being, satisfaction with life and physical activity; and
- financial well-being has a statistically significant positive relationship with life satisfaction.

The main contribution of the study lies in the achievement of empirical objective six: *Constructing a structural equation model, which depicts the influence of investor well-being on risk tolerance*. As mentioned in Chapter 5, Figure 5.10 proposes the components of investor well-being, gender and income that uniquely influence risk tolerance.

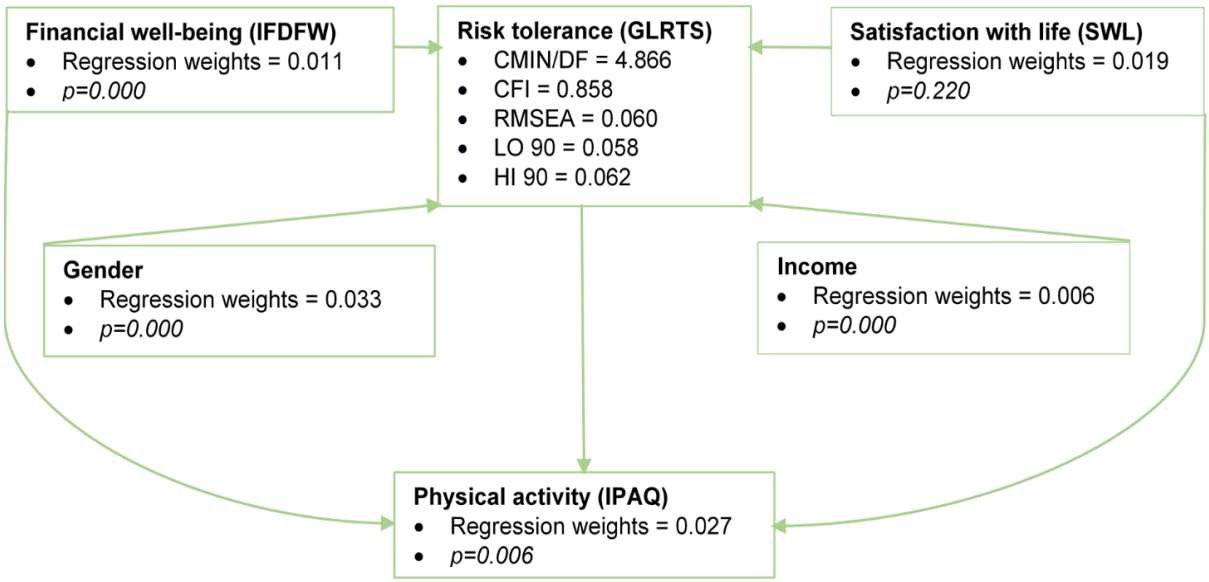

Figure 5.10: Structural model of investor well-being and risk tolerance

Source: Author compilation

During the research process of this study, complex processes, which involve theoretical and meticulous statistical analyses, have been implied to create a forecasting model to identify the influence of investor well-being on overall investor risk tolerance. The KMO indices and Bartlett's test of sphericity results suggested that the study's data are suitable for factor analysis. As such, factor analyses were implemented in Section 5.6 for GLRTS, IFDFW, SWLS and IPAQ.

Subsequently, the measurement model's validity was established through the analyses of the goodness-of-fit results for each of the four scales, namely GLRTS, IFDFW, SLWS and IPAQ. The structural model was specified in Section 5.7.4 and its validity was investigated in Section 5.7.5. The forecasting model conclusion and recommendations were briefly discussed in Section 5.7.6. Ultimately, it can be concluded that financial well-being, physical activity, gender and income have a positive influence on risk tolerance.

6.5 RECOMMENDATIONS, LIMITATIONS AND FUTURE RESEARCH

A few recommendations, limitations and suggestions for future research can be offered when considering this study's theoretical and empirical finding. The empirical analysis revealed that financial well-being, physical activity, income and gender have a positive influence on investors' risk tolerance. Therefore, it is suggested that investment companies consider adding financial well-being and physical activity scales as well as income and gender to the risk profiles of their investors. These aforementioned factors have a positive influence on risk tolerance and may help investment companies to more accurately risk profile their investors.

It is acknowledged that there were a number of limitations within this research study – this may serve as an opportunity for future researchers to explore other aspects of topics relating to risk tolerance. A quantitative research approach was implemented to model risk tolerance and investor well-being; however, a qualitative or mixed methods approach can be recommended. As such, researchers will be able to determine the reasons investors find their financial well-being, satisfaction with life and physical activity influences their risk tolerance level.

Additionally, this study made use of secondary data; it is recommended that a similar study be conducted with the use of primary data and compare the results to that of this study. On the other hand, this study may be conducted by other investment or financial institutions in South Africa to compare whether the results are similar or differ from this study's results. Future research may focus solely on the influence financial well-being and life satisfaction have on risk tolerance. Moreover, the research may be gender-specific and only focus on female investors, rather than male investors. Unique aspects other than financial well-being, life satisfaction, or physical activity can be investigated on whether they have a practical influence on risk tolerance.

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APPENDIX 4.1: QUESTIONNAIRE

SECTION A (Demographics)

Age	16 – 34	1
	35 – 49	2
	50+	3

Gender	Male	1
	Female	2

Race	African	1
	White	2
	Coloured	3
	Asian	4
	Other	5

Other:_____

Marital status	Single – staying on my own	1
	Single – staying with my parents	2
	Not married but staying together	3
	Married	4
	No longer married	5

What is your annual income?	R100 000 or less	1	R 600 001-700 000	7
	R 100 001-200 000	2	R700 001 or more	8
	R 200 001-300 000	3		
	R 300 001-400 000	4		
	R 400 001-500 000	5		
	R 500 001-600 000	6		

Place of origin	Gauteng	1
	KwaZulu-Natal	2
	Western Cape	3
	Northern Cape	4
	Eastern Cape	5
	Free State	6
	Mpumalanga	7
	Limpopo	8
	North West	9
	Live outside RSA	10

Other:_____

Highest level of education	Secondary school education	1
	High school education	2
	Diploma	3
	Undergraduate degree	4
	Honours degree	5
	Master's degree	6
	Doctoral degree	7

Other:_____

SECTION B (Financial well-being, Risk Tolerance & SCF)

Circle or check the responses that are most appropriate for your situation.

Who is responsible for making financial decisions?	1	You on your own
	2	You with your partner
	3	Your partner
	4	Somebody else

1. What do you feel is the level of your financial stress today?	1	Overwhelming stress
	2	
	3	
	4	
	5	High stress
	6	
	7	Low stress
	8	
	9	
	10	No stress at all
2. How satisfied you are with your present financial situation? The "1" represents complete dissatisfaction. The "10" represents complete satisfaction. The more dissatisfied you are, the lower the number you should circle. The more satisfied you are, the higher the number you should circle.	1	Dissatisfied
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	Satisfied

3. How do you feel about your current financial situation?	1	Feel overwhelmed
	2	
	3	
	4	Sometimes feel worried
	5	
	6	
	7	Not worried
	8	
	9	
	10	Feel comfortable
4. How often do you worry about being able to meet normal monthly living expenses?	1	Worry all the time
	2	
	3	
	4	Sometimes worry
	5	
	6	
	7	Rarely worry
	8	
	9	
	10	Never worry
5. How confident are you that you could find the money to pay for a financial emergency that costs about R10 000?	1	No confidence
	2	
	3	
	4	Little confidence
	5	
	6	
	7	Some confidence
	8	
	9	
	10	High confidence
6. How often does this happen to you? You want to go out to eat, go to a movie or do something else and don't go because you can't afford to?	1	All the time
	2	
	3	
	4	Sometimes
	5	
	6	
	7	Rarely
	8	
	9	
	10	Never

7. How frequently do you find yourself just getting by financially and living paycheck to paycheck?	1	All the time
	2	
	3	
	4	Sometimes
	5	
	6	
	7	Rarely
	8	
	9	
	10	Never
8. How stressed do you feel about your personal finances in general?	1	Overwhelming stress
	2	
	3	
	4	High stress
	5	
	6	
	7	Low stress
	8	
	9	
	10	No stress at all

Which of the following statements comes closest to the amount of financial risk that you and your spouse/partner are willing to take when making an investment?	1	Take substantial financial risks expecting to earn substantial returns
	2	Take above average financial risks expecting to earn above average returns
	3	Take average financial risks expecting to earn average returns
	4	Not willing to take any financial risks

1. In general, how would your best friend describe you as a risk taker	1	A real gambler
	2	Willing to take risks after completing adequate research
	3	Cautious
	4	A real risk avoider
2. You are on a TV game show and can choose one of the following. Which would you take?	1	A cash prize of R1,000
	2	A 50% chance at winning R5,000
	3	A 25% chance at winning R10,000
	4	A 5% chance at winning R100,000
3. You have just finished saving for a "once-in-a-lifetime" vacation. Three weeks before you plan to leave, you lose your job. You would:	1	Cancel the vacation
	2	Take a much more modest vacation
	3	Go as scheduled, reasoning that you need the time to prepare for a job search
	4	Extend your vacation, because this might be your last chance to go first class

4. In terms of experience, how comfortable are you investing in shares?	1	Not at all comfortable
	2	Somewhat comfortable
	3	Very comfortable
5. If you unexpectedly received R20,000 to invest, what would you do?	1	Deposit it in a bank account, money market account or an insured Certificate of Deposit
	2	Invest it in safe, high-quality bonds or bond mutual funds
	3	Invest it in shares
6. When you think of the word "risk," which of the following words comes to mind first?	1	Loss
	2	Uncertainty
	3	Opportunity
	4	Thrill
7. Some experts are predicting the value of assets such as gold, jewels, collectibles and real estate (hard assets) will rise, while bond prices may fall. However, experts tend to agree that government bonds are relatively safe. Most of your investment assets are now in high interest government bonds. What would you do?	1	Hold the bonds
	2	Sell the bonds, put half the proceeds into money market accounts, and the other half into hard assets
	3	Sell the bonds and put the total proceeds into hard assets
	4	Sell the bonds, put all the money into hard assets, and borrow additional money to buy more
8. Given the best and worst case returns of the four investment choices below, which would you prefer?	1	A R200 gain best case; R0 gain/loss worst case.
	2	A R800 gain best case; R200 loss worst case
	3	A R2,600 gain best case; R800 loss worst case
	4	A R4,800 gain best case; R2,400 loss worst case
9. In addition to whatever you own, you have been given R1,000. You are now asked to choose between:	1	A sure gain of R500
	2	A 50% chance to gain R1,000 and a 50% chance to gain nothing
10. In addition to whatever you own, you have been given R2,000. You are now asked to choose between:	1	A sure loss of R500
	2	A 50% chance to lose R1,000 and a 50% chance to lose nothing
11. A relative left you an inheritance of R100,000, stipulating in the will that you invest all the money in one of the following choices. Which one would you select?	1	A savings account or money market mutual fund
	2	A mutual fund that owns shares and bonds
	3	A portfolio of 15 common shares
	4	Commodities like gold, silver and oil

12. If you had to invest R20,000, which of the following investment choices would you find most appealing?	1	Invest 60% in low-risk investments, 30% in medium-risk investments and 10% in high-risk investments
	2	Invest 30% in low-risk investments, 40% in medium-risk investments and 30% in high-risk investments
	3	Invest 10% in low-risk investments, 40% in medium-risk investments and 50% in high-risk investments
13. Your trusted friend and neighbour, an experienced geologist, is putting together a group of investors to fund an exploratory gold mining venture. The venture could pay back 50 to 100 times the investment if successful. If the mine is a bust, the entire investment is worthless. Your friend estimates the chance of success is only 20%. If you had the money, how much would you invest?	1	Nothing
	2	One month's salary
	3	Three months' salary
	4	Six months' salary

SECTION C (Behavioural finance)

Indicate to what extent the following statements drive your financial decisions:

Behavioural finance biases	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
I base my investment decision on the past performance of investments	1	2	3	4	5	6
My superior investment knowledge drives my decisions	1	2	3	4	5	6
I rely only on a single piece of information (past or current information) to make investment decisions	1	2	3	4	5	6
My investment decisions are based on future market predictions	1	2	3	4	5	6
My investment decisions are based on the most recent information	1	2	3	4	5	6
I would rather take the risk to keep my money in current	1	2	3	4	5	6

investments (with negative returns) to avoid taking the loss						
My previously incorrect investment decisions which led to a financial loss drives my investment decisions	1	2	3	4	5	6
I receive a good return on my investment and will rather keep money in my current investment as to earn higher future returns elsewhere	1	2	3	4	5	6
I exercise self-control when making investment decisions	1	2	3	4	5	6

SECTION D (Subjective well-being)

		Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
1	In most ways, my life is close to ideal	1	2	3	4	5	6
2	The conditions of my life are excellent	1	2	3	4	5	6
3	I am satisfied with my life	1	2	3	4	5	6
4	So far I have gotten the important things I want in my life	1	2	3	4	5	6
5	If I could live my life over I would change almost nothing	1	2	3	4	5	6

SECTION E (Personality measures)

		Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
1	I often feel inferior to others	1	2	3	4	5	6
2	When I'm under a great deal of stress, sometimes I feel like I'm going to pieces	1	2	3	4	5	6
3	I often feel tense and jittery	1	2	3	4	5	6

4	Sometimes I feel completely worthless	1	2	3	4	5	6
5	Too often, when things go wrong, I get discouraged and feel like giving up	1	2	3	4	5	6
6	I really enjoy talking to people	1	2	3	4	5	6
7	I often feel as if I'm bursting with energy	1	2	3	4	5	6
8	I am a cheerful, high-spirited person	1	2	3	4	5	6
9	I am a very active person	1	2	3	4	5	6
10	I am intrigued by the patterns I find in art and nature	1	2	3	4	5	6
11	I often try new and foreign foods	1	2	3	4	5	6
12	I have little interest in speculating on the nature if the universe or the human condition	1	2	3	4	5	6
13	I have a lot of intellectual curiosity	1	2	3	4	5	6
14	I often enjoy playing with theories or abstract ideas	1	2	3	4	5	6
15	I often get into arguments with my family and co-workers	1	2	3	4	5	6
16	Some people think I'm selfish and egotistical	1	2	3	4	5	6
17	Some people think of me as cold and calculating	1	2	3	4	5	6
18	I generally try to be thoughtful and considerate	1	2	3	4	5	6
19	I keep my belongings neat and clean	1	2	3	4	5	6
20	I'm pretty good about pacing myself so as to get things done on time	1	2	3	4	5	6
21	I waste a lot of time before settling down to work	1	2	3	4	5	6
22	Sometimes I'm not as dependable or reliable as I should be	1	2	3	4	5	6

23	I never seem to be able to get organized	1	2	3	4	5	6
24	I am not willing to take risk when choosing a stock or investment	1	2	3	4	5	6
25	I prefer a low risk/high return investment with a steady performance over an investment that offers higher risk/higher return	1	2	3	4	5	6
26	I prefer to remain with an investment strategy that has known problems rather than take the risk trying a new investment strategy that has unknown problems, even if the new investment strategy has great returns	1	2	3	4	5	6
27	I view risk in investment as a situation to be avoided at all cost	1	2	3	4	5	6
Short term investment intentions							
1	I intend to invest in an Individual Retirement Account every year	1	2	3	4	5	6
2	I intend to put at least half of my investment money into the stock market	1	2	3	4	5	6
3	I intend to engage in portfolio management activities at least twice per week	1	2	3	4	5	6
4	I intend to perform my own investment research instead of using outside advice	1	2	3	4	5	6
5	I intend to compare my portfolio performance to that of professional managers	1	2	3	4	5	6
Long term investment decisions							
1	I intend to save at least 10% of my gross earnings for investing/saving/retirement purposes	1	2	3	4	5	6
2	I intend to have a portfolio that focuses on multiple asset classes (i.e., shares, bonds, cash, real estate, etc.)	1	2	3	4	5	6

3	I intend to take an investments course	1	2	3	4	5	6
4	I intend to manage my portfolio for maximum gross return rather than tax and cost efficiency	1	2	3	4	5	6
5	I intend to invest some money in long-term assets where my money will be tied up and inaccessible for years	1	2	3	4	5	6

SECTION F (Physical activities)

The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No → ***Skip to PART 2: TRANSPORTATION***

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing upstairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ **days per week**

☐ No vigorous job-related physical activity → ***Skip to question 4***

3. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **days per week**

☐ No moderate job-related physical activity → ***Skip to question 6***

5. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

6. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

_____ **days per week**

☐ No job-related walking → ***Skip to PART 2: TRANSPORTATION***

7. How much time did you usually spend on one of those days **walking** as part of your work?

_____ **hours per day**
_____ **minutes per day**

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ **days per week**

☐ No traveling in a motor vehicle → ***Skip to question 10***

9. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ **hours per day**
_____ **minutes per day**

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No bicycling from place to place → ***Skip to question 12***

11. How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ **hours per day**
_____ **minutes per day**

12. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No walking from place to place → ***Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY***

13. How much time did you usually spend on one of those days **walking** from place to place?

_____ **hours per day**
_____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

_____ **days per week**

☐ No vigorous activity in garden or yard → ***Skip to question 16***

15. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **days per week**

☐ No moderate activity in garden or yard → ***Skip to question 18***

17. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ **days per week**

☐ No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **hours per day**
_____ **minutes per day**

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **days per week**

☐ No walking in leisure time → ***Skip to question 22***

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ **hours per day**
_____ **minutes per day**

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **days per week**

☐ No vigorous activity in leisure time → ***Skip to question 24***

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ **hours per day**
_____ **minutes per day**

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ **days per week**

☐ No moderate activity in leisure time → ***Skip to PART 5: TIME SPENT SITTING***

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?
_____ **hours per day**
_____ **minutes per day**

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ **hours per day**

_____ **minutes per day**

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ **hours per day**
_____ **minutes per day**

THANK YOU!

APPENDIX 5.1: CODEBOOK

1. SURVEY OF CONSUMER FINANCES (SCF)

ABBREVIATION	*QUESTION*
SCF	Which of the following statements comes closest to the amount of financial risk that you and your spouse/partner are willing to take when making an investment?

2. GRABLE AND LYTTON 13-ITEM RISK TOLERANCE SCALE (GLRTS)

ABBREVIATION	*QUESTION(S)*
G1	In general, how would your best friend describe you as a risk taker?
G2	You are on a TV game show and can choose one of the following. Which would you take?
G3	You have just finished saving for an "once-in-a-lifetime" vacation. Three weeks before you plan to leave, you lose your job. You would:
G4	In terms of experience, how comfortable are you investing in shares?
G5	If you unexpectedly received R20,000 to invest, what would you do?
G6	When you think of the word "risk," which of the following words comes to mind first?
G7	Some experts are predicting the value of assets such as gold, jewels, collectibles and real estate (hard assets) will rise, while bond prices may fall. However, experts tend to agree that government bonds are relatively safe. Most of your investment assets are now in high interest government bonds. What would you do?
G8	Given the best and worst case returns of the four investment choices below, which would you prefer?
G9	In addition to whatever you own, you have been given R1,000. You are now asked to choose between:
G10	In addition to whatever you own, you have been given R2,000. You are now asked to choose between:
G11	A relative left you an inheritance of R100,000, stipulating in the will that you invest all the money in one of the following choices. Which one would you select?
G12	If you had to invest R20,000, which of the following investment choices would you find most appealing?
G13	Your trusted friend and neighbour, an experienced geologist, is putting together a group of investors to fund an exploratory gold mining venture. The venture could pay back 50 to 100 times the investment if successful. If the mine is a bust,

	the entire investment is worthless. Your friend estimates the chance of success is only 20%. If you had the money, how much would you invest?

3. INCHARGE FINANCIAL DISTRESS/FINANCIAL WELL-BEING SCALE (IFDFW)

ABBREVIATION	*QUESTION*
FWB1	What do you feel is the level of your financial stress today?
FWB2	How satisfied are you with your present financial situation?
FWB3	How do you feel about your current financial situation?
FWB4	How often do you worry about being able to meet normal monthly living expenses?
FWB5	How confident are you that you could find the money to pay for a financial emergency that costs about R10 000?
FWB6	How often does this happen to you: You want to go out to eat, go to a movie or do something else and don't go because you can't afford to?
FWB7	How frequently do you find yourself just getting by financially and living paycheck to paycheck?
FWB8	How stressed do you feel about your personal finances in general?

4. SATISFACTION WITH LIFE SCALE (SWLS)

ABBREVIATION	*QUESTION*
SWL1	In most ways, my life is close to ideal
SWL2	The conditions of my life are excellent
SWL3	I am satisfied with my life
SWL4	So far I have gotten the important things I want in my life
SWL5	If I could live my life over I would change almost nothing

5. INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (IPAQ)

ABBREVIATION	*QUESTION*
J	**Job?**
JVDC	**Job Vigorous last 7 Days? Categorised**
JVCM	Job Vigorous Combined Minutes
JMDC	**Job Moderate last 7 Days? Categorised**
JMCM	Job Moderate Combined Minutes
JWDC	**Job Walk last 7 Days? Categorised**
JWCM	Job Walk Combined Minutes
TWDC	**Transport Walk last 7 Days? Categorised**

TWCM	Transport Walking Combined Minutes
HVDC	**Housework Vigorous last 7 Days? Categorised**
HVCM	Housework Vigorous Combined Minutes
HMDOC	**Housework Moderate last 7 days Outside? Categorised**
HMCMO	Housework Moderate Combined Minutes Outside
HMDIC	**Housework Moderate last 7 days Inside? Categorised**
HMCMI	Housework Moderate Combined Minutes Inside
RWDC	**Recreation Walk last 7 Days? Categorised**
RWCM	Recreation Walk Combined Minutes
RVDC	**Recreation Vigorous last 7 Days? Categorised**
RVCM	Recreation Vigorous Combined Minutes
RMDC	**Recreation Moderate last 7 Days? Categorised**
RMCM	Recreation Moderate Combined Minutes

Only the **Job and **categorised** variables were used in the study.*