

**COLLECTIVE FUTURES AND CLIMATE CHANGE: THE RELATIONSHIP BETWEEN
STUDENTS' VIEWS OF THE FUTURE AND THEIR PRO-ENVIRONMENTAL BEHAVIOUR**

by

Eric van Niekerk

A mini-dissertation submitted in partial fulfilment of the requirements for the degree

MA Research Psychology

in the Department of Psychology at the

UNIVERSITY OF PRETORIA

FACULTY OF HUMANITIES

SUPERVISOR: Professor C. Wagner

September 2018

DECLARATION

Full name: **Eric van Niekerk**

Student Number: **10436147**

Degree/Qualification: **MA Research Psychology**

Title of thesis/dissertation/mini-dissertation:

Collective futures and climate change: The relationship between students' views of the future and their pro-environmental behaviour

I, **Eric van Niekerk**, declare that this mini-dissertation, which I hereby submit for the degree MA Research Psychology at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution. This mini-dissertation is my own work and, where applicable, every effort has been made to correctly reference the work of other authors.

Signed this _____ day of _____ 2018

Signature: _____

ETHICS STATEMENT

The author, whose name appears on the title page of this mini-dissertation, has obtained, for the research described in this work, the applicable research ethics approval. The author declares that he has observed the ethical standards required in terms of the University of Pretoria's Code of Ethics for Researcher, and the Policy Guidelines for Responsible Research.

ACKNOWLEDGEMENTS

The completion of this mini-dissertation would not have been possible without the guidance and support of several people. Throughout this journey I received direction and motivation from many of my peers, family members and educators. I would like to use this opportunity to specifically express my heartfelt gratitude to the following individuals:

My supervisor, Professor Claire Wagner.

For your patience and understanding, as well as your insightful and valuable feedback. This study would not have been possible without you. Thank you for putting up with me.

My parents, Eric and Karen-marié van Niekerk.

For your constant motivation. I appreciate all the direction and assistance.

My copy editor, Donné-Louise Grobler

For your editing, but also your positive attitude and constant motivation. I appreciate your effort.

With special thanks to my peers who have gone through the same journey and assisted with a variety of matters, from emotional to statistical support:

Bronwyn Pieters

Michael Mattern

Marita Lübbe

ABSTRACT

Climate change has become a pressing issue for humanity. If action is not taken to curb the effects of this phenomenon, climate change will have a significantly negative impact on human lives and livelihood. The repercussions of unchecked climate change will be most harshly felt in developing countries like South Africa. The main aim of this study was to determine whether, and then the extent to which, individuals' attitudes towards future society can affect their present-day pro-environmental behaviour. This study was conducted within the collective futures framework, using a survey design and a research instrument developed by an international team of researchers. The research question posed by this study was: What is the relationship between students at a South African higher education institution's views of future society and their pro-environmental behaviour? Data was collected from 254 students at a higher education institution in South Africa and the results were analysed in order to determine respondents' views of the future and their pro-environmental behaviours. Further analysis was then conducted to determine the relationship between these variables. A weak positive relationship between the variables view of the future and pro-environmental behaviour was found. This indicates that as students' views of the future becomes more positive, their pro-environmental behavioural tendencies may increase. These findings assist in creating an understanding of the factors that induce climate change-causing behaviours. This research can ultimately inform the psychological sciences on how to best address the human behaviours that lead to climate change. Further study is recommended to investigate additional factors that influence pro-environmental behaviour.

Keywords: climate change; collective futures; view of future; pro-environmental behaviour

TABLE OF CONTENTS

Abstract.....iv

CHAPTER 1: INTRODUCTION.....1

1.1 Background.....1

1.2 Justification aim and objectives.....2

1.3 Research question.....4

1.4 Theoretical framework.....5

1.5 Description of research methodology.....5

1.6 Chapter outline.....6

1.7 Chapter summary.....6

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL CONSIDERATIONS.....7

2.1 Defining climate change.....7

2.2 Early history of climate change research.....8

2.3 Current research on climate change.....9

2.4 Psychology and climate change.....11

2.5 Climate change and South Africa.....14

2.6 Theoretical framework.....16

2.6.1 Psychological dimensions of climate change.....16

2.6.2 The theory of planned behaviour.....17

2.6.3 Alternatives to the theoretical standpoints.....18

2.6.4 The Collective Futures Framework.....19

2.7 Chapter summary.....20

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY.....22

3.1 Research aims and objectives.....22

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

3.2 Research design.....	23
3.3 Population sampling.....	23
3.4 Research instrument.....	24
3.4.1 Validity and reliability.....	26
3.5 Data collection.....	27
3.6 Data analysis.....	28
3.7 Ethical considerations.....	29
3.8 Chapter summary.....	30
CHAPTER 4: RESULTS.....	31
4.1 Demographic data.....	31
4.1.1 Age.....	31
4.1.2 Gender distribution.....	32
4.1.3 Field of study.....	33
4.1.4 Household income.....	34
4.1.5 Geographic location.....	35
4.2 Beliefs and attitudes towards climate change.....	36
4.2.1 General belief concerning climate change.....	36
4.2.2 Reality and causes of climate change.....	37
4.2.3 Attitude towards being viewed as environmentally friendly.....	40
4.3 Views on the future of society.....	43
4.3.1 Characteristics of future society.....	43
4.3.2 Values of future society.....	44
4.3.3 Aspects of future society.....	45
4.3.4 Overall views towards future society.....	45

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

4.4 Pro-environmental behaviour.....	48
4.4.1 Personal pro-environmental behaviour.....	49
4.4.2 Societal pro-environmental behaviour.....	50
4.4.3 Overall tendency to behave in a pro-environmental fashion.....	51
4.5 Relationship between respondents' view of the future and their pro-environmental behaviour.....	53
4.5.1 Assumptions for correlation.....	53
4.5.2 Relationship between respondents' view of the future and their personal pro-environmental behaviour.....	54
4.5.3 Relationship between respondents' view of the future and their societal pro-environmental behaviour.....	56
4.5.4 Relationship between respondents' view of the future and their overall pro-environmental behaviour.....	57
4.6 Chapter summary.....	59
CHAPTER 5: DISCUSSION, RECOMMENDATIONS AND CONCLUSION.....	60
5.1 Discussion of results.....	60
5.1.1 Demographic results.....	60
5.1.2 Beliefs and attitudes towards climate change.....	62
5.1.3 Views of future society.....	64
5.1.4 Pro-environmental behaviour.....	65
5.1.5 Relationship between respondents' view of the future and their pro-environmental behaviour.....	66
5.2 Limitations.....	69
5.2.1 Limitations regarding data collection instrument.....	69
5.2.2 Limitations regarding sample size and selection.....	70
5.2.3 Limitations regarding prior research.....	70

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

5.3 Recommendations.....71

5.3.1 Expanding the scope of data collection.....71

5.3.2 Creating impactful changes.....71

5.4 Conclusion.....72

6. References.....73

LIST OF TABLES

Table 4.1: Age.....31

Table 4.2: Gender distribution.....32

Table 4.3: Field of study.....33

Table 4.4: Household income.....34

Table 4.5: General belief concerning anthropogenic climate change.....37

Table 4.6: Reality and causes of climate change.....38

Table 4.7: Attitude towards being viewed as environmentally friendly.....41

Table 4.8: Characteristics of future society.....44

Table 4.9: Values of future society.....44

Table 4.10: Aspects of future society.....45

Table 4.11: Overall views of future society.....46

Table 4.12: Kolmogorov-Smirnov test for overall views of future society.....46

Table 4.13: Personal pro-environmental behaviour.....49

Table 4.14: Kolmogorov-Smirnov test for personal pro-environmental behaviour.....49

Table 4.15: Societal pro-environmental behaviour.....50

Table 4.16: Kolmogorov-Smirnov test for societal pro-environmental behaviour.....50

Table 4.17: Overall tendency to behave in a pro-environmental fashion.....51

Table 4.18: Kolmogorov-Smirnov test for overall pro-environmental behaviour.....51

Table 4.19: Relationship between respondents' views of the future and their personal pro-environmental behaviour.....55

Table 4.20: Relationship between respondents' views of the future and their societal pro-environmental behaviour.....56

Table 4.21: Relationship between respondents' views of the future and their overall pro-environmental behaviour.....58

LIST OF FIGURES

Figure 2.1: Psychological and human dimensions of climate change.....16

Figure 2.2: The Collective Futures Framework20

Figure 4.1: Age.....32

Figure 4.2: Valid percentage of income groups.....35

Figure 4.3: Geographic location.....35

Figure 4.4: Reality and causes of climate change.....39

Figure 4.5: Attitude towards being viewed as environmentally friendly.....42

Figure 4.6: Normal Q-Q plot of overall views towards future society.....47

Figure 4.7: Histogram of overall views towards future society.....47

Figure 4.8: Normal Q-Q plot of overall pro-environmental behaviour.....52

Figure 4.9: Histogram of overall pro-environmental behaviour.....52

Figure 4.10: Scatter-plot of personal pro-environmental behaviour and view of future.....55

Figure 4.11: Scatter-plot of societal pro-environmental behaviour and view of future.....57

Figure 4.12: Scatter-plot of overall pro-environmental behaviour and view of future.....58

CHAPTER 1: INTRODUCTION

Chapter 1 serves as an introduction to the contents of this mini-dissertation and related study. In this chapter, the background, research question, theoretical standpoint, justification, aims and objectives, methodology, and chapter outline are discussed.

1.1 Background

The turn of the 20th century heralded a trend of planet-wide increases in average global temperatures (North et al., 2007). This phenomenon has been commonly termed as “global warming” and is a direct result of climate change (Whitmarsh, 2008). Although, historically, there has been much debate over the subject of climate change, the scientific community has reached an undeniable conclusion that climate change is real, and is adversely affecting the natural environment (Cook et al., 2016; Intergovernmental Panel on Climate Change, 2014; National Aeronautics and Space Administration [NASA], 2018; Powell, 2015). Furthermore, the role of human beings in causing or exaggerating the effects of climate change cannot be overlooked. A large scientific consensus shows that the human population has had an alarming effect on the global climate and is the major contributor towards the continuing climate change phenomenon (Powell, 2015). This phenomenon of human contributed climate change is referred to as anthropogenic climate change.

The issue of climate change is an undeniably human one. Not only are the direct consequences of human behaviours causing severe damage to ecosystems, habitats and the natural environment in general, but we are also adversely affecting ourselves. The negative effects of climate change are definitely not limited to only the natural environment. Rather, the human population will soon experience the major negative impacts of climate change, if they have not already begun to do so (Intergovernmental Panel on Climate Change, 2014). This could result in loss of land, income, and even life, for hundreds of millions of people worldwide. Increases in the spread of dangerous diseases; the frequency and severity of natural disasters; and natural resource shortages, are merely some of the negative impacts that humanity will face in the near future - directly due to the effects of climate change (Intergovernmental Panel on Climate Change, 2014; United Nations Children's Fund [UNICEF], 2011).

As climate change is such a human issue, it is pertinent to study this issue from a subject field such as psychology (Swim et al., 2011a). The science of psychology allows for the study and understanding of human attitudes, behaviours, emotions, and many other aspects of human

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

thought and feeling. These types of insights can be extraordinarily valuable in understanding the human causes of climate change. Ultimately, getting to the human root of the issue may well be a step in solving the global crisis of climate change (Swim et al., 2011a).

Continued trends in current human behaviour will see further, irreversible climate change damage dealt to the planet (Intergovernmental Panel on Climate Change, 2014; Powell, 2015). It is thus important to try to come to an understanding of these behaviours. In order to create this understanding, this study focuses on the motivation behind human behaviour: human attitudes. Ultimately, this study will investigate individuals' attitudes related to the future of society, as well as their tendencies to behave in a pro-environmental fashion. The study aims to determine whether an individual's attitude towards the future may have an effect on his/her pro-environmental behaviour.

Once information on both attitudes and behaviour is collected, the relationships between the two variables can be explored. By determining if attitudes towards the future of society have an impact on pro-environmental behaviour, certain motivations behind acts that negatively impact the environment can be determined. Ultimately this can assist in informing the understanding of the human behaviours that influence climate change and can assist in the combatting of this detrimental phenomenon.

1.2 Justification, aim and objectives

Research by the United Nations Development Programme (UNDP) suggests that climate change is one of the greatest threats to human development (Carvajal, 2008). The negative effects of climate change will likely be most severely felt on the African continent (Kenya National Human Development Report, 2013). The impacts of climate change will also most certainly have negative effects for southern Africa's developing countries (Zimbabwe Human Development Report, 2017). Climate change will have profound negative impacts on aspects such as food and water availability, disease control, extreme weather events, and eco-tourism, to name but a few (Intergovernmental Panel on Climate Change, 2014). These effects will all ultimately impact human livelihoods and well-being and will be most harshly experienced by the youth, particularly so in South Africa (UNICEF, 2011). It is thus pertinent to explore the realities of climate change from a South African perspective. Furthermore, human behaviour has been shown to be a large contributing factor to continued global climate change (Powell, 2015). The psychological sciences have a definite role to play in the understanding of these climate change-causing behaviours (Swim et al., 2011a). Ultimately, human beings need to act to curb the climate change

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

phenomenon before irreparable harm is done to the natural environment, and by extension, humanity as a whole (Intergovernmental Panel on Climate Change, 2014). This study seeks to contribute to the broader understanding of human behaviour in relation to the environment in order to assist in curbing the increase and effects of climate change. This will be done by exploring the research question, as laid out in section 1.3 of this study. The ultimate intention of this study is to determine whether a relationship exists between students at a higher education institution's attitudes towards a future society and their inclination to behave in a pro-environmental fashion.

Previous research has indicated that a complicated relationship exists between attitudes and behaviours in the global climate change context, and psychological studies are well suited in creating an understanding of this relationship (Swim et al., 2011a). Research within the collective futures framework by Bain, Hornsey, Bongiorno, Kashima, and Crimston (2013) indicates that attitudes towards the future may have an impact on present day behaviour. Ultimately, a future-oriented outlook may have a positive impact on present day pro-environmental behaviours (Joireman & Liu, 2014).

Historically, South African research on climate change has often been conducted from an environmental or developmental viewpoint, with little focus on human behavioural structures or adaptations (Ziervogel et al., 2014). Studies have often focused on direct impacts on industries such as agriculture or sanitation. Though, even with a limited amount of research into the psychology of climate change in South Africa, several studies have contributed significantly to this topic. In terms of the South African research literature on human behaviours and climate change, it has been previously reported that 25% of South Africans were not familiar with the concept of climate change (Seagar, 2009). Furthermore, even when South Africans do recognise the concept of climate change, many believe that economic and social issues are of larger concern than environmental ones (Struwig, 2010). Research amongst South African student populations shows that they are aware of the realities of climate change, yet take very little pro-environmental behavioural action to prevent further climate change (Benoit, 2015; Mugambiwa & Dzomonda, 2018). It is thus important to investigate what factors influence students' decisions on when to engage pro-environmentally. Some progress has been made in this regard, with local research highlighting the plethora of aspects that can affect pro-environmental behaviour within South African communities (Bryan, Deressa, Gbetibouo, & Ringler, 2009). Aspects such as education, awareness and levels of income are all seen contributing to the likelihood of behaving in a pro-environmental fashion. However, much further research is required to create an encompassing understanding of pro-environmental behavioural motivations within South Africa. Aspects such as

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

views on future society could also contribute to pro-environmental behaviours, and have not been studied within a South African context. This study will aim to further examine aspects of South African society which could impact on pro-environmental behaviour, thereby expanding the available local literature on the topic.

The results of this study could thus inform how the pressing issue of global, anthropogenic climate change could be addressed in the South African context. This is due to the fact that this study will explore to what extent negative or positive attitudes towards the future relate to present day pro-environmental behaviour, thereby assisting psychologists and researchers in bolstering the body of research on how best to curb behaviours which contribute to climate change. As this study will examine climate change-causing behaviours within a South African population, the results will assist in expanding the current local research base. This will aid in understanding why and how a segment of the South African population (particularly students enrolled at a higher education institution) act in accordance to climate change.

The main aim of this study is to determine whether, and then the extent to which, individuals' attitudes towards future society can affect their present-day pro-environmental behaviour. In order to fulfil this aim, three main objectives are presented, to:

- Measure student attitudes towards future society
- Measure the likelihood of students to act in a pro-environmental fashion
- Examine the relationship between students' attitudes towards future society and their present-day behaviour.

1.3 Research question

This study seeks to determine whether an individual's attitude towards the future of society can have an effect on his/her tendency to act in a pro-environmental fashion, as well as the magnitude of this effect. In order to achieve this, the study poses the research question as: What is the relationship between students at a South African higher education institution's views of future society and their pro-environmental behaviour?

1.4 Theoretical framework

The framework of this study relies on the assumption that human attitudes have an effect on related behaviours. The specific framework used in this study is termed the Collective Futures Framework. This framework is used to examine how individuals' specific views of the future can influence their actions in the present day (Bain et al., 2013). This framework has been shown to be effective in showing links in the attitude-behaviour cycle, specifically in environmental studies such as this one (Bain et al., 2013). Specifics of this framework, as well as further motivations for its usage are covered in more depth in Chapter 2.

1.5 Description of research methodology

The research design employed in this study was the survey research design. The survey design, otherwise known as a questionnaire design, is a widely used research methodology in the behavioural sciences (Gravetter & Forzano, 2012). This design has been successfully employed in similar studies focusing on the Collective Futures Framework in the past (Bain, et al., 2013). More information on the research design used in this study can be found in Chapter 3.

Due to the survey being part of a larger, international study, some parameters on the methodology had been previously set. The population from which a sample had to be selected for the South African part of the study was duly limited to South African students at higher education institutions. Convenience sampling was employed to create a sample selection from the population. Further information on the related international study, as well as sampling methods, can be found in Chapter 3.

Once the survey tool had been completed by all respondents, data were collected and analysed in the Statistical Package for the Social Sciences (SPSS). Demographic data was analysed to create a profile of the sample. This was followed by an analysis of the individual respondents' beliefs on the phenomenon of climate change, as well as their attitudes pertaining to the future. The respondents' current and expected future pro-environmental behaviour trends were then analysed.

Finally, a set of correlations were drawn from the relationships between individuals' attitudes towards the future, and their willingness and tendency to engage in pro-environmental behaviours. The data analysis, as well as all pertaining information, can be found in Chapter 4 of this study.

1.6 Chapter outline

This section is a brief overview of the contents of the chapters of this study.

Chapter 1 – Introduction: This chapter serves as the context to the study. Here, the background and motivations behind the study are discussed, as well as the desired aims and objectives. The research question is clearly outlined, and a short discussion on the major theoretical and methodological considerations is included. It is then concluded by a chapter outline.

Chapter 2 – Literature review: This chapter details the historical journey of climate change research, as well as the importance of studying the topic from a psychological standpoint. This chapter also provides more detail on the theoretical considerations taken by this study.

Chapter 3 – Research methodology: This chapter is dedicated to the discussion of the employed research design. It details the research instruments and tools used, the process employed to collect data, and the eventual analysis of the data. Ethical considerations taken into account during the research stage are also detailed here.

Chapter 4 – Results: This chapter presents the final results of this research study as determined by the data-analysis process.

Chapter 5 – Discussion, recommendations and conclusion: This chapter discussed the results found in the study. Considerations to the limitations of this study are also discussed, proceeded by possible recommendations for future research into this topic. A conclusion to the study is provided at the end of this chapter.

1.7 Chapter summary

Chapter 1 was structured to serve as an introduction to the study. Chapter 2 that follows will give an overview of considered literature, as well as a detailed discussion on the theoretical point of departure used.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL CONSIDERATIONS

Chapter 2 serves to provide a contextual background to this study through the process of reviewing past research. This chapter will also provide information on the theoretical considerations implemented. In terms of contextual background and literature, this chapter provides a definition and history of climate change, as is relevant to this study. This chapter also establishes the link between climate change and the science of psychology by exploring the link between climate change and human beings. Relevant local research is included in this section. Following is the theoretical considerations applicable to the study. Here the psychological connections to climate change are more deeply explored, and relevant behavioural theories discussed. This section concludes with a discussion on the chosen theoretical point of departure of this study.

2.1 Defining climate change

The turn of the 21st century has seen an increase in awareness of the potentially devastating effects that human beings are having on the natural environment. At the forefront of these issues is the phenomenon of global warming, or more accurately, climate change. In order to understand the extent of the issues, it is important to create an encompassing definition of the terms “climate change” and “global warming”.

The first use of the term “global warming” in scientific study was by Wallace Broecker in a paper titled “Climatic Change: Are We on the Brink of a Pronounced Global Warming?” published in 1975. The term global warming has since been used to describe the trend of increasing global temperatures and related concerns. For the purpose of this study, the term global warming will be avoided. Global warming has the misleading connotation that rising global temperatures are the only points of concern, while in reality, the actual issues run much deeper (Whitmarsh, 2008). The term climate change will instead be used.

Climate change is defined in this study as the phenomenon of unnatural, global changes in weather patterns over extended periods of time. This includes factors such as temperature, precipitation, and other weather-related concerns. This definition is adapted from Reuss (2015).

2.2 Early history of climate change research

The origin of climate change research dates back to 1681, when a French physicist, Edme Mariotte, first documented his discovery of the greenhouse effect (Le Treut et al., 2007). Mariotte found that the energy from solar rays, in the form of light and heat, was unique in how it could pass through transparent materials, like glass. He observed that this energy could easily pass through most given transparent materials and be transferred to other sources. Though, of notable importance was the further observation that once transferred, this energy could not escape the transparent material nearly as easily. This phenomenon will then eventually lead to the trapping of energy within a cover of transparent material, creating an increase in temperature (Le Treut et al., 2007). Whilst Mariotte probably did not realise the implications that this theory may have on global climate studies, the discovery was instrumental in leading the way forward for future climate researchers like Svante Arrhenius.

In 1896, Svante Arrhenius conducted one of the first studies that explicitly focused on the phenomenon of climate change (Weart, 2008). Specifically, Arrhenius investigated the effect of atmospheric carbon dioxide on global temperatures. Arrhenius' research helped facilitate a cognitive leap in science – the understanding that gasses in the atmosphere have physical effects on the particles that pass through them. Arrhenius' discoveries lead to the understanding that atmospheric gasses, specifically carbon dioxide, could trap solar energy inside the earth's atmosphere. Linking back to Edme Mariotte's 1681 discovery of the greenhouse effect, it was found that an increase in carbon dioxide levels caused more solar energy to be trapped, and ultimately increased the temperature of a system (Weart, 2008). This discovery was one of the first to highlight the impact that increased carbon emissions could potentially have on the planet's temperature.

It was not until the late 1900s that carbon emissions began to significantly increase. A 90% increase in the production of carbon emissions has been recorded since 1970 (Global Greenhouse Gas Emissions Data, 2018) indicating the rapid onset of carbon dioxide build-up in the atmosphere. It is not long after this that researchers begin to record increases in surface temperature.

As studies into global surface temperatures began, researchers such as Hansen and Lebedeff (1988) began to showcase a worrying trend. By using meteorological data, Hansen and Lebedeff showed notable increases in surface temperatures over a 100-year period. A large spike in temperatures was noted from about 1965, leading to the highest recorded average surface temperature at the time in 1981.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Despite the rich body of research, building from Edme Mariotte's 17th century discovery of the greenhouse effect, to Hansen and Lebedeff's depiction of the effect in action, much public debate centred on the topic. Terms like climate change began to be used as political levers around the globe, casting doubt on the severity and even the actual happenings of climate change. This led to the wide-spread belief that climate change was not a topic of concern, if it was even occurring at all (Garud, Gehman, & Karunakaran, 2014; Koteyko, Jaspal, & Nerlich, 2013).

The next section of this chapter will discuss the current trends in climate change research, and whether climate change is a cause for concern.

2.3 Current research on climate change

Climate change has often been a hotly debated topic. Arguments over the actual validity of research on climate change have been a strong theme in news rooms and political debates globally. This argument reached a particularly heated point in 2009 following a research scandal termed "climate-gate" (Garud et al., 2014). During the climate-gate scandal, it was speculated that the University of East Anglia's Climate Research Unit had manipulated research results. It appeared that the results exaggerated the effects of climate change. Following this scandal, the denial of climate change gained footing (Koteyko et al., 2013). This increased denial was especially prominent in online communities, spaces where individuals interact publicly and en masse via the internet (Koteyko et al., 2013). Here, climate change deniers stated that climate change was more of a politically motivated myth, and less of an actual pressing reality.

Yet, despite popular denial of climate change, research by Powell (2015) shows that of nearly 14000 peer-reviewed studies conducted on the topic of climate change, only 24 of them reject that the phenomenon of human-caused climate change is actively occurring. The United States of America's National Aeronautics and Space Association (NASA) also reflects this sentiment, stating that 97% of climate scientists agree that humans are accelerating global climate changes (NASA, 2018).

It is apparent that the scientific community is overwhelmingly in agreement that human-caused, or anthropogenic, climate change is indeed occurring (NASA, 2018; Powell, 2015; Reuss, 2015). This brings with it the concerns about what the impact of climate change may be.

Terms like global warming do little to encompass the range of complications that unchecked climate change may bring in its wake. While having warmer overall weather may seem like a boon to some, the actual implications are far worse. Current trends in climate change will

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

soon have severe negative impacts on our planet – both in an environmental and human sense (Swim et al., 2011b).

Changes in global climate will directly affect animal, plant and human life. Harley et al. (2006) show the devastating negative impact that climate change can have on marine life, specifically in coastal regions. Warming sea temperatures wreak havoc on essential eco-systemic functions within oceans. This disrupts feeding, migratory, and mating patterns for thousands of fish and animal species. The study highlights the destructive knock-back effect on communities of millions of human beings who rely on these natural coastal and marine resources for daily survival. Furthermore, impacts are not limited to communities who rely on naturally-occurring resources. Large industries such as agriculture stand to suffer massive losses due to climate change. A study on Chinese water sources used in agriculture showed the possibility of a strong negative impact due to water scarcity caused by climate change (Piao et al., 2010). This could result in soaring food prices on basic grains, or a shortage of these products. These effects could potentially have dramatically negative outcomes for human populations, especially those nearer the poverty line. Scarcity is also not the only water-related issue. Arnell and Gosling (2014) found that, if the global trend in climate change continues, river floods will be a far greater risk by 2050 in comparison to today. This could potentially impact the lives of billions of people around the globe. The combination of these impacts is likely to cause food shortages, economic distress and increases in the spread of deadly diseases (Intergovernmental Panel on Climate Change, 2014). In addition to flooding and drought, climate change will result in more extreme weather conditions, with destructive storms and weather occurrences like hurricanes appearing more frequently. This plethora of harsh and negative impacts on the environment, animal kingdom, and human population, highlights the severity of the issues of climate change.

Of further concern is the fact that recent recordings of global surface temperatures have moved beyond any data points (spanning back millions of years) previously seen (Global Greenhouse Gas Emissions Data, 2018; Swim et al., 2011b). This makes modelling future outcomes a challenge for climate researchers, as there are no comparable periods in history to reference (Swim et al., 2011b). We may thus only discover the full impacts of climate change many years after they have already occurred, rendering damage irreversible. This highlights the importance of minimalizing the impact of climate change as soon as possible.

Of specific concern to a local South African population would be the fact that climate change will have its most negative effects on the most impoverished people and communities around the globe (Hallegatte et al., 2015). With a large unemployed population and a struggling

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

economy, 16.6% of South Africans live under the poverty line in 2018 (World factbook: South Africa, 2018). Many of these people depend on naturally occurring resources, and grassroots industries like agriculture, for daily survival. These will be the aspects most heavily impacted by climate change and will have a devastating effect on this already-struggling section of our, and other, populations (Hallegatte et al., 2015). More information on the specific concerns facing South Africa is discussed later in this chapter.

The above makes up for only a small portion of the large body of research that indicates that current trends in climate change will soon have drastically negative effects on human populations globally. This is if these effects have not already begun to occur. As the scientific consensus shows that human beings are a large contributor to climate change and its acceleration, it is important to study the human aspect of this phenomenon. This is where study from a psychological perspective becomes immensely valuable. The next section will thus explore how research in climate change can be aided by the addition of psychological study.

2.4 Psychology and climate change

Anthropogenic climate change has been shown to be a cause for concern by a consensus of scientists (Powell, 2015). As human beings are seen as the major contributors to global climate change, it is important to study the phenomenon from a human perspective. This section explores the contributions that the field of psychology can make in climate change research, as well as the contributions previously made.

The American Psychological Association's (APA) special issue report on global climate change highlights the benefits that psychological study can have on climate change research. The Swim et al. (2011a) report titled "Psychology's Contributions to Understanding and Addressing Global Climate Change" states that the field of psychology is uniquely situated to investigate how and why humans propagate climate change-causing behaviours. The field of psychology can also explore how humans interpret and respond to climate change, both in an individual and broader social context. This can ultimately cultivate an understanding of what causes human beings to act in ways that cause climate change, and how they will react when global climates change.

It is important to research the underlying causes of human-driven climate change, as knowledge of the causes may lead to knowledge of a solution. Also, knowing how human beings are likely to react in terms of a climate change crisis may assist in preventing further turmoil.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

The field of psychology is also situated within an influential position from where it has affected public policy on pertinent issues, and is known to draw from a wide variety of other disciplines in order to substantiate findings (Swim et al., 2011a). This means that psychological findings can be used in official governmental or global processes geared towards mitigation and prevention of climate change. As a science, psychology is also uniquely capable of exploring the root cause of climate change – human behaviour. The field of psychology is thus situated as a potentially powerful contributor to the scientific research into climate change. Research into this topic has been the goal of many psychological studies in the past.

With the rising trend of awareness on issues relating to climate change (Dunlap, 2008; Powell, 2015) the turn of the 21st century saw many psychologists exploring the topic. During this time, the general public also began to exhibit greater understanding of the negative impacts human beings are having on the environment (Dunlap, 2008). According to Dunlap (2008), humanity has begun shifting from an environmentally exploitative world view, to what he terms the “new environmental paradigm”. This paradigm acknowledges factors such as limited natural resources, and the dangers of ecological decay. Yet, even with this growing awareness, climate change is still accelerating at an unsustainable rate. Researchers such as Pitcher and Katsikopoulos (2008) use the new environmental paradigm to study human actions and behaviours in relation to pro-environmental behaviours.

Pitcher and Katsikopoulos (2008) created an experiment where individuals were presented with a choice between using fossil fuels or an environmentally friendly alternative energy to power their homes. The majority of respondents chose the more environmentally friendly fuel alternative in the study, yet very few respondents had taken this action in their real lives. According to the study, the choice of an environmentally friendly energy alternative does actually exist, and is readily available for consumption. So then why, in a laboratory experiment, do individuals choose the pro-environmental alternative, but in reality, use the fossil fuel energy supplier? Pitcher and Katsikopoulos believe that this is due to a phenomenon known as “defaults”. A default is the outcome that arises automatically when an individual fails to make a choice. With electricity being supplied to households already, it is inconvenient to make a change to alternative sources. It is not that individuals choose to use the fossil fuel energy; rather it is that they fail to choose the pro-environmental alternative. This is in line with behavioural research on ease of action, as conducted by Fujii (2006). Fujii had shown that the ease of implementation of a specific behaviour is a significant indicator of whether that behaviour will be carried out by an individual, or not.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

This apparent unwillingness to choose a greener way of living is not limited to individuals within their private lives, though. In research done by Hargreaves (2012) it was noted that large corporate structures are also resistant to pro-environmental changes. The resistance was prevalent even when the changes would create a better public opinion of the company, as well as if the changes would be cost-effective. It was found that concerns of safety and overall productivity outweighed any concerns for the environment. Although, interestingly, follow-up research done by the researchers showed that certain employees, being made aware of the impact their company had on the environment through the Hargreaves' study, started displaying pro-environmental behaviours around the office (Hargreaves, 2012). The surprising impact that Hargreaves' study had on individuals after unintentionally raising awareness about environmental impacts is also observed in other studies, as shown by Rioux and Pasquier (2012).

In a longitudinal study by Rioux and Pasquier (2012), it was shown that, similar to Hargreaves' (2012) surprising results, only a small amount of awareness needed to be raised to encourage more pro-environmental behaviours. In Rioux and Pasquier's study, a singular awareness campaign showed a 16-fold increase in pro-environmental behaviours over a period of one year. Four years later, though, this impact had dropped to a mere three-fold increase. This study stated that the drop-off was due to the variable of self-enhancement and the variable of openness-to-change. Another interesting factor to arise from Rioux and Pasquier's study was that the respondent group, who had never considered recycling behaviour before, showed the highest increase in pro-environmental behaviours when introduced to the concept. This is recorded in contrast to the respondent group which had been familiar with the concept in the past, who ultimately showed the smallest increase in pro-environmental behaviours.

A similar trend is echoed in research by Breunig, Murtell, Russell, and Howard (2013). In this study, students were divided into focus groups, and through discussion, two themes emerged from the research. Firstly, a belief that positive environmental change could occur was expressed. Though, this belief was heavily underscored by the second theme: the idea that achieving any real, lasting change is extraordinarily difficult. When viewing these results in combination with Hargreaves' (2012) and Rioux and Pasquier's (2012) findings, it is shown that an awareness of environmental issues and an educated perspective on how to enact positive change can motivate people to act on climate change. Yet, making these changes goes against ingrained social norms, and tends to require effort to enact - effort that many people are often not willing to put in. Dunlap (2008) echoes these sentiments. By demonstrating an awareness of environmental issues, yet

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

not acting in ways to curb the trend, it is apparent that human-caused climate change will remain an issue.

Ultimately, these studies point to the fact that human beings are not engaged enough with climate change-causing actions to avoid the predicted negative effects foreseen by the scientific community. It is thus of importance for researchers to delve deeper into the topic of why people are not acting to curb climate change, and what can then be done to foster positive environmental interactions. This is shown to be not only a global concern, but also one that will bear a direct negative impact on the South African population. Research specific to South Africa and climate change will be discussed in the next section of this chapter.

2.5 Climate change and South Africa

The following section includes South African research into climate change, as well as a discussion on the possible impacts of climate change on local structures and populations.

In terms of South African research, there is much literature available on the environmental effects of climate change (Ziervogel et al., 2014). Significant research has been done into agricultural and water-source impacts caused by climate events such as global warming. Though, historically, there has been a definite lack of research on human elements effecting climate change in South Africa, such as adaptive behaviours (Ziervogel et al., 2014). The South African body of research on climate change related behaviour may thus be limited, but it is still relevant. Research by Seager (2009) found that South Africans show less concern for the environment than the populations in other, similar, developing countries like Brazil, Nigeria and India. Seager also found that over a quarter of South Africans have never heard of climate change. Struwig's (2010) study indicates that a prevalent attitude in South Africa is that economic imperatives should be placed above the concerns of the environment. Contradictory to this, though, is the fact that an older study stated that a large majority of South Africans support and approve of ecological movements within the country (Inglehart, 1995). The lack of research, and the contradictory findings, is concerning as South Africa stands to lose a lot of potential if the environment was to be damaged. As previously noted, human populations in developing countries and those who live underneath, if not close to, the poverty line will be most affected (Hallegatte, et al., 2015). This means that large portions of the South African population are left in a very vulnerable state. Shortages of natural resources and a decaying environment will bear a heavy effect on major economic structures, like agriculture and tourism (Arnell & Gosling, 2014; Ayotte, 2009). Though, if the environment is preserved, South Africa may stand to gain. South Africa can use resources in the environment to its own advantage by creating forms of sustainable eco-tourism (Ayotte,

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

2009). Whilst using the natural environment to promote tourism in a sustainable way, eco-tourism can become a large source of income for the country if managed correctly. Of further concern is that the South African youth population will be one of the most hard-hit sections of the local population (UNICEF, 2011). The youth population tends to be more vulnerable to negative changes in aspects such as disease control, food availability, educational systems and future employment opportunities. These are all aspects of society that suffer under the impacts of climate change (UNICEF, 2011). It is of utmost importance to begin acting towards curbing climate change in order to protect the South African population, especially its most vulnerable sections (the youth and the impoverished), from the potential devastating effects of the phenomenon.

Research on student populations within South Africa have displayed some worrying trends in attitude and behaviour. There seems to be a definite awareness of the negative issues of climate change, but very little action taken to prevent further exaggeration of the phenomenon (Benoit, 2015; Mugambiwa & Dzomonda, 2018). This is specifically noticeable when investigating personal behaviours of individuals in relation to combatting climate change and its effects (Benoit, 2015; Mugambiwa & Dzomonda, 2018).

A possible reason for environmental concerns not being given large amounts of attention within the South African context is the fact that the country is faced with more immediate concerns. Crime, unemployment, and lack of necessary medical support means that most South Africans have more pressing concerns on their minds than the state of the environment (Anderson, Romani, Phillips, Wentzel, & Tlabela, 2007). Though, this does not automatically imply that South Africans should not be cognisant of the environmental impacts their actions can have. Climate changes could lead to drought, fires and other natural disasters (Intergovernmental Panel on Climate Change, 2014), which could harm the agricultural and tourism industries of the country. This will, in turn, lead to more poverty and unemployment, possibly giving rise to higher levels of crime. The natural environment and its resources make for a large factor in ensuring the prosperity of South Africa and its people. It is thus important to understand the impact that the human population is having on the environment, and ultimately how to minimise the negative aspects of this impact.

The above sections in Chapter 2 have established a background for climate change and pro-environmental behaviour research. Following from this is a discussion on the theoretical considerations relevant to this study.

2.6 Theoretical framework

From the discussed literature, it is known that climate change-focused research has been underway since 1896. Over more than a century of research, climate change scientists have used many different theoretical points of departure to study different aspects of the climate change phenomenon. Due to the psychological nature of this study, this theoretical section will focus specifically on the theories dealing with the human influences on climate change. The goal of this section is to create a holistic understanding of the relevant theories involved in studying human behaviour as related to human actions in an environmental context.

2.6.1 Psychological dimensions of climate change

The literature has pointed at the fact that the science of psychology has a large role to play in climate change research. A theoretical framework from which to assess the psychological impact and implication of climate change has been developed by the APA and is shown in Figure 2.1 (reproduced from Swim et al., 2011a).

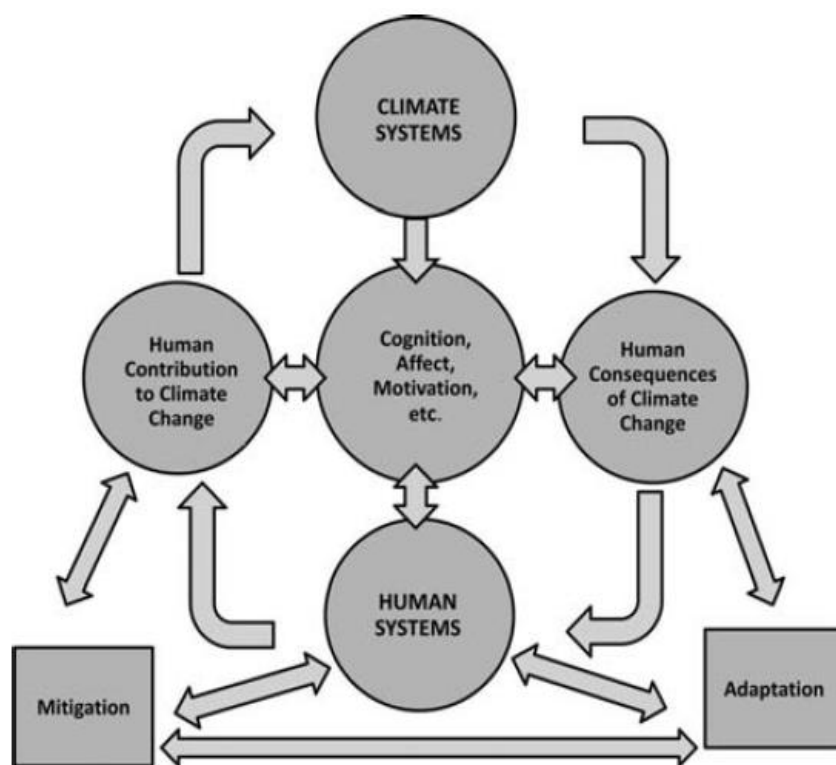


Figure 2.1 Psychological and human dimensions of climate change (Swim et al., 2011a)

This framework implies that human beings do not experience climate change directly. Rather, human systems influence the global climate through an arrangement of variables, such as mitigation and adaptation, as well as innate human traits such as cognition, affect and motivation

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

(Swim et al., 2011b). These human impacts on the global climate are then communicated back to people through media and educational outlets, adding a barrier between action and outcome (Swim et al., 2011b).

Another factor highlighted by this framework is that several different dimensions of human behaviour can impact the global climate (Swim et al., 2011b). Physical actions (such as the burning of fossil fuels) can have an influence on climate change. Furthermore, these physical behaviours are motivated by social factors (such as the willingness to use renewable energy sources). A changing climate may also impact human beings directly, altering their physical environments, causing social, and even biological, changes. These aspects can then be influential on physical behaviours, once again impacting on the cycle (Swim et al., 2011b).

This complex and encompassing view of how human beings and the changing climate relate to each other gives a more in-depth understanding of why current trends in behaviour (like awareness, but no action) are observed. Though, whilst the framework proposed by Swim et al. may appear to be a solid theoretical point of departure into research on human impacts on climate change it is not the only way to approach this topic.

2.6.2 The theory of planned behaviour

Another theoretical perspective taken to extrapolate possible reasons for the trend in behaviour of awareness, but no action, is discussed specifically in Breunig et al. (2013). A common theme that emerged from student focus groups in the Breunig et al. study was the concept of attitudes. An attitude is, according to Bohner and Dickel (2011, p. 392), “an evaluation of an object of thought”. This could refer to any form of idea that a person holds in their mind, and their opinion of this idea. Breunig et al. (2013) found that attitudes towards subjects have profound influences on actions taken in related contexts.

Previously, the studying of attitudes has helped to predict behaviours towards the environment. Ripper, Kyle, Sutton, Yoon, and Tobin (2013) used the Theory of Planned Behaviour (TPB) as a theoretical point of departure to attempt to predict behaviour by measuring attitudes and subjective norms. Rioux and Pasquier (2012) have also successfully made use of this theory in their study on the impacts of environmental actions. Though, an individuals’ attitude is not all that affects their behaviour.

Even though individual attitudes have a large impact on behaviour, the power of social norms should not be disregarded when using a theory such as the TPB. Social norms, whether they are injunctive (behaviours perceived to be socially acceptable) or descriptive (actual lived

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

behaviours regardless of social stigma), can have a significant influence on how an individual will act and feel about his or her environment (Smith et al., 2012). This is can be further impacted by an individual's perceived behavioural control – the level of autonomy an individual believes he/she has over the act of performing a behaviour. The combination of attitudes and social norms is a powerful indicator in predicting the behaviours of individuals and communities (Smith et al., 2012).

Although there is much support for the study of attitude and its use in predicting behaviour, not all academics agree on its virtues. Levine and Strube (2012) are of the opinion that, through the use of the new environmental paradigm and the TPB, only explicit attitudes can be measured. This leaves out any implicit attitudes that may be present. According to these authors, explicit attitudes do not fully explain behaviour; rather, implicit attitudes have a far greater impact on human behavioural patterns.

Another criticism directed at the TPB comes from Broomell, Budescu, and Por (2015) who expressed concern over TPB using behavioural intentions as precursor to actions. The researchers explain that TPB assumes that there are no barriers to the physical performance of an action. Broomell et al. (2015) look at the difference between the intention to act, and then the actual, physical impact-orientated actions taken to fulfil this intention. Ultimately, Broomell et al. recommend that when taking action to communicate the effects of climate change to the general public, it is important to link behaviours to their specific effects on the environment. This could assist the general public in visualising the effect that their actions are or could be having on the environment. It is thus important to consider other alternatives to TPB in future climate studies. The following section gives a brief overview of alternative standpoints.

2.6.3 Alternative theoretical standpoints

With the criticism from Broomell et al. (2015), as well as Levine and Strube (2012), it is apparent that TPB is not necessarily the most impactful framework available to discern how an individual will behave. Recently, alternatives to attitude research in terms of climate change and environmental behaviour studies have begun to emerge. One of these alternatives is the future time-orientation approach and has been successfully linked to certain pro-environmental behaviours (Demarque, Apostolidis, & Joule, 2013). Future time-orientation refers to an individual's level of foresight for the consequences of their behaviour (Demarque et al., 2013). As behaviour concerning the environment often does not have short-term consequences, only those individuals who can foresee the long-term consequences of their behaviour will actually consider the effect they may have on the environment.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

According to Joireman and Liu (2014), taking cognisance of the fact that the consequences to peoples' actions are often only visible after a significant delay in time, and often occur in a different space as the initial behaviour, may assist researchers in explaining certain human actions. This is especially valuable insight when dealing with the topic of climate change. There is almost no directly visible link between peoples' present actions and their impact on the environment. These changes to the environment are slow and subtle and cannot be attributed to any one specific individual's or group's behaviour. This concept is further problematized by the fact that behaviours which are immediately rewarded with perceived benefits may eventually lead to environmental degradation (Joireman & Liu, 2014). These effects may not even be felt by the generation of individuals who are participating in these behaviours and will only be experienced by future generations. This makes the issues which pertain to climate change-inducing behaviours difficult to discuss in terms of theoretical standpoints such as the TPB. Rather, Joireman and Liu suggest that a better standpoint to take when researching behaviours which consequence is only visible after an extended period of time is one of future time-orientation. This is due to its ability to take into account the delay between action and consequence. Thus, in order to incorporate aspects of the future time-orientation approach into climate change and environmental behaviour research, Bain et al. (2013) developed the Collective Futures Framework.

2.6.4 The Collective Futures Framework

To incorporate the future-orientated approach into climate change research, a theoretical framework, titled the Collective Futures Framework, can be used (Bain et al., 2013). This Collective Futures Framework approach is used to examine how individuals' views of the future may influence their present behaviour (Bain et al., 2013). The Collective Futures Framework is based on the idea that people's actions in the present can be influenced by their view of what the future may hold (Bain et al., 2013). If views of the future can influence present behaviour, it stands to reason that it is important to understand how people view the future. Once an understanding of these views can be created, it may be easier to understand why and how people act. This can be specifically significant in determining, and influencing, attitudes related to large social issues, such as climate change or drug laws (Bain et al., 2013).

This framework has successfully been used to show links between attitudes about the future and their relating, present-day behaviour in several different contexts (Bain et al., 2013). This framework is well suited to studying environmental concerns (Bain et al., 2013). Figure 2.2 presents a graphical depiction of the Collective Futures Framework (figure reproduced from Bain et al., 2013). Here it is indicated that changes in a social context, like changes in group or

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

governmental power, can impact people's beliefs of the future. In terms of this framework, future beliefs are broken down into how an individual views positive or negative changes in broader society, as well as changes in individual behaviours determined by ingrained traits and values. Ultimately, the model predicts that an individual's future beliefs will bear an impact on present-day behaviours.

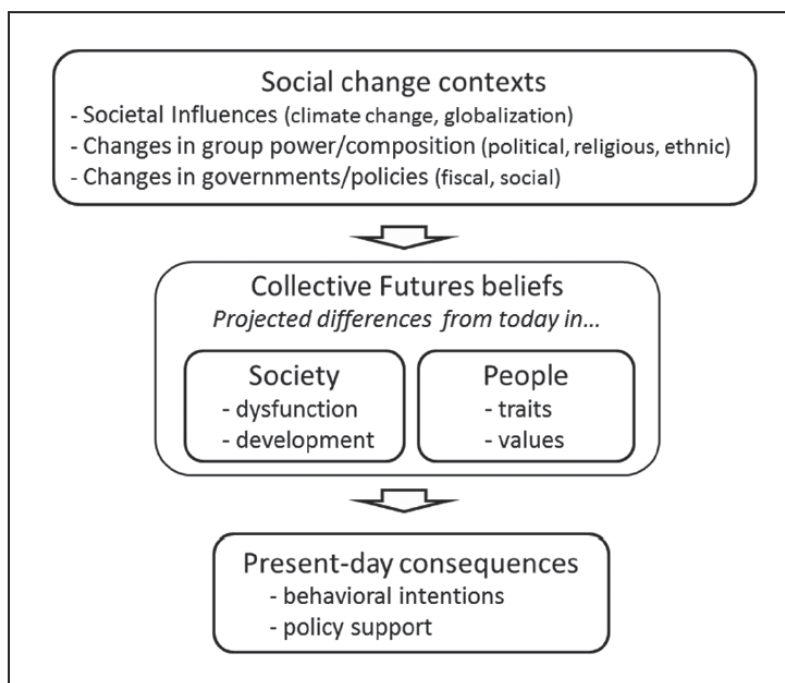


Figure 2.2 The Collective Futures Framework (Bain et al., 2013)

The Collective Futures Framework will be the theoretical viewpoint used to facilitate this study. As the research question pertains to exploring how future views affect present behaviour, the collective futures approach matches the outcomes of the study directly.

2.7 Chapter summary

After centuries of study, the scientific community is largely in consensus that human-induced climate change is occurring. This climate change will have, and is already having, a severely negative impact on the environment. Ultimately, these negative environmental effects will have drastic repercussions on human lives. These effects will be felt on a global scale, yet South Africa is in a particularly vulnerable state. Whilst it is possible that too much damage has already been done to the environment for these repercussions to be avoided or wholly mitigated, studying and understanding climate change can assist in ensuring that no further damage is done. Given that human beings are responsible for the major contributing factors of climate change, it

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

would be appropriate to study human behaviours to foster an understanding of the human factors contributing to this phenomenon.

For the purposes of this study - to investigate the human behavioural factors that contribute to climate change - the use of the Collective Futures Framework is most appropriate. This is due to the fact that it takes into consideration the criticisms levelled against the traditional theoretical points of departure, like TPB, when studying this topic. This framework overcomes several limitations by incorporating the ideas of a future-time orientation approach into the traditional studies of human behaviour. By using this approach, previously unexplained human behaviours relating to climate change can be understood.

In order to create a study to research the impacts that future-orientated views have on present-day behaviours, a specific research methodology has been selected. Chapter 3 will serve to provide a description of this methodology. This will be achieved by providing an overview of the research aims and objectives, design, data collection and analysis, and ethical considerations of this study.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

In order to study how individuals' views of the future affect their pro-environmental behaviour, this study uses a section of the dataset collected for a larger, international study titled "Collective Futures and Climate Change". This study was headed by Dr Paul Bain of the University of Queensland, Australia, and involved collecting data from more than 25 different countries. Professor Claire Wagner from the Department of Psychology at the University of Pretoria coordinated the collection of the South African data and was assisted in the data collection process by the researcher of this study. Permission was gained from Dr Bain to use the data collected in South Africa for further analysis and study.

As the data initially formed part of the above-mentioned larger study, many parts of the design and methodology were informed by the parameters of the global "Collective Futures" project. That process will be outlined in the sections that follow, along with other aspects of the design and methodology employed.

Chapter 3 begins with a contextualisation of the main goals of the study. The chapter then goes on to discuss the research design employed in this study: the survey design. The benefits of using a survey design, the survey instrument, and data collection procedures will also be discussed. As the study analyses survey data, a quantitative approach was selected to produce the most value from available data. Information on this approach, along with the discussion on statistical methods used to analyse the data, will follow. A discussion on the ethical implications of the design and methodology will then conclude this chapter.

3.1 Research aims and objectives

The main aim of this study is to determine whether, and then the extent to which, individuals' attitudes towards future society can affect their present-day pro-environmental behaviour. In order to fulfil this aim, three main objectives are presented, to:

- Measure student attitudes towards society in the year 2050
- Measure the likelihood of students to act in a pro-environmental fashion
- Examine the relationship between students' attitudes towards future society and their present day behaviour.

To achieve these objectives, the research question was posed: What is the relationship between students at a South African higher education institution's views of future society and their pro-environmental behaviour? This chapter will therefore explore how the researcher acted on collecting and analysing data in order to achieve this.

3.2 Research design

The research design employed in this study is the survey research design. The survey design, otherwise known as a questionnaire design, is a widely used research methodology in the behavioural sciences (Gravetter & Forzano, 2012; Groves, Fowler, Couper, Lepkowski, Singer, & Tourangeau, 2009) and has been successfully employed in similar environmentally-focused studies in the past (Bain et al., 2013; Fuji, 2006). The survey research design is defined by Gravetter and Forzano (2012) as “A research study that uses a survey to obtain a description of a particular group of individuals” (p. 205).

Ultimately, survey designs are employed to build a representative picture of certain aspects of a chosen population. These aspects can include characteristics, attitudes, behaviours, or a number of other measurable human attributes (Gravetter & Forzano, 2012; Saris & Gallhofer, 2014). In the case of this study, a survey design was used to explore several factors relating to respondents' views on society, and their pro-environmental behaviour. To achieve the aforementioned goal of building an accurate picture of a population, a suitable questionnaire must be appropriately created. Clear and well-constructed questions need to be formulated in an appropriate manner as to solicit the most accurate and usable responses (Gravetter & Forzano, 2012; Saris & Gallhofer, 2014). To this point, the Collective Futures questionnaire, designed by Dr Bain and the Collective Futures team, was used to collect the data for this study.

3.3 Population sampling

In order to create the most accurate picture of a population, researchers must collect data on as many members of the population as possible. However, as it is generally not possible or feasible to approach every single member of a population, a sample portion must be selected from the population (Etikan, Musa, & Alkassim, 2016).

Due to this study forming part of the larger Collective Futures project, sample parameters had already been partially defined. The international study co-ordinators set the following requirements for the sample: a selection of at least 200 students currently enrolled in a university course. The sample also had to cover as many different disciplines as possible and had to strive for an as equal as possible gender distribution.

The sampling method chosen for this study was convenience sampling. Convenience sampling is a non-random, or non-probability sampling method, that uses certain practical criteria to select a sample from a target population (Etikan et al., 2016). These criteria can include aspects such as geographical proximity to the researcher through to willingness to participate in the study

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

(Etikan et al., 2016). As one of the most common sampling methods, convenience sampling generally relies on the process of selecting respondents who are easily accessible, who are in close geographical proximity, and who are willing to participate (Etikan et al., 2016; Gravetter & Forzano, 2012). This method reliably offers the cheapest and quickest method of sampling and stands to provide large samples which are easy to gain access to.

Students at a South African university were approached for participation. To ensure that the sample was as representative of the student body as possible, several university departments across faculties were approached for permission to interact with associated students. The Faculty of Humanities, as well as the Faculty of Engineering, Built Environment and Information Technology were approached.

3.4 Research instrument

The Collective Futures questionnaire used in this study was specifically designed by a team of international researchers under the supervision of Dr Bain. The team used a variety of pre-existing scales from several different sources to create the initial questionnaire. Further scales were developed by the international study co-ordinators in order to create measures for specific constructs that the existing scales did not cover. The draft form of the questionnaire was circulated to the different international co-ordinators for their input, and feedback was duly incorporated.

The particular questionnaire used was designed for international use, and had to be adapted for a South African audience. This process involved placing the correct country name where appropriate, as well as changing the currency and languages to match that of the local population. The questionnaire was also translated from English to Afrikaans, so that it could be administered in the official languages of tuition at the university where the data was collected – namely Afrikaans and English. The adaptation and translation was done by the researcher, in close collaboration with the supervisor of this study, Prof. Claire Wagner, the international study coordinator, Dr Bain, and the University of Pretoria's Language Unit.

The specific translation method used was back translation. In this process, the researcher translated the original English questionnaire into Afrikaans. The University of Pretoria's Language Unit then translated the questionnaire from Afrikaans back to English and compared this back translation to the original questionnaire. All discrepancies were highlighted and communicated to the researcher. The researcher then revised the translation to the satisfaction of the Language Unit. Extensive care was taken to ensure that the translated questionnaire remained as close as possible to the structural layout and format of the original English version of the questionnaire.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

The questionnaire is divided into three sections. Section one and two of the questionnaire are identical, though, the differentiation between the two sections is dependent on the respondent's view on climate change. If, on the one hand, a respondent believes that climate change is occurring, and that humans are having a significant effect on climate change, then section one of the questionnaire must be completed. If, on the other hand, respondents believe that climate change is not occurring, or, that human beings are not having a significant effect on climate change, section two is to be completed. These two sections are mutually exclusive, and if a respondent opted to fill in one section, the other must be left blank.

Section three of the questionnaire measures respondents' behaviours, particularly relating to pro-environmental behaviour. This section also includes further questions specific to South Africa and concludes with a section on demographic data. More information on the questionnaire sections is provided below.

Section one and two consist of a selection of 11-point Likert-type scales. These scales range from -5 through to 5 and are designed to measure a respondent's view on future society, specifically, South African society in the year 2050. Respondents are required to compare characteristics, values, and actions of today's South African society to that of society in 2050. A low-end score (-1 to -5) indicates that a respondent believes that a certain aspect of society will have deteriorated by 2050, and a high-end score (1 to 5) indicates that a respondent believes that the aspect of society being measured will have improved by 2050. These aspects included items such as equality, freedom, honesty, and enjoyment of life.

After the completion of either section one or two by a respondent, as determined by their views on climate change, section three of the questionnaire must be completed. Section three is to be completed by all respondents. This section of the questionnaire is designed to measure behavioural characteristics, particularly those related to pro-environmental behaviour. Respondents were asked to indicate the likelihood of enacting behaviours such as installing energy saving products, recycling, car-pooling, and conserving water. The section also includes scales that measure a respondent's views of South African society as it currently is, as well as views on the human connection regarding animals and nature. The section is concluded with a set of demographic questions.

Ultimately, the questionnaire consisted of 24 pages, and took between 15 and 20 minutes to complete. Respondents were given a 30-minute timeframe in which to complete the questionnaire in order to eliminate any time-pressure.

3.4.1 Validity and reliability

This section will demonstrate the validity and reliability of the data collection methodology employed in this study.

The data collection instrument used in this study was designed by an international team of researchers under the supervision of Dr Paul Bain of the University of Queensland, Australia. The measures used in the survey have been validated, and the instrument has been successfully used in other studies (Bain et al., 2013; Milfont et al., 2017; Park, Bain, & Kusumi, 2015).

Further common indicators of validity found in this selected research instrument include the following: Gravetter and Forzano (2012) describe face validity as a degree of whether a study appears to measure the variable it claims to measure. In this study the questionnaire seeks to measure specific knowable components of a respondent's behaviours and attitudes. The questions are stated directly to respondents, exactly as they are interpreted by the researchers. The notion that questions do not seek to misinform or manipulate respondents' answers means that this questionnaire is high in face validity. Predictive validity refers to the ability of a measure to predict behaviours as presented by an established theory or body of research (Gravetter & Forzano, 2012). As this measure is built on the theoretical standpoint of the collective futures paradigm, it does fall within an established theory. The results of this study, as seen in Chapters 4 and 5, do indeed fall within the expectations of the theoretical standpoint on which is it based, as reflected in other research based on the same research instrument (Bain et al., 2013; Milfont et al., 2017; Park et al., 2015). This indicates the predictive validity of this study.

Reliability refers to the consistency of a measure's performance (Gravetter & Forzano, 2012). As this measure was implemented by administering it directly to respondents, using relatively similar environments and not recording changes over time, there is minimal room for external impacts causing errors in the data. This uniform method of presenting the research instrument adds to the overall reliability of the overall measure.

The research instrument also makes use of multiple data points to construct a single scale. As recorded in Chapter 4, several Likert-type scales are combined in order to form one variable. The combination of several data points to create one final score adds greatly to the internal consistency, and thus overall reliability, of the study (Gravetter & Forzano, 2012).

The next section of this chapter will explore how the data gathered by the questionnaire was collected and captured.

3.5 Data collection

The data collection process in this study involved the distribution, completion and collection of the Collective Futures questionnaire to the sample outlined above. The international co-ordinators of the Collective Futures study made the questionnaire available in both online and paper-based format. It was decided that a paper-based approach would best suit the sample, due to notoriously low South African online questionnaire response rates (Minnaar & Heystek, 2013), a trend echoed, although to a lesser extent, across the globe (LaRose & Tsai, 2014).

Before any data collection could begin, permission had to be gained from all approached university bodies. Deans of relevant faculties had to give permission for research to be conducted on students within the faculty. Once the faculty had given permission, the specific head of department was contacted for further permission to interact with students within those departments. Once both faculties and departments had given permission for data collection, the researcher could approach lecturers within the specific departments to ask for an opportunity during student contact hours in which the questionnaire could be administered. Once these arrangements were made the researcher could directly access the students in their lecture room within a specific lecture.

Once access was granted to the researcher to interact with students during lecture times, students were given a respondent information sheet. This sheet listed the aims of the study, as well as an informed consent form. Once students had had an opportunity to consider all the information presented in the information sheet, as well as the informed consent form, they could choose whether to participate in the study by completing the questionnaire, or not.

Once students chose to participate, the questionnaire was presented to them by the researcher. The researcher's only instruction to respondents was to concentrate and read carefully, as different sections of the questionnaire were to be completed based on respondents' personal beliefs. Respondents were then given time to read and complete the questionnaire. After completion, all questionnaires, along with the informed consent forms, were collected by the researcher. All responses were collected and filed for manual data capturing.

The questionnaire was administered to students during their lecture time in their lecture halls. All respondents were given the same instructions and time to complete the questionnaire. The similarity in setting and instruction was implemented to minimise external impacts on the respondents' answers.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

All data were captured in IBM's SPSS® Version 22, using the guidelines and templates provided by the study's international co-ordinators. Once completed, physical questionnaires were given to the Department of Psychology at the University of Pretoria for safe storage within the appropriate archives. These questionnaires will remain in storage for a period of 15 years as determined by the University of Pretoria's considerations for ethical data storage.

Following is a description of how the raw data was analysed to create meaningful statistical data to be interpreted.

3.6 Data analysis

In order to extrapolate usable information from the data captured, a statistical analysis must be undertaken. All analysis of the data was done within IBM's SPSS® Version 22, with guidance from the IBM SPSS Statistics 22 Core System User's Guide (2013), as well as the SPSS Survival Manual (Pallant, 2013). All results and data produced from this analysis, along with accompanying figures and tables, are available in Chapter 4: Results.

The collected data contains many specific details pertaining to the individual respondent who completed the questionnaire. This includes information on age, geographical location, nationality and gender, amongst others. The data were analysed to provide a profile of the demographic distribution of the sample.

The data was further analysed using descriptive techniques: The mean, medium, average, range, standard deviation and mode are all aspects of the data that can be determined through the use of descriptive statistics. Descriptive statistics assist researchers in assessing the data as is, and does not attempt to extrapolate further information about relationships between variables (Pallant, 2013). To determine relationships between variables, such as "views of the future", and "pro-environmental behaviour", further descriptive techniques can be used.

Correlation can be used to calculate the level of influence that certain variables have on one another (Gravetter & Forzano, 2012; Pallant, 2013). Correlation calculations are a particularly useful set of descriptive techniques in the context of this study. Specifically, correlation can be used to determine the relationship between the variables pertaining to students' views of the future and their tendency to act in a pro-environmental fashion – an important factor in this research study.

The research question of how attitudes towards future society affect the pro-environmental behaviours of students at a higher education institution in South Africa requires the investigation

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

of the relationship between two variables. By correlating individuals' attitudes with their behaviours, the relationship between the variables (if a relationship indeed exists) can be discovered. Correlation calculations can also indicate the direction and strength of a given relationship. Further information about which type of correlation coefficient was used and why will be provided in chapter 4.

In order to work with personal data on individuals' attitudes and behaviours, strict ethical considerations must be put in place. These will ensure the privacy and security of respondents in the study, as well as keep data from being misused. Section 3.7 of this chapter discussed the ethical guidelines followed by this study.

3.7 Ethical considerations

In accordance with the University of Pretoria's research ethics requirements, ethical clearance was applied to all aspects of this study: The initial study, relating to the Collective Futures projects, and headed by Prof. Claire Wagner, was granted ethical clearance by the Faculty of Humanities' Research Ethics Committee in 2013. The same committee granted the researcher permission to use the data gathered by this project in July 2015. In accordance with the general ethical terms of health practitioners (Sadock & Sadock, 2007), this study does not intend to pose any harm to respondents, and the results are intended to be used to benefit humanity and not to its detriment. The ethical considerations as laid out for behavioural studies by Gravetter and Forzano (2012), as well as the General Ethical Guidelines for Health Researchers by the Health Professions Council of South Africa (2008), were consulted in preparing for this study.

In order to comply with these ethical standards, all respondents were expressly informed that participation in the survey was voluntary. It was explained that participation is not obligatory and that respondents could withdraw at any point during the questionnaire completion process. Respondents were also informed that they could skip questions they felt uncomfortable with or unsure of. Respondents in the study were given a respondent information sheet before the questionnaire was administered. This sheet contained a breakdown of the goals and motivation of the study, as well as an informed consent form. Respondents were given time to read through the information sheets and were given an opportunity to raise any questions or concerns with the researcher. Questionnaires were only collected for analysis if the individual respondents had signed the informed consent form.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

The completion of the questionnaire made respondents eligible for entry into a prize draw. A question that required some ethical considerations was related to this prize draw. Respondents were asked if they would be willing to donate a portion of their prize towards an environmental organisation. Though, at the conclusion of the questionnaire, respondents were informed that they would be under no obligation to donate any of their prize winnings. This deception was addressed in the debriefing form supplied to respondents after the completion of the questionnaire. This debriefing form also contained more information on the study, as well as contact details for the researchers.

To ensure anonymity, questionnaires were designed to not contain any personally identifiable details, ensuring that any specific individual's responses could not be identified after collection. All aspects of the survey process that contained personal details which could compromise anonymity, like the informed consent form and prize draw entry, were both collected and stored separately so that there could be no linkage of personal details to specific questionnaires. All physical documents relating to the study which contain personal information are in safe-keeping within the Department of Psychology data storage facility and will remain there for a 15-year period as required by the University of Pretoria's Department of Psychology.

3.8 Chapter summary

In order to achieve the aims and objectives in this study, as described in Chapter 1, a research study was designed and appropriate materials distributed to potential respondents. This study made use of the survey research design, in the form of a questionnaire. This questionnaire was distributed to a convenience sample from a South African instate of higher education. Once administered and completed, all questionnaires were collected and captured into a data-analysis program. All aspects of data collection were done following the ethical guidelines appropriate for such a study.

Once captured, data could be analysed to extrapolate results. Chapter 4 of this study focuses on the results constructed from the collected dataset.

CHAPTER 4: RESULTS

The previous chapter detailed the process of obtaining the data used in this research study. Chapter 4 will explore the results determined from the aforementioned data. A total of 254 completed questionnaires were received from students by following the methodology laid out in the previous chapter.

In order to create an encompassing understanding of the respondents sampled, a statistical analysis must be undertaken. The results from the descriptive statistical methods are presented first to describe the demographics data of respondents. Secondly, descriptive statistics that explore respondents' attitudes and understanding of climate change are presented. The results found for variables of view of the future and tendency to engage in pro-environmental behaviours are then presented. Finally, the results of the correlational analysis are then presented to determine the relationship between these aforementioned variables.

4.1: Demographic data

To gain some insight into the socio-economic backgrounds of the respondents of this study, the demographic data can be used to describe them (Gravetter & Forzano, 2012; Saris & Gallhofer, 2014). The data are presented in the form of descriptive statistics. Descriptive statistics aim to merely describe results of data as seen, and do not attempt to determine any relationship between variables (Gravetter & Forzano, 2012; Pallant, 2015). Factors discussed include age, gender, field of study, income, and geographic location.

4.1.1 Age

The age of respondents is presented in Table 4.1. The table shows a mean respondent age of 21.49 (SD = 3.85). The range of 35, measured in years, indicates a varied age group.

Table 4.1

Age

	N	Range	Minimum	Maximum	Mean	Std. deviation
Age	242	35	18	53	21.49	3.85

As represented in Figure 4.1, the majority of respondents represent the 18-24 age range, with few outliers otherwise.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

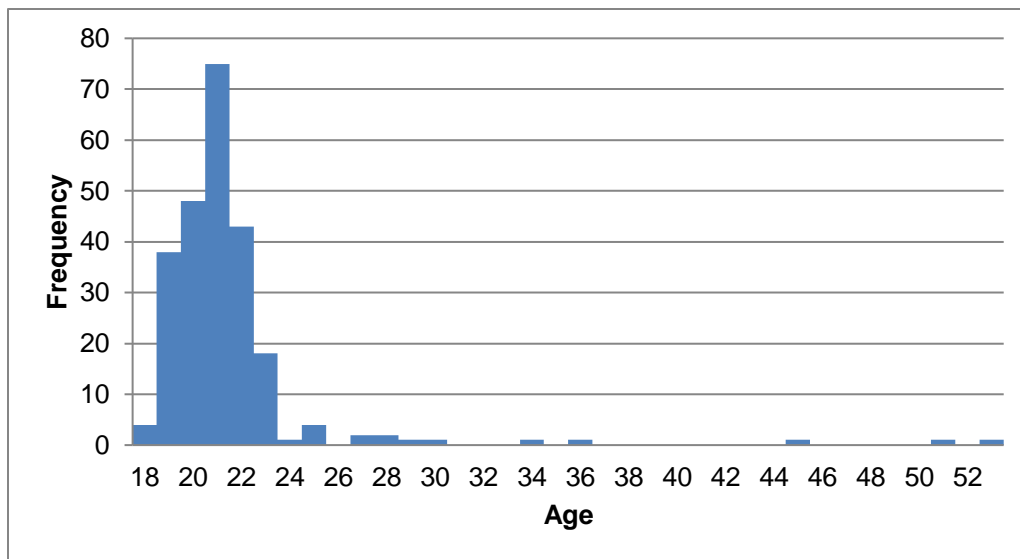


Figure 4.1 Age

4.1.2 Gender distribution

Table 4.2 summarises the gender distribution of respondents. From the 254 completed surveys received, 242 respondents disclosed their gender. With 193 female respondents and 49 male respondents, the gender split is almost exactly 80:20 (female:male).

Table 4.2

Gender distribution

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Male	49	19.3	20.2	20.2
Female	193	76.0	79.8	100.0
Total	242	95.3	100.0	
Missing	12	4.7		
System Total	254	100.0		

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

4.1.3 Field of study

Included in the demographic data are findings on the different field of studies for each respondent. Table 4.3 presents the study fields indicated by respondents.

Table 4.3

Field of study

	Field of study	Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	B Political Studies	22	8.7	10.5	10.5
	BA General (Inclusive)	132	52.0	62.9	23.3
	B Commerce	7	2.8	3.3	74.8
	B Education	1	0.4	0.5	75.2
	BSc Bio-kinetics	1	0.4	0.5	75.7
	BSc General	2	0.8	1.0	76.7
	BSc Biotechnology	1	0.4	0.5	77.1
	BSc Geography	3	1.2	1.4	78.6
	BSc Human Physiology	2	0.8	1.0	79.5
	B Engineering	1	0.4	0.5	80.0
	B Human Management Sciences	1	0.4	0.5	80.5
	B Town & Regional Planning	37	14.6	17.6	100.0
Missing		44	17.3		
Total		254			

The findings displayed in Table 4.3 indicate that the highest participating student group was from the BA General group, with 52.0% (n = 132) of respondents originating from this group. This grouping represents a wide selection of different study fields within the Bachelor of Arts degree in the Humanities faculty. This included subjects across the humanities spectrum, such as Philosophy, Psychology, Languages, and Art. Students from B Town and Regional Planning are the second largest group, with a 14.6% (n = 37) representation. Those studying other BA-orientated fields made up a further 12.6% of the respondents, with the final noticeably represented

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

group being B Political Science students with 8.7%. The remaining 24.7% of the respondents span a range of fields, from Bachelors of Science to Bachelors of Engineering.

4.1.4 Household income

Further demographic data collected from the questionnaire indicates the household income of respondents, as represented in Table 4.4. A total of 232 respondents opted to disclose their household economic status. From those that disclosed their economic status, the data indicates that 66.7% (n = 155) of respondents' households earn an income greater than that of the average South African household which was indicated as R10'000.00 per month at the time of the study. A further 15.5% (n = 36) earn about the average income. The table thus shows that 81% of respondents are of equal or higher income than the average local citizen. This spread of economic standing within the respondent population is visually represented in Figure 4.2

Table 4.4

Household income

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	Very much above average	53	20.9	22.8	22.8
	Above average	66	26.0	28.4	51.3
	A little above average	36	14.2	15.5	66.8
	Average	33	13	14.2	81.0
	A little below average	13	5.1	5.6	86.6
	Below average	16	6.3	6.9	93.5
	Very much below average	15	5.9	6.5	100.0
	Total	232	91.3	100	
Missing	System	22	8.7		
Total		254	100		

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

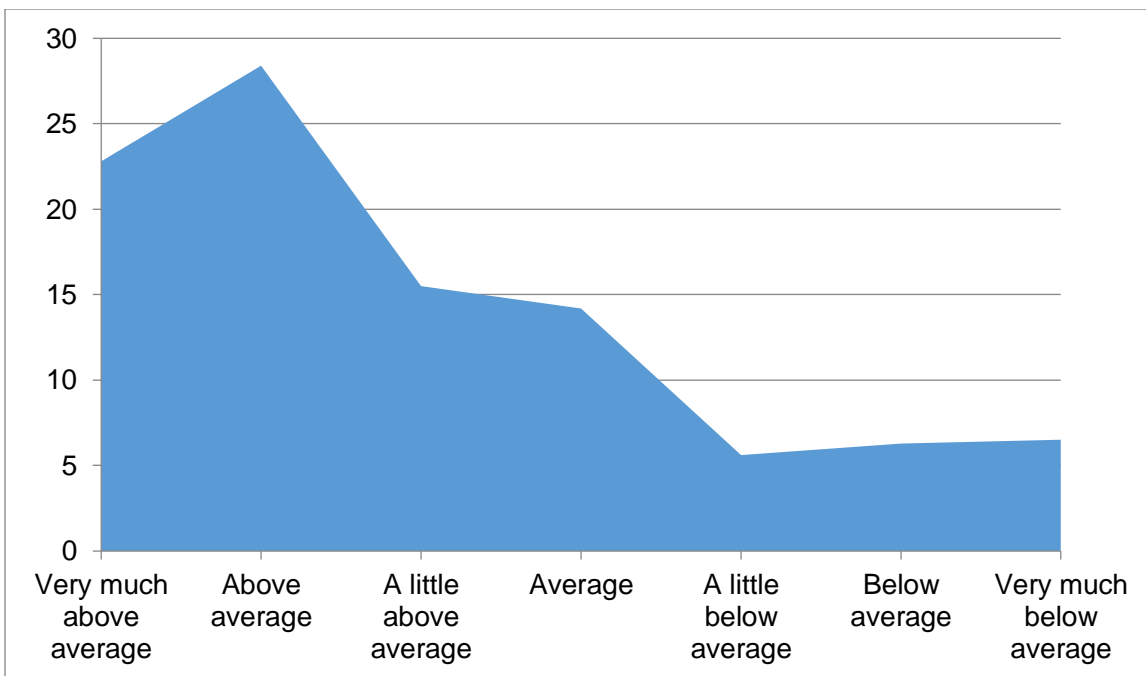


Figure 4.2 Valid percentage of income groups

4.1.5 Geographic location

The chart in Figure 4.3 indicates that the vast majority of respondents come from urbanised living areas. Only 9.2% (n = 22) of respondents stated that they live in very rural or rural areas, with the remaining 90.8% (n = 217) indicating a more urban style of living.

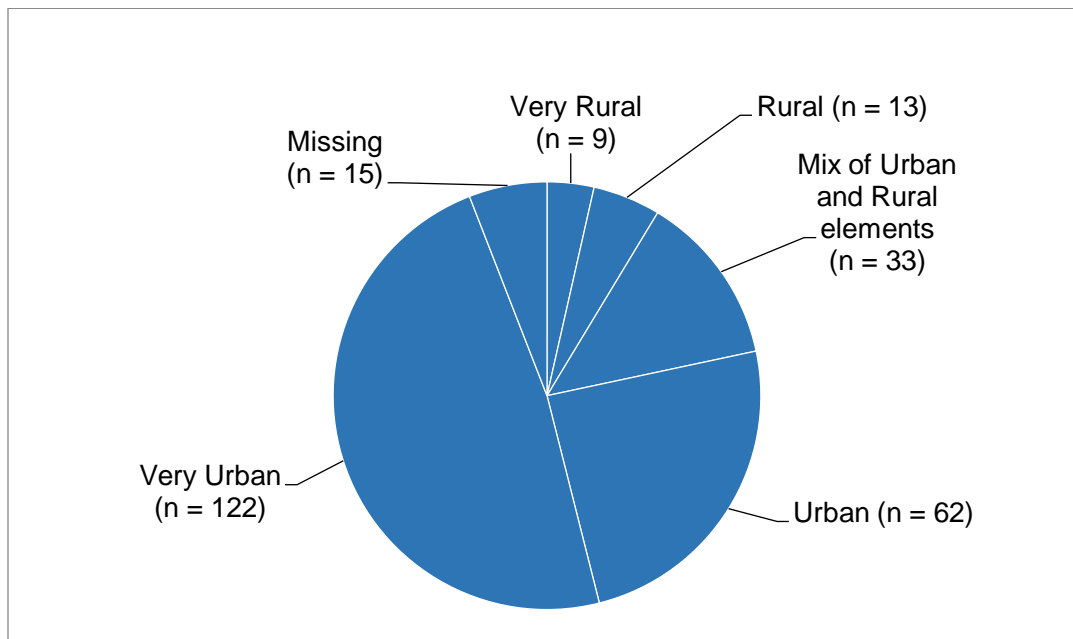


Figure 4.3 Geographic location

4.2 Beliefs and attitudes towards climate change

Section 4.1 showcased the demographic data analysis using descriptive statistics. In section 4.2 descriptive statistics will also be employed. This section examines the measures concerning attitudes towards a future society - the South African society of 2050.

4.2.1 General belief concerning climate change

Respondents' general belief concerning whether anthropogenic climate change is occurring or not was investigated. Respondents were asked to indicate which of the following statements most closely represented their views.

- 1) I believe climate change is occurring and humans are having significant effects on climate change.
- 2) I believe climate change is occurring but human activities are not having significant effects on climate change.
- 3) I do not believe climate change is occurring.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Table 4.5

General belief concerning anthropogenic climate change

		Frequency	Percentage	Valid percentage	Cumulative percentage
Valid	I believe climate change is occurring and humans are having significant effects on climate change	225	88.6	90.4	90.4
	I believe climate change is occurring but human activities are not having significant effects on climate change	21	8.3	8.4	98.0
	I do not believe climate change is occurring	3	1.2	1.2	100.0
	Total	249	98.0	100.0	
Missing		5	2.0		
Total		254	100.00		

Table 4.5 shows that, when missing data is excluded, more than 90% (n = 225) of students believe that anthropogenic climate change is a reality. Furthermore, 8.4% (n = 21) of students believe that climate change is indeed occurring, but that human behaviour has a negligible effect. Lastly, a mere 1.2% (n = 3) of the students surveyed do not believe that climate change is occurring.

4.2.2 Reality and causes of climate change

Table 4.6 depicts the results of questions pertaining to respondents' beliefs surrounding the severity and causes of climate change. Respondents were asked to rate their agreement or disagreement in relation to several, climate change-related statements. This measure asked for respondents to state their agreement or disagreement on a Likert-type scale, rated from 1 – 5. In this scale, a score of 5 indicated Strong Agreement, and a score of 1 indicated Strong Disagreement. As the mean score indicates the average participate answer, a higher mean score

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

indicates overall agreement with the statements, whilst a lower score indicates disagreement (Pallant, 2013).

Table 4.6

Reality and causes of climate change

	Climate change is real	Climate change is natural	There is no such thing as climate change	Humans contribute significantly to climate change	Addressing climate change is one of the most important issues facing society	Climate change is caused by humans	Most people are too concerned about climate change
Valid	249	247	246	248	248	243	248
Missing	5	7	8	6	6	11	6
Mean	4.67	2.26	1.36	4.42	4.04	3.69	2.43
Standard deviation	0.64	1.06	0.82	0.78	0.98	0.90	1.06
Range	4	4	4	4	4	4	4
Sum	1164	557	335	1096	1001	897	602

As evident from Table 4.6, and visually represented in the graph, Figure 4.4, some clear trends emerge. The mean score values show that most respondents agree relatively strongly on several points. The measure has a range of 4, with a minimum value of 1 and a maximum of 5. In this measure, values nearer the maximum indicate greater agreement with the statements. The items that indicate high levels of agreement are as follows:

- a) Climate change is real (M = 4.67, SD = 0.64)
- b) Humans contribute significantly to climate change (M = 4.42, SD = 0.78)
- c) Addressing climate change is one of the most important issues facing society (M = 4.04, SD = 0.98)
- d) Climate change is caused by humans (M = 3.69, SD = 0.90)

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

The mean scores also indicate a high level of disagreement on the remaining statements, which are as follows:

- a) Climate change is natural (M = 2.26, SD = 1.06)
- b) There is no such thing as climate change (M = 1.36, SD = 0.82)
- c) Most people are too concerned about climate change (M = 2.43, SD = 1.06)

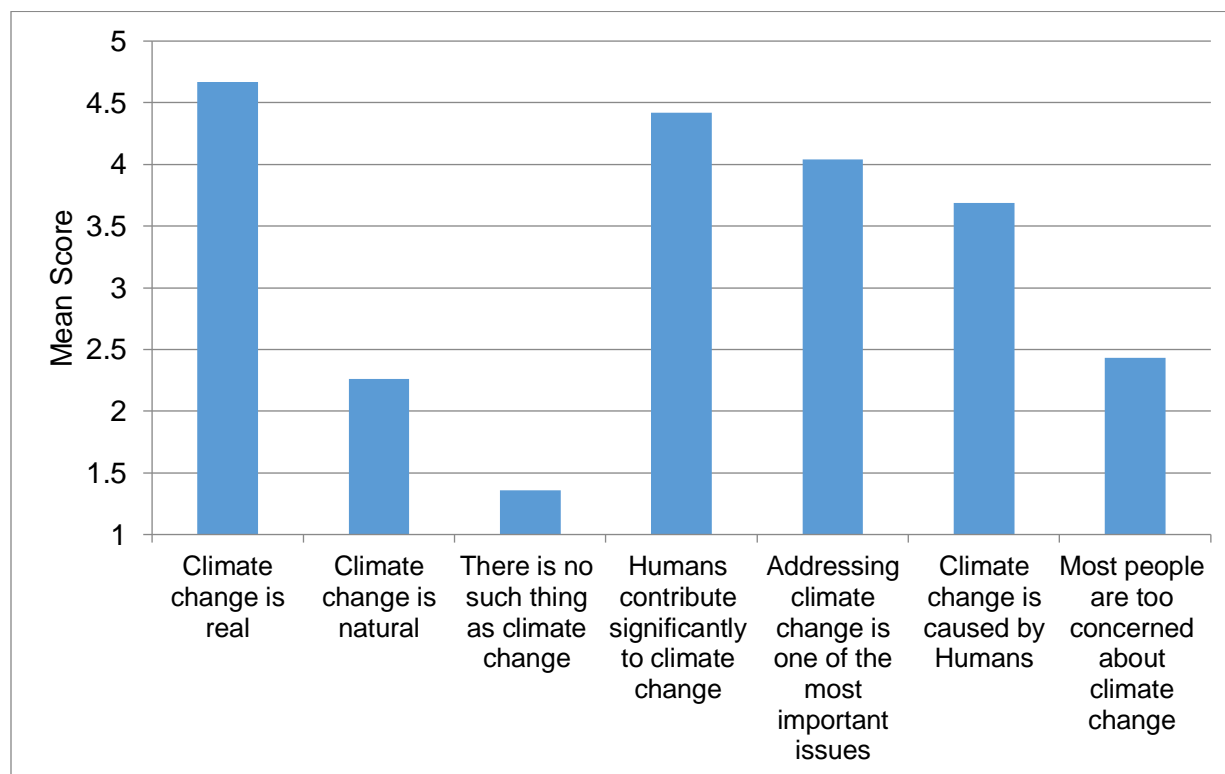


Figure 4.4 Reality and causes of climate change

It is, however, important to note that the mean scores alone do not form a complete picture of the respondents' agreement with the statements. The level of agreement range value of 4 is recorded on every individual question. This displays some inconsistency in opinion. To further explore these scores, the measure of standard deviation can be used. A larger standard deviation score indicates a more dispersed dataset (Pallant, 2013).

The relatively low standard deviation for the results relating to whether respondents believe that climate change is real (SD = 0.64) indicates a clustered response, with a large number of respondents' responses being near to the mean of 4.67. This result shows that the large majority of respondents believe that climate change is indeed a real occurrence.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Another noticeably low standard deviation is noted in the question relating to whether humans contribute significantly to climate change (SD = 0.78). This relatively clustered response shows that respondents agree that humans, at the very least, contribute significantly to climate change. However, there is not quite as much agreement on whether human beings are actually the direct cause of climate change. The larger standard deviation seen in the statements relating to whether climate change is natural (SD = 1.06) points to a slightly more varied attitude amongst respondents. The higher standard deviation observed here indicates a more dispersed dataset. This dispersion means that the data was not particularly clustered around the mean values, showing more variation in respondent answers.

Related to this result is the high standard deviation value for the statement relating to whether humans are the direct cause of climate change (SD = 0.90). Even though respondents generally agree that human beings cause climate change, and disagree that climate change is a purely natural occurrence, these high standard deviation values indicate that there is some debate on these topics.

A final high standard deviation score to note from Table 4.6 is the score relating to whether respondents believe that most people are too concerned about climate change (SD = 1.06). Even though the low mean score of 2.43 implies that the majority of respondents disagreed with this statement, the high standard deviation indicates a dispersed set of responses to the statement.

4.2.3 Attitude towards being viewed as environmentally friendly

This section analyses the results gathered from survey questions relating to whether respondents view themselves as being environmentally friendly, and what the social impact of this view may be. Respondents were asked to rate on a Likert-type scale whether they strongly disagree (indicated by a score of 1) or strongly agree (indicated by a score of 5) with several statements. The results of this scale are displayed in Table 4.7.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Table 4.7

Attitude towards being viewed as environmentally friendly

	N	Range	Minimum	Maximum	Mean	Standard deviation
I identify with South Africa	240	4	1	5	3.60	1.14
I am concerned with environmental issues	237	4	1	5	3.60	0.98
I would be embarrassed to be seen as having an environmentally friendly lifestyle	240	4	1	5	1.63	0.91
I am an environmentally friendly person	240	4	1	5	3.76	0.82
I would not want my family and friends to think of me as someone who is concerned about environmental issues	240	4	1	5	1.66	0.97

Table 4.7 assists in giving an indication of respondents' views on their selves concerning issues of environmental impact. The table indicates a wide range of views, with a range of 4 for every point of questioning. This range indicates that each question received the full array of possible answers, ranging from Strongly Agree to Strongly Disagree. The results displayed in this table are expressed graphically in Figure 4.5.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

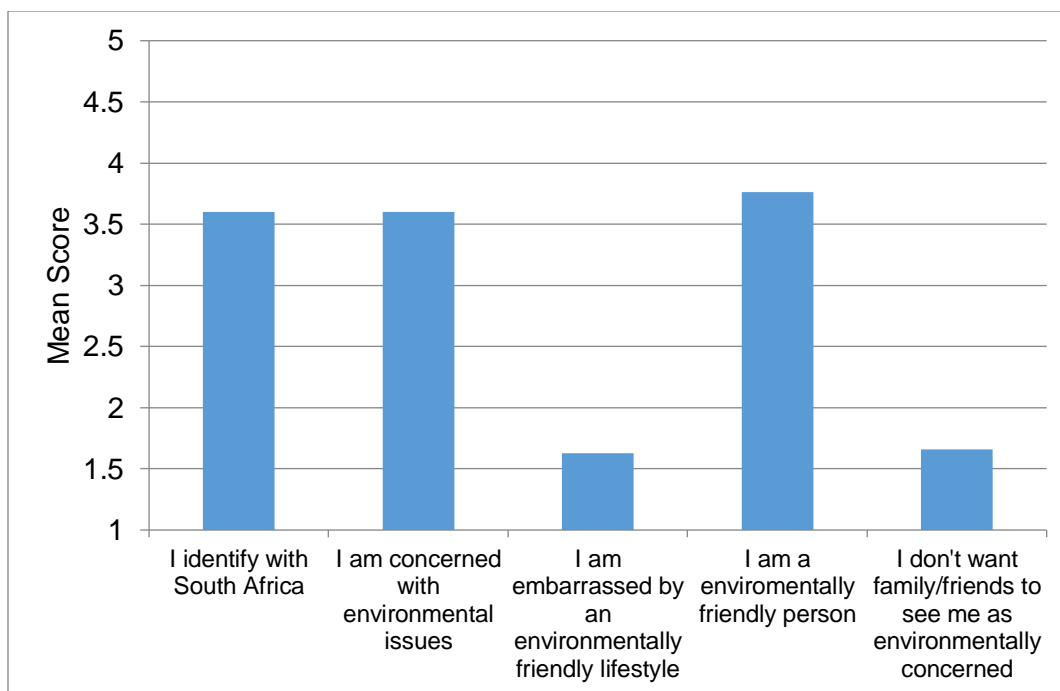


Figure 4.5 Attitude towards being viewed as environmentally friendly

Figure 4.5 and Table 4.7 depicts mean scores of above or equal to 3.60 for the statements relating to being, firstly, an environmentally friendly individual, and secondly, having concerns relating to environmental issues. These mean scores are 3.76 and 3.66 respectively. This finding is further emphasised by the respondents' strong disagreement on the points of:

- I would be embarrassed to be seen as having an environmentally friendly lifestyle; and
- I would not want my family and friends to think of me as someone who is concerned about environmental issues.

Both of these statements scored a mean value of less than 1.7. This indicates that respondents do not find it embarrassing to be seen as environmentally friendly persons or as someone who is concerned about environmental issues.

The high standard deviation scores ($SD > 0.90$) on almost all scales shows some disagreement between respondents' views towards environmentally conscious attitudes. Though, the slightly lower standard deviation ($SD = 0.82$) on the statement relating to whether respondents view themselves as environmentally friendly shows a slightly more clustered response. This indicates that a large portion of participating individuals generally agree that they are environmentally friendly.

4.3 Views on the future of society

This section analyses the data captured on respondents' views concerning future society. Specifically, this study measures views and attitudes on South African society in the year 2050, if this society had acted to curb climate change. In order to establish respondents' views of the future, a selection of scales were employed in the questionnaire. Respondents were asked to rate what they believed the South African society of 2050 would be like compared to that of today's current society. The rating system used a scale of -5 to +5, creating an 11-point Likert-type scale. This scale indicates deterioration or improvement of certain aspects of society (-5 being severe deterioration, +5 being severe improvement). In order to create an overall measure of society in 2050, the study employed three sets of questions. Each set contained several of the above-mentioned 11-point scales, each measuring a specific sub-aspect of society. The full measure is available in Appendix B. Ultimately, the three measures were as follows:

- 1) Characteristics of 2050 society. These included "Caring", "Lazy", "Honest", and several others.
- 2) Values in 2050 society. These include "Equality", "Self-discipline", "Wealth", and several others.
- 3) Aspects of 2050 society. These include "Violent crime", "Education levels", "Poverty" and several others.

The results from each of these three sets of questions are analysed in sections 4.3.1 to 4.3.3.

4.3.1 Characteristics of future society

The questionnaire uses 15 individual 11-point Likert-type scales in order to measure respondents' views on how certain characteristic of society will change in the future. The 11-point scales range from a score of -5 to indicate complete deterioration of a characteristic, to +5 to show complete improvement. In order to create a single measure of a respondent's overall view of the future as related to societal characteristics, all 15 of the 11-point scales are combined into one measure. Ultimately, a new scale is created: the view of overall future societal characteristics. This provides an overall impression of respondents' views towards favourable characteristics exhibited by a future society.

This new scale, as a combination of the 15 11-point scales, now has a minimum value of -75 and a maximum of 75. Here, a score value of -75 would indicate complete deterioration of societal characteristics, whereas a score of 75 would indicate massive improvement. The results of this are displayed in Table 4.8.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Table 4.8

Characteristics of future society

	N	Range	Minimum	Maximum	Mean	Standard Deviation
Characteristics of future society	233	128	-59	69	8.37	13.69

The results from this measure depicted in Table 4.8 indicate that respondents are not necessarily strong believers in the idea that societal characteristics, such as honesty and sincerity, would be improved in a future society that acted to curb climate change. This is shown by a relatively central mean score of 8.37. Here, a score of 0 would indicate no change. This score indicates that the average respondent deems that only a very small positive change would be noted in future societal characteristics. The high standard deviation score (SD = 13.69) indicates some variance in responses though, as it shows some disparity around the mean (Pallant, 2013).

4.3.2 Values of future society

In order to measure respondents' views on what values a future society would hold, a selection of 15 11-point Likert-type scales is used, similar to the methods seen in section 4.3.1. The scales are combined as indicated in section 4.3.1 to create a new measure with the same range values as previous. The results of this measure are presented in Table 4.9.

Table 4.9

Values of future society

	N	Range	Minimum	Maximum	Mean	Standard deviation
Values of future society	245	91	-32	59	21.04	20.13

Table 4.9 indicates that respondents believe that a future South African society in 2050 that has acted to curb climate change will have somewhat improved in terms of societal values. These include aspects such as equality, honesty and freedom. The generally positive outlook can be determined from the positive mean (M = 21.04) as seen in Table 4.9. A high standard deviation score (SD = 20.13) does however show a large degree of variance around the mean (Pallant, 2013).

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

4.3.3 Aspects of future society

As in sections 4.3.1 and 4.3.2, a measure was created to determine respondents' thoughts on how a future society which has acted to curb climate change will change in reference to certain aspects of society. The scales used were 15 11-point Likert-type scales combined to create a measure with a minimum score of -75 and apposite score of 75. Table 4.10 displays another relatively positive view on future South African society in 2050, with a mean score of 20.19 indicated in the table. This score relates to an improvement in societal aspects such as disease, pollution and crime.

Table 4.10

Aspects of future society

	N	Range	Minimum	Maximum	Mean	Standard deviation
Aspects of future society	247	114	-54	60	20.19	18.43

Sections 4.3.1 to 4.3.3 give an indication of certain views and attitudes towards specific parts of a future society in which action has been taken to prevent climate change. As indicated, by positive mean vales, respondents believe that a future society where action has been taken to prevent climate change will experience positive change. Though, in order to produce an overall idea of respondents' views of this future society, all three previous measures must be combined into one. Section 4.3.4 discusses this combined measure.

4.3.4 Overall views towards future society

In order to generate an indicator of respondents' total view of future society, the results of the three scales in section 4.3.1 – 4.3.3 were combined into one overarching result - overall view of future society. The combination of these three measures creates a scale with a minimum value of -225 and a maximum of 225. A lower score indicates definite deterioration of future South African society, whereas a positive score indicates improvement. The results of this combined measure are presented in Table 4.11.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Table 4.11

Overall views towards future society

	N	Range	Minimum	Maximum	Mean	Standard deviation
Overall view of future society	225	196	-61	135	49.00	34.33

The results indicated in Table 4.11 show that the majority of respondents believe that society would have improved overall by the year 2050 if action is taken to curb climate change. This is indicated by a positive mean score of 49.00 as seen in the table. Further information on this measure, specifically the normality of its distribution, is provided in Table 4.12, and represented graphically in Figures 4.6 and 4.7.

Table 4.12

Kolmogorov-Smirnov test for overall views towards future society

	Statistic	df	Significance
Overall views towards future society	0.05	205	0.200

Table 4.12 presents the results of the Kolmogorov-Smirnov test. This is a test used to determine whether a measure is normally distributed or not (Pallant, 2013). Here, the Kolmogorov-Smirnov test results display a significant value greater than 0.05, indicating that the data is indeed normally distributed (Pallant, 2013). Figures 4.6 and 4.7 present the related normal Q-Q plot graph and histogram of results respectively.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

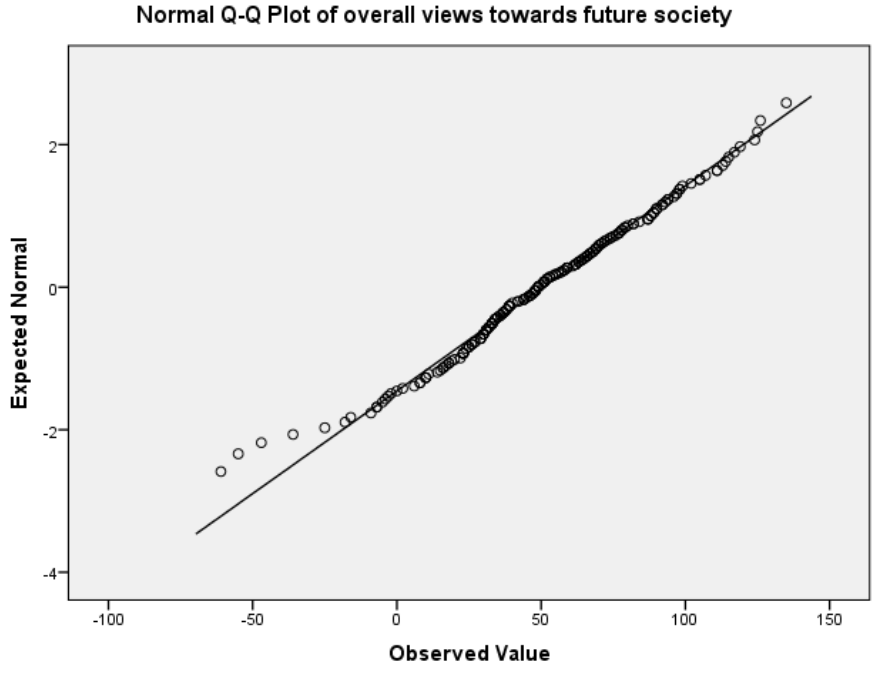


Figure 4.6 Normal Q-Q plot of overall views towards future society

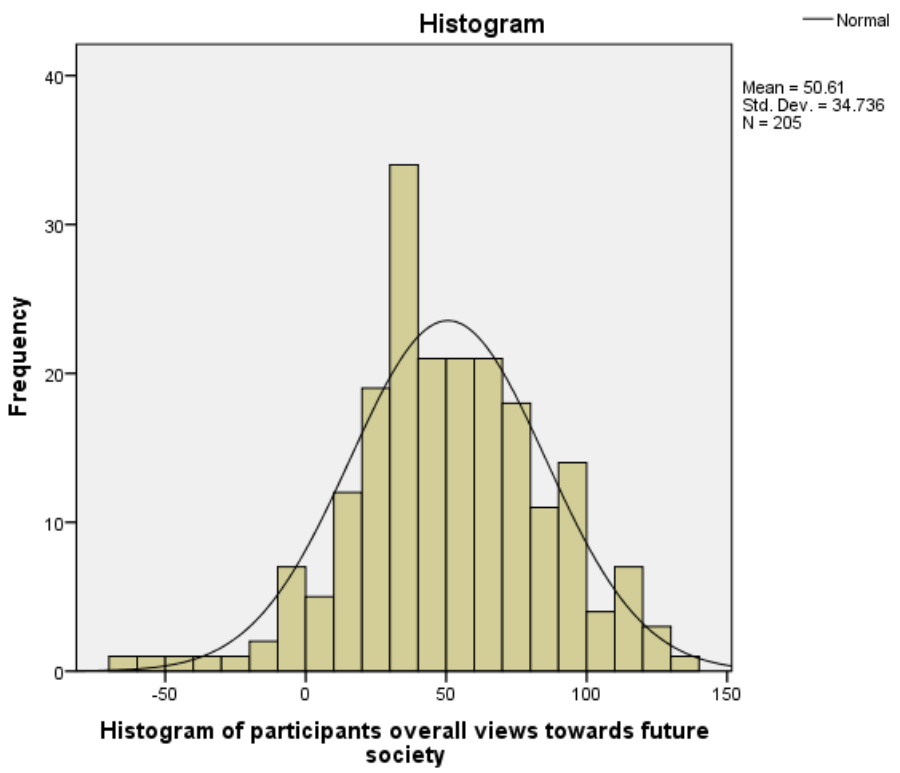


Figure 4.7 Histogram of respondents' overall views towards future society

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

From the results of the Kolmogorov-Smirnov test, as well as the Q-Q plot and histogram, it is apparent that the data relating to respondents' overall views towards the future of society is normally distributed (Pallant, 2013).

Section 4.3 has defined respondents' overall view of the future by combining several measures used within the questionnaire. Measures relating to characteristics, values and aspects of future society were combined to form one overarching measure. This measure indicated that respondents had an overall positive view of a South African future society in which changes had been made to reduce the impacts of climate change. This is indicated by the positive mean value of 49.00 as shown in Table 4.11. Furthermore, Table 4.12, in combination with figures 4.6 and 4.7, show a normal distribution for this data.

Section 4.4 will aim to explore the behavioural aspects of respondents as related to pro-environmental actions.

4.4 Pro-environmental behaviour

Section 4.4 analyses the data gathered on respondents' tendency to behave in a pro-environmental fashion. Several different measures were employed to determine trend in behaviour. These different measures are ultimately combined to form a picture of respondents' overall tendency to behave pro-environmentally.

In order to gauge respondents' pro-environmental behavioural tendencies, two specific measures were used. The first measure is designed to determine how likely respondents are to act in a pro-environmental fashion on a societal scale. The second measure is more focused on the personal, individual level of actions and behaviours. Each measure consists of 12 individual questions using a 5-point Likert-type scale. Scores range from 1 (not at all likely to engage in behaviour) to 5 (very likely to engage in behaviour). Lower scores (in the range of 1 to 2) will indicate an unwillingness to take certain actions, whilst higher scores (in the range of 4 to 5) show increased tendency to act in this fashion. If a certain activity was not realistically possible for a respondent to perform, they could choose to opt out of specific questions by selecting the not applicable option. Respondents were asked to rate the likelihood of them engaging in a specified behaviour in the near future – the next 12 months.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

4.4.1 Personal pro-environmental behaviour

To understand in what capacity respondents were inclined to act in a pro-environmental fashion in their personal lives, several measures were merged into an overall score. The 12 5-point Likert-type scales used to measure pro-environmental behaviour in a personal capacity were combined. This included behaviours like installing power-saving products, buying environmentally-friendly products, and reducing car travel. Table 4.13 shows the results of this combination.

Table 4.13

Personal pro-environmental behaviour

	N	Range	Minimum	Maximum	Mean	Standard deviation
Personal pro-environmental behaviour	231	35	26	61	45.06	7.61

The positive mean score presented in Table 4.13 ($M = 45.06$) indicates that the respondents exhibited a tendency to behave in a pro-environmental fashion in their personal capacity. The standard deviation of 7.61 also indicates a clustering of data closer to the mean, showing a tendency for a small amount of personal pro-environmental behaviour from respondents.

Table 4.14

Kolmogorov-Smirnov test for personal pro-environmental behaviour

	Statistic	df	Significance
Personal pro-environmental behaviour	0.057	231	0.063

From the indicated Kolmogorov-Smirnov test in Table 4.14, a significant score greater than 0.05 indicates data that is normally distributed (Pallant, 2013).

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

4.4.2 Societal pro-environmental behaviour

To create a measure of overall willingness to act in a pro-environmental way in a larger societal context, a combination of measures was used. The 12 5-point scales used to determine different aspects of behaviours in a societal sense were combined into one scale. This scale determines overall willingness to engage pro-environmentally in society. This measure included behaviours such as giving money to environmental groups, signing pro-environmental petitions, and joining environmental groups. The combination of 12 5-point scales creates a scale with a minimum of 12 and maximum of 60. The results of this measure are indicated in Table 4.15.

Table 4.15

Societal pro-environmental behaviour

	N	Range	Minimum	Maximum	Mean	Std. deviation
Societal pro-environmental behaviour	245	48	12	60	36.73	11.03

From Table 4.15, the mean result of 36.73 indicates that the average respondent was somewhat inclined to act in a pro-environmental fashion in a societal context. However, compared to results in Table 4.13 it is evident that participants are less likely to act pro-environmentally in a social context than in their own personal capacity. The standard deviation (SD = 11.03) does however indicate less clustered data, showing some variation in respondents behavioural tendencies in a social pro-environmental capacity Table 4.16 shows the results of the Kolmogorov-Smirnov test on the data. The significant result of 0.200 indicates a normal distribution (Pallant, 2013).

Table 4.16

Kolmogorov-Smirnov test for societal pro-environmental behaviour

	Statistic	df	Significance
Societal pro-environmental behaviour	0.047	245	0.200

4.4.3 Overall tendency to behave in a pro-environmental fashion

In order to create a detailed understanding of respondents' overall willingness to act in a pro-environmental manor, the two measures of societal and personal pro-environmental behaviour discussed in Section 4.2.1 and 4.2.2 are combined to form the results found in Table 4.17. A total of 240 valid scores were produced with a minimum value of 12 and a maximum of 120.

Table 4.17

Overall tendency to behave in a pro-environmental fashion

	N	Range	Minimum	Maximum	Mean	Standard deviation
Overall pro-environmental behaviour	240	96	24	120	81.44	17.16

The mean score of 81.44 observed in the combined measure indicates a tendency for respondents to engage in pro-environmental behaviour overall.

The results observed in Table 4.18, showing a significance value greater than 0.05, along with the representation in Figures 4.8 and 4.9, indicate a normally distributed set of data (Pallant, 2013).

Table 4.18

Kolmogorov-Smirnov test for overall pro-environmental behaviour

	Statistic	df	Significance
Overall pro-environmental behaviour	0.040	240	0.200

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

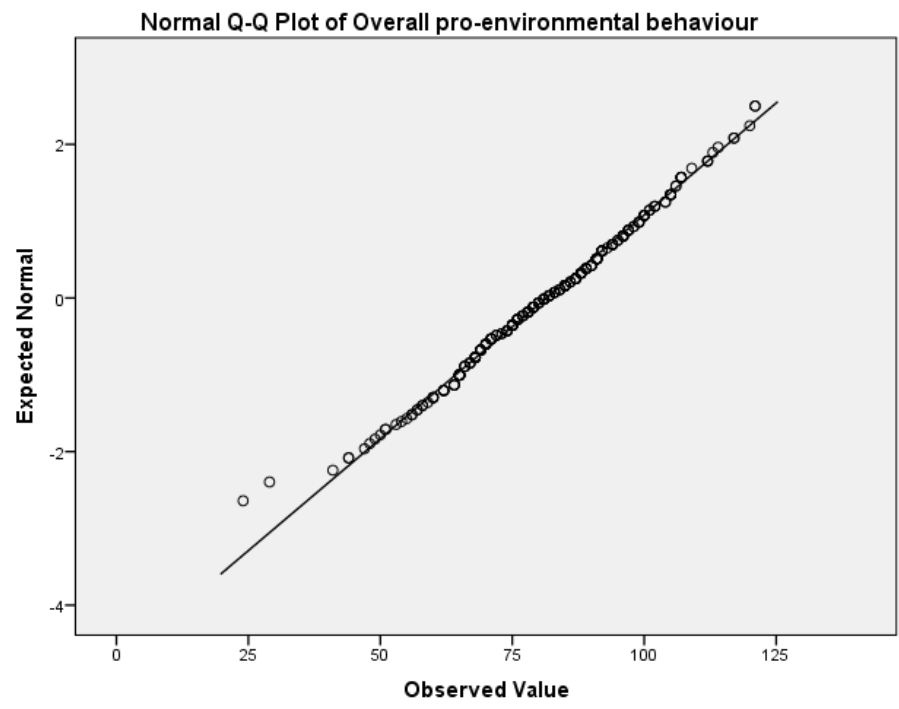


Figure 4.8 Normal Q-Q plot of overall pro-environmental behaviour

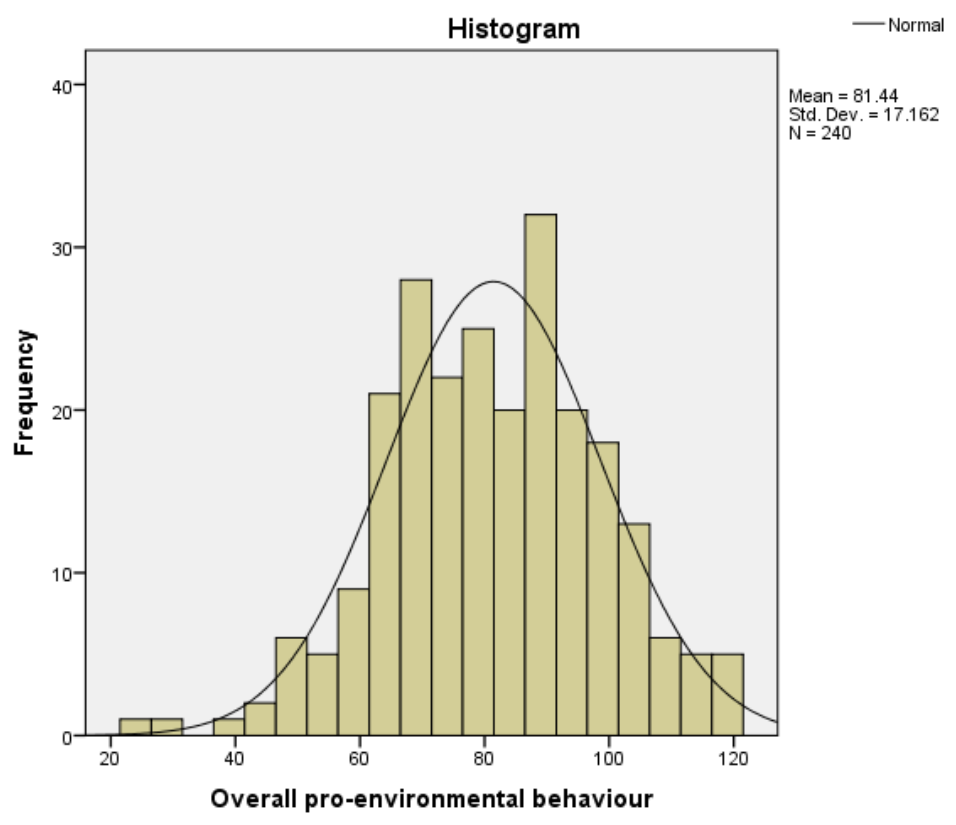


Figure 4.9 Histogram of overall pro-environmental behaviour

Section 4.4 has shown the behavioural tendencies of respondents in relation to pro-environmental actions. Individuals' tendency to act pro-environmentally on both a social and personal scale was recorded. These were combined to form a measure for overall tendency to act pro-environmentally. Section 4.5 will use the results from this section, as well as the previous Section 4.3, to create a correlation calculation.

4.5 Relationship between respondents' views of the future and their pro-environmental behaviour

Section 4.5 aims to understand respondents' environmental behaviour with reference to their views on future society. In order to come to this understanding, a relationship between the variables must be established. In the case of this study, two scores have been created for each respondent. Each respondent has a score indicating their pro-environmental behavioural tendencies, as well as a score detailing their attitude towards the future. In order to establish the magnitude and direction of a relationship between two variables, a correlation calculation is used (Gravetter & Forzano, 2012; Pallant, 2015). A correlation calculation investigates this relationship in terms of both strength and direction. These calculations can indicate whether variables influence each other in a positive or negative manner, and also to what degree this relationship is influenced. As the research question aims to investigate the relationship between two variables, correlation calculations are well suited to investigating this question.

Section 4.5 will ultimately investigate the relationship between respondents' view of the future and how this affects their tendency to act in a pro-environmental fashion on both a societal and personal level. This section will detail the assumptions necessary for a correlation calculation to be made, and show how those are accounted for. The results of the correlation will then be presented.

4.5.1 Assumptions for correlation

In order to use a correlation measure, certain assumptions must be met. For the purposes of this study, Pearson's correlation assumptions were used (Pallant, 2013). Pearson dictated five assumptions that must be met in order to use data for correlation. These assumptions are as follows:

Firstly, in order to use a set of data in a correlation, the data used must be continuous in nature. All data used in this measure has been recorded via Likert-type scale, and therefore occupy a value on a scale. The data is thus continuous in nature. Secondly, for a correlation

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

calculation to be successful, all data must be in pairs. The scores used in the correlation calculations are all variables from the same individual respondent. The data was analysed in SPSS to exclude any missing cases pairwise (Pallant, 2013). All remaining data can thus be considered paired. Thirdly, data sets used in the correlation calculation measure must be absent of outliers. The data was analysed via SPSS (Pallant, 2013) in order to determine whether outliers exist. Where outliers were detected, they were removed in order to conduct the correlation calculation. Fourthly, in order to use data for a correlation, data sets must be normally distributed. As indicated by the histograms and Q-Q plot graphs in section 4.3.4 and section 4.4, all variables used in the correlation calculation are normally distributed. Fifthly and finally, for a correlation calculation to be analysed, data must present in a linear and homoscedastic nature. The results of the correlations calculated are presented as scatterplots, indicating the linearity and homoscedasticity of the data. These scatterplots can be found at Figures 4.10, 4.11 and 4.12. As all data assumptions are shown to be met, the correlation calculation results will be explored in detail further in this section.

4.5.2 Relationship between respondents' views of the future and their personal pro-environmental behaviour

Table 4.19 indicates the relationship between respondents' views of the future and their tendency to behave pro-environmentally in a personal capacity. This was investigated through the use of the Pearson product-moment correlation coefficient. As detailed in section 4.5, no assumptions required for a correlation calculation were breached. The results display a p-value of greater than 0.05, indicating a non-significant result. There is a positive, but weak, relationship between the two variables ($r = .136$, $n = 204$). Though the p-value of 0.052 indicates that the results is not significant at the traditional $p < .05$ level. The scatter-plot of this calculation is shown in Figure 4.10.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Table 4.19

Relationship between respondents' view of the future and their personal pro-environmental behaviour

		View of future	Personal pro-environmental behaviour
View of future	Pearson	1	.136
	Sig. (2-tail)		.052
	N	220	204
Personal pro-environmental behaviour	Pearson	.136	1
	Sig. (2-tail)	.052	
	N	204	231

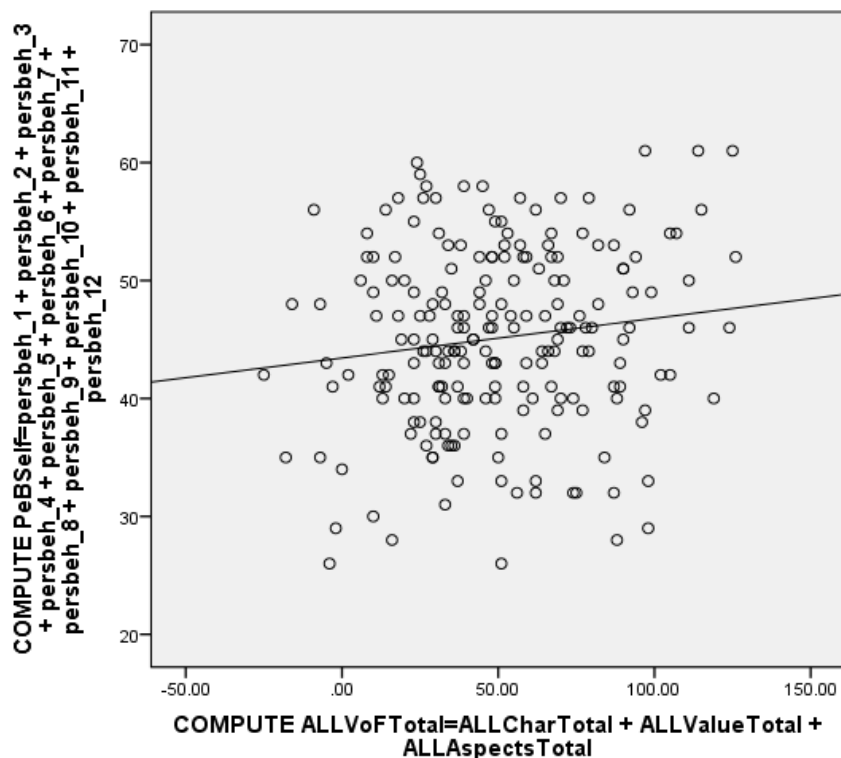


Figure 4.10 Scatter-plot of personal pro-environmental behaviour and view of future

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

4.5.3 Relationship between respondents' views of the future and their societal pro-environmental behaviour

Table 4.20 shows the results of the correlation between respondents' views of the future and their tendency to behave pro-environmentally in a broader societal context. This is investigated through the use of the Pearson product-moment correlation coefficient. There is a positive, but weak, relationship between the two variables ($r = .249$, $n = 215$, $p < .05$). The scatter-plot of this calculation is shown in Figure 4.11.

Table 4.20

Relationship between respondents' view of the future and their societal pro-environmental behaviour

		View of future	Societal pro-environmental behaviour
View of future	Pearson	1	.249
	Sig. (2-tail)		.000
	N	220	215
Societal pro-environmental behaviour	Pearson	.249	1
	Sig. (2-tail)	.000	
	N	215	245

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

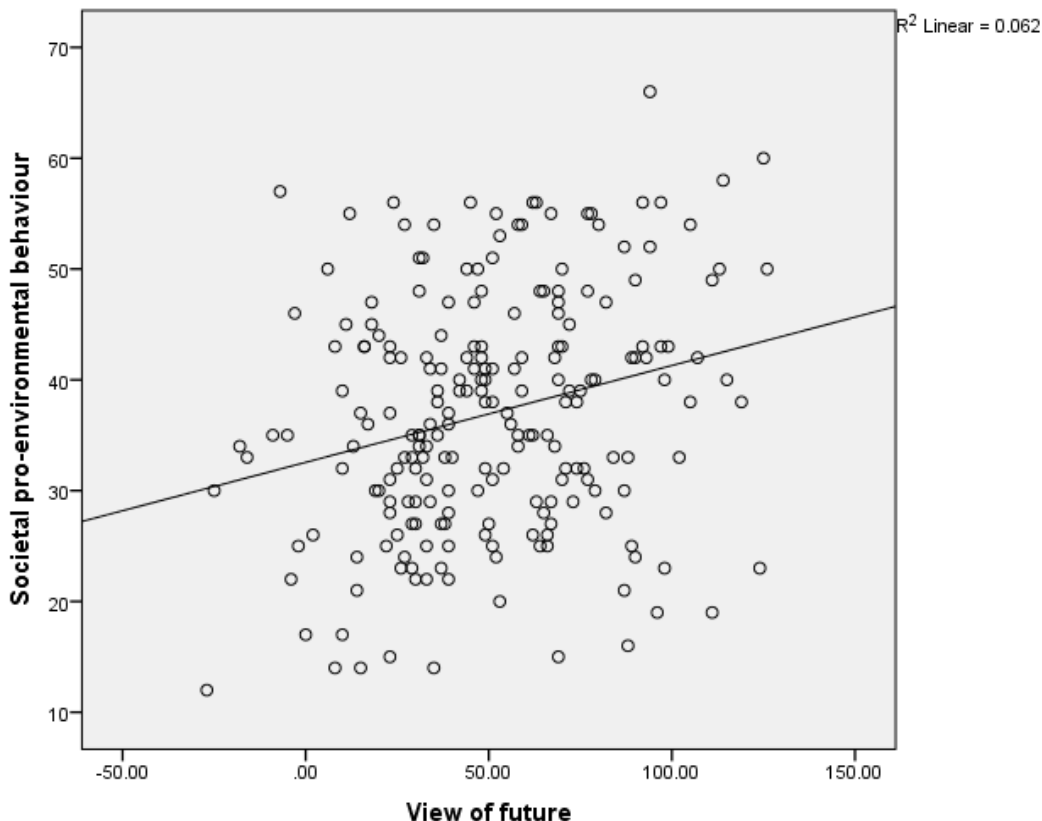


Figure 4.11 Scatter-plot of societal pro-environmental behaviour and view of future

4.5.4 Relationship between respondents' views of the future and their overall pro-environmental behaviour

Table 4.21 shows the results of the correlation between respondents' views of the future and their tendency to behave pro-environmentally overall. This is investigated through the use of the Pearson product-moment correlation coefficient. As detailed in section 4.5, no assumptions required for a correlation calculation are breached. There is a positive, but weak, relationship between the two variables ($r = .249$, $n = 211$, $p < .05$). The scatter-plot of this calculation is shown in Figure 4.12.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Table 4.21

Relationship between respondents' views of the future and their overall pro-environmental behaviour

		View of future	Overall pro-environmental behaviour
View of future	Pearson	1	.249
	Sig. (2-tail)		.000
	N	220	211
Overall pro-environmental behaviour	Pearson	.249	1
	Sig. (2-tail)	.000	
	N	211	238

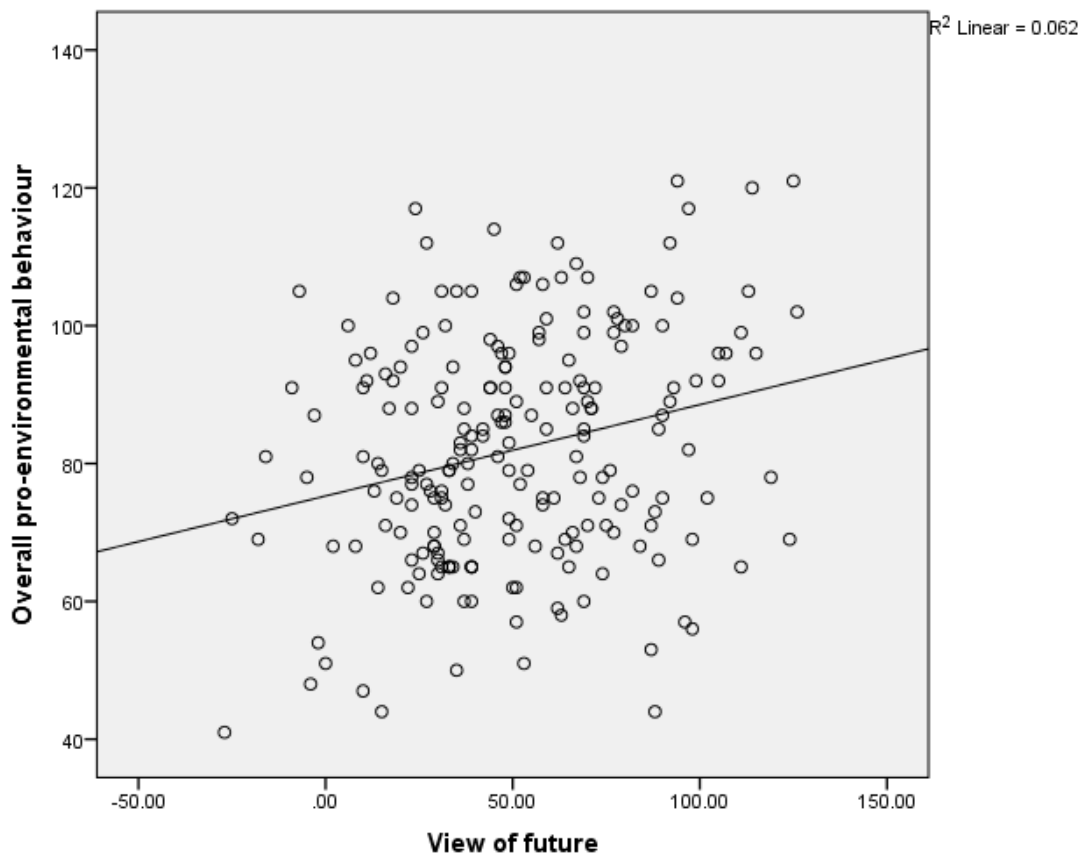


Figure 4.12 Scatter-plot of overall pro-environmental behaviour and view of future

4.6 Chapter summary

Chapter 4 presented the results of this study. The demographic data of respondents was shown, as well as descriptive data on respondents' general attitude towards climate change. Respondents' views of future society were also analysed, along with their tendency to act in a pro-environmental fashion in both a personal and societal capacity.

Once all descriptive data were analysed, correlation calculations were used to determine the relationships between respondents' views of the future and their pro-environmental behaviour. It was shown that respondents' views of the future share a positive but weak relationship with their pro-environmental behaviour.

Chapter 5 will seek to further discuss and interpret the results presented in Chapter 4. This discussion will be supplemented by recommendations for future research, and a conclusion for the study will be presented.

CHAPTER 5: DISCUSSION, RECOMMENDATIONS AND CONCLUSION

Chapter 5 will discuss and interpret results presented in Chapter 4 of this study. This will be done in relation to the research question, aims and objectives of this study as expressed in Chapter 1. The demographic and general attitudes towards climate change of respondents are discussed. Thereafter, the results pertaining to respondents' views of future society, as well as their pro-environmental behaviours are investigated. Subsequently, the results of the correlation between these variables are then deliberated upon.

Once all results have been discussed and interpreted, the limitations of this study are detailed, and further recommendations on how to continue this research are presented. The study is then ultimately concluded in the last section of this chapter.

5.1 Discussion of results

Section 5.1 will discuss the results as presented in Chapter 4 of this study. A total of 254 completed questionnaires were received from respondents by following the methodology laid out in Chapter 3. These results from the data analysis are further examined in relation to existing literature about human behaviours influencing climate change, focusing on the South African context.

5.1.1 Demographic data

This section seeks to investigate the demographic spread of the respondents. Investigating demographic factors assists researchers in showcasing more details about the selected sample. The demographic data is reported in section 4.1 of this study.

By assessing the age of a sample group, researchers can determine what generational section of a population has participated in a study. As indicated in section 4.1.1, respondents were mainly in the age range of 18-24 years, with an average age of about 21.5 years ($M = 21.49$). There were some outliers, with a maximum age of 53 recorded. This indicates that the sample is mainly representative of a young-adult population. As the study was conducted at a university, this young-adult demographic can be expected (Hanel & Vione, 2016; Statistics South Africa, 2011). As the study intended to investigate the relationship between views of the future and pro-environmental behaviours at a higher education institution, this relatively young demographic serves this purpose. It does, however, make generalising the results to the general South African population difficult (Hanel & Vione, 2016). This is further exaggerated by the fact that only 17.61% of the general South African population falls within the 15-24 years age group (World factbook: South Africa, 2018).

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Section 4.1.2 gives an overview of the gender distribution of the sample. It is important to take note of any gender biases that may have an effect on a study. A near 80:20 ratio of female to male respondents is observed. This shows that a large portion of responses were from female respondents ($n = 193$), with male respondents making up a relatively small section of the respondents ($n = 49$). Several respondents chose to not disclose their gender ($n = 12$). This result indicates that the study will possibly be slightly biased towards female opinion. This result is also not totally unexpected, as female representation has been relatively high at South African higher education institutions when compared to the near 50:50 gender distribution found nationally (World factbook: South Africa, 2018). In 2016, women made up 58.1% of the total enrolment for higher education institutions in South Africa (Mkhize, 2017). In order to gain more accurate insight into the general populations of higher education institutions, a gender distribution of 60:40 (female:male) would be more ideal. Another gender-driven factor to take note of is that a plethora of research has shown that women are more likely to believe that climate change is an issue and are also more likely to act to curb climate change (Joireman & Liu, 2014). The skewed gender distribution may thus positively bias the results in terms of willingness to act in a pro-environmental fashion.

The select fields of study that respondents are enrolled in is recorded in section 4.1.3. By determining what avenues of study are pursued by the students in this sample, it is possible to determine how representative the sample is in terms of academic interest. Table 4.3 indicates that the largest group of respondents ($n = 132$) study a general Bachelor of Arts (BA) degree, making up 52.0% of the sample. Those studying a specific BA degree make up a further 12.6% of the sample. The second largest group are those studying B Town and Regional Planning ($n = 37$), at 14.6%. A last noticeable group are those studying B Political Sciences with an 8.7% ($n = 22$) representation. Missing data on field of study is found in 17.3% ($n = 44$) of respondents' responses. The data gathered shows a spread of study topics, with respondents ranging over more than 12 fields. This includes topics from the humanities to science and engineering. The largest part of the sample is recorded within the humanities field ($n = 154$), with far less representation for the science-based fields ($n = 10$). As the study researcher used convenience sampling to collect data, the humanities students were the largest and easiest population to gain access to. This selection only represents a handful of the particular university's offered courses.

Further data is gathered on the household income levels of respondents. Figure 4.2 highlights the results. The economic background of individuals may be an important factor in their consideration of climate change, as Struwig (2010) found that a prevalent attitude in South Africa

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

is that economic imperatives should be placed above the concerns of the environment. This sentiment is also echoed globally (Milfont et al., 2017), with results from large international studies showing that individuals with less social and economic power are less likely to engage in pro-environmental behaviour. From those that disclosed their economic status, the data indicates that 66.7% (n = 155) of respondents' households earn an income greater than that of the average South African household. A further 15.5% (n = 36) earn about the average income. Table 4.4 thus shows that 81% of respondents are from households of equal or higher income than the average local citizen. This shows that the population sampled is generally wealthier than average. This sample may thus be less inclined to place economic issues above environmental ones.

A final section of demographic data collected shows the geographical spread of respondents. It is indicated in Figure 4.3 that the largest part of the sample inhabits urban dwellings, with only 22 respondents stating that they live in rural areas. Previous research in Ethiopia and South Africa found that geographic location was not necessarily a strong driving factor in adopting climate change mitigation behaviours (Bryan et al., 2009). Rather, factors such as awareness, education, and income levels have a stronger influence on pro-environmental behaviours.

The demographic data ultimately creates a framework for viewing the sampled population. In this sample, the data shows that the demographic most represented in this sample are young-adult female students. The majority of students in this sample are pursuing degrees in humanities. Most respondents come from higher-income backgrounds and live in urbanised areas. As the research question aims to determine the views and attitudes of students and how these effect behaviour, the demographic data confirms a young student population.

5.1.2 Beliefs and attitudes towards climate change

Respondents' general beliefs concerning climate change are recorded in Table 4.5. This table shows an overwhelming agreement within the sample that climate change is indeed occurring (n = 246), with 90% (n = 225) of the sample agreeing that human beings are having a significant effect on the global climate. This awareness of global climate decline and the human impact is reflected in other research by the likes of Dunlap (2008) and Powell (2015).

Locally, previous research by Seagar (2009) found that more than 25% of South Africans were not familiar with the concept of climate change. This study indicates that only 3% of respondents do not believe that climate change is occurring, showing far more awareness of the issue amongst the study sample than generally locally expected. As only about 12.45% of South

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Africa's population have higher education qualifications (Statistics in South Africa, 2011), finding discrepancies between Seager's general population findings and the results of this study's sample population is not entirely unexpected. Furthermore, the global academic consensus that climate change is occurring (Powell, 2015) could foster awareness of environmental issues at places like institutes of higher education. This could ultimately expose students at higher education facilities to the realities of climate change on a more direct basis than what members of the general population experience.

In order to determine the extent of this awareness of climate change issues, Table 4.6 details respondent responses to more specific questions on the climate change phenomenon. Table 4.6 indicates that a vast majority of respondents strongly believe that climate change is real ($M = 4.67$). This is followed by relatively strong disagreement that climate change is a natural phenomenon ($M = 2.26$), and strong agreement ($M = 4.42$) that humans contribute significantly to climate change. This result mirrors the results seen in Table 4.5. This indicates that the majority of respondents strongly believe that climate change is occurring, and that human beings are having a significant effect on the phenomenon. Notably, the sample was also in relatively strong agreement ($M = 4.04$) that addressing climate change is an important issue. These results indicate that the majority of respondents agree with the scientific consensus (Powell, 2015) that anthropogenic climate change is a reality. This may again be due to the higher levels of education in the sampled population generating awareness of scientific and global issues such as climate change.

The mean score ($M = 4.04$) on the question of the importance of addressing climate change in Table 4.6 indicates a willingness to engage pro-environmentally. This willingness is also reflected in the results displayed in Table 4.7. Respondents indicate that they would not be embarrassed as being identified as environmentally friendly and would not mind their family and friends thinking of them as pro-environmental. Yet, when questioned about their individual pro-environmental behaviours, Table 4.7 shows responses were not as strongly in agreement as seen in Table 4.6. When asked whether they were concerned with environmental issues, a moderate agreement ($M = 3.60$) was recorded. The statement "I am an environmentally friendly person" was also met with moderate agreement ($M = 3.76$).

The results seen here are in line with the literature discussed in section 2.4 of this study. Past studies by Breunig et al. (2013), Hargreaves (2012), and Rioux and Pasquier (2012), have shown that educated individuals possess an awareness of climate change issues, and believe that these issues need to be addressed. Though, the research also suggests that this viewpoint

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

is underscored by a tendency to not act to curb climate change in individuals' personal lives. The aforementioned research contributes this to the idea that behavioural changes are seen as either having insignificant impact, or are difficult to carry out. This is in line with the new environmental paradigm standpoint, which shows an acute awareness of environmental decline, and a willingness to act, but that very little action is ultimately taken. As climate change is bound to have devastating consequences on the natural environment and the global human population (Arnell & Gosling, 2016; Ayotte, 2009; Demarque et al., 2013; Hallegatte et al., 2015; Intergovernmental Panel on Climate Change, 2014; NASA, 2018; Piao, 2010; Powell, 2015; UNICEF, 2011), it is important to examine the causes of human beings' unwillingness to act to curb this trend.

According to the Collective Futures Framework, present day behaviours may be influenced by specific views of the future (Bain, 2013). This may assist in explaining the phenomenon of awareness of climate change, but a general apathy in preventative actions. In order to better understand respondents' collective beliefs on the future of society, section 5.1.3 will discuss the results relevant to respondents' views of the future.

5.1.3 Views of future society

The first objective of this research study is to measure student attitudes towards future society. Section 5.1.3 aims to fulfil this objective by discussing the results obtained from the relevant sections of this study.

Respondents' views on several aspects of future society were explored. These include societal characteristics, societal values and societal aspects of a future society which acted to curb climate change. Specifically, respondents were asked to answer in terms of how they view South African society in the year 2050 as compared to the present. The detailed results of respondents' views of future society are detailed in section 4.4.

Data gathered on respondents' views of the characteristics of future society are presented in Table 4.8. This table shows that respondents foresaw a very small positive increase in favourable characteristics in future society, though with some disparity amongst results. This indicates that respondents view a future society to have fairly similar characteristics to our present day society.

Data gathered on respondents' views of the values of future society are presented in Table 4.9. The higher mean score ($M = 21.04$) seen in this measure, as compared to that of the characteristics ($M = 8.37$), shows a more positive outlook on an improvement on values in future

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

society. This shows that respondents believe that a future society would have somewhat improved on several value-issues.

Data gathered on respondents' views of the aspects of future society are presented in Table 4.10. A relatively similar result ($M = 20.19$) to the views on values indicates that respondents predict an increase in positive aspects of society.

This positive trend in results shows that respondents mostly harboured positive thoughts about the state of South African society in the year 2050. In order to express this overall view of future society, the discussed measures were combined into a single score. This score, as seen in Table 4.11, indicates that a slight positive outlook is exhibited in respondents' views of future society. Data was normally distributed, indicating a reasonable spread of data as expected from a large population (Pallant, 2013).

This result indicates that the average respondent in this study has a slight positive outlook on future South African society. As a general understanding on respondents' views on the future has been explored, a discussion on respondents' tendency to behave pro-environmentally in the near future follows.

5.1.4 Pro-environmental behaviour

Another objective of this study was to measure the likelihood of pro-environmental behaviour in respondents. Section 5.1.4 explores the results of the study most relevant to meeting this objective.

In order to gauge the pro-environmental behavioural trends of the sample, respondents were asked to rate the likelihood of engaging in a certain pro-environmental behaviour within the next 12 months. Respondents completed two sets of questions pertaining to their pro-environmental behaviours, one relating to their tendency to behave pro-environmentally in a personal context. The other measure relates to pro-environmental behaviour in a wider, societal context. These measures are combined to form a total score on intention to act pro-environmentally.

In terms of personal pro-environmental behaviour, it was found that respondents indicate that they tend to act in a pro-environmental fashion. Several actions centred on activities done in a personal capacity are explored. It is shown in Table 4.13 that respondents intend to take generally environmentally friendly actions within their personal lives over next 12 months.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Respondents show a similar tendency to act in a pro-environmental fashion in societal contexts, though to a lesser extent. A slightly lower mean score ($M = 36.73$) is recorded in Table 4.15 as compared to 4.13. This shows that respondents are more likely to behave pro-environmentally in their private lives than act in a broader social context.

The combined measure of overall tendency to behave in a pro-environmental fashion reflects the results from Table 4.13 and 4.15. Table 4.17 indicates that respondents intend to act on pro-environmental behaviours.

As respondents' views of future society, as well as their tendency to behave pro-environmentally, have been discussed, it is pertinent to explore the relationship between these variables. Section 5.1.5 aims to break down the relationship between the variables by reporting on the results of the correlation calculations marked in Chapter 4.

5.1.5 Relationship between respondents' view of the future and their pro-environmental behaviour.

The research study set out to answer the question of what the relationship between students at a South African higher education institution's views of future society and their pro-environmental behaviour is. In order to answer this question, the following objectives were laid out:

- Measure student attitudes towards future society
- Measure the likelihood of students to act in a pro-environmental fashion
- Examine the relationship between students' attitudes towards future society and their present day behaviour.

The first two objective points are met in section 5.1.3 and 5.1.4 respectively, and are necessary precursors to the fulfilment of the third and final objective. Section 5.1.5 addresses the third objective by discussing the relationship found between respondents' views of future society, and their tendency to behave pro-environmentally. This will also ultimately answer the initial research question as laid out in Chapter 1.

To create an understanding of how individuals' view of the future can affect their pro-environmental behaviour, respondents' tendency to behave pro-environmentally in both personal and societal capacities are correlated with their view of the future.

To begin this discussion, the representation of the relationship between respondents' personal pro-environmental behaviour and their view of the future can be found in Table 4.19 and

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Figure 4.10. The relationship between a respondent's view of the future and their tendency to act pro-environmentally in a personal capacity is shown to be very weak ($r = .136$); however, there is still a positive relationship between the variables. This indicates that individuals with a more positive view on the future are slightly more likely to act in a pro-environmental fashion within their own personal capacity. Thus, as an individual's views on future society increase positively, their tendency to act pro-environmentally in their personal lives may also increase to a small yet significant degree. However, a correlation coefficient of determination is calculated to be 1.8% ($r^2 = .018$). The coefficient of correlation indicates the degree to which one variable determines, or predicts, the relationship with another variable (Gravetter & Forzano, 2012). In this case, the variable of view of the future only accounts for 1.8% of the respondents' willingness to engage pro-environmentally.

As the relationship between an individual's view of the future and their personal pro-environmental has now been established, the relationship between view of the future and societal pro-environmental behaviour is explored. Table 4.20 and accompanying Figure 4.11 indicate the relationship between respondents' views of future society and their tendency to act pro-environmentally. As seen in the table, a weak, yet positive relationship exists between the variables ($r = .249$). This result indicates that individuals with a positive outlook on future society are more inclined to behave in a pro-environmental fashion in a societal context. It would also imply that as an individual's view of the future improves, their societal pro-environmental behaviour is likely to increase somewhat. A decrease in positivity of future outlook can ultimately have an adverse effect on societal pro-environmental behaviour. The coefficient of determination ($r^2 = .062$) of this correlation result indicates that future outlook accounts for 6.2% of the motivation behind individuals' tendency to behave in a pro-environmental fashion in a societal context.

Notably, there is a slightly stronger relationship between respondents' view of the future and their societal pro-environmental behaviour ($r = .249$), as opposed to their personal pro-environmental behaviour ($r = .136$). This result indicates that an individual who experiences an increase in his/her view of future society is likely to have an increase in his/her exhibited pro-environmental behaviour in a societal context. Past research (Breunig et al., 2013; Hargreaves, 2012; Rioux & Pasquier, 2012) has also indicated that, even if aware of environmental decline, individuals are hard-pressed to actively act to curb its effects on a personal level. The findings in the literature are thus also reflected in these results.

In order to fully meet the third and final objective of this study, as well as answer the research question, it is necessary to discuss the relationship between students' views on future

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

society and their overall pro-environmental behaviour tendencies. Table 4.21 and Figure 4.12 jointly showcase the relationship between the two variables. The results indicate a weak, but statistically significant positive correlation ($r = .249$). Ultimately, as seen by these results, it is feasibly possible that increased positivity in future outlook can be an important factor in encouraging individuals to act in an increased pro-environmental fashion. The variable of future outlook is thus found to predict 6.2% ($r^2 = .062$) of the respondents' tendency to behave in an overall pro-environmental fashion. This result is also in line with the findings from previous research, as shown in Joireman and Liu (2014), where many different variables are shown to have potential impact on individuals' tendencies to act pro-environmentally. These variables can include a wide range of personal preferences and situations, ranging from political leaning to economic status.

The discussion relating to this finding on the relationship between students' views of the future and their pro-environmental behaviour is necessarily to answer the research question: What is the relationship between students at a South African higher education institution's views of future society and their pro-environmental behaviour? This study finds a weak yet positive relationship between students' attitudes toward the future and their tendency to behave in a pro-environmental fashion. This correlation does not imply that a positive outlook on the future causes positive changes in pro-environmental behaviour. Rather, it indicates the presence of a relationship between the two variables. The results of the study are thus interpreted as follows: As respondents' positive attitudes towards the future increase, there may be an increase in their pro-environmental behaviours. Though, if respondents garner an increasingly negative attitude towards the future, they may enact increasingly negative tendencies in terms of pro-environmental actions. Other studies have shown multiple factors that can inform pro-environmental behaviour, from political leaning to gender to income level (Joireman & Liu, 2014; Seager, 2008). View of the future may thus be one of the many factors that impact pro-environmental behaviour tendencies in students at a higher education facility in South Africa.

A final hurdle to consider when exploring the results of a correlation calculation is the problem of directionality (Gravetter & Forzano, 2012). The correlation calculation has determined that a weak, yet significant, relationship exists between respondents' views of the future and their pro-environmental behaviour. Though, the calculation cannot determine which of the two variables dictate the direction of this relationship. In the context of this study, it is possible that as respondents engaged in more pro-environmental behaviour, their view of the future became more positive. The results of this study thus merely indicate the presence of a relationship between the

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

variables of view of the future and pro-environmental behaviour. The results cannot determine which of the two variables cause this trend.

In terms of the theoretical standpoint of this study, the collective futures approach, this result can be explained by the model in Figure 2.2. Present day events, like political unrest, economic strain, and global warming, shape individual's outlook on future society. These views have a direct impact on present day actions, like support of environmental policies, or pro-environmental behavioural tendencies (Bain et al., 2013). This study finds that a positive outlook on future society correlates positively towards present-day pro-environmental behaviour. This indicates that a relationship does indeed exist between future society and current trend in behaviour.

This information can be of valuable use in the attempt to foster positive, pro-environmental behaviours in individuals. In order to encourage pro-environmental behaviour in the present day, thereby assisting in securing a positive future, it will be beneficial to foster a positive outlook on the future.

5.2 Limitations

Section 5.2 contains a critical reflection on the research study. This reflection is necessary to addressing possible shortcomings in this study. Limitations can be present in multiple factors of a research study, from methodology to the interpretation of results. Any item that can adversely impact the interpretation of results is considered a limitation (Gravetter & Forzano, 2012). The limitations lead to recommendations for future research.

5.2.1 Limitations regarding data collection instrument

This study formed part of the larger Collective Futures project, as detailed in Chapter 1. The data is thus limited to the requirements of the larger project. As such, a pre-determined questionnaire was used to gather data. The use of a pre-determined questionnaire meant that data gathered was limited to the specific points investigated by this questionnaire. Using different instruments with a broader scope of questioning could assist in creating a more wholistic image of society. Questionnaires pose the further hurdle of being self-report measures. Self-report measures have been shown to suffer from response bias (Rosenman, Tennekoon, & Hill, 2011). This refers to peoples' tendency to respond with a positive personal bias when asked to evaluate themselves. As studies that investigate the relationship between variables are sometimes considered to be statistically weak in nature, even a slight positive bias can interfere with result

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

accuracy (Rosenman et al., 2011). The self-evaluation positive bias could thus be a limiting factor on the accuracy of these results.

Previous studies have also shown a plethora of other aspects that can affect individuals' tendencies to behave pro-environmentally. Aspects such as an individual's gender, political alignment, general beliefs on climate change, and their economic background could all contribute toward their tendency to behave pro-environmentally (Joireman & Liu, 2014). To create a more complete image as to the ultimate causes of climate change-causing behaviours, far more data is required.

5.2.2 Limitations regarding sample size and selection

Some limitations are present regarding the sample used in this study. Non-random convenience sampling was used to select respondents. This method of sampling is relatively weak in terms of ability to create a representative sample of a population (Gravetter & Forzano, 2012). Combined with the relatively small sample size ($n = 254$), the results of this would potentially have inaccuracies if generalised back into a larger population. Furthermore, psychological studies have often been known to use student populations as samples, and then generalise these results (Hanel & Vione, 2016). This method of generalisation has been shown to be largely inaccurate (Hanel & Vione, 2016). If these results are to be generalised, the limited diversity of the sample would also lead to potential errors. The skewed gender distribution of the sample may potentially have affected the results. It has been shown that women are more likely to believe in, and act to curb, climate change (Joireman & Liu, 2014). As the gender distribution shows a majority female respondent group, the results may be biased.

5.2.3 Limitations regarding prior research

Much research has been done on the topic of climate change, with thousands of research papers published on the topic (Powell, 2015). Though, as expressed in Chapter 2, there is a lack of South African research on the topic of human behaviour related to climate change (Ziervogel et al., 2014), leading to contradictory findings and gaps in knowledge. South Africa, along with other developing countries, face many challenges – poverty, unemployment, lacking health-care and education are often deemed to be of more pressing concern than environmental decline (Hallegatte et al., 2015; Struwig, 2010). There is thus a limited amount of research dedicated to climate change, and thus limited data available to compare the results of this study with. This factor potentially lowers the validity of the results of this study (Gravetter & Forzano, 2012), as there are limited past results from which to compare aspects such as validity and reliability.

5.3 Recommendations for future research

The science of psychology has a definite role to play in the global struggle against climate change (Swim et al., 2011b). In order to better understand human actions and behaviours with regard to the climate and larger environment, further research must constantly be conducted. As the results of this study may have some the potential to inform how to encourage pro-environmental behaviour, much further research into this topic is required to produce valuable results geared to lessening the negative effects of global environmental decline. Following is the recommendations for future research.

5.3.1 Expanding the scope of data collection

In order build a more comprehensive idea of the relationship the larger student (and ultimately South African) population shares between views of future society and pro-environmental behaviour, a more representative sample is required. This study focuses on the attitudes and behaviours of individuals enrolled at a higher education institution in South Africa. It would be necessary to study a much more diverse sample before results could be accurately generalised, as student samples are known to not accurately reflect general populations (Hanel & Vione, 2016), even if they are often used in psychological studies. Furthermore, different measures can be employed to more accurately assess aspects such as behaviour. Longitudinal studies would provide far greater insight into actual behaviour, and using methods other than self-report could assist in minimising bias. Finally, to fully understand the multiple causes of human climate-change causing behaviours, it will be necessary to study a wide range of topics from broader theoretical standpoints. Much further data is needed to determine the root causes of human climate-change causing behaviour.

5.3.2 Creating impactful changes

The results of the study indicate a positive relationship between an individuals' view of the future and their pro-environmental behavioural tendencies. The study, however, does not seek to address how this information can be implemented in a real-world environment. By conducting further research on topics such as the process of fostering a positive future outlook, research could have broader positive impacts on society.

5.4 Conclusion

Climate change has caused severe and possibly irreparable damage to the natural environments of our planet (Arnell & Gosling, 2016; Ayotte, 2009; Demarque et al., 2013; Hallegatte et al., 2015; Intergovernmental Panel on Climate Change, 2014; NASA, 2018; Piao, 2010; Powell, 2015; UNICEF, 2011). It has become increasingly apparent that human beings are at the root of the planet-wide rapid rise in temperature wreaking havoc on the global climate (Powell, 2015). The negative impacts of this rapid, accelerated change will soon begin to bare dire consequences, if these consequences have not already been felt. It is pertinent to explore the root of the issue of climate change, the human being, in order to attempt to curb this dangerous phenomenon.

This study explored the relationship between future outlook and a tendency to act pro-environmentally. The results indicated a positive, but weak, relationship between positive future outlook and pro-environmental behaviour. Even though the relationships between the variables were relatively weak, it is important to continuously explore possible avenues of research. Insights into human behaviour surrounding climate change will ultimately assist in reducing the damaging impact humans are having on the environmental and climate.

6. References

- Anderson, B.A., Romani, J. H., Phillips, H., Wentzel, M., & Tlabela, K. (2007). Exploring environmental perceptions, behaviors and awareness: water and water pollution in South Africa. *Population and Environment*, 28, 133-161.
- Arnell, N.W., & Gosling, S.N. (2016). The impacts of climate change on river flood risk at the global scale. *Climatic Change*, 134, 387-401.
- Ayotte, A. (2009). *Ecotourism as a form of sustainable development in South Africa*. (Unpublished thesis). Queen's University, Canada. Retrieved from <http://hdl.handle.net/1974/5190>
- Bain, G. B., Hornsey, M. J., Bongiorno, R., Kashima, Y., & Crimston, D. (2013). Collective futures: How projections about the future of society are related to actions and attitudes supporting social change. *Personality and Social Psychology Bulletin*, 39(4), 523-539.
- Benoit, N. (2015). The study of the perceptions of climate change at two South African universities. (Masters Dissertation). Retrieved from <http://uir.unisa.ac.za/handle/10500/20047>
- Bohner, G., & Dickel, N. (2011). Attitude and attitude change. *Annual Review of Psychology*, 62, 391-417.
- Breunig, M., Murtell, J., Russell, C., & Howard, R. (2013). The impact of integrated environmental studies programs: are students motivated to act pro-environmentally? *Environmental Education Research*, 20(3), 1-15.
- Broomell, S. B., Budescu, D. V., & Por, H. (2015). Personal experience with climate change predicts intentions to act. *Global Environmental Change*, 32, 67-73.
- Bryan, E., Deressa, T. T., Gbetibouo, G. A., & Ringler C. (2009). Adaptation to climate change in Ethiopia and South Africa: options and constraints. *Environmental science & Policy*, 12(4), 413-426.
- Carvajal, L. (2008). Impacts of climate change on human development. *Human Development Report 2007/2008*. United Nations Development Programme: Human Development Reports. Retrieved from <http://hdr.undp.org/en/content/impacts-climate-change-human-development>
- Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R. L, Verheggen, B., Maibach, E. W., ... Rice, K. (2016). Consensus on consensus: A synthesis of consensus estimates on human-

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

- caused global warming. *Environmental Research Letters*, 11(4). doi:10.1088/1748-9326/11/4/048002
- Demarque, C., Apostolidis, T., & Joule, R. (2013). Consideration of future consequences and pro-environmental decision making in the context of persuasion and binding commitment. *Journal of Environmental Psychology*, 36, 214-220.
- Dunlap, R. E. (2008). The new environmental paradigm scale: From marginality to worldwide use. *The Journal of Environmental Education*, 40(1), 3-18.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4.
- Fujii, S. (2006). Environmental concern, attitude toward frugality, and ease of behavior as determinants of pro-environmental behavior intentions. *Journal of Environmental Psychology*, 26, 262-268.
- Garud, R., Gehman, J., & Karunakaran, A. (2014). Boundaries, breaches, and bridges: The case of Climategate. *Research Policy*, 43(1), 60–73. doi:10.1016/j.respol.2013.07.007
- Global Greenhouse Gas Emissions Data. (2018). Retrieved from www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data
- Gravetter, F. J., & Forzano, L. B. (2012). *Research methods for the behavioral sciences*. Cengage Learning.
- Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey Methodology*. Hoboken, NJ: John Wiley & Sons.
- Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., ... Vogt-Schilb. (2015). *Shock waves: Managing the impacts of climate change on poverty*. Washington, DC: World Bank.
- Hanel, P. H. P., & Vione, K. C. (2016). Do student samples provide an accurate estimate of the general public? *Public Library of Science*, 11(12). doi:10.1371/journal.pone.0168354.
- Hansen, J., & Lebedeff, S. (1988). Global surface air temperatures: Update through 1987. *Geophysical Research Letters*, 15, 323-326. doi:10.1029/GL015i004p00323.
- Hargreaves, T. (2012). Questioning the virtues of pro-environmental behaviour research: Towards a phronetic approach. *Geoforum*, 43, 315-324.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Harley, C. D., Hughes, R. A., Hultgren, K. M., Miner, B. G., Sorte, C. J., Thornber, C.S., Rodriguez, L. F., Tomanek, L., & Williams, S. L. (2006). The impacts of climate change in coastal marine systems. *Ecology Letters*, *9*(2), 228-241.

Health Professions Council of South Africa. (2008). *The general ethical guidelines for health researchers*. Pretoria, South Africa: Health Professions Council of South Africa

Inglehart, R. (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *Political Science and Politics*, *28*(1), 57-72.

Intergovernmental Panel on Climate Change. (2014). *Climate change 2014 synthesis report*. Retrieved from www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

Joireman, J., & Liu, R. L. (2014). Future-oriented women will pay to reduce global warming: Mediation via political orientation, environmental values, and belief in global warming. *Journal of Environmental Psychology*, *40*, 391-400.

Kenya National Human Development Report. (2013). *Climate change and human development: Harnessing emerging opportunities*. United Nations Development Programme: Kenya. Retrieved from <http://hdr.undp.org/en/content/climate-change-and-human-development>

Koteyko, N., Jaspal, R., & Nerlich, B. (2013). Climate change and “climategate” in online reader comments: a mixed methods study. *The Geographical Journal*, *179*(1), 74–86. doi:10.1111/j.1475-4959.2012.00479.x

LaRose, R., & Tsai, H. S. (2014). Completion rates and non-response error in online surveys: Comparing sweepstakes and pre-paid cash incentives in studies of online behavior. *Computers in Human Behavior*, *34*, 110-119.

Le Treut, H., Somerville, R., Cubasch, U., Ding, Y., Mauritzen, C., Mokssit, A., Peterson, T., & Prather, M. (2007). Historical overview of climate change science. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, & H. L. Miller (Eds.), *Climate Change: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 93-127. Cambridge, United Kingdom and New York, NY: Cambridge University Press.

Levine, D. S., & Strube, M. J. (2012). Environmental attitudes, knowledge, intentions and behaviors among college students. *The Journal of Social Psychology*, *152*(3), 308-326.

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

- Milfont, T.L., Bain, P.G., Kashima, Y., Corral-Verdugo, V.C, Pasquali, C., Johansson, L.O., ... Einarsdottir, G. (2017). On the relation between social dominance orientation and environmentalism: A 25-nation study. *Social Psychological and Personality Science*. Retrieved from <http://dro.dur.ac.uk/22391/>
- Minnaar, L., & Heystek, J. (2013). Online surveys as data collection instruments in education research: A feasible option? *South African Journal of Higher Education*, 27(1), 162-183.
- Mkhize, H. (2017). University graduation numbers are on the rise – StatsSA. Retrieved from <https://www.iol.co.za/business-report/university-graduation-numbers-are-on-the-rise-statssa-12109853>
- Mugambiwa, S., & Dzomonda, O. (2018). Climate change and vulnerability discourse by students at a South African university. *Jàmbá: Journal of Disaster Risk Studies*, 10(1), 6.
- National Aeronautics and Space Administration. (2018). Evidence of Climate Change. Retrieved from <http://climate.nasa.gov/evidence>
- North, G. R., Biondi, F., Bloomfield, P., Christy, J. R., Cuffey, K. M., Dickinson, R.E., ... Wallace, J. M. (2006). *Surface temperature reconstructions for the last 2,000 years*. Washington, D.C: The National Academic Press
- Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (5th ed.). Allen & Unwin.
- Park, J., Bain, P., & Kusumi, T. (2015). Nuclear power and Japan's collective future: Understanding beliefs about how nuclear policies will affect society. *Journal of Pacific Rim Psychology*, 9(2), 78-85.
- Piao, S., Ciais, P., Huang, Y., Shen, Z., Peng, S., Li, J. ... Fang, J., (2010). The impacts of climate change on water resources and agriculture in China. *Nature*, 467(2), 43–51.
- Pitcher, D., & Katsikopoulos, K. V. (2008). Green defaults: Information presentation and pro-environmental behaviour. *Journal of Environmental Psychology*, 28, 63-73.
- Powell, J. L. (2015). Climate scientists virtually unanimous: anthropogenic global warming is true. *Bulletin of Science, Technology and Society*, 35(5-6), 121-124. doi:10.1177/0270467616634958

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

- Reuss, A. (2015, March/April). *Climate change: What is it? What causes it? What can we do about it?* Dollars & Sense, 34-38.
- Rioux, L., & Pasquier, D. (2012). A longitudinal study of the impact of an environmental action. *Environmental Education Research, 19*(5), 1-14.
- Ripper, C. J., Kyle, G. T., Sutton, S. G., Yoon, J. I., & Tobin, R. C. (2013). Australian residents' attitudes towards pro-environmental behaviour and climate change impacts on the Great Barrier Reef. *Journal of Environmental Planning and Management, 56*(4), 494-511.
- Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural & Healthcare Research, 2*(4), 320–332. doi:10.1504/IJBHR.2011.043414
- Sadock, B. J., & Sadock, V. A. (2007). *Kaplan & Sadock's synopsis of psychiatry* (10th ed.). Philadelphia, PA: Wolters Kluwer Health.
- Saris, W. E., & Gallhofer, I. N. (2014). *Design, evaluation, and analysis of questionnaires for survey research* (2nd ed.). Place: Wiley.
- Seager, J. (2008). Blowing hot or cold: South African attitudes to climate change. *HSRC Review, 6*(3), 9-10.
- Smith, J. R., Louis, W. R., Terry, D. J., Greenway, K. H., Clarke, M. R., & Cheng, X. (2012). Congruent or conflicted? The impact of injunctive and descriptive norms on environmental intentions. *Journal of Environmental Psychology, 32*, 353-361.
- Statistics South Africa. (2011). *Gender statistics in South Africa 2011*. Retrieved from <http://www.statssa.gov.za>
- Struwig, J. (2010). South African's attitudes towards the environment. In B. Roberts, M. Kivilu, & Y. D. Davids (Eds.), *South African social attitudes: Reflection on the age of hope* (pp. 198-219). Cape Town: HSRC Press.
- Swim, J. K., Clayton, S., Doherty, T. J., Gifford, R., Howards, G. S., Reser, J., Stern, P. C., & Weber, E. U. (2011a). Psychology and global climate change: Addressing a multi-faceted phenomenon and set of challenges. *Report of the American Psychological Association Task Force on the Interface Between Psychology and Global Climate Change*. Retrieved from www.apa.org/science/about/publications/climate-change.aspx

RELATIONSHIP BETWEEN VIEW OF FUTURE AND PRO-ENVIRONMENTAL BEHAVIOUR

Swim, J. K., Stern, P. C., Doherty, T. J., Clayton, S., Reser, J. P., Weber, E. U., ... & Howard, G. S. (2011b). Psychology's contributions to understanding and addressing global climate change. *American Psychologist*, 66(4), 241-250.

United Nations Children's Fund. (2011). *Exploring the impact of climate change on children in South Africa*. Pretoria: UNICEF South Africa. Retrieved from https://www.unicef.org/southafrica/resources_9983.html

Weart, S. R. (2008). *The discovery of global warming*. Cambridge, MA: Harvard University Press.

Whitmarsh, L. (2008). What's in a name? Commonalities and differences in public understanding of "climate change" and "global warming". *Public Understanding of Science*, 18(4), 401-402.

World factbook: South Africa. (2018). The Central Intelligence Agency of the USA. Retrieved from www.cia.gov/library/publications/the-world-factbook/geos/sf.html

Ziervogel, G., New, M., Van Garderen, E. A., Midgley, G., Taylor, A., Hamann, R., ... & Warburton, M. (2014). Climate change impacts and adaptation in South Africa. *WIREs Climate Change*, 5, 605-620. doi:10.1002/wcc.295

Zimbabwe Human Development Report. (2017). *Climate change and human development: Towards building a climate resilient nation*. United Nations Development Programme: Zimbabwe. Retrieved from <http://hdr.undp.org/en/content/national-human-development-report-2017-zimbabwe>