School of Management Studies

Mindsets: Lived Experiences of Black Actuarial Science Students

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COMPULSORY DECLARATION:

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, cited and referenced.

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Abstract

This qualitative study employed semi-structured interviews and an intersectionality lens to explore the experiences of six black actuarial science students at the University of Cape Town (UCT). With the underrepresentation of black African students in South Africa's actuarial science exacerbating societal imbalances, the research aims to unveil their experiences and factors shaping these students' mindsets. Mindsets are influenced by parental feedback, socioeconomic status, background, and socialisation, among other factors. At historically white UCT, challenges faced by black African actuarial science students stem from a clash between their diverse mindsets and the prevailing white-oriented academic environment. The study reveals that academic excellence and the desire to uplift families' socioeconomic status motivate students amid challenges tied to socioeconomic factors, language barriers, and disparate educational backgrounds. The mindset analysis reveals that prevalent discouragement, external expectations, and self-doubt rooted in predetermined negative beliefs foster a fixed mindset among these students.

Conversely, factors fostering a growth mindset include resilience, determination, and socioeconomic motivations. Positive role models, supportive lecturers, and optimistic career prospects contribute to a growth-oriented perspective, emphasising individual agency, positive influences, and socioeconomic considerations. The findings underscore the urgent need for universities and actuarial science programmes to implement targeted support mechanisms addressing the unique challenges black actuarial science students face. The study advocates for increased racial representation, linguistic inclusivity, and socioeconomic equity within actuarial science, highlighting the importance of fostering a supportive, inclusive learning environment. Furthermore, it urges academic institutions to invest in mental health services to alleviate the emotional toll associated with actuarial science studies.

Keywords: Black African students; actuarial science, lived experiences, mindsets, intersectionality, University of Cape Town.

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Chapter One: Introduction

This chapter introduces the study, presenting the backdrop against which it unfolds, specifically focusing on the landscape of actuarial science studies in South Africa. Furthermore, it elucidates the significance of examining mindsets and highlights why this research emphasises the mindsets of black [1] actuarial science students.

1.1 Study Background

Obtaining an actuarial science qualification, particularly in South Africa, is a formidable challenge. This difficulty is underpinned by the country's elevated university attrition rates and a scanty actuarial workforce, totalling less than two thousand professionals (Actuarial Society of South Africa, 2022; Ramjee et al., 2013; Strugnell & Ranchod, 2018). The elevated university attrition rates for actuarial science students can be attributed to a range of challenges, including the challenging transition from high school to university, disparities in educational backgrounds, language barriers, and the demanding nature of coursework (Naidoo, 2008; Strugnell & Ranchod, 2018). Most notably, Naidoo (2008) and Ramjee et al. (2013) highlight that the actuarial science profession in South Africa is not diverse and that students from previously disadvantaged groups may face additional barriers in their academic journeys. South Africa faces the enduring challenge of addressing the structural inequalities stemming from its apartheid past (Lephalala & Makoe, 2012; Mzangwa, 2019; Ndimande, 2016). The advantages granted to the white population during the apartheid era continue to manifest in secondary education, access to tertiary education, and the hierarchical composition of corporate leadership in South Africa (Mzangwa, 2019; Ndimande, 2016; Taylor & Yu, 2009). This disparity is also evident in the field of actuarial practice. As of 2022, statistics reveal that out of 1754 fellow actuaries, a significant majority of 1315 (75%) were identified as white (ASSA, 2022). This lack of diversity within the actuarial profession mirrors broader societal imbalances and reflects the enduring impact of historical inequalities (Mzangwa, 2019). As asserted by Strugnell and Ranchod (2018), the ramifications of the demographic profile of the profession extend far beyond the surface. The prevalence of a single dominant group within the profession poses

[1] Black specifically pertains to individuals of black African descent. In South Africa, the term black is often used in a broader sense to encompass various racial and ethnic groups, including black Africans, Indians, and Coloured individuals. However, for this study, the researcher has restricted the term black to refer exclusively to black Africans.

significant risks, such as the potential lack of diversity in thinking, the absence of role models, and the perception of gatekeeping practices (Davis, 2007; Phume & Bosch, 2018; Strugnell & Ranchod, 2018).

Higham (2012) and Kessi and Cornell (2015) argue that despite the emphasis on transformation, leading to an increase in the number of black students attending historically white-only universities, there have been notable and direct resistance to this transformation. The media has been saturated with discourses portraying black students as the 'problem,' using arguments of low standards and reverse racism instead of acknowledging them as rightful co-beneficiaries of the transformation process (Kessi & Cornell, 2015). The lack of transformation is especially prevalent in fields like actuarial science within the university, where most students continue to be white (Phume & Bosch, 2018; Ramjee et al., 2013; Strugnell & Ranchod, 2018). Idahosa and Mkhize (2021) underscore the significant impact of underrepresentation in Science, Technology, Engineering, and Mathematics (STEM) fields, contributing to the perception of actuarial science as a predominantly white field. This perception acts as a deterrent for black students, fostering a sense of exclusion. Murray et al. (2022) assert that this sense of exclusion is exacerbated when black students are underrepresented in their degree programmes or universities. The lack of diversity highlights the enduring impact of historical inequalities, emphasising the pressing need to understand the experiences of black students in such spaces (Lephalala & Makoe, 2012; Mzangwa, 2019; Ndimande, 2016). Existing research highlights inequality within this field, predominantly affecting black students who grapple with resource limitations, inadequate support and financial constraints when it comes to funding their studies (Motsabi et al., 2020; Mzangwa, 2019; Naidoo & McKay, 2018; Strugnell & Ranchod, 2018).

Furthermore, these students encounter socioeconomic obstacles. Motsabi et al. (2020) highlight the additional burden they encounter as they bear the financial responsibility of supporting their families, which often compels them to navigate the complexities of the actuarial science degree while balancing work commitments, hampering their ability to concentrate on their studies. Despite post-apartheid initiatives aimed at tackling educational inequities, educational disparities persist among black students in South Africa. These discrepancies contribute to a notable deficit in foundational knowledge of actuarial science (Naidoo, 2008; Naidoo & McKay, 2018).

In addition, the field is known for its rigorous demands and intense competition, necessitating students to have a solid foundation in mathematical, statistical, and analytical proficiencies (Naidoo, 2008; Smith & Schumacher, 2005, 2006). While these competencies are

indisputably crucial, as the profession revolves around the application of mathematical and statistical methods for assessing and managing financial and business risks, it is worth noting that psychological attributes, such as mindsets, exert a significant influence on students' overall success (Beigi et al., 2011; Blackwell et al., 2007; Yeager & Dweck, 2012). Mindsets or implicit theories refer to individuals' beliefs about the malleability of human attributes (Bernecker & Job, 2019; Dweck & Leggett, 1988; Dweck & Yeager, 2019). A fixed mindset is the perception that particular human attributes, such as intelligence or personality, are fixed and unchangeable. In contrast, a growth mindset sees human attributes as malleable through effort and persistence (Dweck, 2017; Dweck & Yeager, 2019). Dweck (2017) emphasises the profound influence of individuals' adopted beliefs on their interactions with the surrounding world. This notion holds significant weight as research has demonstrated that these mindsets are pivotal in predicting crucial outcomes in academic achievement and various interpersonal domains (Bernecker & Job, 2019; Blackwell et al., 2007; Hwang et al., 2016).

The impact of these mindsets is particularly noteworthy when considering their implications on academic performance and overall well-being. A growth mindset, for instance, has emerged as a powerful predictor of positive educational and emotional experiences. It has been associated with heightened motivation, outstanding academic performance, and an increased capacity for experiencing positive emotions (Blackwell et al., 2007; Dweck, 2017; Hwang et al., 2016; Park et al., 2020). Conversely, the ramifications of a fixed mindset are equally compelling but contrasting. This belief system has been linked to lower motivation levels, decreased life satisfaction, and challenges in achieving academic success (Good et al., 2012; Hwang et al., 2016; Schroder et al., 2019). The underlying reasons for the positive outcomes linked to a growth mindset are often ascribed to the profound belief held by individuals with such a mindset. These individuals perceive challenges and barriers to success not as intimidating threats to their abilities but as valuable opportunities for personal growth and development (Dweck & Yeager, 2019; Yeager & Dweck, 2012; Yeager et al., 2012). This perspective fosters a transformative approach to facing adversity, enabling them to embrace challenges with a sense of resilience, curiosity, and a willingness to learn (Blackwell et al., 2007; Park et al., 2020).

In essence, individuals who embrace a growth mindset demonstrate a profound comprehension of the potential for their abilities to evolve through persistent effort and dedication. This understanding forms the foundation of their mindset, leading them to adopt a proactive approach towards academic challenges. With a firm belief in their capacity to grow and improve, they are naturally driven to invest the necessary effort to achieve academic

success (Aditomo, 2015; Dweck, 2017; Park et al., 2020). This understanding of the transformative nature of their abilities empowers them to face challenges with optimism and resilience, as they recognise that each obstacle is an opportunity to learn and progress (Blackwell et al., 2007; Dweck & Yeager, 2019). Consequently, their inclination to invest in their academic endeavours reflects their enlightened perception of personal development and the path to achievement (Yeager et al., 2012). Despite the positive outcomes associated with a growth mindset, there is limited research exploring the experiences and mindsets of black actuarial science students in South Africa. Studies conducted locally have highlighted the significant role mindset plays in resilience and well-being, emphasizing the link between mindset and personal development in overcoming challenges (O'Neil & Kruger, 2022). These findings underscore the importance of understanding how mindset shapes academic and personal outcomes, particularly in contexts marked by systemic barriers. Addressing this gap offers an opportunity to contribute to the growing body of research on mindset in South Africa, with a focus on fostering inclusive and supportive academic environments.

In the context of historically white-only universities (such as the University of Cape Town), where representation is lacking and an alienating atmosphere prevails, the challenges faced by black actuarial science students are especially pronounced (Bazana & Mogotsi, 2017; Cornell & Kessi, 2016; Sennett et al., 2003). These students enter an environment where their diverse mindsets, shaped by unique backgrounds and upbringing, collide with the dominant, white-oriented academic landscape (Higham, 2012; Kessi & Cornell, 2015; Sennett et al., 2003). Examining the experiences of black actuarial science students in such spaces is crucial because it can provide insights into the intersection of racial inequalities, class dynamics, and other social differences within the academic context in South Africa. The study is particularly relevant in this context as it sheds light on how these students navigate and negotiate their diverse mindsets in an academic environment historically dominated by white-oriented perspectives (Higham, 2012; Sennett et al., 2003). The legacy of apartheid and the exclusionary practices that characterised these institutions for many decades, as highlighted by Kessi and Cornell (2015) and Sennett et al. (2003), can be unwelcoming to black students, contributing to the importance of understanding the challenges they face in this context. As these students navigate towards careers in a white-dominated field, their barriers call for a profound understanding of their experiences and the factors that shape their mindsets (Campbell et al., 2021).

Against this backdrop, the proposed research question for this study is: What shapes black actuarial science students' mindsets?

By employing an intersectionality lens, this study aims to illuminate the nuanced and interconnected factors shaping the mindsets of black actuarial science students, acknowledging the intricate interplay of race, academic pursuits, and socio-economic contexts in their unique experiences within the academic landscape (Boonzaier & Mkhize, 2018; Collins, 2000, 2019).

1.2 Problem Statement and Rationale

The field of actuarial science in South Africa is currently characterised by a marked underrepresentation of black students, mirroring historical patterns prevalent in institutions like UCT, which have traditionally been white-dominated. This prevailing trend perpetuates historical disparities and poses significant obstacles for black actuarial science students navigating an academic environment shaped predominantly by white-oriented perspectives (Cornell & Kessi, 2016; Sennett et al., 2003; Strugnell & Ranchod, 2018). Research indicates that these students face a multitude of challenges, including resource limitations, insufficient support, and financial constraints in pursuing their studies (Motsabi et al., 2020; Mzangwa, 2019; Naidoo & McKay, 2018; Strugnell & Ranchod, 2018). Beyond the academic rigour, black actuarial science students must grapple with the intricate interplay between their diverse mindsets rooted in unique backgrounds and the prevailing academic culture at UCT, highlighting the intersection of racial inequalities, class dynamics, and various social disparities (Bazana & Mogotsi, 2017; Higham, 2012; Kessi & Cornell, 2015; Sennett et al., 2003; Strugnell & Ranchod, 2018).

Mindsets play a pivotal role in shaping students' overall success by shaping their attitudes, approaches to learning, and resilience in the face of challenges, thereby significantly impacting their academic achievements and personal growth. (Beigi et al., 2011; Blackwell et al., 2007; Yeager & Dweck, 2012). In the dynamic context of black actuarial science students, gaining insight into their mindsets becomes essential for effectively understanding and addressing their unique challenges. Consequently, this study aims to explore the lived experiences of black actuarial science students and to understand the factors that shape their mindsets. By doing so, the findings of this research would offer valuable insights for educators, policymakers, and support services, enabling them to craft inclusive and supportive environments tailored to the needs of black actuarial science students. Understanding the factors that shape the mindsets of these students is poised to be instrumental in designing culturally sensitive support initiatives within academic institutions, thereby addressing the distinct challenges they encounter in actuarial science.

This study holds significance within the field of Organisational Psychology by addressing critical issues of diversity, inclusion, and the systemic barriers that shape individual experiences within institutions (Reichman,2014). The exploration of black actuarial science students' lived experiences highlights the interplay between historical inequalities, cultural dynamics, and psychological factors, mirroring challenges faced by underrepresented groups in organisational settings. By focusing on the factors influencing mindsets, this research aligns with Organisational Psychology's emphasis on understanding how attitudes impact success and adaptability in demanding environments. Moreover, the findings provide a foundation for designing culturally sensitive interventions that support academic success and foster inclusive and equitable systems (Martins & Geldenhuys, 2016; Reichman,2014). This reflects a key aim of Organisational Psychology: applying psychological principles to improve the experiences and outcomes of individuals in structured environments, whether academic or professional (Martins & Geldenhuys, 2016; Riechman, 2014).

1.3 Applying an Intersectionality Lens

In conjunction with the theory of mindsets by Dweck and Leggett (1988), this study employed an intersectionality lens to decipher the experiences of black actuarial science students. Intersectionality is a theoretical framework from critical race theory and feminist studies developed by Crenshaw (1991). It recognises that individuals occupy multiple intersecting social identities, including but not limited to race, class, gender, sexual orientation, ethnicity, disability, and age, and these identities interact to shape their experiences, perspectives, and access to opportunities and resources (Collins, 2000, 2015, 2019). Black actuarial science students in South Africa do not have homogenous experiences. They bring diverse backgrounds, experiences, and identities into their learning environments (Cornell & Kessi, 2016; Sanger, 2020; Sennett et al., 2003). These identities include race, gender, socioeconomic status, cultural background, and potentially others. Intersectionality allows the researchers to acknowledge and examine the complexity of these identities and how they interact to shape students' experiences (Boonzaier & Mkhize, 2018; Collins, 2015; Rice et al., 2019). In the context of historically white-only universities, black students may already be dealing with systemic racism, discrimination, and exclusion (Bazana & Mogotsi, 2017; Cornell & Kessi, 2016; Higham, 2012; Mzangwa, 2019). Intersectionality is essential here because it helps to understand how race intersects with other factors like gender, class, and cultural background to exacerbate or mitigate these challenges (Alexander-Floyd, 2012; Collins, 2015;

Rice et al., 2019). These universities' dominant culture and curriculum are often oriented toward white experiences and perspectives (Bazana & Mogotsi, 2017; Higham, 2012; Kessi & Cornell, 2015; Sennett et al., 2003). Intersectionality helps to analyse how the students' various identities intersect and influence their sense of belonging, self-esteem, and engagement in the academic environment. It allows researchers to explore how different aspects of their identity impact their ability to navigate and succeed within this context (Boonzaier & Mkhize, 2018; Carastathis, 2014; Collins, 2015).

Chapter Summary and Dissertation Structure

This dissertation comprises five chapters. The introductory chapter presented an overview of actuarial science studies in South Africa and the mindset concept. The chapter also outlined the problem statement, elucidated the study's rationale, emphasised the significance of adopting an intersectional approach and introduced the research question. Chapter two delves into a literature review, exploring the experiences of black students in South Africa and their connection to the field of actuarial science. It also examines the literature on mindset in the context of black actuarial science students. Chapter three details the research methodologies employed in this study. Chapter four offers an in-depth analysis of the study's findings, and Chapter five discusses the key findings and provides implications of the study and recommendations for future research.

Chapter Two: Literature Review

This chapter provides an overview of the educational landscape in the context of South Africa, setting the stage for the current state of actuarial science education in the country. Furthermore, it delves into the pathway to becoming an actuary in South Africa, the hurdles black actuarial science students encounter, examines the formation of mindsets and explores the intersectionality of students' identities.

2.1. Education in South Africa

The historical context of education in South Africa is a testament to the enduring legacy of apartheid, a system of racial segregation and discrimination that profoundly shaped the nation's social fabric. For several decades, the apartheid regime imposed harsh laws and

policies that enforced racial segregation in nearly every aspect of daily life (Donaldson, 1996; Mubangizi & Mubangizi, 2005). These racial divisions extended deeply into the educational system, leaving a lasting impact on the experiences and opportunities of black students. One of the pivotal pieces of legislation during this era was the Separate Amenities Act of 1953 (Donaldson, 1996; Higham, 2012). This act enshrined the principle of "separate but equal" public services, further entrenching racial divisions in the country. These divisions were categorised into four officially defined population groups: White, Indian, Coloured, and Bantu (representing black Africans) (Giliomée, 2009; Higham, 2012; Seekings, 2008). According to Sennett et al. (2003), "White" was a term used to describe individuals with European ancestry, "Coloured" referred to those of mixed-race heritage, "black African" denoted people with indigenous African roots, and "Indian" indicated individuals who traced their lineage back to indentured workers from the Indian subcontinent. Each group was assigned separate public amenities, reflecting a strict racial hierarchy, where whites were afforded the best resources and facilities. At the same time, black South Africans, the majority of the population, were relegated to subpar, underfunded services (Higham, 2012; Mubangizi & Mubangizi, 2005; Seekings, 2008).

The Bantu Education Act of the same year was perhaps the most striking embodiment of apartheid's impact on education. This act, seemingly meant to govern black education, formally separated black school education from the educational provision available to white students. The outcome was the establishment of four separate Departments of Education, each catering to one of the defined population groups. These departments systematically engineered racial inequalities in every aspect of the educational system, from student-to-staff ratios to examination pass rates (Giliomée, 2009; Higham, 2012; Shepherd, 1955).

The curricula of black schools were notably devoid of subjects like mathematics and science, perpetuating a vast gap in access to educational resources. Further echoing the Minister of Native Affairs, Hendrik Verwoerd's statements during the second reading of the Bantu Education Bill in 1953, suggesting that teaching Mathematics to black children was purposeless if they could not apply it (Giliomée, 2009; Shepherd, 1955). Moreover, the broader curriculum of black education institutions was infused with an ideology of white supremacy and the denigration of blackness (Higham, 2012; Shepherd, 1955). These policies were deeply insidious, further entrenching racial divisions and creating a hierarchy of educational opportunities where most black students were systematically disadvantaged (Mzangwa, 2019; Nkomo et al., 2007).

Many black students in South Africa are strongly motivated to pursue fields like actuarial science due to the pressing desire for financial security. Contextual factors profoundly influence this motivation, as Abrahams et al. (2015) and Lephalala and Makoe (2012) highlighted. Mzangwa (2019) and Van Der Berg (2007) assert that the historical disparities in education, especially concerning access to quality education and resources, have left a lasting imprint on the career choices of black students. The limited access to mathematics and science education during apartheid has significantly impacted these students' academic trajectories. The historical disparities in education and restricted access to crucial subjects have led to actuarial science, emphasising mathematical and quantitative skills, being perceived as a beacon of financial stability (ASSA, 2022; Naidoo, 2008; Lephalala & Makoe, 2012). Despite the advent of democracy in South Africa and the dismantling of the apartheid system, certain fields, such as actuarial science, remain predominantly populated by white individuals (ASSA, 2022; Phume & Bosch, 2018; Strugnell & Ranchod, 2018). This enduring lack of diversity is a poignant reminder of the deep-rooted historical disparities that persist in the country (Mzangwa, 2019; Seekings, 2008; Strugnell & Ranchod, 2018).

Mzangwa (2019) argues that despite the efforts made in the post-apartheid era to redress educational inequalities, significant disparities in access to quality education endure. Graven (2013) reinforces this point, stating that after the inaugural democratic elections in 1994, education emerged as the catalyst for societal transformation. Nearly all educational discussions strongly emphasised rectifying historical inequalities, prompting substantial revisions to the curriculum. Despite substantial resource allocation and robust political support, profound disparities persist as a central issue hindering the success of educational initiatives designed to diminish inequality (Graven, 2013; Mzangwa, 2019; Van Der Berg, 2007). Historically disadvantaged areas often lack the resources and facilities to prepare students for advanced studies in specialised fields. These systemic educational inequalities create barriers for black students who aspire to enter professions like actuarial science, contributing to the continued underrepresentation (Mubangizi & Mubangizi, 2005; Mzangwa, 2019; Strugnell & Ranchod, 2018). Despite attempts by the South African government to revise and improve higher education policies, most black individuals have not adequately realised the material benefits of these policy changes (Graven, 2013; Mzangwa, 2019). As noted by Mzangwa (2019), there persists a stark discrepancy in access, equity, and participation in higher education, with the affluent continuing to enjoy privileged access while the predominantly black, economically disadvantaged majority struggles to reap the intended benefits of

transformative policies. This disparity can be attributed to various factors, including ineffective policy implementation and a lack of monitoring to ensure compliance. Consequently, the higher education system in South Africa faces significant challenges in successfully addressing and transforming the systemic inequalities that impede the academic progress of black students (Mzangwa, 2019).

2.2 Studying Actuarial Science in South Africa

Pursuing actuarial science in South Africa involves years of rigorous coursework (Naidoo, 2008; Phume & Bosch, 2018; Ramjee et al., 2013). However, the academic journey of black actuarial science students is further influenced by structural and contextual factors, which become integral components of their overall educational experience (Lephalala & Makoe, 2012; Mzangwa, 2019; Strugnell & Ranchod, 2018).

2.2.1 Achieving Fellowship

Studying actuarial science as a black student in South Africa is a journey fraught with challenges. The actuarial field in South Africa is relatively small and heavily skewed regarding race, with 75% of the 2022 Fellow membership comprising white individuals (ASSA, 2022; Ramjee et al., 2013; Ramjee et al., 2014). The lack of diversity in actuarial science is noticeably evident within university classrooms, where most students are white. The historical divide between historically white and black universities, accentuated by an urban-rural distinction, reinforces the perception of actuarial science as a field associated with "white excellence" in well-resourced urban centres (Robus & Macleod, 2006). Booi et al. (2017) and Robus and Macleod (2006) highlight this urban-rural divide, which has perpetuated an inequitable distribution of resources, leaving historically black universities disadvantaged and under-resourced compared to their historically white university counterparts. The homogeneity at the educational level reflects and reinforces broader disparities within the profession and the industry, highlighting the pressing need for greater representation in the actuarial profession, especially in a nation as diverse as South Africa (Mzangwa, 2019; Naidoo, 2008; Strugnell & Ranchod, 2018).

Black students aspiring to achieve a Fellowship actuarial qualification typically commence their studies at South African universities. The admission standards for actuarial programmes are rigorous. These prerequisites can differ among universities and may fluctuate

annually, but they generally necessitate outstanding mathematics proficiency and strong overall academic performance (Naidoo, 2008; Ramjee et al., 2013; Smith & Schumacher, 2005). At UCT, prospective students aiming to enrol in actuarial science must attain upper-intermediate level scores in the National Benchmark Test (NBT) for both Academic Literacy (AL) and Quantitative Literacy (QL). Moreover, a minimum score of 80% is necessary in Mathematics. Proficiency in English is assessed with a requirement of 60% for the Home Language (HL) and 80% for the First Additional Language (FAL). Ramjee et al. (2013) further assert that actuarial programmes typically draw the most accomplished 5% of high school graduates. During their undergraduate phase, they pursue degrees in commerce, business science, or science, completing courses that grant them exemptions from specific professional examinations, which cover the core skills required to be an actuary. However, the number of exemptions attainable depends on the university's accreditation by the professional body (Ramjee et al., 2013). After graduation, students often enter actuarial environments, usually large life insurers and pension companies, where they write professional examinations semi-annually. Becoming a Fellow is long and arduous, involving nearly 16 professional examinations and courses. However, most student members typically take at least eight years to pass the mandatory 13 technical skills examinations and fulfil the necessary work-based learning (ASSA, 2022; Naidoo, 2008; Ramjee et al., 2013; Strugnell & Ranchod, 2018).

2.2.2 Structural Impact

Myburgh (2005), Mzangwa (2019) and Naidoo (2008) argue that structural factors impact black students' journey toward becoming actuaries. One of the most significant factors is the legacy of apartheid, which has left many black families with a low socio-economic status. Motsabi et al. (2020) echo these sentiments by stating that the pressure to support their families financially can lead these students to tackle demanding actuarial subjects while simultaneously trying to earn an income, often hindering their ability to focus entirely on their studies. Additionally, many black students come from isolated and rural regions, and studies have indicated that students from such areas face a higher risk of poor university performance (Lephalala & Makoe, 2012; Motsabi et al., 2020; Steyn & Kamper, 2011). Relocating to one of the four main actuarial universities in Cape Town, Johannesburg, Stellenbosch, or Pretoria can be a significant challenge, requiring resettlement and readjustment to a new environment (Naidoo, 2008; Ramjee et al., 2013). Bazana and Mogotsi (2017) and Sennett et al. (2003) contend that historically, these universities were reserved for white students, and the culture

that has persisted within these institutions can be unwelcoming to black students. The legacy of apartheid and the exclusionary practices that characterised these institutions for many decades have left a lasting imprint on their environment. Bazana and Mogotsi (2017) and Cornell and Kessi (2016) argue that these universities may still carry remnants of a culture that is not fully inclusive or accommodating to the diverse experiences of black students.

2.2.3 Contextual Impact

The pursuit of actuarial science is influenced by contextual factors in education, particularly regarding representation and role models, as discussed by Jordan (2006) and Lephalala and Makoe (2012). Many black students are considered first-generation university attendees, defined as black South African students whose parents have not previously attended university or have had no formal education (Jones et al., 2008; Vincent & Hlatshwayo, 2018). Most first-generation higher-education students are of black African descent (Motsabi et al., 2020). Motsabi et al. (2020) argue that for these students, attending university represents the opportunity to forge a brighter future for themselves. In the eyes of their families, it holds the potential for their child to secure employment and enhance the family's circumstances.

Idahosa and Mkhize (2021) argue that the underrepresentation of black students in Science, Technology, Engineering, and Mathematics (STEM) fields profoundly impacts aspiring black students. In these traditionally white male-dominated fields, black students report encountering intersectional oppressions tied to their race, gender, and class. These challenges adversely affect their progress and ability to remain in the field (Idahosa & Mkhize, 2021). The importance of representation is accentuated in the education context, which recognises that contextual factors such as ethnic and cultural characteristics play a crucial role in shaping students' learning journeys (Cornell & Kessi, 2016; Steyn & Kamper, 2011).

Furthermore, the perception of actuarial science as a predominantly white field can deter black students. This perception can contribute to a sense of exclusion and a lack of representation, impacting the willingness of black students to engage with and navigate a field that is perceived as culturally and racially homogeneous (Bazana & Mogotsi, 2017; Naidoo, 2008; Steyn & Kamper, 2011; Tinto, 1975). As of 2022, among the 1754 actuaries in South Africa, only 142 are black African, constituting 8% of the total (ASSA, 2022). The lack of diversity in the profession can create an unwelcoming or intimidating environment for black individuals (Naidoo, 2008; Steyn & Kamper, 2011).

Black students may be less likely to consider actuarial science a viable career option because they lack direct exposure to professionals who look like them and have successfully navigated the complex journey of becoming actuaries (Phume & Bosch, 2018; Strugnell & Ranchod, 2018). Without black actuaries to serve as mentors and provide firsthand accounts of their experiences, black students may lack essential information about what actuarial science studies entail and the challenges they might encounter (Davis, 2007; Naidoo, 2008; Phume & Bosch, 2018). Furthermore, the lack of black role models in actuarial science can perpetuate stereotypes and misconceptions about who can succeed. It may reinforce the notion that actuarial science is reserved for certain racial or ethnic groups, contributing to a lack of diversity and inclusivity (Naidoo, 2008; Phume & Bosch, 2018; Ramjee et al., 2013). In this way, black actuaries' dearth perpetuates an underrepresentation cycle, limiting opportunities and career choices for black students.

2.3 Challenges Faced by Black Actuarial Science Students

In the pursuit of higher education and professional aspirations, students in the field of actuarial science often encounter a multitude of challenges that can significantly impact their academic progress, personal development, and career trajectories. This holds especially true for black actuarial science students in South Africa, who navigate a unique set of hurdles shaped by historical, cultural, and educational factors.

2.3.1 Rigour and Difficulty of the Actuarial Science Curriculum

Black actuarial science students in South Africa face significant educational and curriculum challenges, particularly in light of the rigorous and demanding nature of actuarial science programmes (Naidoo, 2008; Strugnell & Ranchod, 2018). These challenges are compounded by the high entrance requirements, which typically attract the top 5% of school leavers, as highlighted by Ramjee et al. (2013). To gain entry into actuarial science programmes, students must demonstrate excellent mathematics skills and high overall academic performance (Smith & Schumacher, 2005, 2006). This initial barrier reflects the demanding nature of the curriculum, which requires a strong foundation in mathematical concepts (Naidoo, 2008; Ramjee et al., 2013; Smith & Schumacher, 2005).

Furthermore, the actuarial science curriculum is known for its complexity and the need for high intellectual rigour. Case et al. (2014) and Naidoo (2008) highlight that the curriculum is academically challenging and requires a high-pressure work environment. This combination of rigorous coursework and intense pressure creates a unique situation for actuarial students, who risk experiencing substantial stress (Kitzrow, 2003; Pascoe et al., 2019). This stress can be a significant barrier to success, particularly for students who do not have a strong sense of belonging in the field (Cornell et al., 2022; Murray et al., 2022; Naidoo, 2008). For black actuarial science students, these challenges are exacerbated by the historical disparities in South African education, which may have limited their exposure to advanced mathematics and complex academic content (Motsabi et al., 2020; Mzangwa, 2019; Ndimande, 2016; Strugnell & Ranchod, 2018). As highlighted by Hill et al. (2010), the high failure rates in actuarial courses can lead to a sense of uncertainty and a lack of belonging, disproportionately affecting students from underrepresented backgrounds. These students may find it more challenging to navigate the demanding curriculum and cope with the stress associated with actuarial studies.

2.3.2 Institutional Barriers

The institutional barriers facing black actuarial science students in South Africa are rooted in historical inequalities and persistently exclusionary practices within the higher education system (Mzangwa, 2019; Ndimande, 2016). Higham (2012) and Mabokela (2000) argue that, despite efforts to address these issues, there is a continued dominance of white middle-class males as academics in South African universities. This lack of diversity among academic staff perpetuates institutional cultures deeply ingrained with the birthmarks of dominant traditions, symbols, and behaviour patterns (Bazana & Mogotsi, 2017; Steyn & Kamper, 2011). This homogeneity within the academic community sends a strong message to black students that they may not fully belong within these spaces, hindering their sense of inclusion and acceptance (Bazana & Mogotsi, 2017; Cornell & Kessi, 2016).

Furthermore, as Bazana and Mogotsi (2017) and Cornell et al. (2022) outlined, South African higher education carries the legacy of colonialism and apartheid, which has led to discriminatory practices and oppressive power dynamics. While there has been an increase in the participation of students from diverse backgrounds, many students, particularly those who do not fit the dominant status quo, question their belonging within these institutions (Bazana & Mogotsi, 2017; Higham, 2012; Sennett et al., 2003). Cornell et al. (2022) and Smith et al.

(2011) assert that the alienation experienced by these students can have detrimental physical, psychosocial, and educational outcomes. Despite the widening participation of diverse students, exclusionary practices persist in many universities. Historically white institutions, in particular, remain environments where black students often encounter cultural dissonance upon entering these formerly exclusive spaces, leading to feelings of alienation (Strugnell & Ranchod, 2018). This institutional culture, characterised by marginalisation, compounds the challenges faced by black actuarial science students, creating additional barriers to their academic journeys (Cornell & Kessi, 2016; Sennett et al., 2003).

2.3.3 Cultural and Language Adjustments

Black actuarial science students in South Africa face significant cultural and language adjustments during their academic journey. These adjustments are influenced by their home languages and the need to communicate effectively in a generally accepted language like English (Bazana & Mogotsi, 2017; Cornell & Kessi, 2016; Steyn et al., 2014). As Borghi et al. (2017) and Naidoo (2008) point out, language skills are crucial when dealing with abstract and challenging material, which is common in actuarial science. Comprehending and communicating complex technical concepts is vital in academic settings and the workplace. Naidoo (2008) and Strugnell and Ranchod (2018) assert that actuarial programmes predominantly employ English as the medium of instruction. Paxton (2009) and Strauss (2012) highlight the possibility of acquiring conversational proficiency through regular practice for students who may not consider English their first language. However, to excel academically within a second language educational environment, students require a strong conceptual foundation in their native language, facilitating the connection between the second and primary languages (Naidoo, 2008; Paxton, 2009; Strauss, 2012).

Moreover, Bazana and Mogotsi (2017) and Kessi and Cornell (2015) highlight that black students often encounter the expectation that they must assimilate into whiteness to succeed at universities like UCT. This assimilation includes changing one's language and accent to fit into the dominant culture. Such expectations can lead to a struggle between adapting to the institution's culture and maintaining one's identity and self-esteem (Bazana & Mogotsi, 2017; Kessi & Cornell, 2015). Fanon's (2016) concept of the ‘white mask’ aligns with black students' struggles. The metaphor underscores the idea that individuals from colonised cultures may feel compelled to wear a figurative mask to conform to Eurocentric norms, suppressing their

authentic selves in the process. This aligns with the notion that assimilation, including changing language and accent to fit into the dominant culture, is a form of adopting this 'white mask.'

Consequently, students employ various strategies to cope with these challenges, including silencing themselves, distancing from transformation discourse, or adopting certain cultural practices (Kausar, 2010; Kessi & Cornell, 2015). These adjustments reveal the complex dynamics that black actuarial science students face, where language and cultural shifts are essential for academic and social integration but also come with identity and self-esteem implications.

2.3.4 Psychological and Self-Perception Challenges

Black actuarial science students often face profound psychological and self-perception challenges, significantly impacting their academic and personal well-being. These challenges include the fear of failure, perfectionist tendencies, imposter syndrome, self-doubt, stress, and mental health challenges (Hoang, 2013; Murray et al., 2022; Rice et al., 2015). The fear of failure looms large in the minds of many black actuarial science students, given the rigour and high stakes of their coursework. The demanding nature of actuarial education often leads to a paralysing fear of not meeting expectations, which can hinder their progress and lead to anxiety and self-doubt (Markoulakis & Kirsh, 2013; Naidoo, 2008; Pascoe et al., 2019)

Furthermore, many students develop perfectionist tendencies as they strive for academic excellence in a highly competitive field (Rice et al., 2015). Perfectionism in the context of actuarial science students refers to their tendency to set exceptionally high, often self-imposed, standards for their academic performance and career achievements. These students strongly desire to excel and reach these rigorous standards, but pursuing perfection can become unreasonable and potentially detrimental. They often strive for flawless performance and are highly self-critical, even when they achieve exceptional results (Rice et al., 2015). Actuarial science students typically comprise high-achieving individuals with a strong academic record in high school (Ramjee et al., 2013; Wong & Chiu, 2019). When these students, especially black actuarial science students, encounter academic challenges in university, they may experience a significant disconnect between their prior successes and current struggles. This shift in self-perception can lead to self-doubt and stress, impacting their well-being (Murray et al., 2022; Naidoo, 2008). The relentless pursuit of perfection can lead to overwhelming stress and self-imposed pressure, increasing their vulnerability to anxiety and depression (Bantjes et al., 2020; Markoulakis & Kirsh, 2013; Pascoe et al., 2019).

Imposter syndrome is another common challenge faced by actuarial science students. As defined by Murray et al. (2022), imposter syndrome encapsulates the persistent sense of feeling like a fraud despite evident success, accompanied by an underlying fear of exposure. This psychological phenomenon, characterised by internalised doubts and a reluctance to accept one's competence, significantly impacts individuals' perceptions of their achievements and self-worth (Hoang, 2013; Murray et al., 2022). Navigating predominantly white academic spaces adds a layer of complexity to the experience of imposter syndrome. The demanding nature of the actuarial field, combined with potential cultural differences and underrepresentation, can intensify feelings of fraudulence (Hoang, 2013; Murray et al., 2022). As black students navigate predominantly white academic spaces, they may feel a persistent sense of inadequacy and believe their achievements are due to luck rather than merit (Cornell & Kessi, 2016; Cornell et al., 2022; Hoang, 2013). This self-doubt can undermine their self-esteem and hinder their overall success in the programme. Moreover, the stress and mental health challenges that arise from these pressures must not be underestimated. Although some stress can be a motivating force, excessive stress can harm students' well-being, leading to burnout, anxiety disorders, and depression (Bantjes et al., 2020; Cilliers & Flotman, 2016; Markoulakis & Kirsh, 2013; Pascoe et al., 2019).

2.3.5 Social Support

Social support is assistance and resources individuals or networks offer to enhance well-being, including emotional, informational, and appraisal support (Bernardon et al., 2011). Social support plays a crucial role in the academic journey of black actuarial science students, particularly given the demanding nature of the curriculum (Motsabi et al., 2020; Naidoo, 2008). The studies by Lotkowski et al. (2004) and Uter et al. (2018) underscore the significance of social support and social involvement in predicting academic success and retention. Actuarial science students often face a rigorous curriculum, requiring immense dedication and time commitment, which can limit their opportunities for socialising. As a result, students who struggle to establish friendships or feel disconnected from their university environment may be more likely to withdraw from their studies (Lotkowski et al., 2004; Naidoo, 2008; Uter et al., 2018).

Conversely, those who successfully navigate the challenges of their programme often attribute their completion to the sense of being welcomed and supported by peers and staff members (Lotkowski et al., 2004; Motsabi et al., 2020; Uter et al., 2018). Therefore, fostering

a supportive and inclusive social environment within actuarial programmes can be instrumental in helping black students overcome the academic obstacles they encounter and promoting their academic success.

2.4 Mindset Formation of Black Actuarial Science Students

The concept of mindset plays a pivotal role in education and influences academic and career success. Carol Dweck's research has explored the idea of two fundamental mindsets: entity and incremental theories of intelligence. An entity mindset, also known as a fixed mindset, perceives abilities as a fixed trait, making individuals believe their abilities are predetermined and unchangeable. In contrast, an incremental mindset, often referred to as a growth mindset, sees abilities as something that can be developed and expanded through persistence, learning and effort (Blackwell et al., 2007; Dweck & Leggett, 1988; Dweck & Yeager, 2019; Hwang et al., 2016). These mindsets shape students' goals, beliefs about effort, attributions for setbacks, and learning strategies (Blackwell et al., 2007; Dweck, 2017). Students with a fixed mindset may be more concerned with looking smart, avoiding making mistakes, attributing failures to their lack of natural talent, and resisting challenges.

In contrast, students with a growth mindset are more focused on learning, viewing challenges and effort as opportunities for improvement. A fixed mindset can trigger a fear of failure and imposter syndrome, as students with this perspective are more preoccupied with appearing intelligent, evading mistakes, attributing failures to inherent deficiencies, and shying away from challenges (Dweck & Yeager, 2019; Murray et al., 2022). This mindset can detrimentally impact students' well-being by fostering negative affect and mental health problems, as the fear of not meeting perceived expectations and the pressure to maintain a facade of inherent intelligence can contribute to heightened stress and emotional distress (Hwang et al., 2016; Markoulakis & Kirsh, 2013; Pascoe et al., 2019). These mindsets profoundly impact students' responses to academic challenges and failures, subsequently affecting their academic success (Dweck, 2017; Dweck & Leggett, 1988; Dweck & Yeager, 2019; Yeager & Dweck, 2012).

2.4.1 Impact of Parents

Mindsets are not just individual beliefs; various factors influence them, including parents' perceptions. When students perceive that their parents hold a mindset that views failure as

debilitating and attaches low value to the learning experience, they are more likely to adopt a similar negative attitude towards failure (Grolnick & Slowiaczek, 1994; Hwang et al., 2016; Tao et al., 2021). Parents' attitudes can significantly impact how students view their intellectual ability and the role of failure in their learning journey. Jawitz et al. (2000) found that the career choices of young South Africans who are high achievers in school mathematics and physical science are influenced by their parents' role in their career choices (Abrahams et al., 2015; Myburgh, 2005). In actuarial science and similar challenging fields, parental support and guidance can encourage students to embrace learning opportunities and persist through setbacks or contribute to developing a fixed mindset that views failure as debilitating and success as the only measure of competence. If parents emphasise failure as a negative indicator of performance and competence, students may develop a pessimistic expectation for future success, hindering their ability to see their growth potential (Dweck, 2017; Tao et al., 2021; Yeager & Dweck, 2012). This interaction between parents and students in the socialisation process can lead to students adopting a fixed view of their abilities, believing that intelligence is static and cannot be improved through effort.

2.4.2 Impact of Lecturers

Hunter and Tetley (1999) contend that an effective lecturer should be able to synthesise, explain, analyse, reflect on the learning process, share personal perspectives, engage in intellectual discourse, demonstrate dedication, and inspire students with challenging ideas and debates. These attributes hold relevance in actuarial science as they impact the formation of black actuarial science students' mindsets. The actuarial science programme is intrinsically demanding and requires educators who can guide students in developing the necessary cognitive skills (Baldwin et al., 2011; Naidoo, 2008). Actuarial science calls for diverse thinking styles, where the core technical subjects necessitate well-structured and process-centred thinking. The ‘core technical’ subjects are characterised by their technical nature, demanding well-structured and process-centred thinking. These subjects focus on foundational principles and technical aspects.

In contrast, specialist application subjects demand higher-order thinking skills for synthesising information and exercising judgment. These subjects require higher-order thinking skills for synthesising information and applying judgment effectively (Naidoo, 2008; Nigmatov, 2014; Van Den Berg, 2004). To help black actuarial science students navigate these cognitive intricacies, lecturers who embody the qualities outlined by Hunter and Tetley (1999)

can foster a growth mindset that encourages resilience and emphasises the learning journey rather than the outcome (Hochanadel & Finamore, 2015; Mosanya, 2020; Yeager & Dweck, 2012).

2.4.3 Role of Societal and Structural Factors

The formation of mindsets among black actuarial science students is a multifaceted process deeply rooted in their educational journey and societal contexts (Claro et al., 2016; Destin et al., 2019). Many black students entering actuarial science programmes have experienced disparities in early education, including inadequate resources, limited exposure to advanced coursework, and varying teaching quality (Mzangwa, 2019; Naidoo & McKay, 2018). These early experiences can influence their beliefs about their intellectual abilities and the role of effort in achieving academic success (Dweck, 2017; McCutchen et al., 2016). In parallel, Bishop and Mañé (2001) delved into the influence of school attributes such as school size, teacher salaries, student-teacher ratios, the proportion of low-income peers, ethnic demographics, and public or private status on later academic success. Their findings revealed that the risk of not graduating increased in larger high schools and decreased in environments with a lower proportion of low-income peers and peers with lower academic performance (Bishop & Mañé, 2001). The larger school size, with its potential for increased competition and fewer opportunities for personalised attention, can instil a sense of added pressure and higher stakes. Conversely, the positive effects of being surrounded by peers from a lower proportion of low-income backgrounds and with lower academic performance can shape the mindset of students (Bishop & Mañé, 2001; Destin et al., 2019). In such environments, students may experience less social and academic stress, which could encourage a more growth-oriented mindset.

2.4.4 Impact of High-Achieving Backgrounds

The rigorous entrance requirements for actuarial programmes, which often draw the top 5% of high-achieving school leavers, profoundly impact the formation of mindsets among black actuarial science students, particularly regarding their response to challenges and failures in university. These students enter their actuarial studies with a strong foundation in mathematics and a history of academic success, which can shape their initial mindset towards achievement (Blackwell et al., 2007; Hwang et al., 2016; Ramjee et al., 2013). However, when

encountering the high demands and difficulties of actuarial coursework in the university setting, some high-achieving students may face their first substantial academic setbacks (Naidoo, 2008; Ramjee et al., 2013). Such challenges can lead to shifts in their mindset as they grapple with the experience of struggling academically, which they may not have been accustomed to during their prior educational journey (Hwang et al., 2016). These mindset shifts can have profound implications for how black actuarial science students perceive and respond to academic obstacles, adapt to the difficulties of the curriculum, and ultimately shape their career aspirations and success within the field.

2.4.5 Role of Stereotype Threat

Steele (1997) argues that stereotype threat plays a significant role in forming the intellectual identity and performance of black students, especially in a predominantly white-dominated field. This psychological phenomenon occurs when negative stereotypes about a group to which an individual belongs become self-relevant, affecting their performance and self-identity in situations related to their group (Bell et al., 2003; Steele, 1997). In the case of black actuarial science students, stereotype threat can be particularly detrimental to high-achieving individuals who have excelled academically. These students, who are already invested in their academic pursuits and have identified with the field, may experience heightened pressure and anxiety due to the negative stereotypes of being a minority in a white-dominated field. This threat can result in self-doubt, reduced confidence, and fear of confirming these stereotypes, ultimately impacting their academic performance and self-perception as aspiring actuaries (Naidoo, 2008; Steele, 1997).

The study conducted by Cornell and Kessi (2016), which highlighted the pervasive negative stereotypes about the intelligence and work ethic of black students at UCT, is a clear example of stereotype threat and its impact on the formation of the mindsets of black actuarial science students. These stereotypes, which portray black students as lacking in intelligence and indolent, directly contribute to the self-relevant and plausible interpretations of these students' experiences and self-definitions within the university environment (Cornell & Kessi, 2016). When black students pursuing actuarial science programmes are exposed to such stereotypes, it creates a hostile and exclusionary atmosphere, reinforcing the notion that they do not belong or fit in with the academic community (Cornell & Kessi, 2016; Cornell et al., 2022; Kessi & Cornell, 2015). As a result, these stereotypes affect their overall university experience and significantly shape their mindsets. Black actuarial science students may internalise these

negative stereotypes, leading to self-doubt and decreased confidence in their abilities. This, in turn, can hinder their academic performance, as they may constantly grapple with the fear of confirming these stereotypes, ultimately impacting their self-perception as aspiring actuaries (Bell et al., 2003; Cornell & Kessi, 2016; Hwang et al., 2016; Steele, 1997).

2.5 Theoretical Framework: Intersectionality

In addition to the theory of mindset explained above (Section 2.4), this research uses an intersectionality lens to understand the experiences of black actuarial science students. Using an intersectionality lens in this study is essential because prior research on black actuarial science students often lacks nuance, creating essentialist narratives that oversimplify their experiences. By employing intersectionality, the researcher aims to avoid reinforcing stereotypes and instead delve into the multifaceted aspects of these students' identities, considering the interconnected influences of race, class, and other social factors.

Intersectionality, as introduced by Crenshaw (1991), challenges the oversimplified understanding of human identity by emphasising that individuals' identities are not isolated categories but rather a complex web of interconnected aspects that interact and influence one another. This interconnectedness involves but is not limited to race, class, gender, ethnicity, disability, and age. These interact to create unique and multifaceted life experiences marked by privilege and oppression (Collins, 2000, 2015, 2019). It underscores that no two individuals share the same experiences, as their identities intersect uniquely, forming distinct forms of injustice and discrimination (Crenshaw, 1991; Gopaldas, 2013). The essence of intersectionality lies in recognising the diversity within human existence, emphasising that understanding identity necessitates considering multiple dimensions simultaneously. In the context of black actuarial science students, the intersectionality of race, gender and socio-economic factors is particularly noteworthy (Boonzaier & Mkhize, 2018; Collins, 2015; Rice et al., 2019). These students do not experience racial or gender-related challenges in isolation but encounter a complex web of intersecting identities contributing to their unique mindset formation.

Race plays a fundamental role in the lived experiences of black actuarial science students. White individuals dominate South Africa's actuarial profession, and racial disparities persist in educational institutions and workplaces (Higham, 2012; Mzangwa, 2019; Naidoo, 2008; Strugnell & Ranchod, 2018). Black students entering this field often confront the legacy of apartheid and racial exclusion, influencing their perception of belonging and their ability to

succeed (Cornell & Kessi, 2016; Higham, 2012; Mzangwa, 2019). This racial intersectionality can lead to stereotype threat, where students may internalise negative stereotypes about their intelligence and work ethic, impacting their self-esteem and motivation (Bell et al., 2003; Cornell & Kessi, 2016; Strugnell & Ranchod, 2018). In this context, race can also intersect with gender, as black female actuarial students may face compounded challenges related to race and gender bias, further shaping their mindset formation (Phume & Bosch, 2018; Ramjee et al., 2013).

Additionally, socioeconomic factors intersect with race and gender, shaping the mindsets of these students. Their socioeconomic environment may influence their aspirations, financial constraints, and outlook, affecting their perception of success and opportunities within the actuarial profession (Claro et al., 2016; Destin et al., 2019). Students from disadvantaged backgrounds may face additional economic stressors, such as their families' financial constraints, limited educational resources, and exposure to economic struggles, which can shape their perception of success and opportunity (Destin et al., 2019; Motsabi et al., 2020; Sennett et al., 2003). This intersection of race, gender, and class influences their self-perception and resilience as they navigate both academic challenges and financial constraints. These intersecting factors are pivotal in shaping the students' experiences in the classroom and interactions with peers and faculty.

2.6 Gaps in Current Literature

Despite black actuarial science students' intricate web of challenges, a substantial gap exists in the literature. Previous research has explored factors contributing to the success of actuarial science students (Naidoo, 2008; Ramjee et al., 2013; Strugnell & Ranchod, 2018) but has not delved into what shapes the mindsets of black actuarial science students by examining their lived experiences. This gap limits our understanding of the specific challenges they encounter and how these challenges shape their mindsets and outlook on their academic and professional journeys. Therefore, this research aims to explore the lived experiences of black actuarial science students and to understand the factors that shape their mindsets. This research would offer insights into the complexities of their journeys, the intersection of their identities, and the impact of these factors on their mindset formation.

Chapter Summary

The literature review in this chapter navigated the intricate educational landscape of South Africa, serving as a foundation for an in-depth analysis of the then-current state of actuarial science education within the country. Delving into the specific journey towards becoming an actuary in South Africa, the review shed light on the formidable challenges black students face in this field. Moreover, it examined the intricacies surrounding the formation of mindsets, emphasising their impact on academic pursuits. The exploration extended to the intersectionality of students' identities, unveiling the complex interplay of various factors that influenced the experiences of aspiring actuarial science professionals.

The following chapter discusses the methods employed in this study.

Chapter 3: Method

This research sought to gain insights into black actuarial science students' lived experiences and the factors that shape their mindsets through the lens of intersectionality. This chapter is structured into seven main sections: the adoption of a qualitative research approach, an exploration of intersectionality analysis, an explanation of the data collection process, a description of the research procedure, an exploration of the data analysis, ethical consideration and a discussion of the researcher's reflexivity.

3.1 Research Approach

This research adopted a qualitative, phenomenological research design to understand the lived experiences of black actuarial science students. This approach was chosen due to its effectiveness in exploring the intricacies of individuals' subjective experiences and the underlying structures that shape their perceptions and behaviours. Phenomenology allowed for a deep dive into the unique lived experiences of the participants, enabling a holistic understanding of the factors that shape their mindsets (Alase, 2017; Bryman et al., 2016). The qualitative research approach is a methodology that focuses on understanding and interpreting the meanings and experiences of individuals within a specific context. Braun and Clarke (2013) assert that qualitative research centres on language and dialogue as data sources. It aims to uncover meanings, recognising that data is collected within a specific context. This approach

generates narrow but rich data, often called thick descriptions, providing detailed and complex accounts from each participant (Alase, 2017; Braun & Clarke, 2013). These descriptions are invaluable, as they allow for a detailed and complex exploration of each participant's unique journey, which is crucial for understanding the intricacies of the students' mindset development.

Qualitative research is less rigid in its methodology, allowing for shifts in focus within the same study. As the research unfolds and data collection progresses, researchers can adjust their lines of inquiry based on emerging insights, unexpected findings, or participants' evolving narratives (Agee, 2009). This adaptability is particularly crucial when studying a complex and context-dependent phenomenon like the formation of black students' mindsets, which involve interconnected factors that become clearer as the study unfolds.

The qualitative research approach views social reality as an ever-evolving and emergent construct shaped by the dynamic interplay of individual interpretations and societal contexts. It emphasises that individuals construct their realities through their interpretations, beliefs, and interactions within their environments. In this view, there is no fixed, universal truth; instead, reality is contingent upon the diverse perspectives and meanings attributed by different individuals and groups. This recognition of the fluidity of social reality highlights the significance of understanding how individuals make sense of their world (Braun & Clarke, 2013; Brinkmann & Kvale, 2017; Cropley, 2023). By delving into these interpretations and lived experiences, qualitative research provides valuable insights into human existence's complex and multifaceted nature, shedding light on the nuances and intricacies that shape the understanding of the world (Alase, 2017; Cropley, 2023). This research utilised a qualitative approach because it can comprehensively explore the multifaceted and context-dependent experiences of black actuarial science students in South Africa. Qualitative research excels at uncovering rich, nuanced narratives; this allows the researcher to understand students' unique challenges within their sociocultural context (Braun & Clarke, 2013; Bryman et al., 2016). Moreover, the approach's flexibility and emphasis on personal involvement align with the sensitivity of the research topic and the need to establish trust and rapport with participants. By embracing subjectivity, qualitative research offered the most suitable means to capture the complexities of these students' lived experiences.

3.2 Applying an Intersectional Approach

This research is grounded in the theoretical framework of intersectionality. This conceptual lens shines a light on the intricate nuances of lived experiences by considering how various systems of oppression intersect and interact. Intersectionality, initially coined by Crenshaw (1991), challenges the limitations of reductionist approaches by emphasising that human identities are not isolated silos; instead, they intersect and influence each other, giving rise to multifaceted forms of life experiences, especially experiences of privilege and oppression (Crenshaw, 1991; Gopaldas, 2013). At its core, intersectionality asserts that various aspects of identity, including but not limited to race, class, gender, sexual orientation, ethnicity, disability, and age, are not discrete categories but rather interconnected and interdependent. These aspects of identity intertwine and interact in intricate ways, creating unique combinations that yield distinct forms of injustice and discrimination (Collins, 2000, 2019; Crenshaw, 1991). This critical perspective challenges the idea of homogenous standpoints. It boldly declares that no two individuals share precisely the same lived experiences because their identities intersect in unique and complex ways (Collins, 2019). This perspective underscores the rich tapestry of human experiences, highlighting that no single aspect of identity can be fully understood in isolation. Instead, the convergence of multiple dimensions of difference shapes individuals' social, economic, and cultural lives. The essence of intersectionality lies in its acknowledgement of the vast diversity within human existence. It stresses that no one-dimensional perspective can encapsulate an individual's experiences and struggles (Collins, 2000, 2019; Crenshaw, 1991).

Moreover, intersectionality prompts us to recognise that addressing inequality and injustice requires a nuanced and multifaceted approach. Overlooking the intersectional nature of oppression can lead to incomplete or misguided solutions. To truly understand and dismantle systems of power, it is essential to consider how various aspects of identity intersect, influence one another, and produce a wide range of outcomes, as expounded upon by Collins (2019) and Gopaldas (2013). In the context of this research, which focuses on what shapes the mindsets of black actuarial science students in South Africa by understanding their lived experiences, applying the intersectional lens is of paramount importance. Acknowledging that these students possess multiple intersecting identities – such as race, class, and gender – the research delved into the intricate web of challenges they face during their educational journey. These challenges do not stem from one identity dimension alone but emerge from the complex interplay of these

various identities (Gopaldas, 2013; Shields, 2008). By adopting this framework, the study acknowledged that their racial identity does not solely define these students' mindsets but is a product of the complex web of intersecting identities and experiences. An intersectional approach empowered this research to explore the complex and multifaceted nature of these students' experiences. It recognised that their paths through higher education are not uniform but are shaped by a unique amalgamation of identities, each contributing to their unique experiences and challenges.

3.3 Data Collection:

3.3.1 Semi-structured Interviews

Brinkmann and Kvale (2018) describe interviews as an exchange of perspectives between two individuals engaging in conversation around a shared topic or theme. Semi-structured interviews combine the informality of everyday conversation with a predetermined set of questions (Brinkmann & Kvale, 2018). In-person 45-60 minute semi-structured interviews were the chosen data collection method in this study, combining predefined open-ended questions with the flexibility to explore emergent themes and ideas during the interview process. The utilisation of in-person semi-structured interviews was instrumental in achieving the study's objectives, which aimed to gain a deep understanding of the lived experiences of black actuarial science students in South Africa.

Using in-person semi-structured interviews allowed for a rich and interactive data collection process. They allow for a direct and personal connection by engaging participants face-to-face, creating a conducive environment for open and candid discussions. This interpersonal dynamic was particularly significant in this study as it fostered trust, rapport, and a sense of comfort among participants (Bryman et al., 2016; Rahman, 2015; Willig, 2017). This enabled the participants to share their experiences, challenges, and perspectives more deeply and authentically.

Semi-structured interviews provided a flexible and dynamic approach to data collection, allowing the researcher to explore participants' perspectives, experiences, and mindsets in a nuanced and contextually relevant manner. One of the primary advantages of semi-structured interviews is their adaptability to the research context (Willig, 2017). Given the sensitivity and complexity of the study's topic, this approach was particularly well-suited. It enabled the researcher to build rapport with participants and create a safe space for them to share their experiences and thoughts openly. The predetermined open-ended questions provided a

structured framework for the interviews (Brinkmann & Kvale, 2018; Willig, 2017). These questions were carefully crafted to address key themes and topics related to the factors shaping the mindsets of black actuarial science students, with the careful guidance of existing literature and alignment with the research aims. This structured approach ensured that essential aspects of the research question were systematically explored across all interviews. Semi-structured interviews can adapt to the unfolding conversation. As participants share their unique experiences and perspectives, the researcher can delve deeper into specific aspects or themes that emerge organically during the interviews. This adaptability allows the researcher to follow the participants' lead and explore areas of significance to them, even if the predetermined questions did not initially cover those areas (Brinkmann & Kvale, 2018; DeJonckheere & Vaughn, 2019; Willig, 2017). Therefore, in this study, the flexibility of semi-structured interviews allowed for probing deeper into specific issues that emerged during the conversations, ensuring a comprehensive exploration of the factors influencing the students' mindsets.

3.3.2 Sampling

This research drew participants from the actuarial science student population at the University of Cape Town (UCT) in South Africa. This study's participants were selected using purposive and convenience non-probability sampling techniques. Non-probability sampling is characterised by an unknown probability of selecting each element from the population (Bless et al., 2013). As applied in this research, purposive sampling involves a deliberate and careful selection process (Bryman & Bell, 2015). The researcher identified potential participants based on their relevance to the research question, which focused on the experiences of black actuarial science students and the factors that shape their mindsets. In this context, relevance was determined by specific criteria: participants needed to be registered for the 2023 academic year at UCT and be within their first to fourth year of their actuarial science studies.

Additionally, participants were required to self-identify as black students. This selection process ensured that the chosen participants had the first-hand experience and perspective to provide valuable insights into the research question. By purposively selecting individuals who met these criteria, the research aimed to collect data that would be directly applicable to understanding the lived experiences of the target population. Convenience sampling was also utilised in this study to facilitate the practical aspects of participant recruitment. Convenience sampling involves selecting participants who are readily accessible and willing to participate

in the research (Bryman & Bell, 2015). Given the logistical challenges and constraints often associated with conducting research, particularly with a specific target group like actuarial science students, convenience sampling offered a pragmatic solution. It allowed the researcher to engage with participants currently enrolled at the UCT and willing to participate in the study. This approach expedited the participant recruitment process, making it more feasible within the confines of the research timeline and available resources.

3.3.3 Sample

The research sample for this study consisted of six participants. In conducting this qualitative study with six participants, the researcher recognised that the aim was not to generate generalisable statements about larger populations but to gain in-depth, specialised insights into the experiences of black actuarial science students. Qualitative research often employs smaller sample sizes, typically six to twenty participants, as it prioritises depth over breadth, allowing for a thorough exploration of individual perspectives and contexts (Alase, 2017). Four participants were in the fourth year of their actuarial science studies at UCT, signifying a crucial stage in their academic journey, while the remaining two were in their third year of studies, as depicted in Table 1 below (page 37). The researcher sought to encompass a range of experiences by including participants in different academic years of study. This approach allowed for the inclusion of individuals at different stages in their academic journey, such as those nearing graduation who had encountered various academic experiences and those in a slightly earlier stage of their academic path. Gender diversity was also considered, contributing to a comprehensive understanding of the factors shaping mindsets. Among the participants, four identified as women, and two as men. This gender balance acknowledged the potential influence of gender-related experiences and perceptions within the context of actuarial science education in South Africa.

3.4 Procedure

In order to ensure that this study adhered to essential ethical standards, it underwent a comprehensive ethical review process. Ethical approval was granted by the Commerce Faculty Ethics in Research Committee (EiRC) at the University of Cape Town (Ethics Approval Code: COM/02145/2023) (Appendix A). In addition, formal consent was obtained from the UCT Department of Student Affairs (DSA) to conduct semi-structured interviews with actuarial

science students as research participants. The process of recruiting participants for this study unfolded through a multi-faceted approach. Initially, the researcher disseminated a poster through various actuarial science students' WhatsApp groups. This outreach was made possible with the assistance of actuarial science tutors within the department at UCT.

Furthermore, invitations to participate in the research were extended to students at UCT who had expressed an interest in contributing to the study. As a result of these initial recruitment efforts, the research received expressions of interest from two individuals who voluntarily chose to participate. To broaden the participant pool, the researcher leveraged LinkedIn as a platform for reaching out to UCT actuarial science students. Private messages were sent to five selected students on LinkedIn, resulting in four students expressing their interest and willingness to participate in the research.

Before the semi-structured interviews, the researcher ensured that all selected participants were well-informed about the study's objectives, procedures, and rights as participants (Brinkmann & Kvale, 2017). Consent forms were distributed to each participant, and their willingness to participate in the study and be audio-recorded during interviews was obtained.

Throughout the research process, ethical principles and guidelines were upheld to safeguard the well-being and privacy of the research participants. These ethical principles encompass respecting participants, ensuring informed consent, upholding voluntary participation without coercion, and preventing any harm or deception to the participants. In line with the ethical guidelines, participants were debriefed after the interview to safeguard their well-being. Participants' identities were carefully protected, and no identifying information was included in the research findings (Brinkmann & Kvale, 2017; Willig, 2017).

Demographics Table

Table 1

Participant Information

Participant number	Pseudonym	Gender	Year of study
Participant 1	Neo	Woman	Fourth year
Participant 2	Amahle	Woman	Fourth year
Participant 3	Lesedi	Woman	Third year
Participant 4	Bongani	Man	Fourth year
Participant 5	Mpho	Man	Third year
Participant 6	Buhle	Woman	Fourth year

3.5 Data Analysis

Thematic analysis is a valuable qualitative research method to uncover, examine, and communicate recurring patterns or themes in a dataset (Terry et al., 2017). In the context of this study, the researcher applied thematic analysis to analyse the six semi-structured interviews. This analysis adhered to the well-structured and systematic steps articulated by Braun and Clarke (2006), which serve as a comprehensive framework for conducting thematic analysis. While thematic analysis is not traditionally associated with phenomenological studies, it is a flexible and versatile method that can be applied across various qualitative approaches, including phenomenology. Its adaptability allows researchers to capture the richness and complexity of participants' lived experiences, which is central to phenomenological research (Braun & Clarke, 2006). By focusing on identifying and interpreting themes that encapsulate the essence of participants' narratives, the thematic analysis provided a systematic approach to identifying and interpreting themes within the data, while its adaptability allowed it to align with the phenomenological focus of this study.

Through this method, the researcher delved into the interviews to identify underlying themes that encapsulated the essence of the participants' narratives and experiences. Thematic analysis enables the extraction of meaningful insights from the data and offers a structured approach for organising and interpreting the richness of qualitative information (Terry et al., 2017).

Following Braun and Clarke's thematic analysis steps, which include data familiarisation, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report (Braun & Clarke, 2006), the researcher navigated the complexities of the data, moving from a phase of data immersion to the development of initial codes and subsequently to the formulation of overarching themes. This process allowed for a deeper understanding of the topics discussed in the interviews and shed light on the commonalities and variations in participants' perspectives and experiences.

To be familiar with the data, the researcher initiated the process by carefully examining and listening to the six interviews on multiple occasions. Simultaneously, the researcher reviewed the interview transcripts using Microsoft Word. The process of generating initial codes involved a manual approach, where the researcher dissected the data into smaller segments using NVivo14, a qualitative data analysis software designed to assist researchers in organising, coding, and analysing qualitative data (Dhakal, 2022). During this comprehensive

review, particular emphasis was placed on identifying recurring words, phrases, and concepts that surfaced consistently throughout the interviews. These recurrent elements encompassed significant terms like “academic challenges”, “self-doubt”, “job security”, “lack of diversity”, and “fear of failure” (see Table 2, Appendix D for the rest of the coding scheme). Additionally, the researcher made a point of taking note of the emotional undertones and contextual circumstances that accompanied these thematic elements. This involved recognising and documenting the expressions of frustration, hope, and resilience embedded within the participants' narratives.

After understanding the data, the researcher generated initial codes (Braun & Clarke, 2006). Relevant text segments from the interviews were meticulously selected, and descriptive labels were assigned to encapsulate the essence of these segments. Initial codes were identified, capturing the participants' specific concepts, experiences, and emotions. Expressions and concepts associated with the participants' experiences as students were systematically coded in red, while expressions about their mindsets were distinctly coded in blue.

With the initial codes in place, the researcher initiated the search for potential themes by systematically grouping codes that exhibited similarity (Braun & Clarke, 2006). This method allowed the identification of patterns and relationships among the codes. For instance, during this process, codes such as “limited awareness of alternative careers,” “lack of diversity in the field”, and “disparities between black and white students” were consolidated under the emerging theme labelled “diversity in actuarial science”.

After identifying potential themes, the researcher reviewed and refined them to guarantee they accurately represented the dataset (Braun & Clarke, 2006). A thorough examination was conducted to verify that each theme was substantiated by numerous occurrences in the interviews, effectively encapsulating the spectrum of experiences under discussion. In this phase, the researcher assigned more explicit names and definitions to each theme to enhance clarity and precision.

3.6 Ethical Considerations

This research adhered to rigorous ethical standards outlined by the Commerce Faculty Ethics in Research Committee (EiRC). Ethical approval (Appendix A) from the Commerce Faculty EiRC was obtained before the initiation of the study, reaffirming the researcher’s commitment to ethical research practices. A fundamental ethical principle of voluntary participation was maintained, ensuring participants retained the autonomy to withdraw from

the study at any stage (Willig, 2017). This essential information was detailed in the informed consent form (Appendix B) and the participation invitation (Appendix C), including an overview of the research procedure.

Participants were assured that their privacy and confidentiality would be maintained. Their identities and personal details were carefully safeguarded, with no disclosure in the research (Willig, 2017). Participants were provided with pseudonyms to ensure their confidentiality and protect their privacy. Using pseudonyms helped safeguard the identity of the individuals involved in the study, allowing them to share their experiences more openly and reducing the risk of any unintended consequences of revealing their real names in a potentially sensitive context (Heaton, 2021). During the data collection, semi-structured interviews were audio recorded and securely stored in a cloud-based platform, protected by a password for added privacy. Participants were also informed that their involvement carried no significant risks or benefits. Given the topic's sensitivity, participants were encouraged to contact the UCT student wellness centre for support and assistance if they encountered any distress during the research process. To further promote transparency and participant well-being, contact information for the researcher and supervisor was provided in case of any participant inquiries. These stringent ethical measures underscored the commitment to respecting participants' rights, maintaining confidentiality, and ensuring their well-being throughout the research process.

3.7 Quality Criteria

As defined by Guba (1981), quality criteria are essential benchmarks that ensure the trustworthiness and rigour of qualitative research. The four criteria - credibility, dependability, confirmability, and transferability- are fundamental for establishing the robustness of research findings (Guba, 1981).

3.7.1 Credibility

Credibility in qualitative research refers to the trustworthiness and believability of study findings, emphasising the accuracy and authenticity of the data representation (Bryman et al., 2016; Guba, 1981). In ensuring credibility, the researcher sought ethical approval, obtained informed consent from participants, and engaged in debriefing sessions with the participants after interviews. These debriefing sessions with participants allowed the researcher to clarify

any misunderstandings, address potential emotional impacts of the research, and confirm the accuracy of their contributions. This practice ensured that participants fully understood the study's objectives and procedures, promoting transparency and trust. To mitigate potential biases and bolster the study's credibility, the researcher consistently practised reflexivity, enabling a thoughtful examination of biases and contributing to the transparency and reliability of the research findings (Dodgson, 2019; Teh & Lek, 2018). Additionally, regular meetings with supervisors and the submission of each study chapter for review and feedback further fortified the credibility of the research by aligning it with scholarly standards and ensuring methodological rigour (Guba, 1981).

3.7.2 Dependability

Dependability in research refers to the consistency and stability of findings over time, ensuring that the interpretations and recommendations derived from the study align faithfully with the data collected from participants (Bryman et al., 2016; Guba, 1981; Korstjens & Moser, 2017). To ensure dependability, the researcher meticulously adhered to Braun and Clarke's (2006) thematic analysis framework, which provided a structured and dependable approach to data analysis. The iterative nature of data familiarisation and multiple reviews of interview transcripts contributed to a deep understanding of the data (Braun & Clarke, 2006; Guba, 1981). Using NVivo14 for coding ensured a systematic and consistent application of codes. This emphasis on methodological rigour aligns with dependability, as it offers a reliable foundation for the study's outcomes to withstand scrutiny (Guba, 1981; Korstjens & Moser, 2017).

3.7.3 Transferability

Transferability in qualitative research refers to how study findings can be applied or generalised to different contexts or settings with alternative participants (Bryman et al., 2016; Guba, 1981; Korstjens & Moser, 2017). To ensure transferability, the researcher employed a diverse participant recruitment strategy, reaching out to potential participants through various channels such as WhatsApp groups and LinkedIn, capturing a range of perspectives (Guba, 1981). The documentation of the research procedure, participant recruitment, and analysis steps serve as a roadmap for future research, contributing to the broader scholarly discourse and offering insights applicable beyond the immediate study context (Guba, 1981; Korstjens & Moser, 2017). In this way, the study sheds light on the experiences and factors that shape the

mindsets of actuarial science students at UCT and provides a framework for understanding similar phenomena in different settings.

3.7.4 Confirmability

Confirmability refers to how other researchers could replicate and verify the study's findings. It is focused on ensuring that the data and interpretations are not subjective or influenced by the researcher's biases but are transparently derived from the collected data (Guba, 1981; Korstjens & Moser, 2017). The thematic analysis followed Braun and Clarke's (2006) systematic steps to ensure confirmability in this research, providing a transparent and replicable framework. The researcher actively engaged in reflexivity, acknowledging and minimising personal biases; through this, the study demonstrated a commitment to objective interpretation (Dodgson, 2019; Teh & Lek, 2018). The documentation of the thematic analysis and the use of NVivo14 for coding contributed to an audit trail, fostering transparency and allowing for scrutiny, thereby enhancing the overall confirmability of the study (Guba, 1981).

3.8 Reflexivity

Reflexivity is considered a cornerstone of ensuring rigour and quality in qualitative research and is often regarded as the gold standard for establishing trustworthiness (Dodgson, 2019; Teh & Lek, 2018). As Mitchell et al. (2018) aptly put it, engaging in reflexive practice can be challenging and vitally important in qualitative research. When a researcher adeptly delineates the intricate contextual intersections, such as race, socio-economic status, age, and cultural backgrounds, between themselves and the participants, it enhances the credibility of the research findings. It enriches the comprehension of the subject matter (Dodgson, 2019). Reflexivity, therefore, not only aids in maintaining a balance between methodological rigour and self-awareness but highlights the importance of recognising and addressing biases of the researcher and within the field they investigate. Instead of oversimplifying complex situations with a single, objective perspective, it underscores the value of embracing the multitude of viewpoints and interests inherent in the contexts under examination (Dodgson, 2019; Macbeth, 2001).

Recognising my active involvement in co-constructing and moulding the data as the researcher, engaging in a reflexive process and analysing my role within this context is

imperative. In this section, I examine my position, shedding light on the intricate dynamics that unfolded during the research process.

As a black female student pursuing my studies at UCT, I began this research journey with a profound recognition of the intersections between my own experiences and those of the participants. This intersectionality became a cornerstone of my reflexivity as a researcher, enriching my understanding of their narratives and complexities.

My academic journey has been characterised by various challenges, with notable obstacles such as self-doubt and a persistent fear of failure that I have had to navigate. These trials forged within me a deep well of empathy for the participants in my study who grappled with their academic difficulties. Their stories resonated with me, reminding me of the self-doubt and academic hurdles I had encountered and battled.

The participants' backgrounds, frequently identified as working-class, emerged as a significant aspect of their narratives, with many expressing financial motivations for pursuing actuarial science. A recurring theme was the desire to uplift their families and improve their socio-economic circumstances. As a researcher with a black, middle-class identity, this resonated with my experiences, fostering a connection with participants who viewed their humble origins as a potent catalyst for academic success. I found common ground in their aspirations and determination to dismantle socio-economic barriers through education. I believe that the common racial identity shared among the participants and myself fostered trust and connection. This shared identity appears to have established a secure environment, allowing participants to openly share their thoughts and emotions, with the understanding that I, as the researcher, could empathise with their experiences. It seems plausible that this shared racial identity made participants feel at ease discussing sensitive topics.

Acknowledging the complexities of my intersectionality as a black female researcher was paramount to the integrity of this study. It meant recognising that while some of my experiences paralleled those of the participants, they were by no means universal. It also entailed understanding that my presence as a researcher carried a certain level of authority and influence, potentially affecting the dynamics of the interviews.

Throughout the research process, I maintained a vigilant introspection, continuously pondering how my identity and experiences might shape the collection and analysis of data. This self-awareness was a guiding light, compelling me to approach the study with sensitivity and an open heart. It pushed me to listen with unwavering attention and pose thoughtful and probing questions such as “How might my background and experiences influence how I interpret the participant’s narrative?” “Am I unintentionally projecting my beliefs or values

onto the participants, and if so, how can I mitigate this influence?". Such questions helped me remain receptive to the diverse experiences and perspectives the participants brought to the fore.

At the outset, I held a stereotype about actuarial science students, viewing them as individuals who approached life with logical precision, their emotions seemingly held in check. However, during the interviews, these preconceived ideas unravelled before me. I was taken aback by the raw vulnerability displayed by the participants. They shattered the stereotype I had held, revealing a depth of emotion and humanity that transcended my initial perceptions. Reflective writing became my refuge, providing a means to process and protect my emotions amidst the participants' unexpected vulnerability and emotional depth. One of the interviews left an indelible mark on me. At the end of this interview, I was overcome with emotion, tears streaming down my face. It was a poignant reminder that this research endeavour had transcended my expectations; it was not merely a study but a means for amplifying the voices of countless black actuarial science students. Their stories, struggles, and determination were far greater than any one person's narrative, including mine. This research became a call to action, a reminder of the many stories and unspoken struggles that deserve to be brought to light. It was a realisation that this research was a shared journey that extended beyond my individual experience and that the stories and cries of these students needed to be heard and acknowledged.

Chapter Summary

This chapter presented an overview of the qualitative research approach and intersectionality analysis employed in this study. The data collection process was explained, detailing the research procedure, and the exploration extended to encompassing data analysis methods. Ethical considerations, quality criteria, and the researcher's reflexivity were also discussed.

The following chapter presents the results and discussion of the findings.

Chapter 4: Results and Discussion

This chapter dissects the research findings, with Section One illuminating the diverse lived experiences and Section Two delving into the factors that shape the mindsets of black actuarial science students. It explores participants' experiences, challenges, and perspectives,

engaging in a robust discussion that situates these outcomes within the broader context of existing literature.

4.1 Section One: Lived Experiences

The first section of this chapter seeks to analyse the lived experiences of black actuarial science students. Within this context, three themes were identified: transitioning from high school to university, academic challenges and demands, and diversity in actuarial science.

4.1.1 "In my life, I had never used a computer": Transitioning From High School to University.

This theme explores the challenges black actuarial science students encounter as they transition from high school to studying actuarial science. It encompasses the role of academic excellence as a motivating factor and the societal pressures on these high-achieving students to pursue actuarial science. Additionally, socio-economic considerations, language challenges, disparities in educational backgrounds, and self-doubt are prominent aspects of this theme, collectively shaping students' experiences from high school to university.

When discussing her academic journey from high school, Buhle elaborated:

> *''I have always been a top student. I was never really cool or anything like that, so I felt inadequate in different ways. And my safe space…my safe place, was really my academics. So that is how I really just became super brilliant.''*

Buhle's narrative emphasises the role of academic excellence as a coping mechanism and source of self-worth. Feeling inadequate in other aspects, particularly socially, Buhle found solace and a sense of identity as a top student. The academic realm became a "safe space", providing a refuge where Buhle could excel and find fulfilment. This highlights the complex interplay between academic achievement and personal identity, suggesting that for Buhle, excelling academically was not just a pursuit of knowledge but a means of building confidence and overcoming feelings of inadequacy in other areas of life.

Buhle's reliance on academic excellence as a coping mechanism aligns with the findings of Ramjee et al. (2013) and Strugnell and Ranchod (2018), who emphasise the stringent entrance requirements of actuarial science programmes. Admission into the Actuarial Science

programme at UCT requires meeting specific criteria. To secure admission, applicants need to achieve National Benchmark Test (NBT) scores at the upper intermediate level for Academic Literacy (AL) and Quantitative Literacy (QL). Additionally, a minimum score of 80% is expected in Mathematics. For English proficiency, a score of 60% is required for the Home Language (HL) and 80% for the First Additional Language (FAL). Actuarial science programmes often attract individuals from the upper levels of academic achievement, representing the top 5% of school graduates (Ramjee et al., 2013; Strugnell & Ranchod, 2018). This selected group is characterised by a history of excelling in academic pursuits, especially in mathematics, and demonstrates high overall academic performance (Smith & Schumacher, 2005, 2006). Buhle's narrative reflects an intersectional experience where academic excellence becomes a refuge amid feelings of inadequacy, highlighting the interconnected dynamics of achievement, identity, and social acceptance. The emphasis on the academic realm as a safe space underscores the complex interplay of multiple dimensions shaping her sense of self. Buhle's narrative thus exemplifies how pursuing academic excellence can serve as a refuge for individuals within this high-achieving cohort, offering a source of identity and self-worth. It underscores why many students, like Buhle, are drawn to actuarial science programmes.

This notion is further explained by Neo when expanding on her academic journey from high school:

> *''After high school, when you have high marks, you are almost expected to go into certain fields. Like, whether you like it or not, you've been programmed to believe that if you have this mark for this, you should study that. So, my other options were medicine or accounting.''*

Neo articulates the societal expectations and programming that follow high academic achievement in high school. Neo notes that with high marks, there is a predetermined expectation to pursue specific fields of study. The pressure to conform to these expectations becomes a form of programming, limiting the perceived choices for individuals with excellent academic performance. Neo highlights the narrowed options, specifically medicine and accounting, suggesting that students are often directed towards conventional and high-status professions based on their academic success. This post-high school decision-making process reveals the intersectionality of academic achievement and societal expectations, wherein high marks come with predetermined expectations regarding career choices. The limited options presented, namely medicine or accounting, illustrate the intersection of academic success,

career paths shaped by societal norms, and students' constraints in navigating predefined trajectories based on academic performance (Collins, 2015, 2000; Rice et al., 2019). Neo's statement aligns with the arguments presented by Lephalala and Makoe (2012), Abrahams et al. (2015), and Mzangwa (2019). The pressure on high-achieving students to pursue specific fields, such as actuarial science, reflects additional factors beyond personal interest. The socio-economic context of South Africa, where financial stability is a prominent concern, is pivotal in steering students toward fields perceived to offer economic security (Abrahams et al., 2015; Lephalala & Makoe, 2012; Mzangwa, 2019). Neo's experience resonates with these arguments, highlighting the lasting influence of societal expectations and historical inequalities on academic choices among high-achieving students in South Africa.

When asked about her motivation to study actuarial science, Buhle explained:

> *''Because of the prospect of stability and a decent income. Not a decent income, actually a good income. I don't come from a well-off family. I've always been that kid being chased by the fees office. Like, your fees are in arrears. So, it was like, okay, I need to bring in the money. We need the money. So that's how I got into it [actuarial science].''*

Buhle's account provides a poignant perspective on the motivations that drive black actuarial science students towards fields like actuarial science. The prospect of stability and, more importantly, a substantial income underscores the profound impact of socio-economic considerations on career choices. Buhle's decision to pursue actuarial science reveals an intersectional experience where financial stability and financial difficulties within her family intersect with career choices, emphasising the impact of socioeconomic factors on academic and professional pathways (Boonzaier & Mkhize, 2018; Collins, 2015, 2000; Rice et al., 2019). Buhle's admission of not coming from a financially privileged background and having faced the stress of unpaid fees accentuates the significance of economic security in their decision-making process, further emphasising Lephalala and Makoe (2012) and Mzangwa (2019) arguments that black students in South Africa are driven to choose fields like actuarial science for financial security, influenced by historical disparities in education. Buhle's economic struggles highlight the urgent necessity, mentioned by Manganyi (2018), to unravel the socio-economic foundations and institutional practices that sustain racial inequality post-1994. Buhle's experience exemplifies how economic security, or the lack thereof, is intricately woven into the decision-making process, illustrating black actuarial science students' persistent challenges in navigating career paths within a post-apartheid context.

These disparities persist as actuarial science students transition to university, as illuminated by Amahle when she describes her transition:

> *''In high school, we used to study everything in our home language. So, the first thing was adapting to learning in English, understanding everything in English and being taught in English, especially by people from different countries. So, you have to be able to listen to that in class. It was actually so tough because in high school when you don't understand something, your teacher will sit you down and explain it in your home language.''*

Amahle's account highlights the challenges she faced when transitioning from high school to UCT, where English is the primary medium of instruction. Amahle was accustomed to studying and learning in her home language, Sepedi, in high school. However, upon entering a new academic setting, she had to adapt to learning in English, which included comprehending lectures and instructions delivered in English, often by instructors from various countries. This language transition was particularly demanding, as her support structure in high school, where teachers would explain concepts in her home language when needed, was no longer available. Amahle's experience highlights the intersectionality of language, cultural adaptation, and educational disparities, where the shift to English instruction intersects with diverse cultural backgrounds, creating additional hurdles for comprehension and learning support (Boonzaier & Mkhize, 2018; Collins, 2015, 2000; Rice et al., 2019). Amahle's experience aligns with the challenges faced by black actuarial science students in South Africa. These students often encounter significant cultural and language adjustments during their academic journey (Kessi & Cornell, 2015; Sennett et al., 2003). The significance of language skills, emphasised by Borghi et al. (2017) and Naidoo (2008), extends beyond basic communication, impacting students' ability to engage with complex subjects like actuarial science.

Additionally, the pressure to assimilate into the dominant culture, including linguistic conformity, as noted by Bazana and Mogotsi (2017) and Kessi and Cornell (2015), introduces a challenging dynamic where students must navigate between academic success and preserving their cultural identity, leading to diverse coping strategies (Kausar, 2010; Kessi & Cornell, 2015). Borghi et al. (2017) and Naidoo (2008) emphasise the crucial role of language skills in dealing with abstract and challenging material, which is prevalent in actuarial science. Amahle's struggle to understand technical concepts in English reflects the importance of language proficiency in this field, where comprehending and effectively communicating

complex technical concepts is vital in academic and professional contexts. Naidoo (2008) and Strugnell and Ranchod (2018) further reinforce that actuarial science programmes in South Africa employ English as the medium of instruction, aligning with Amahle's experience. Paxton (2009) emphasises the value of using various languages to expand students' comprehension of unfamiliar terms, highlighting the significance of acknowledging the linguistic diversity within South Africa's student population. Mashiyi (2014) advocates for regional bilingualism in South African universities, arguing that it will enhance student success and social cohesion.

Black actuarial science students in South Africa transition from various high schools, each confronting unique disparities. Amahle explains:

> *''In first year, there was a computer science course. So, in my life, I had never used a computer, let alone coding. So, we took a computer science course in the first year where we were learning coding in Python. So, yeah, that was very challenging for me because I had to learn the functions, how to make the code work and everything.''*

Amahle's experience provides valuable insights into the challenges she faced when venturing into computer science during her first year of study. She describes being completely inexperienced with computers and coding at the beginning of their academic journey. Her account of taking a computer science course in the first year, where they were introduced to coding in Python, highlights the significant learning curve she had to navigate. Amahle's narrative underscores the intersectionality of educational disparities, where lack of prior exposure to technology intersects with the challenge of learning computer science, reflecting the layered impact of socio-economic and educational factors on academic pursuits (Collins, 2015, 2000; Mzangwa, 2019). Amahle's experience of entering a computer science course with no prior coding or computer knowledge aligns with the broader context of educational disparities that many black students, including those pursuing actuarial science programmes, encounter in South Africa. These disparities, as highlighted by Naidoo (2008) and Naidoo and McKay (2018), can lead to a significant gap in foundational knowledge, especially in technical subjects like computer science. Mzangwa (2019) and Ndimande's (2016) argument that despite post-apartheid efforts to address educational inequalities, significant disparities in access to quality education persist resonates with Amahle's experience. Amahle's limited exposure to computers before entering the computer science course exemplifies the challenges faced by many students who have not had access to advanced coursework or resources. These disparities

in secondary education can affect students' preparedness for university education, especially in fields like actuarial science (Ndimande, 2016; Strugnell & Ranchod, 2018; Taylor & Yu, 2009).

The disparities experienced by these students not only impact their readiness for university but cultivate self-doubt and a prevailing sense of not belonging to the university environment (Cornell et al., 2022; Murray et al., 2022; Ndimande, 2016). These feelings can further hinder their academic success and overall well-being, as highlighted by Lesedi:

> *''When you get here [UCT], you start to recognise, maybe am I good enough to be here? And especially when you see people who went to a private school answering questions well, and maybe even they are more exposed [to actuarial science]. So, you start to doubt yourself.''*

Lesedi's statement offers insight into the experience of imposter syndrome in which she asks herself, "Am I good enough to be here?" revealing feelings of self-doubt that can manifest when students enter academic environments, particularly in fields like actuarial science. She describes a common phenomenon where individuals question their abilities and qualifications, especially when they perceive their peers as more prepared or experienced.

The mention of students who attended private schools and seem more acquainted with actuarial science highlights the impact of socioeconomic disparities on students' confidence levels. The implication is that individuals from more privileged backgrounds might have had access to resources and exposure that others, like Lesedi, may not have had. Lesedi's narrative reveals the intersectionality of imposter syndrome, socioeconomic disparities, and educational background, as the perception of worthiness at UCT intersects with class-related anxieties and the influence of private school exposure, shaping a complex self-evaluation process. This narrative unveils the nuanced dynamics of privilege and access, highlighting how intersecting factors like socio-economic status and educational background can shape one's perception of belonging and competence within the academic environment (Boonzaier & Mkhize, 2018; Collins, 2000; Rice et al., 2019). Fanon's (2016) perspective, particularly outlined in his work 'Black Skin, White Masks', could provide a lens through which Lesedi's experience of imposter syndrome can be understood. Fanon argued that colonialism and racism create a psychological impact on the oppressed, leading to a sense of inferiority and self-doubt (Fanon, 2016). From this perspective, it can be argued that Lesedi's feelings of inadequacy are not inherent but rather a product of a colonial and racially stratified society. The perception of being less prepared or

experienced than peers may stem from systemic inequalities that limit access to resources and opportunities for black individuals.

Lesedi's experience of self-doubt upon entering an academic environment that includes peers from diverse backgrounds is closely related to the broader discussions about the inclusivity and diversity within South African universities and actuarial science. Cornell and Kessi (2016) and Cornell et al. (2022) argue that universities may still carry remnants of a culture that is not fully inclusive or accommodating to the diverse experiences of black students. Lesedi's feelings of not being "good enough" could be rooted in this culture, reflecting the challenges faced by minority students in academia. Fanon (2016) explores how the colonial experience shapes individuals' perceptions of themselves, often leading to a sense of inferiority among those from colonised cultures. The author further looks at the influence of Eurocentric standards and the imposition of a dominant culture on the colonised (Fanon, 2016). In the academic context, this could manifest as black students needing to conform to mainstream expectations and questioning their worth based on these standards. From this perspective, it would be argued that the roots of Lesedi's feelings are deeply embedded in a broader societal structure that places value judgments on individuals based on their cultural background.

This perspective extends to the perception of actuarial science as a predominantly white field, potentially deterring black students from pursuing it. The lack of diversity within the profession can create an unwelcoming environment, which aligns with Naidoo's (2008) assertion about the impact of diversity on student experiences and choices. The sections below further explore the theme of diversity in actuarial science.

Furthermore, the absence of black actuaries as mentors or role models may contribute to the doubts and uncertainties that black students like Lesedi may experience when considering careers in actuarial science (Davis, 2007; Phume & Bosch, 2018). The legacy of colonialism and apartheid in South African higher education, as outlined by Cornell et al. (2022), reinforces the notion of an unwelcoming environment for minority students, where feelings of not belonging or self-doubt may be common (Bazana & Mogotsi, 2017; Higham, 2012; Sennett et al., 2003).

4.1.2 "Failing took me to rock bottom": Academic Challenges and Demands.

This theme delves into the multifaceted experiences of black actuarial science students as they confront a complex array of hurdles within their academic journey. This theme encompasses the demanding coursework and the need to balance academic pursuits with a

social life. The repercussions manifest in various forms, including mental and physical health challenges. Moreover, these academic challenges, particularly the difficulty of grasping intricate course concepts, represent a pivotal aspect of their experiences.

Amahle elaborates on the challenges when asked about her experience in actuarial science:

> *''The course content, like some of the concepts, like understanding the concepts, applying them, mostly application. You can read through the content, a concept, understand how it works, understand what it does, but when you have to apply it to a real-life situation…yeah, that's when it gets really difficult. And, there's a lot of work, there's a lot of things to juggle.''*

Amahle discusses her academic experience, focusing on the content and the challenge of understanding and applying concepts. She emphasises that while understanding the concepts and content may not be a problem, the real difficulty arises when applying these concepts in real-life situations. This suggests that the practical application of academic knowledge is a notable challenge for Amahle.

Additionally, Amahle mentions the presence of a significant workload and the need to manage multiple tasks, using the term “juggle” to describe her situation. This language indicates that they perceive their academic responsibilities as demanding and potentially overwhelming (Kausar, 2010).

Amahle's observations align with Naidoo's (2008) insights. Naidoo (2008) highlighted the need for different thinking styles in actuarial education, depending on the skills being evaluated. Well-structured and process-centred thinking is necessary for the 'core technical' subjects (Nigmatov, 2014). These subjects focus on foundational principles and technical aspects. However, as students advance to the 'specialist application' subjects, they are required to utilise higher-order thinking skills to synthesise information and apply judgment effectively. A shift to higher-order thinking skills becomes crucial to synthesising information and exercising judgment effectively (Naidoo, 2008; Van Den Berg, 2004). This distinction underscores that, in actuarial science, two distinct thinking styles are imperative at different stages of the examination process. Amahle's statement mirrors this notion by emphasising the significance of practical application and its challenges.

Bongani further emphasises the diverse cognitive prerequisites required from actuarial science, asserting that:

‘‘The courses expect you to think like chatGPT… like a computer or something, because even the level of questions they ask is high level. Sometimes, I don't know what it wants. Like I see a question and ask what do you want from me? Because I think it requires a lot, a high level of thinking and they give you a short time. So obviously, that's why it's a course that is great for people who can work fast and under pressure. When you get there, you only have one hour to complete a test. That would make sense if it was at least two hours because sometimes you know what you have to do; it's just that you don't have enough time.’’

Bongani expresses the challenging nature of their actuarial science courses, where the expectations are set at an extremely high level. Bongani underscores the need for advanced thinking skills, comparing it to thinking like a computer or a sophisticated language model like ChatGPT (Eysenbach, 2023). Bongani describes a sense of frustration when faced with these complex questions within a limited time frame, highlighting that the courses are designed for individuals who can work quickly and effectively under pressure. The mention of having only one hour for a test underscores the time constraints that can make it difficult for students to showcase their understanding and abilities. Naidoo (2008) asserts that the actuarial science curriculum is academically rigorous and marked by intense pressure. Bongani's call for advanced thinking skills is supported by Chu (2010) and Goford (2003), who emphasise the importance of thinking styles in actuarial success. Chu (2010) underscores communication, creativity, and critical thinking, closely aligning with thinking like a computer or complex language models.

While the time constraints on tests and the immense academic pressure placed on students are significant components of the demanding nature of actuarial science, Bongani's perspective sheds further light on the academic rigour these students encounter. Bongani's insights provide a firsthand account of the formidable academic standards and expectations within the field:

‘‘In the first year, you have to get 70% for mathematics and 70% for statistics. Statistics and mathematics are not easy courses. I feel like for them [lecturers], it's like… if you can't get those marks, then the degree is not for you. It's a way to see who is capable because if you get 50% for those courses, to the lecturers, it is a representation that you won't be able to handle whatever comes after.’’

Bongani's statement highlights the rigorous and demanding nature of actuarial science studies, particularly in the first year. They emphasise the high academic standards set for courses in mathematics and statistics, where achieving a minimum of 70% is expected. This stringent requirement creates considerable academic pressure, reflecting the challenging nature of these courses. Additionally, Bongani suggests that this high benchmark is a criterion for lecturers to assess a student's capability and readiness for the actuarial science programme. Falling short of this standard, with a 50% grade or lower, may indicate that a student may struggle with the more advanced material in the programme. This perception adds a layer of pressure and scrutiny to students, potentially contributing to the stress and anxiety commonly associated with actuarial science studies, where maintaining high grades is critical to success (Markoulakis & Kirsh, 2013; Pascoe et al., 2019). Intersectionality is evident in Bongani's narrative, as the stringent academic requirements for mathematics and statistics serve as a filter, disproportionately affecting students with intersecting challenges. The expectation of high grades in these challenging courses is a barrier that may disproportionately impact individuals with diverse backgrounds, experiences, and potential barriers to academic success. This reveals a system where the intersectionality of students' identities intersects with the stringent academic criteria, potentially disadvantaging those facing additional hurdles in navigating the demanding landscape of actuarial science (Boonzaier & Mkhize, 2018; Collins, 2015; Cornell & Kessi, 2016).

Bongani's description of the academic demands and stringent grading standards aligns with what the authors Naidoo (2008), Ramjee et al. (2013), and Smith and Schumacher (2005) have noted about the challenging nature of actuarial science programmes. These programmes involve rigorous admission standards that often require exceptional proficiency in mathematics and overall academic excellence, emphasising the difficulty of gaining entry into these programmes (Smith & Schumacher, 2005). The long and demanding journey to becoming a Fellow, comprising numerous professional examinations and work-based learning, as outlined by ASSA (2022) and Phume and Bosch (2018), further underscores the arduous nature of the field. Bongani's reference to the requirement of maintaining high grades for critical courses like mathematics and statistics reflects the relentless pressure that students face in maintaining the necessary academic performance, which can impact their mental health, a concern highlighted by Markoulakis and Kirsh (2013) and Pascoe et al. (2019).

Navigating these demanding challenges often necessitates peer support, yet the availability of time for such support is not always guaranteed (Harper, 2006; Lotkowski et al.,

2004). Students grapple with the need for peer guidance in an environment where time constraints can make it precious. Bongani expands on these demands:

> *‘‘So, it’s very challenging, and that's why you see a lot of people dropping out because it requires a lot of time, a lot of energy, and a lot of sacrifices. So, it's great for people who don't have a social life. So, if you know that you are here to study, I feel like that’s what it [actuarial science] expects. It expects you to just focus on it [actuarial science] and ignore everything else, which is obviously not great.’’*

Bongani's perspective sheds light on the demanding nature of actuarial science studies and the significant commitment it requires from students. He emphasises that this field necessitates a substantial investment of time, energy, and personal sacrifices, making it challenging for individuals to balance their academic pursuits with other aspects of their lives, particularly social activities. Bongani's observation that many students drop out of actuarial science highlights the rigorous and intensive nature of the programme.

Additionally, Bongani's statement raises questions about the impact of this intense academic focus on students' well-being and work-life balance (Markoulakis & Kirsh, 2013; Motsabi et al., 2020; Pascoe et al., 2019). The expectation that actuarial science students should prioritise their studies above all else may lead to feelings of isolation and stress, as highlighted by Buhle:

> *‘‘I'm extremely lonely. I've got no one. And it's not because people don't want to be there for me, but because of the amount of dedication that I need to put in in order to do well in this specific profession. I'm unable to create space for my relationships to bloom and for me to interact with people. So now I'm lonely, and it's just me and these tricky academics. And now I'm just, like, spiralling because this is hard. I want to cry, but I can't cry because if I do cry, I'm going to lose an hour. And an hour is a big amount of time.’’*

Buhle's account provides a glimpse into the emotional toll and isolation that can accompany pursuing a demanding profession like actuarial science. Her “extremely lonely” description underscores the sacrifices and dedication required to excel in this field. The isolation is not due to a lack of support or willingness from others to be there for them but rather a result of the substantial commitment demanded by the profession (Naidoo, 2008; Uter

et al., 2018). The loneliness expressed in Buhle's narrative is deeply entwined with the intersectionality of her identity and future profession in actuarial science. The struggle to excel in this profession reveals the intersectionality of her experiences, where the demands of dedication and academic challenges limit the space for nurturing personal relationships. This narrative underscores the compounding effects of societal expectations and academic pressures as Buhle grapples with isolation and the relentless demands of actuarial science, navigating a complex interplay of identity and career.

As expressed by Buhle, the need for an intense level of dedication to excel in actuarial science often leaves little room for maintaining social connections and nurturing relationships. Motsabi et al. (2020) and Uter et al. (2018) argue that this can lead to isolation and distancing from the usual social interactions that provide emotional support and companionship.

Buhle's description of feeling extremely lonely while pursuing actuarial science directly relates to the concept of social support and its importance, as discussed by Naidoo (2008) and Lotkowski et al. (2004). Naidoo (2008) highlights the critical role of social support for black actuarial science students, especially considering the demanding nature of the curriculum. Buhle's sense of loneliness indicates the challenges she faces in accessing the emotional support that can enhance their well-being during their academic journey. Lotkowski et al. (2004) and Uter et al. (2018) emphasise the significance of social support and social involvement in predicting academic success and retention. This assertion underscores the fact that academic achievement is not solely a product of individual effort and intellectual capabilities but is intricately tied to the social fabric of the educational environment.

Buhle's statement, "I want to cry, but I can't cry because if I do cry, I'm going to lose an hour", poignantly illustrates the mental health challenges faced by students in high-pressure academic settings (Bantjes et al., 2020; Markoulakis & Kirsh, 2013; Pascoe et al., 2019). The pressure of time constraints resulting in emotional suppression and the trade-off between well-being and academic demands are all encapsulated in this brief comment.

Mpho contributes to this, explaining how the academic demands and failing in actuarial science have impacted him emotionally and mentally:

> *''I think for me, failing really took me to rock bottom. I don't think I even recovered from that. I think I'm still at rock bottom. I'm still in the pits because I was telling someone that I am at the point where I'm just here because I'm just required to show up. There's no spark anymore. There's really nothing exciting for me about what I'm doing or what I'm studying.''*

Mpho’s statement reveals a deep sense of despair, primarily stemming from their experience of failure in the challenging field of actuarial science. The phrase “failing really took me to rock bottom” underscores the profound emotional impact of academic setbacks, suggesting a significant blow to their self-esteem and motivation. The expression “the pits”, often used colloquially to describe a state of extreme adversity or despair, encapsulates Mpho's hopelessness and emotional distress. His statement implies that he has not recovered from this failure, indicating unresolved psychological turmoil and a persistent sense of being stuck in a profoundly negative emotional state (Blackwell et al., 2007; Cimpian et al., 2007; Markoulakis & Kirsh, 2013). Mpho’s experience underscores the intersectionality of academic setbacks and emotional well-being, where the impact of failure extends beyond academics, intersecting with mental health struggles and a diminished sense of purpose within actuarial science, revealing the complex interplay between academic challenges, emotional resilience, and his overall sense of fulfilment and engagement in his academic pursuits.

Markoulakis and Kirsh (2013) and Wynaden et al. (2013) assert that this persistent state of feeling “in the pits” highlights the toll that mental health challenges can take when confronted with academic difficulties, potentially leading to a disengaged and demotivated state. Mpho’s mention of just showing up without any excitement or passion for his studies underscores the importance of addressing mental health issues and supporting students dealing with the pressures and setbacks in this demanding academic field (Bantjes et al., 2020; Markoulakis & Kirsh, 2013; Uter et al., 2018). Mpho's account of feeling at “rock bottom” after encountering academic setbacks is a sentiment that resonates with many actuarial science students (Aditomo, 2015). These students, typically high achievers with strong academic backgrounds, often face a challenging transition when confronted with academic difficulties in university (Ramjee et al., 2013; Wong & Chiu, 2019). This shift can be particularly daunting for black actuarial science students, as it creates a disparity between their prior successes and current struggles, potentially leading to feelings of self-doubt and imposter syndrome (Murray et al., 2022; Naidoo, 2008). This struggle to meet high standards can induce overwhelming stress and self-imposed pressure, rendering students more susceptible to anxiety and depression (Bantjes et al., 2020; Markoulakis & Kirsh, 2013; Pascoe et al., 2019).

4.1.3 "Why are there not many black people in the field": Diversity in Actuarial Science.

This theme reflects the issue of diversity in actuarial science and discusses the disparities between black and white students in the field. It highlights the lack of diversity within actuarial science, particularly how these disparities impact students' experiences, opportunities, and success. It draws attention to the prevailing underrepresentation of black students and the influence of racial and socioeconomic factors on their academic journeys within this field.

Black actuarial science students recognise that the actuarial science field in South Africa lacks diversity, with most individuals being white. This absence of diversity within the field significantly impacts black students' academic journeys, as they lack role models to look up to (Davis, 2007; Phume & Bosch, 2018; Strugnell & Ranchod, 2018). Amahle's statement reflects a black student's complex experience in actuarial science, where diversity and representation are pressing issues:

> *"It [becoming an actuary] actually feels like it is going to be a tough journey. Also, you kind of think, why are there not that many black people in the field? What happens? Why are they not making it all the way? What happens between them graduating and stuff? Sometimes you do feel like giving up, but then sometimes you feel like, okay, maybe I am the one who is going to make the diversity. Maybe I'm the one who's going to represent. It motivates you at the same time."*

Amahle expresses a sense of anticipation and uncertainty about the challenges they might encounter as a black student in actuarial science. She wonders why there is a lack of black representation in the profession and questions what hurdles may exist between graduation and success in the field. These inquiries reflect a concern for the lack of diversity for black individuals in actuarial science (ASSA, 2022; Phume & Bosch, 2018; Ramjee et al., 2013). Despite moments of doubt and the inclination to give up, Amahle also acknowledges a strong motivation to become a trailblazer for diversity, serving as a representative of their community and, in doing so, finding inspiration and determination to persist in the face of adversity. This complex mix of apprehension, inquiry, and determination highlights the challenges and aspirations many underrepresented students may experience in striving for diversity and inclusivity within their chosen field (Carpi et al., 2016). Amahle's reflection reveals the intersectionality of career aspirations, race, and the lack of diversity within actuarial science, where the journey is perceived as challenging. The motivation to break the pattern and become

a representative figure for diversity intersects with the broader systemic factors affecting black individuals' progression within the field (Collins, 2000, 2019; Crenshaw, 1991; Gopaldas, 2013).

Amahle's inquiry about the lack of representation mirrors the stark statistics highlighted by the Actuarial Society of South Africa (ASSA) in 2022, where only 8% of actuaries are black (ASSA, 2022). The lack of representation and diversity within actuarial science can create an unwelcoming or intimidating environment for minority individuals, as they may not find professionals who look like them and have successfully navigated the challenging path to becoming actuaries (Naidoo, 2008; Phume & Bosch, 2018; Ramjee et al., 2013). Amahle's desire to be a representative of diversity and motivation to break down these barriers underscore the urgent need for increased representation, mentorship, and inclusivity within the field to make actuarial science a more viable career option for black students (Davis, 2007; Phume & Bosch, 2018).

Amahle continues to express her view on being a minority in the industry and the challenges that come with it:

> *"There are a few black people in the industry. So when you do something, it kind of feels like people are already expecting you to fail. So, you constantly have to prove that you are not going to fail.*
> *It feels like we always have to work harder to actually be noticed in the industry. So, I don't know. I feel like my entire career is based on working hard to prove myself as a black person in the industry. As a black person in the industry, you will always have to work hard to prove yourself because you will be outnumbered in the industry and in the workplace. So, I don't know. It feels like the pressure is on you to represent."*

Amahle describes feeling like expectations of failure are already placed upon them as black individuals, which compels them to prove themselves continuously. This constant need to validate her competence and stand out in a predominantly non-diverse industry creates the perception that her entire career is contingent upon proving their worth as a black professional. Amahle acknowledges the necessity of working exceptionally hard to gain recognition and respect, as black people are outnumbered in the industry and the workplace. The pressure to represent her community is palpable, making her career a constant journey of demonstrating her capabilities and overcoming biases that stem from being a minority in their field. Amahle's sentiments emphasise the additional hurdles and responsibilities black professionals may

encounter in their quest for recognition and inclusion in their industry. Amahle's narrative highlights the intersectionality of race, professional expectations, and the need for constant validation within actuarial science, where the perception of being expected to fail intersects with the systemic pressure on black individuals to consistently work harder, underscoring the layered challenges faced by black individuals in establishing credibility and representation within actuarial science (Collins, 2000, 2019; Crenshaw, 1991; Naidoo, 2008; Phume & Bosch, 2018). This aligns with Akoojee et al. (2012) argument, which asserts that despite a rise in black graduates, labour market outcomes for black professionals are inconsistent, highlighting racial biases favouring white students in the labour market. This suggests the presence of systemic hurdles and discrimination that hinder career prospects for black professionals (Theron, 2016).

Bongani sheds light on the complex issue of diversity within the field. Their perspective touches upon the experiences of black and white students, suggesting that disparities may exist in the support and background each group receives:

> *"The white students probably get [academic] exemptions. I think it's probably their background as well. I think the background has a lot to do with it as well because most of the time, they come from stable households where they get a lot of support. They don't have many issues going on because sometimes we, as [black] students, have a lot of stuff we have to deal with; obviously, that can impact your life."*

Bongani's statement highlights the issue of diversity among students in actuarial science, specifically addressing disparities in support and background. Bongani suggests that white students may receive certain exemptions, possibly because they often come from more stable households with significant support systems, allowing them to exert more effort towards academics. This observation underscores the impact of background and external factors on students' academic experiences. Bongani implies that black students, in contrast, may face additional challenges and issues outside of their academic pursuits, which can significantly affect their lives and, by extension, their ability to meet the rigorous demands of actuarial science. Bongani's narrative also exposes stereotype threat by suggesting that white students might receive academic exemptions due to perceived stable backgrounds, implying a systemic bias that can perpetuate stereotypes and hinder black students' recognition for their academic achievements, further highlighting how racial stereotypes and socio-economic factors intersect in shaping educational experiences (Naidoo, 2008; Steele, 1997).

Jones et al. (2008) and Motsabi et al. (2020) highlight that many black students are first-generation university attendees, indicating that their parents have not had previous exposure to higher education. This circumstance often means a lack of familial support, as mentioned by Bongani. Additionally, as Cornell and Kessi (2016) emphasised, the significance of representation cannot be understated. Ethnic and cultural factors are pivotal in shaping students' educational experiences, influencing their sense of belonging and access to resources (Higham, 2012; Sennett et al., 2003). Bongani's comments reflect the broader issue of equity in education and underscore the necessity of addressing disparities based on students' backgrounds and experiences to foster inclusivity and support in actuarial science (Naidoo & McKay, 2018; Taylor & Yu, 2009).

The scarcity of black actuaries in the country has created a notable representation gap within the field, which often results in a disconnect between the marketing of actuarial science to black students and the actual representation within the profession (Phume & Bosch, 2018; Ramjee et al., 2013). Mpho elaborates on his introduction to the field of actuarial science:

> *"I think it's the typical black child story where you don't know what actuarial science is about. You were just told that you were smart in math. Back in 2013, the South African Actuaries Development Program were doing tours around the country. So, they came to one of the centres that was helping us with mathematics and physical science, and they presented to us, and they said we could apply. So that's when I actually got to hear about actuarial science. But even then, I was still not sure. All they gave us was the typical definition that actuaries were people who were able to use mathematical, statistical, economic, and business skills to solve real-world problems. That's how they marketed it. And I think for me, it sounded interesting. I didn't know what it was all about, but I just knew that it had to do with economics."*

Mpho narrates his journey into actuarial science, describing it as a familiar narrative among many black students who initially had limited field exposure. He attributes his introduction to actuarial science to a visit by the South African Actuaries Development Program to their community in 2013, where they provided a brief overview of the profession. Mpho acknowledges that, at that time, he had limited clarity on what actuarial science entailed but found the description intriguing, particularly because it was linked to economics. Mpho's journey reflects the intersectionality of limited exposure to actuarial science, racial dynamics, and educational opportunities, where the lack of early awareness and access intersects with the

systemic challenges faced by black students, underscoring how intersections of race and educational resources shape individuals' perceptions and opportunities within the field of actuarial science (Collins, 2000, 2019; Crenshaw, 1991; Gopaldas, 2013).

Mpho's experience highlights the lack of early exposure and awareness about the field among black students and the critical role outreach and information-sharing initiatives play in introducing potential career paths to students who might not have encountered them otherwise (Falconer & Hays, 2006). Ramjee et al. (2013) highlight that the lack of diversity in the actuarial profession can lead to a scarcity of diverse perspectives, a dearth of role models, the perception of gate-keeping, and limited representation of black individuals and women in leadership roles (Phume & Bosch, 2018; Strugnell & Ranchod, 2018). Mpho's experience resonates with these findings, illustrating the consequences of a lack of early exposure and awareness of actuarial science among underrepresented students, perpetuating the profession's demographic homogeneity.

The underrepresentation of black actuaries is a notable issue among lecturers at UCT, a concern Neo reflects upon:

> *"In 2020, when they hired one of the lecturers, he's a black man. It was such a big thing for UCT. I remember UCT made such a big deal out of it. "We have a black actuary as a lecturer", [they said]. And I always wondered why it was not that deep when they hired other people, but they hired him, and it was a big thing. But then I realised it was because there were not many people like him to be hired."*

Neo reflects on a significant event at UCT, where hiring a black male lecturer in actuarial science was widely celebrated in 2020. Neo initially found the emphasis on this hiring somewhat perplexing, considering that similar attention was not given to other faculty appointments. However, she realised the heightened attention was the scarcity of black individuals in such academic positions. Neo highlights the rarity of black representation within the field, making each instance of a black professional's appointment stand out significantly. Neo's observations underscore the importance of increasing diversity and representation in academia to normalise the presence of individuals from underrepresented backgrounds, eliminating the need for such celebrations and making diversity a natural and integral part of educational institutions and workplaces. Neo's observation further reveals the intersectionality of racial representation within academia, as hiring a black actuary as a lecturer is highlighted as a significant event, underscoring the scarcity of such representation within the field and the

broader societal context where diversity is exceptionalized. Neo's narrative exposes how race intersects with institutional dynamics, emphasising the rarity of black representation in academic roles and the heightened significance attached to such instances, reflecting broader systemic challenges in achieving diversity within actuarial science and educational institutions (Collins, 2000, 2019; Naidoo, 2008; Strugnell & Ranchod, 2018). Cornell and Kessi (2016) and Mabokela (2000) argue that the skewed demographics of academic staff at UCT, characterised by a lack of representation of black academics, exacerbates the feelings of exclusion among black students within the university environment. The authors emphasise that this lack of representation underscores the limited opportunities for black students to envision themselves pursuing similar careers as their lecturers. Therefore, Cornell and Kessi (2016) argue that black academics can play a crucial role in validating students' academic capabilities and sense of belonging and serve as important role models for black students.

Amahle highlights that the underrepresentation of black individuals extends beyond the lecturer demographics at UCT and is notably prominent in actuarial science classes:

> *"Throughout my university years, like studying in classes, there were a lot of black people in my first year. But then, as we continue, there are fewer and fewer black people in the class. You also see this even in the lecturers. I think we only have two black lecturers, and there is no black female."*

Amahle describes their experience of a diminishing presence of black students in her university classes throughout her academic journey. She also notes the stark lack of representation among lecturers, with only two black lecturers, all males. Amahle's observations highlight a concerning trend of declining diversity as students progress through their academic programmes, which can lead to a sense of isolation and underrepresentation for black students (Motsabi et al., 2020). The absence of black female lecturers underscores the gender and racial disparities within the academic staff (Mabokela, 2000; Phume & Bosch, 2018; Ramjee et al., 2013). The lack of representation of black individuals in actuarial science is a pervasive issue that starts within the classrooms and continues throughout the career pipeline (Ramjee et al., 2013; Strugnell & Ranchod, 2018). Amahle's observation of a diminishing number of black students in actuarial science classes at the university level reflects the beginning of this issue. Structural barriers present formidable challenges that hinder demographic change within the field, particularly for black candidates (Lephalala & Makoe, 2012; Mzangwa, 2019; Strugnell & Ranchod, 2018). As pointed out, this underrepresentation has far-reaching consequences,

including the risk of a lack of diversity in thinking within the profession (Strugnell & Ranchod, 2018).

The first section of the analysis laid the foundation for understanding the factors that shape the mindsets of black actuarial science students by exploring their lived experiences and unfolding a narrative marked by intricate challenges. In the transition from high school to university, academic excellence emerged as a pivotal motivator, with socio-economic factors, language barriers, and disparities in educational backgrounds weaving into the fabric of students' journeys. This emphasis on academic excellence as both a refuge and a source of identity echoed the broader socio-economic landscape of South Africa. Furthermore, the academic challenges theme revealed the multifaceted nature of hurdles encountered in the actuarial science journey, encompassing rigorous coursework, time constraints, and mental health strains. The demanding nature of actuarial studies and the pressures to excel underscored the need for enhanced support structures and a holistic understanding of students' well-being. Lastly, the diversity theme unveiled a stark reality – the lack of representation of black individuals in actuarial science. Students grappled with the absence of role models, disparities in support, and the uphill battle to overcome racial biases.

4.2 Section Two: Mindsets

4.2.1 "Fear cripples me": Factors That Shape a Fixed Mindset.

This theme delves into the factors influencing the fixed mindset prevalent among black actuarial science students. Within the context of black actuarial science students, a fixed mindset is emphasised by a perspective influenced by factors that impede the embrace of challenges and hinder the pursuit of growth opportunities. This mindset manifests as a stagnant and limited outlook on one's abilities and potential, emphasising the impact of various inhibiting factors on the individual's belief in their capacity for personal and intellectual development (Blackwell et al., 2007; Dweck & Yeager, 2019; Hwang et al., 2016). This section highlights the obstacles that hinder black actuarial science students from embracing challenges and pursuing growth opportunities. It highlights how various factors contribute to a stagnant and limited outlook on one's abilities and potential.

The theme also encapsulates the impact of fear on fostering a fixed mindset, hindering growth and development. The fear is often cultivated by external influences rather than solely from the students.

Lesedi explains their initial expectations of actuarial science and recalls the instance when fear altered her perspective on her studies:

> *''I think my expectations were quite high. I didn't want to fail because, on the first day when we were at orientation, they said, "look to your left, look to your right; whoever is there is not going to be with you at the end". And so immediately when they tell you that, there's a lot of fear that comes in. For some people, it's a good kind of fear. It motivates them, but for someone like me, fear cripples me, so it sort of discourages me sometimes.''*

Lesedi describes how high expectations and an atmosphere of fear during orientation have influenced her mindset towards actuarial science. Lesedi recalls the initial high expectations set and the introduction to a fear-inducing statement during orientation, leading to a sense of pressure and apprehension. The statement, "look to your left, look to your right, whoever is there is not going to be with you at the end", instilled fear within some individuals, motivating them to work harder. However, for Lesedi, this fear became crippling, acting as a discouragement rather than a source of motivation. The words "fear that comes in", "cripple me", and "discourages me" highlight the negative effects of this fear, illustrating how it hindered her outlook and approach. These expressions underline the debilitating impact of a fixed mindset, impeding motivation and resilience in the face of challenges (Blackwell et al., 2007; Cimpian et al., 2007; Hochanadel & Finamore, 2015; Mosanya, 2020). The fear-inducing information provided makes the fixed mindset evident in feeling discouraged rather than motivated (Dweck, 2008). Blackwell et al. (2007) argue that those with a fixed mindset are more likely to be discouraged by challenges and fear-inducing information because they view their abilities as inherent traits, leading to a focus on proving their intelligence rather than embracing challenges. Lesedi demonstrates a belief that their abilities and success are predetermined and fixed, leading to a sense of helplessness and discouragement rather than motivation and resilience. The fear described by Lesedi resulted in a mindset that hindered her ability to cope with challenges and setbacks, highlighting the impact of a fixed mindset within the academic environment (Dweck & Leggett, 1988; Dweck & Yeager, 2019; Hochanadel & Finamore, 2015; Hwang et al., 2016).

Lesedi further expands on the fear that she experiences:

> *''I think I have been a very fearful person, not believing in myself or believing that I'm capable of still doing it [actuarial science]. So the whole time, I've just been very tense,*

and every time I approach a course, I'm like, okay, this one is hard. And then, instead of actually just learning or understanding the work, I approach it with, okay…I don't understand it, and then I start to freak out. So, I think that is the number one challenge.''

Lesedi highlights a profound struggle with self-doubt and fear that has significantly impacted her academic journey. She expresses a lack of self-belief and an ongoing fear of not being capable. This pervasive fear and self-doubt result in a constant state of tension, affecting her approach to actuarial science. Instead of engaging with the material to learn and understand it, Lesedi admits to approaching each course with an immediate assumption of its difficulty, leading to panic when faced with challenging concepts. Lesedi identifies this perpetual fear and self-doubt as the primary challenge, indicating how these mental barriers have hindered her ability to approach actuarial science with confidence and a learning mindset, creating a significant obstacle to her academic success. Lesedi's narrative illustrates this fixed mindset through her ongoing fear, lack of self-belief, and an immediate assumption of the difficulty of coursework without attempting to learn or understand it. This aligns with Dweck and Leggett's (1988) and Dweck and Yeager's (2019) emphasis on the impact of a belief in human malleability, where a fixed mindset, as demonstrated by Lesedi, can hinder an individual's capacity for growth and learning. Lesedi's approach, primarily driven by fear and self-doubt, reflects the challenges that arise when one holds a fixed mindset about one's abilities (Blackwell et al., 2007; Dweck & Leggett, 1988; Dweck & Yeager, 2019).

Bongani confronts an inner battle sparked by the contrast between past academic success and the discomfort of embracing failure, leading to deep self-doubt and a challenging journey of acceptance:

''I think the course gets you thinking a lot in terms of just questioning yourself, "Are you smart?" Because obviously, you are a person who does well, then you get here [UCT] and get humble day by day. So now, the challenging part is having to accept failure. It's gotten to that where you're like, okay, you just accept your failure. So, that is obviously not a nice thing for me because I've never been a person who accepts failure. But obviously, being here, that's something that I've had to deal with.''

Bongani articulates the internal struggle and self-doubt that emerge when confronted with academic challenges in the context of his university experience at UCT. Bongani reflects on transitioning from a successful academic background to an environment like UCT that

continuously deflates them. This contrast prompts deep introspection, leading to self-questioning regarding their intellectual capabilities. Bongani's challenge concerns embracing failure, which he finds uncomfortable as it contradicts his prior achievements. Bongani grapples with accepting failure, something he has not been accustomed to. The experience at UCT has forced him to confront and reconcile this new reality of encountering failure, signifying a significant internal struggle and a departure from their past experiences of academic achievement. Bongani's experience resonates with the findings of various authors. Murphy and Thomas (2008) highlight that individuals with a fixed mindset are more prone to responding helplessly to challenges, leading to a decline in self-esteem, a pattern evident in Bongani's struggle to accept failure. Schroder et al. (2019) point out the relationship between a fixed mindset and anxiety, where the acceptance of failure by the student, despite being uncomfortable, aligns with this notion. Dweck and Leggett (1988) and Zhao and Wichman (2015) further corroborate this by emphasising that self-doubt and fixed mindsets are associated with negative affect and reduced task performance, reflecting the inner conflict and discomfort expressed by Bongani when facing the necessity of acknowledging failure in his academic journey.

The fear experienced by these students is not solely due to the fear of failure but also stems from their desire not to let down their families. Neo explains:

> *''I would say fear is a real one. When you left home, you said, I'm going to go get a degree. So fear is a big one. There's a lot of fear, a lot of uncertainty. You just feel negative. You're not positive. You're not a positive person. Yeah…You become a bit more pessimistic, and then just the anxiety.''*

Neo reflects on the weight of fear and its influence on her emotions, particularly regarding the pressure not to disappoint her family. Neo articulates the fear as a significant and real emotion tied to the commitment made upon leaving home to pursue a degree. This fear is intertwined with uncertainty, creating a pervasive sense of negativity and pessimism within her. The anxiety she experiences appears to stem from the weight of the expectations and responsibilities placed upon her, particularly the pressure to succeed and meet the aspirations of her family.

Neo's description of experiencing fear, uncertainty, and negativity aligns with the research findings of Claro et al. (2016) and Destin et al. (2019). Claro et al. (2016) highlight how socioeconomic background and fixed mindsets intersect to influence student performance.

The struggle described by Neo reflects the potential impact of a fixed mindset, as those from lower-income families are less likely to hold a growth mindset, exacerbating the challenges they face due to economic disadvantages (Claro et al., 2016). This resonates with Destin et al. (2019), who suggest that the consequences of a fixed mindset may differ among students from different socioeconomic backgrounds. A fixed mindset may be more detrimental to academic outcomes for individuals facing greater educational barriers due to lower socioeconomic status (Claro et al., 2016).

In a shared sentiment with Neo's fear of disappointing their family expectations, Lesedi reveals a similar concern:

> *''I think before, I used to feel like I didn't want to let my parents down. I don't want to let them down, especially when you fail, because I have never failed before.''*

Lesedi's fear of failing and the desire not to disappoint her parents is intricately linked to the implications of a fixed mindset, as elucidated by various research findings. Claro et al. (2016) and Destin et al. (2019) establish that students from lower socioeconomic backgrounds with fixed mindsets encounter greater hurdles in overcoming educational barriers. Lesedi's anxiety about potential failure, rooted in a history of prior academic success, may mirror a fixed mindset. Hwang et al. (2016) highlight the influence of parental feedback on a child's mindset, emphasising the significant impact of parental beliefs on a child's approach to challenges and failure. Lesedi's apprehension about not meeting parental expectations aligns with the stress associated with fixed mindsets, particularly when met with challenges or the prospect of failing, echoing the idea that interactions between parents and children can significantly shape a child's mindset, contributing to the fear and pressure to meet high expectations (Hwang et al., 2016; Mueller & Dweck, 1998).

Lesedi reveals an additional layer of fear, suggesting the weight of meeting others' expectations as a contributing factor:

> *''Sometimes, you also carry other people's expectations of you. And so, I think even in terms of fear, it also could be not keeping up with the expectations of other people.''*

Lesedi expresses the weight of external expectations and how they contribute to the fear they experience. Lesedi describes the burden of carrying the expectations placed on her by others, highlighting how these expectations contribute to her fear. This fear is linked not just to personal standards or aspirations but also to the pressure of meeting and aligning with what

others anticipate of her. Lesedi's mention of carrying other people's expectations and the fear of not meeting those expectations aligns with Dweck's (2017) and Mueller and Dweck's (1998) arguments about the consequences of praise on children's achievement orientations and attributions. When external praise focuses on intelligence or ability following successful performance, children might adopt a performance goal orientation to continually prove their intelligence by maintaining high scores (Dweck, 2017; Mueller & Dweck, 1998). Lesedi's fear of not meeting these expectations might stem from this emphasis on performance, possibly originating from parents and lecturers, leading to negative affect, cognition, and behaviour (Dweck, 2017; Hwang et al., 2016; Mueller & Dweck, 1998). The fear of not living up to external expectations is mirrored in the concern that children, when receiving praise for intelligence, might reject challenges or learning opportunities that hold the risk of errors or lower performance, opting instead to preserve the image of being smart (Dweck, 2017; Mueller & Dweck, 1998).

Neo reveals a transformative incident involving a disheartening encounter at the UCT actuarial science department, a moment that significantly contributed to her narrative. This encounter not only left an indelible mark on her university experience but also served as a catalyst, reinforcing a fixed mindset:

> *"In first year, you have to see the psychologist for DP purposes. And I went to her, and I remember she was just so mean. I literally had a meltdown in front of her. And I remember that week, I was just tired. Imagine being in your first year, first semester, and you are in a new place. I am in a new province, school's hard, and everyone is telling me that I am going to fail. And then I go to that lady [psychologist], and I remember I was like, this is my last hope. And then you get there, and she was busy just telling me, "You're going to fail". "How much time do you spend with your friends?" She's telling me to sleep at midnight and wake up at two [am]. And I was just so down. I was like, I'm down, but now I'm DOWN. So, I think that, for me, that has characterised my entire experience. That one situation just changed how I viewed the department as a whole. The last thing you need to be told when you are down bad is that you are only going to keep going down and down."*

Neo describes a distressing encounter that occurred in her first year three years ago. Neo recounts feeling emotionally overwhelmed and vulnerable in a new academic environment, where the psychologist's discouraging and unsupportive approach intensified their stress and

despair. This encounter, meant to assist with Due Performance (DP), left a lasting negative impression. The psychologist's approach, marked by criticism and fatalistic predictions, compounded Neo's emotional distress, worsening an already difficult situation. This experience, where Neo sought support but encountered further demoralisation, reflects a defining moment in her academic journey, exacerbating their emotional state during a challenging period.

Neo's experience resonates with Buhle's narrative, emphasising the shared belief that the department has room for improvement in offering adequate support to its students. Buhle advocates for a more involved and caring approach, underscoring the department's need to prioritise students' well-being, echoing Neo's call for a change in the department's approach to foster a more supportive and empathetic learning environment. Buhle voices her concerns about the need for enhanced support:

"I think that UCT or the actuarial science department needs to work a little harder at taking care of its students. There has to be a way to be more involved. It's a very difficult journey in terms of the impact that it [actuarial science] has on you mentally. You will really struggle with how you think of yourself because our life literally revolves around board exams. And if you don't get a board exam, if you don't get a 75%, you feel useless and you feel like, hopeless and you don't belong on earth and stuff like that. We need a lot more care. I think we definitely do need a lot more care."

Neo's account of an encounter with the psychologist aligns with Dweck's (2017) and Mueller and Dweck's (1998) argument regarding the consequences of praising ability or intelligence. The encounter suggests the psychologist's approach likely involved praising fixed abilities, which, according to Dweck, can lead to a fixed mindset and a helpless reaction to difficulty. As Dweck (2017) explained, this kind of praise can elicit delight initially but can backfire when individuals face challenges. The feedback received from the psychologist, likely emphasising the inability to succeed, could have contributed to Neo's feeling of descending further when already struggling, a scenario aligned with Dweck's (2017) argument on the impact of fixed mindsets and helpless responses. The encounter illustrates the harmful effects of such fixed-ability praise on a person's mindset, especially in times of difficulty. The Park et al. (2020) study reiterates the importance of environmental influences, emphasising the need for supportive and growth-oriented feedback to promote resilience and adaptive mindsets in the face of failure or difficulties instead of reinforcing a fixed mindset.

Echoing the findings of Park et al. (2020), Amahle expresses concern about the prevalent discouragement from lecturers in the actuarial science department at UCT:

> *''In first year, the only thing that you'll hear from the lecturers is that the course is difficult and you are going to fail. So, I feel like that's not something they should say to first-year students. I feel like in first year, they should be motivating more than saying that the course is difficult. Some people may be motivated by that, but at some point, it's not motivating.''*

Amahle expresses dissatisfaction with the prevailing narrative conveyed by lecturers during the first year of university, highlighting the pervasive emphasis on the course's difficulty and the impending possibility of failure. Amahle criticises this approach, suggesting that rather than instilling motivation, repeatedly portraying the course as overwhelmingly hard and foreseeing failure is demotivating, especially for new students. Amahle believes that such a constant negative reinforcement is not conducive to a constructive learning environment, indicating that while some individuals might initially find motivation in this narrative, it eventually becomes discouraging and counterproductive. Dweck (2017) emphasises that praise for ability or intelligence can lead to a fixed mindset and a helpless reaction to difficulty. The repetitive warnings of the course's difficulty and the likelihood of failure serve as a form of fixed-ability praise that might demotivate students, inducing a belief in fixed ability and a subsequent plunge in performance when confronted with obstacles (Dweck, 2017; Dweck & Leggett, 1988; Dweck & Yeager, 2019). This constant narrative of anticipated failure does not foster a growth mindset or a constructive reaction to challenges, as it does not emphasise the process or strategies that lead to success. Instead, as Dweck (2017) suggests, praising the process, such as hard work or good strategies, fosters a growth mindset and a mastery-oriented reaction to difficulty, encouraging perseverance and the idea that difficulties are opportunities for learning and improvement, not signs of incompetence or unworthiness.

4.2.2 ''I can't say it is the most difficult thing on earth if I have not tried'': Factors That Shape a Growth Mindset.

This theme explores the various factors that contribute to the growth mindset of black actuarial science students. The growth mindset is characterised by an outlook that embraces

challenges and growth opportunities, shaped by positive influences and experiences that foster continuous personal and intellectual development (Dweck & Yeager, 2019; Hwang et al., 2016). The theme delves into the influences and experiences that shape these students' belief in their capacity for learning, resilience, and adaptability.

From such an exploration, Neo subtly offers a compelling insight, suggesting that academic success is not solely about innate intelligence but rather a complex mental game that heavily relies on one's resilience and mentality:

> *''I think the degree in itself is a mind game. I always say to the people that I tutor that I don't think that the degree is about how smart you are. I think it's about your mental strength and your resilience. I feel like if you have a strong mentality and you're resilient enough, you can get through the degree.''*

Neo describes the academic journey within the actuarial science degree as a psychological challenge rather than merely assessing intelligence. According to Neo, success within the degree programme is not solely determined by intellect but significantly hinges on one's mental grit and resilience. Neo suggests that a robust mentality and the ability to bounce back from setbacks are crucial for navigating and succeeding within the degree. The emphasis on mental strength and resilience indicates the belief that these qualities play a more vital role in overcoming academic challenges than innate intelligence. Neo's perspective aligns with the notion of implicit theories and mindset advocated by Dweck and her colleagues (Blackwell et al., 2007; Yeager & Dweck, 2012; Yeager et al., 2012;). Neo's belief that success in the degree hinges on mental strength and resilience indicates a growth mindset, suggesting a view that personal qualities, such as perseverance and resilience, can be developed and nurtured over time. This aligns with Yeager and Dweck's (2012) argument that fostering the belief in the potential for change in one's academic approach and social resilience can significantly impact students' ability to navigate challenges effectively. Neo's emphasis on mental strength and resilience echoes the concept that these qualities can be cultivated and applied to overcome academic adversities, aligning with the notion that students' mindsets are changeable and can be developed to enhance resilience (Blackwell et al., 2007; Dweck, 2017; Yeager & Dweck, 2012;).

When asked about their expectations and assumptions of actuarial science before commencing the degree, Neo revealed a personal approach that challenges the pervasive belief in the perceived difficulty of the degree:

‘‘I mean, everyone said it was difficult, but then again, in high school, when I picked up two extra subjects, everyone was like, “It's hard”, but then it was just vibes, and I ended up doing quite well. So when I started the degree, I was like, no, I'm not going to believe anything. Like, I'm not going to take other people's experiences and make them mine. So when everyone was like, “It's hard, it's hard”, I was just like, okay, I hear that it is hard, but I don't know how hard it is. And I can't say it is the most difficult thing on earth if I have not tried.’’

Neo expresses scepticism and resilience towards others' perceptions of the degree's difficulty. Neo draws from past experiences in high school, where people anticipated challenges that turned out to be manageable. She rejects the idea of preemptively adopting negative expectations based on others' experiences, choosing instead to reserve judgment until personally experiencing the degree's difficulty. By emphasising the importance of individual experience over others' opinions, Neo highlights a determination to approach the degree with an open mind and a reluctance to adopt predetermined negative beliefs without personal exploration. Neo's growth mindset, already present since high school, is shaped by rejecting predetermined negative beliefs based on others' experiences. Neo does not simply adopt others' expectations but upholds a mindset emphasising personal experience. Neo’s approach also reveals an attempt to counter stereotype threat by resisting negative stereotypes about the difficulty of the degree. By distancing herself from preconceived notions and maintaining a growth mindset, she navigates potential stereotype threats, showcasing a proactive strategy to mitigate the psychological impact of negative stereotypes on academic performance (Bell et al., 2003; Steele, 1997). This is aligned with the growth mindset perspective as outlined by Dweck and Leggett (1988), where the growth mindset signifies an individual's belief in the potential for change and the development of abilities through effort. This mindset allows individuals to perceive self-control over their future academic outcomes and emphasises learning material rather than being confined by fixed capabilities (McCutchen et al., 2016; Yeager & Dweck, 2012). Neo's inclination to reserve judgment until personally experiencing the challenges of the degree and not allowing others' negative expectations to dictate their beliefs indicates a proactive approach driven by a growth mindset. This supports the notion that one's experiences and beliefs and the confirmation of those beliefs play a role in shaping academic mindsets and achievement (Dweck, 2017; McCutchen et al., 2016).

These beliefs also encompass the students' perceptions of their backgrounds and how these shape their perspectives on their academics. Amahle unpacks the driving force behind her motivation:

> *''So, my background actually motivated me. Whenever I want to give up, I know that I still want to give my siblings a better life than I had. When you're going through university, and you realise that, I wish I had this, I wish I had an iPad, and I wish I could just buy this and that. So, I'm motivated to complete my studies and work so that I can provide for my siblings. And I still want to build them a home, make my home warm and stuff. So it's motivating you every step of the way, every time you feel like giving up.''*

Amahle describes how her background and the desire to uplift her family are significant motivators. Whenever she feels the urge to quit, her aspirations to create a better life for her siblings compel her to persist. The lack she experienced growing up, especially while witnessing what she lacked in comparison to her university peers, propels her to finish her studies and secure a job that will enable her to provide for her siblings. Her ultimate goal is to build a comfortable home for her family, which she wished for during her upbringing. This drive is a constant motivation, urging her to persist even when she feels like giving up. Amahle's growth mindset is significantly shaped by her background and the desire to provide a better life for her siblings, which act as motivational factors throughout her academic journey. This aligns with Destin et al. (2019) argument that socioeconomic contexts shape an individual's mindset, which, in turn, influences academic outcomes. The authors posit that a growth mindset positively predicts achievement across different socioeconomic backgrounds. The authors argue that students from lower-income families are less likely to hold a growth mindset. However, those with a growth mindset are more resilient against the detrimental effects of poverty on achievement (Destin et al., 2019).

Bongani adds to this by emphasising how his background serves as a motivator:

> *''I don't come from a well-off background. So, I think it's some motivation for me in the sense that I know where I want to be. I know I want to make my family proud. So, obviously, it's a good thing to have that motivation. It drives you. So, I would say that it played a major role in making sure that even though sometimes you feel like giving up, I just think that, okay, you are not just doing this for yourself. But there are also other people you also have to do it for.''*

Bongani expresses the significance of his background as a driving force in motivating his academic journey. He notes that coming from a less privileged background motivates him to strive for a better future. This motivation is rooted in his desire to make his family proud and is a crucial factor that helps him persist even when facing challenges. His sense of purpose extends beyond personal goals, as he is aware that his efforts are not just for himself but also the betterment of his family. Bongani emphasises that this sense of responsibility toward his family is significant in keeping him focused and resilient, even when he feels like giving up. Bongani's growth mindset is shaped by his determination to make a better life for his family despite coming from a less privileged background. His mindset reflects a growth orientation, as he emphasises striving for improvement, not only for himself but for the betterment of his family, showcasing his understanding of the malleability of abilities and the motivation to overcome challenges for broader reasons beyond personal gain (Destin et al., 2019; Dweck & Yeager, 2019; Yeager et al., 2012). This aligns with studies that highlight the strong correlation between a growth mindset and increased academic achievement, as individuals with a growth mindset tend to embrace challenges and persist when faced with difficulties compared to those with a fixed mindset (Dweck, 2017). Additionally, Destin et al. (2019) emphasise how socioeconomic context can influence and shape mindsets, underscoring the potential impact of background on mindset development and academic outcomes.

Buhle highlights the crucial support and belief provided by a particular lecturer in shaping her mindset.

> *''There's one lecturer who has kept me in the degree. If I had to say anything about the department, I would say that man is a treasure to the department. In first year, I struggled with things in class. After class, he would stay behind to explain things to me, and he would always tell me how much he believed in me. And he's a white man, but he would always say that black people are just brilliant. And he would say, There are not many black actuaries, and I want you to make it; I want you to make it. I promise you that man has kept me in the degree.''*

Buhle acknowledges a particular lecturer's significant impact on motivating and engaging students in their degree. The lecturer's unwavering support and encouragement proved pivotal in overcoming academic challenges, especially in her first study. Buhle credits this lecturer, highlighting his exceptional commitment by providing extra guidance after classes and

expressing genuine belief in their abilities. The lecturer's encouragement transcended racial barriers, voicing the importance of representation and the potential of black students in actuarial science. Buhle's narrative suggests the profound impact of the lecturer's encouragement and support in shaping a growth mindset. The lecturer's reinforcement of the belief in Buhle's abilities, especially within a predominantly white field context, exemplifies the influence of positive role models (Allen & Collisson, 2020; Rissanen et al., 2019). This mirrors Aronson et al.'s (2002) findings, where African American students when supported and encouraged to view intelligence as malleable through an intervention, experienced enhanced academic engagement and performance. The intervention positively influenced African-American and white students' Grade Point Averages (GPAs), yet the effects were particularly significant for African-American students. This parallels Buhle's experience, illustrating how mentors and educators who instil a belief in one's potential can significantly impact a student's academic journey.

Bongani emphasises a growth mindset concerning job security, expressing optimism about securing employment in the actuarial science field:

> *‘‘I think there's a lot for you to do as a black actuary. I think the world is literally your oyster…just the opportunities are endless. I think you'll never find yourself in a situation where you don't have a job. I do know that companies are looking for black actuaries. So, in terms of job prospects, I'm not really concerned about that because I've come to understand that there is a market, and they are looking.’’*

Bongani expresses a sense of optimism and opportunity regarding the career prospects for a black actuary, acknowledging the vast opportunities available in the professional world. Emphasising the abundant possibilities. Bongani sees a landscape where being a black individual in the field offers endless opportunities. With confidence, Bongani highlights the demand for black actuaries in the job market, making a strong case for the employability and market needs for black actuaries. This belief in the market demand for black actuaries instils Bongani with assurance and less concern regarding job prospects, underlining the sense of a promising future in their chosen career path. Bongani's statements reflect a growth mindset shaped by the belief in abundant opportunities and market demand. The expressed confidence in the job prospects for black actuaries aligns with a perspective promoting adaptability and development. This outlook resonates with the concept of a growth mindset, emphasising malleability and opportunities for learning and advancement (Dweck, 2008; Yeager & Dweck,

2012). Bongani's belief in the continuous demand for black actuaries signifies a mindset that aligns with the view that intelligence and skill sets are not fixed but can be developed through effort and learning. It echoes the notion that career success is not predetermined but rather a result of ongoing development, echoing a growth mindset that thrives on continual progress and adaptability (Aronson et al., 2002; Yeager & Dweck, 2012).

Chapter Summary

The second section of the analysis explored the mindsets of black actuarial science students. The theme “Factors that shape a fixed mindset” delved into factors that fostered a fixed mindset among black actuarial science students, highlighting the impact of external expectations and fear-inducing information in hindering a growth-oriented perspective. Participants expressed discouragement and self-doubt, revealing the pervasive influence of predetermined negative beliefs on their academic approach. Conversely, the theme “Factors that shape growth mindset” explored factors that shaped a growth mindset, emphasising the role of resilience, determination, and socioeconomic motivations. Positive role models, supportive lecturers, and optimistic views on career prospects contributed to a growth-oriented perspective, showcasing the importance of individual agency, positive influences, and socioeconomic considerations in fostering a growth mindset among black actuarial science students.

The following section presents the conclusion.

Chapter 5: Conclusion

This research sought to delve into the lived experiences of actuarial science students and the factors that shape their mindsets. Within this chapter, the researcher presents the pivotal findings of the study, elucidate its theoretical and practical contributions, discusses the implications and limitations, and concludes with recommendations for future research.

5.1 Summary of Key Findings

To understand the mindset of black actuarial science students, the researcher embarked on a journey that transcended the conventional boundaries of academic inquiry. It required a holistic exploration that considered the multifaceted dimensions of their lives—spanning the

transitions from high school to university, the intricacies of academic challenges, and the disparities within the field of actuarial science. This approach recognised the students not as passive recipients of knowledge but as individuals shaped by many personal and societal experiences (Clandinin, 2006). Delving into these lived experiences was an acknowledgement that the challenges faced and the choices made by these students were not isolated events but rather interconnected threads, weaving a narrative that was uniquely theirs (Alase, 2017; Clandinin, 2006). By recognising the profound impact of their lived experiences, the researcher laid the foundation for a deeper understanding of the complexities that underlie their mindsets.

The transitional phase from high school to university emerged as a pivotal period, marked by challenges that intricately moulded black actuarial science students' academic and personal identities. Academic excellence emerged as a significant coping mechanism and a source of self-worth, emphasising the intricate link between academic achievement and personal identity. Societal expectations following a high academic performance in high school led to predetermined academic choices at university and societal programming, highlighting the pressure on students to conform to specific fields for economic stability (Lephalala & Makoe, 2012; Mzangwa, 2019). Language challenges, particularly the transition from home language to English as the primary medium of instruction, posed significant hurdles. This aligned with broader challenges black actuarial science students face, reflecting the broader context of South African universities (Bazana & Mogotsi, 2017; Steyn et al., 2014). This alignment with broader challenges black actuarial science students face encapsulated the multifaceted impact of disparities in South African schools. Specifically, the disparities manifest in language challenges, where some students are initially instructed in their home languages rather than English. This divergence in language instruction sets the stage for significant adjustments when transitioning to university, where English becomes the primary medium of instruction (Naidoo, 2008; Strugnell & Ranchod, 2018). Additionally, imposter syndrome surfaced as a shared experience, indicating broader issues of inclusivity and diversity within academic environments.

Academic challenges and demands constituted another integral dimension, portraying a multifaceted landscape where students grappled with coursework, social life balance, and mental and physical health repercussions. One key finding was the difficulty students faced in applying theoretical knowledge to real-life situations, indicating a notable challenge in the practical application of academic concepts. The academic demands were intensified by a significant workload, requiring students to juggle multiple tasks and manage their responsibilities, reflecting a perception of overwhelming demands. Actuarial sciences students

expressed frustration and stress in grappling with the complex nature of actuarial science courses, emphasising the high expectations and advanced thinking skills required (Naidoo, 2008; Van Den Berg, 2004). The stringent grading standards, especially in the first year, contributed to academic pressure, potentially impacting students' mental well-being. The emotional toll of pursuing actuarial science was revealed through experiences of loneliness and isolation, highlighting the sacrifices and dedication required for academic success. The mental health challenges were further emphasised by participants who described the profound emotional impact of academic setbacks, revealing a deep sense of despair and hopelessness.

The examination of diversity within actuarial science unravelled disparities between black and white students, shedding light on the lack of representation and its profound impact. Beyond the student body, this theme extended to a scarcity of black role models among academic staff, emphasising the urgent need for increased diversity in both student and professional realms. The findings revealed that black actuarial science students recognised and questioned the lack of diversity in their field, echoing broader statistics highlighting the disproportionate representation of black individuals in actuarial roles (ASSA, 2022; Phume & Bosch, 2018; Ramjee et al., 2013). Actuarial science students expressed a sense of anticipation, uncertainty, and determination in the face of this lack of representation. They grappled with the expectations placed upon them as black professionals, emphasising the need to prove themselves continuously and work exceptionally hard to gain recognition and respect in a predominantly non-diverse industry. The pressure to represent their community and serve as trailblazers for diversity added a layer of complexity to their academic journeys.

In the mindset section, exploring factors shaping fixed mindsets exposed pervasive obstacles influenced by external expectations, fear-inducing statements, and discouraging encounters within the academic space. The psychological struggles experienced by students impacted the formation of their fixed mindset. Self-doubt and fear, particularly concerning potential academic failure and the prospect of disappointing parents, intertwined with the fixed mindset, creating a cycle of apprehension that influenced their entire academic journey. The fear of falling short of personal or societal expectations contributed to a mindset that viewed challenges as insurmountable obstacles rather than growth opportunities (Dweck & Leggett, 1988; Dweck & Yeager, 2019).

Moreover, socioeconomic background and fixed mindsets added another layer of complexity (Claro et al., 2016; Destin et al., 2019). The students, already contending with external challenges, found their mindsets further shaped by pervasive fear and negativity. The limitations imposed by socioeconomic factors became intertwined with the fixed mindset as

students grappled with academic hurdles and the additional burden of economic disparities. Additionally, dissatisfaction with a prevailing negative narrative, often perpetuated by lecturers that forewarned students of their impending failure, shaped the fixed mindset of students, reinforcing the demotivating impact of constant negative reinforcement.

Conversely, investigating factors influencing growth mindsets underscored the dynamic interplay of personal resilience, socioeconomic context, and positive influences. Actuarial science students emphasised that success in their academic journey relied not only on innate intelligence but also on mental grit and resilience, aligning with a growth mindset (Hochanadel & Finamore, 2015; Mosanya, 2020). Their belief in developing qualities like perseverance and resilience reflected a growth mindset. Socioeconomic backgrounds played a pivotal role, as students drew their motivations from a deep-seated desire to uplift their family members' quality of life, serving as a compelling force that fueled their perseverance through academic challenges and adversities. The study further revealed positive role models, particularly supportive lecturers, influenced the students' growth mindset. Additionally, participants demonstrated a positive outlook on career prospects, believing in abundant opportunities for black actuaries in the job market.

5.2 Theoretical and Practical Contributions

This research contributes significantly to the theoretical landscape by offering a nuanced understanding of the experiences of black actuarial science students and the factors that shape their mindset. This study contributes by qualitatively exploring mindsets, addressing a gap in the existing literature. It illuminates that mindsets can be understood through a qualitative exploration of the lived experiences of individuals.

Acknowledging the profound impact of lived experiences on mindsets contributes to the broader discourse on student development and research in psychology. By emphasising the interconnected nature of various challenges, transitions, and disparities, the research challenges traditional compartmentalisation within academic studies, encouraging a more holistic and integrated approach to understanding the complexities of student experiences.

The study advances theoretical discussions on the role of mindset in shaping students' responses to academic challenges and failures. Identifying fear as a determinant of fixed mindsets aligns with Dweck's mindset theory, enriching the theoretical discourse on the psychological barriers hindering students in challenging academic disciplines (Dweck & Yeager, 2019; Hochanadel & Finamore, 2015; Hwang et al., 2016; Mosanya, 2020).

Additionally, exploring socio-economic influences on mindset aligns with broader discussions on the intersectionality of race, class, and educational experiences.

Understanding the impact of fear and external expectations on mindset can inform practical interventions to foster a growth-oriented approach. Recognising the influence of socio-economic factors allows for targeted support mechanisms, addressing challenges unique to students from diverse backgrounds. Moreover, the study highlights the pivotal role of positive role models and supportive educators in promoting a growth mindset, emphasising the importance of mentorship programmes and inclusive teaching practices. A South African study on first-year students found that participation in a mindset-focused support programme facilitated a shift from fixed to growth-oriented mindsets, highlighting the transformative potential of targeted interventions in fostering resilience and adaptability (Terblanche et al., 2021). These findings are particularly relevant to black actuarial science students who face systemic barriers, emphasizing the need for culturally sensitive support programmes that address their unique challenges.

By delving into the emotional impact of academic setbacks, the study aligns with existing psychological theories emphasising the connection between academic achievement and emotional well-being (Bantjes et al., 2020; Markoulakis & Kirsh, 2013; Motsabi et al., 2020; Pascoe et al., 2019). Furthermore, exploring language transitions contributes to the theoretical discourse on the role of language and cultural adjustments in academic success (Bazana & Mogotsi, 2017; Cornell & Kessi, 2016; Sennett et al., 2003).

The findings offer actionable insights for educators, policymakers, and support services to create more inclusive and supportive environments for black actuarial science students. Identifying socio-economic considerations as a significant factor influencing career choices highlights the need for targeted interventions to address economic disparities and create career pathways for students from underprivileged backgrounds. Understanding the emotional toll of academic pressures calls for developing culturally sensitive mental health support programmes within academic institutions that acknowledge students' unique challenges in demanding fields like actuarial science.

Moreover, the study's emphasis on the importance of social support aligns with practical implications for universities to foster a sense of community and belonging, incorporating strategies that promote peer support, mentorship, and inclusivity. This echoes the recommendations of Naidoo (2008), Lotkowski et al. (2004) and Uter et al. (2018) regarding the critical role of social support for black actuarial science students. Additionally, the study underscores the significance of recognising and addressing imposter syndrome, a practical

consideration for educational institutions aiming to create environments that validate diverse identities and experiences, as emphasised by Cornell and Kessi (2016) and Cornell et al. (2022).

5.3 Study Limitations and Recommendations for Future Research

The findings of this study pave the way for several key recommendations for future research. While this study provides valuable insights, it is also essential to acknowledge its limitations.

The study's qualitative nature may introduce subjective biases. Despite the researcher's thorough use of reflexivity to prevent the imposition of biases and personal values onto the participants, qualitative research is inherently interpretative. The researcher's perspectives and interpretations may influence the findings (Alase, 2017; Cropley, 2023). Combining qualitative data with quantitative measures could enhance the robustness of future studies. Integrating a quantitative measure could contribute objectivity and statistical rigour, mitigating potential subjective biases inherent in qualitative research.

The research is situated in a specific socio-cultural context in South Africa. The experiences and challenges identified may not universally apply to actuarial science students in other regions. Future research should explore cross-cultural variations to develop a more nuanced understanding of the intersectionality of factors influencing the experiences of black actuarial science students.

The research examined the participants' lived experiences and mindsets during their current year of study without considering changes over time. The study suggests a need for longitudinal research that traces black actuarial science students' academic trajectories and career paths over an extended period. This approach would provide insight into how the students' mindsets evolve from the first to their final year. A longitudinal approach would enable a more comprehensive understanding of the long-term impact of socioeconomic factors, language transitions, lack of representation and academic challenges on students' mindsets and educational and professional journeys.

Future research could explore the understanding of mindsets using focus groups as a data collection method. This approach is suggested to facilitate a more comprehensive understanding by promoting group dynamics, fostering diverse perspectives, and enabling in-depth discussions that unveil nuanced aspects of mindset formation among the participants (Bryman et al., 2016).

Future research could also explore the effectiveness of existing support structures, such as mentorship programmes, mental health support structures and academic assistance initiatives, in aiding black actuarial science students' academic and emotional well-being. Understanding the specific elements that contribute to the success of these support mechanisms would enable institutions to refine and expand their offerings, ensuring tailored assistance that addresses the unique challenges black actuarial science students face.

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Appendix A

Ethical Approval

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA · UNIVERSITEIT VAN KAAPSTAD

2023/05/13

COM/02145/2023

RE: Research Ethics Committee Project Approved with Condition(s) Letter

Dear Sixolile Ntombana,

Your application for ethics review of your project titled

Mindset and Well-being: Lived Experiences of Actuarial Science Students in South Africa

has been reviewed and evaluated by the

School of Management Studies Research Ethics Committee (REC).

Based on the information supplied your application has been conditionally approved.

Please note the following additional conditions associated with this approval:

(i) The applicant must ensure that all necessary gatekeeper permissions (here, DSA, and the Head of Section) are obtained before commencing the study

Proof that you have met these conditions, in the form of letters of permission or other relevant documentation, should be supplied to the REC, via the eRA system.
Once you have met with the above condition(s), you may proceed with your research project titled:

Mindset and Well-being: Lived Experiences of Actuarial Science Students in South Africa

Please note that should:

(i) any serious or adverse effects to participants occur and/or,
(ii) aspect(s) of your current project change and/or
(iii) any unforeseen events that might affect continued ethical acceptability of the project occur then you should immediately report this to the approving REC. You may be required to submit an amendment to this application, in order to determine whether the changed aspects increase the ethical risks of your project.

Regards,

School of Management Studies

Research Ethics Committee

Appendix B

Informed Consent Form

INFORMED CONSENT

DEPARTMENT OF ORGANISATIONAL PSYCHOLOGY

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

1. Invitation and purpose

You are invited to participate in the research project to understand the lived experiences of black actuarial science students in South Africa. Using a qualitative approach, this study intends to advance the understanding of the factors that shape the mindsets of actuarial science students. This study will use semi-structured interviews to gain in-depth insight. The findings of this study will be used to inform interventions that may assist actuarial science students.

2. Procedures

Participation in this study is voluntary, and you have the right to withdraw from the study at any time without any negative consequences.

If you decide to take part in the study, you will be expected to do the following:

- To participate in one of the semi-structured interviews. The semi-structured interview will focus on engaging in a detailed dialogue regarding your experience as an actuarial science student.

The semi-structured interviews will be audio recorded. The audio recordings will be stored on a cloud-based platform that will be password-protected. You will be assigned pseudonyms to ensure you engage in dialogues without breaching anonymity.

3. Inconveniences

This research has no foreseeable risks and no direct benefits; however, the findings will be used to inform interventions that may assist actuarial science students. The research process in this study does not intend to cause harm or psychological distress; however, should the study become distressing, you may stop participating at any time without any negative consequences.

If you do experience any distress, here is a list of resources where you can access help:

***Counselling*:** Student Wellness: 28 Rhodes Ave, Mowbray, Cape Town. Tel: 021 650 1020

You may withdraw from the study at any time, and your withdrawal will have no negative consequences. Furthermore, you can also contact the researcher, Sixolile Ntombana, at ntmsix001@myuct.ac.za, and I can refer to you to support structures.

4. Privacy and confidentiality

Your privacy and confidentiality will be maintained. Your name and identifying details will not be revealed without your consent. You will be assigned pseudonyms to ensure you engage in dialogues without breaching anonymity. The audio recordings will be managed and stored safely to ensure no one besides the researcher accesses them.

6. Money matters

You will not be paid for taking part in the study.

7. Contact details

If you have further questions or concerns about the study, please contact researcher Sixolile Ntombana at ntmsix001@myuct.ac.za (079 1648 369) or the supervisor Zonke Zungu at zonke.zungu@uct.ac.za.

If you understand all of the procedures and the risks and benefits of the study and you would like to participate in the project, please sign below:

Participant Name: _____

Participant Signature: _____

Appendix C

Participant Invitation

Lived experiences of actuarial science students

Dear UCT Actuarial Science Students,
You are invited to participate in a research project conducted as part of a Master's program in the Organizational Psychology Department at UCT. The study aims to understand the lived experiences of actuarial science students in South Africa.

WHAT DOES PARTICIPATION IN THIS STUDY ENTAIL?

1. Participants will be required to participate in an in-person interview with the researcher. The Interview will be 45-60 minutes long.
Your confidentiality and privacy will be strictly maintained throughout the research process. Your name and identifying details will not be revealed without your consent. All participants will be audio-recorded using pseudonyms to ensure anonymity during analysis and reporting.

WHO CAN PARTICIPATE?

- Black actuarial science students at UCT
- Students must be registered for the 2023 academic year.

If you are interested in participating, please enter your details on the form below by clicking on this link:
https://forms.gle/zih9BqVDUENRnCUF7
If you have any questions regarding the study, please contact the researcher, Sixolile Ntombana, at ntmsix001@myuct.ac.za. Your participation in this research is greatly appreciated, and we look forward to hearing from you.

Appendix D
Interview Questions

1. Can you tell me about your academic journey? What brought you into Actuarial science?
2. What were your expectations and assumptions about actuarial science before starting your degree? Have these changed over time?
3. When I say the word “mindset,” what comes to mind?
4. What challenges have you faced while studying actuarial science? Have these experiences influenced your attitude/mindset toward your studies?
5. What has your experience in the actuarial science department at your university been? Do you feel that the environment has influenced your mindset?
6. How do you perceive the level of diversity and inclusivity within the actuarial science field in South Africa? Has this impacted your mindset towards your studies?
7. How do you perceive the job market and career prospects for black actuarial science graduates in South Africa? Have these perceptions affected your mindset and career decisions?
8. How do you feel about the support and resources available to actuarial science students at your university? Has this impacted your mindsets and overall experience?
9. Looking back on your experience as an actuarial science student, is there anything you would change or improve?
10. Are there suggestions or recommendations you would give to future black actuarial science students?

Appendix E
Coding Scheme

Table 2
Coding Scheme

Code Name	Reference
Academic challenges	18
Academic demands	12
Advise to future actuarial science students	13
Balancing school and social life	10
Being an A student in High school	3
Career uncerteinty	3
Challenges with health	15
Desire for intellectual challenge	8
Disparities between black and white students	9
Experience with department	10
experiences with lecturers	15
Factors for success	5
Fear of being a disappointment	3
Fear of failure	7
Humble background as motivation	8
Impact of course on mindset Engagement	24
Impact of opinions	20
Impact of prerequisite courses on degree progress	4
Initial academic expectations	6
Job Security	14
Lack of diversity	21
Mindset shift	11
Persistence and determination	3
Self-doubt	8
Source of awareness about actuarial science	4
Struggles with perfectionisms and self-compassion	9
Support and community	18
Transition to university	20