

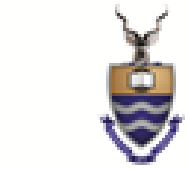
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UNIVERSITY OF THE WITWATERSRAND

School of Human and Community Development

Department of Psychology

Trespassers? A narrative study of black women academics in science at a South African University

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February 2023

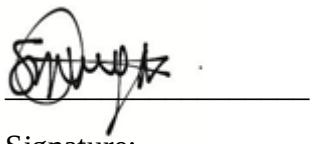
A research report submitted to the School of Human and Community Development, Faculty of Humanities, University of Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Arts in Community-based Counselling Psychology by coursework and research report.

PLAGIARISM DECLARATION

I **Felicia Ramafalo (Student number: 1743305)** am a student registered for the degree of **Master of Arts in Community-Based Counselling Psychology** in the academic year **2023**. With ethics Protocol number: **MACC/19/006 IH**.

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Signature: Date: February 2023

DEDICATION

This work is dedicated to my parents, Kedibone Nkwane and Philemon Ramafalo. In the words of the script: “I hope you are up there with God saying ‘that’s my kid’.”

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ABSTRACT

This study explores the narratives of black women academics in the Science, Technology, Engineering and Mathematics (STEM) related fields in order to understand their experiences since their post-apartheid inclusion in higher education. The aim of the research was to explore the stories that black women academics in science tell about their early lives, and careers, and to understand how they negotiate the raced and patriarchal cultures of science disciplines and to study the disruptive possibilities they enable in the sciences. The study follows a narrative approach and uses intersectionality, Critical Race Theory and habitus as theoretical frameworks. Snowball and purposive sampling were used to recruit 10 black women academics between the ages of 25 and 65 who had worked as academics for at least three years and the data was analysed using thematic analysis inflected through the narrative lens. The findings indicate that despite most of the women growing up in working class homes, their parents valued and advocated for the pursuit of education. Some of the participants also attended Model C/private school which allowed them to build their cultural capital which they would later use to navigate the academy. Second, we found that black women academics experience hardships such as bullying, micro-aggressions, gendered and racist interactions that often lead to feelings of isolation, lack of support and limitations on other roles that they have. Lastly, we found that women academics disrupt through an insistence that the future has got be different and by remaining hopeful that attracting more black women into the science field and academia and epistemic rupture will alter the academy. This research extends studies on space, race and gender in higher education.

Keywords: black women, STEM, African feminism, habitus, higher education, race

1. CHAPTER ONE: INTRODUCTION

1.1 Statement of the problem and context

While higher education has been recalcitrant to change over the last twenty-five years (Canham, 2018), disciplines in the sciences have been particularly resistant to the entry and retention of women academics and black women academics in particular. The paucity of black women in science suggests they have been excluded from various spaces due to their race, gender, sexuality and class amongst other factors particularly in academia where white males are seen as the rightful occupants (Alexander-Floyd, 2015). Puwar (2004) contends that although the presence of women and racialised minorities in spaces from which they were historically excluded is increasing, it is uneven across different organisations and sectors and is happening at a slow rate. Nkomo (2015) has made similar arguments in relation to the South African context. Puwar (2004) calls minorities in exclusive spaces, "space invaders". The concept of space invaders refers to the bodies that are in places they were historically regarded as not belonging and actively excluded from (Puwar, 2004). It is worth noting from the onset that due to the pairing of certain bodies in certain places, space invaders face various consequences as they are breaking the norm.

Statistics on Post-School Education and Training in South Africa for the 2019 academic year show that there is an increase in the number of women entering the space of higher education (Department of Education and Higher Training, 2021). However, while the number of women students and academics in the sciences is growing, men continue to outnumber women; particularly at the higher levels of these professions (Hill et al., 2013; Floyd, 2021). The Gender Fact Sheet for the Post School Education and Training System for the 2016 and 2017 academic year shows that while there is an increasing number of women students entering the space of

Higher Education Institutions (HEI), their representation is the lowest in the Science, Engineering and Technology (SET) related fields for both the 2016 and 2017 academic years (Department of Education and Higher Training, 2020). With the exception of SET disciplines, the report further highlights that the presence of women is higher in all other fields of study (Department of Education and Higher Training, 2020). In SET disciplines, the pipeline from students to academics is therefore much narrower than other fields of study. Furthermore, a 2018 study conducted by PricewaterhouseCoopers (PwC), shows that in South Africa, the ratio of women to men in maths and statistics is 4:5, engineering is 2:5 and manufacturing and construction is 3:10 (Mahlatsi, 2020). This is the point of entry for this research as it aims to explore the stories of women academics who have invaded the world of science in HEIs as well as how they negotiate and grapple with the consequences of this invasion.

1.2 Rationale

The main aim of this research is to contribute to a body of work that explores the experiences of black women in science by attending to their identities through the intersectionality of race and gender. Given the current strategies aimed at attracting more women to science through organisations such as South African Women in Science and Engineering (SAWISE), Black Women in Science (BWIS) and the Organisation for Women in Science for the Developing World (OWSD) to name a few, it has become vital that we understand the different accounts and experiences of the women who are already in the field.

Although there is substantive research on issues of race and gender across the board, Puwar (2004) argues that there is in fact not enough research on the occupation of spaces that were not accessible to black women due to historical exclusions. The need for more knowledge pertaining to the experiences of black women who occupy spaces that were not previously afforded to them becomes even greater when we consider that black women's experiences are

often overshadowed by the experiences of black men and white women (Naicker, 2013; Hull, Bell-Scott, & Smith, 1982). Black men's experiences are seen to be representative of the black experience while white women's experiences are seen to be representative of the experiences of all women. This research is not aimed at filling the "gap" but rather at expanding our understanding and making a valuable contribution to this body of knowledge.

A report based on a national study by Canham (2018) highlights some of the challenges faced by black women in academia. One of these includes being bullied by senior men academics and peers. This speaks to the broader challenges that need to be explored in higher education research. At the core of this research is the need to explore the complexity of bodies that inhabit spaces that continue to be misrecognised and repelled. By attending to narrative accounts of experience, the study sought to illuminate opportunities for advancement in science while also exposing micro-aggressions that are gendered, raced, classed and discriminate on the basis of sexual orientation.

Many black women in academia state that they are often the first in their families to come to university. It is therefore important to understand how they are navigating this 'strange place' of which they are the first to enter (Canham, 2018). In addition to being the first in their families to attend university, many are also first generation academics to work at universities. Generally, student success rate is an area of concern within HEIs particularly concerning first-generation students as they are associated with high failure rates and attrition in their first year within HEIs (Motsabi et al., 2020). Amongst the range of difficulties faced by this group of students is the difficulty in transitioning to higher education, financial difficulties, being underprepared, choosing the wrong courses and lack of emotional support from family members (Hicks & Wood, 2016). All of these challenges are significant determining factors of their academic, social and personal expectations (Hicks, 2003). Another element we need to consider is that by

entering the higher education institution space, these women are also breaking family traditions and by so doing, they need to adjust to both the academic and social culture of university (Hicks & Wood, 2016). I surface student difficulties since these influence the nature of the pipeline into academic jobs in the sciences.

1.3 Research Objectives

The study aims to:

1. Explore the stories that black women academics in science tell about their careers.
2. Understand how women academics in science negotiate the raced and patriarchal cultures of science disciplines.
3. Investigate the disruptive possibilities enabled by black women academics in the sciences.

1.4 Research Questions

Three questions that will be addressed are:

1. What stories do black women academics in science tell about their careers?
2. How do women academics in science negotiate the raced and patriarchal cultures of science disciplines?
3. What are the disruptive possibilities enabled by black women academics in the sciences?

1.5 Background

Various scholars have noted that tertiary education acts as a catalyst in areas such as social mobility, individual and societal well-being, it plays a role in perpetuating or disrupting gender stereotypes, and that it is central to the overall development of individuals and nations (Akala,

2019; Moses et al., 2017). Due to this, it is imperative that we broadly contextualize the South African education system; more so as institutions of higher education were significantly shaped by apartheid ideology and planning (Badat, 2008). This is to ensure that the study adequately maps the journey of black women academics.

Before 1994, the black South African education sector was governed by the Bantu Education Act of 1953. Introduced in the wake of formalised apartheid in 1942, with racialised segregation as the guiding philosophy, this Act was based on the National Party's fear that the "natives" were imitating the white man and becoming more like him (McConkey, 1972). The government felt that the education system at that time was too academic, abstract and did not prepare black people for the jobs that they were to ultimately take up. Jobs that were considered appropriate for black people were manual labour, service work, low skilled and unskilled work. It is also important to note that the distinct inequalities in education were not only observed at a tertiary level but across educational levels. Martineau (1997) highlights that education for white girls or those classified as European was accessible since the beginning of the century, and only in the 1970s and 1980s for those classified as coloured and Indian respectively. Furthermore, by 1985, less than five percent of black women had completed high school (Martineau, 1997). At best, the National Party thought it necessary to train black people to be teachers, social workers, and nurses in order for them to attend to the basic needs of black populations. The schools that were offered to black people were underfunded and lacked resources while the opposite was true for white schools. It is fair to state that black people's education, during this time, was aimed at supporting the economy which was in the service of white people and which they benefited very little from (Rakometse, 2008).

Under increased political pressure, historically privileged white English medium language universities started being open to the idea of being "open universities" thus making limited

room for students who were historically excluded from accessing these particular universities (Cross & Carpenter, 2009). Students admitted to these universities remained small minorities and could only gain access based on ministerial approval. The University of the Witwatersrand took the lead on the matter and included the importance of being an "open university" in its manifesto in 1950. This encouraged the University of Cape Town, University of Natal and Rhodes University to do the same. Although this was generally a positive move, it had a negative impact on the traditionally disadvantaged black universities as they lost both students and staff and this led to the weakening of their academic culture (Cross & Carpenter, 2009).

In the hopes of correcting the exclusionary apartheid past, institutions of higher education were identified as one of the primary means to address inequities and injustices, but also to the development and modernisation of South Africa (Teferra & Altbachl, 2004). Thus, to make strides towards an inclusive education system (for both student and staff), various steps were taken in the policy arena. This was achieved through the introduction of legislation such as the Higher Education Act of 1997 and the White Paper 1 of 1995. For instance, Section 37 of the Higher Education Act of 1997 notes that "in their admissions policies, all South African universities are required to comply with appropriate measures for the redress of past inequalities, but they may not unfairly discriminate in any way" (Republic of South Africa, 1997). It is through such an act that currently; universities are receiving students of different backgrounds. Cross and Carpenter (2009) refer to some of these as "non-traditional" students. Non-traditional students refer to the population of students who are predominantly working class, black and from disadvantaged communities. During the apartheid regime, this group of students was actively excluded from many educational institutions of higher learning due to their racial membership. Although the increase in accessibility to universities by non-traditional students is positive and a step in the right direction, this move comes with its own challenges.

During this period, black women were generally employed in sector jobs such as teaching and nursing (Canham & Maier, 2018). Through these roles, the apartheid regime ensured that the lives of South African women were considered to be the cheapest form of life and labour (Canham, 2014; Badat, 2009). The African National Congress utilised the introduction of the White Paper 1 of 1995 and the equity clause as strategies to aid institutions of higher education in overcoming sexism and racism (Akala & Divala, 2016). More gender reforms policies were also formalised through the introduction of the of the Employment Equity Act No 55 of 1998 and the Broad-Based Black Economic Empowerment Act No. 52 of 2003. The two Acts allow for preferential treatment to be extended towards previously disadvantaged groups such as black people and women. Naicker (2013) reports on the findings by the National Commission of Higher Education which revealed that in 1993, 32% of the total research and teachings positions were occupied by women and further revealed that the majority of the women were employed at the level of junior lecturer or lecturer. Additionally, the report held that in some historically white universities, women occupied all the positions below the rank of junior lecturer (Naicker, 2013).

Canham (2018) gives a clear picture of the progress the education sector has made since the introduction of democracy in South Africa in a study that focused on the recruitment, retention and progression of Black South African academics. The study was carried out at the University of Western Cape, North-West University, University of Fort Hare, University of Kwa-Zulu Natal, University of Cape Town and the University of the Witwatersrand. The report shows that in 2016 the percentages of PhD holders by race were: white 55%, black 28%, Indian 8%, Coloured 6% and 3% were unspecified. The report was further broken down into gender and it showed that 5063 men hold PhDs as opposed to the 3564 women with PhDs. Additionally, black women are still underrepresented even when compared to their male counterparts. This implies that black women are more concentrated at junior levels at universities while white

male academics are concentrated at a professoriate level. Phakeng (2015) reiterates this and takes it a step further by looking at statistics in relation to the research aspect of academia. The statistics showed that in 2015 there was only one black A rated female from the National Research Foundation and 2 who are B-rated. This is juxtaposed with the 12 A-rated and 67 B-rated white females (Phakeng, 2015).

1.6 Outline of research report

This research report is constituted of five chapters. The current chapter is the introductory chapter or chapter one. Here the research objectives and questions that frame this project were outlined. In addition, the research was contextualised in this chapter. The second chapter is divided into two parts made up of the literature review and conceptual framework of the study. The first part reviews existing literature regarding space, and which bodies are given or denied access into certain spaces, and how they are perceived when access is granted to them. The second part of the chapter details the feminist conceptual framework constituted of theories of intersectionality, African feminism, Critical Race Theory and the theory of habitus. The third chapter outlines the narrative methodology used in the study. It is made up of discussions of the research design, a discussion of the use of narrative research, and the procedures that include sampling, research participants, data collection, how the interviews were conducted and data analysis. In addition, the chapter offers a discussion on reflexivity where the researcher's positionality is highlighted. This chapter concludes with a discussion of the ethical considerations taken into account. The fourth chapter outlines the findings and discussion of the research and presents three major themes in a manner that honours a narrative approach. The fifth chapter is the concluding chapter where a high level engagement with the findings is provided alongside the limitations and recommendations. Additionally, the appendixes include supporting documents which include the ethical clearance certificate, information sheet,

interview guide, interview consent forms and recording consent forms are provided as appendices.

2. CHAPTER TWO: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This chapter is divided into two parts. The first part provides an overview of extant literature on conceptions of space in relation to which bodies are granted or denied access into certain spaces and how they are viewed when granted access. The second part offers a feminist conceptual framework by providing an overview of the theories of intersectionality, African feminism, Critical Race Feminist Theory and habitus as the theoretical lenses through which the research is conducted.

2.1 Literature Review

2.1.1 Bodies that do not belong

The term 'space invaders' is used in association with bodies that occupy spaces from which they were historically excluded due to race, class and/or gender. The exclusion of certain bodies from some spaces comes with the understanding that there is a connection between bodies and space. Puwar (2004, p. 8) conceives of space as "built, repeated and contested over time". This is linked to the idea of the "somatic norm" which is the belief that specific bodies are 'naturally' designed for particular spaces. For Puwar (2004), bodies that are not the somatic norm are those that do not belong in certain spaces. These are then perceived as trespassers. Tamale (2010) and Alexander-Floyd (2015) contend that certain spaces are exclusive to particular bodies and the classification of who belongs where is mainly based on race and gender. Tamale (2010) contributes to this field by looking at how African women are underrepresented in parliaments across the continent. She argues that women are excluded from contributing to the law making processes in their respective countries. Alexander-Floyd (2015) explored how black women are space invaders in the field of political science. These two studies highlight how previously excluded bodies occupy spaces in which they are not the somatic norm. Their findings suggest

that there are even greater challenges that black women face in these exclusive spaces. For instance, black women are met with challenges of racism, sexism and bullying amongst others (Mahabeer et al., 2018).

With regards to gender; the male body continues to be seen as the ideal type and this is the reason women experience barriers and resistance when they enter spaces not meant for them (Puwar, 2004). Previously excluded groups are constantly confronted by practices that undermine their careers (Alexander-Floyd, 2015), practices that serve to remind them of their 'proper' place (Tamale, 2010), and regularly find themselves outside the organisational culture (Canham, 2014) while also navigating the burdens of being black, working class and woman. The thinking and belief that women are soft is another contributor to how women are treated and determine what it is that women can and cannot do (Martineau, 1997). This pressure drives black women to constantly attempt to prove their capabilities. The irony here is that the onus is on the women to prove their competence (Alexander-Floyd, 2015) and not on the systems and policies that further marginalise black women.

2.1.2 Trespassers in academia

Within the academic space, black women's very presence challenges the ideology of white men's bodies as the sovereign knowers and holders of all knowledge (Puwar, 2004). Maodzwa-Taruvinga and Divala (2014) argue that black women in South Africa are in fact not given adequate support and not taken seriously as knowledge producers in academia. This is a direct reflection of how universities have been male-dominated thus creating the impression that roles like those of a professor can only be adequately held by men which in turn determines which bodies are competent and which ones are not (Social Sciences Feminist Network Research Interest Group, 2017). In South Africa particularly, it is clear that there has been attempts to ensure that space invaders make a smooth transition into these new spaces through initiatives

of diversity and equity (Mahabeer et al., 2018). However, Ahmed (2007) argues that talks of diversity enter the university spaces through marketisation but these talks lack commitment and this contributes to why women and minority groups are met with challenges within these spaces.

Within the field of academia and the sciences in particular, men progress faster than women (Canham, 2018). The maintenance of the status quo is sometimes enabled by members of the very group that is excluded. This is of course informed by the insidious work of patriarchal indoctrination. An example of how early gendered expectations are socialised into children is that mothers expect their girl children to perform better in English than their boy children while the boy children are expected to perform better in sciences than the girl children (Martineau, 1997). Martineau (1997) further highlighted that girls who do chose subjects within the sciences receive different treatment from their teachers and not much is expected from them by virtue of being women. Girls are encouraged to choose subjects that are considered to be more feminine such as teaching and other care roles such as nursing and social work, while boys go for masculine subjects such as engineering (Martineau, 1997). This further shows how certain bodies are seen as more deserving to occupy certain spaces while others are seen as unsuitable.

2.1.3 "Organisational terrors"

In addition to the challenges mentioned above, minoritarised groups carry the burden of being seen as threats (Puwar, 2004). There are varying levels of threat associated with different bodies. Bodies of space invaders that occupy elite positions are seen as benign as they have gone through the screening process that monitors entry to the various consecrated spaces (Puwar, 2004). However, this does not imply that they are fully welcomed and accepted in the space. It only suggests that the threat they possess is diluted and they risk being viewed as

"organisational terrors". The greatest fear is that the black bodies will not conform to the institutional culture and they will seek to change the space and bring in others like them. For example, Canham (2014) illustrated how a 'terrorising' black woman (Lulu) confirmed all the worst fears of her white colleagues. Lulu is an example of an organisational terror in that her demeanour was not filtered or altered to make herself more acceptable in that space (Canham, 2014). Lulu's influence and resistance led to her being depicted as a threat, called out for her personality, to being ridiculed to limit her influence. She was who she is and this was grounds to unveil feelings of terror in the original dwellers of that space as her presence threatened their dominance and power. Lulu's experience coheres with Puwar's (2004) sentiments that space invaders are often seen as threats when they occupy spaces they were previously excluded from. This illuminates the possibility that despite being permitted into the space, they are still outsiders. Consequently, this research sought to understand if indeed black women in the sciences might be conceived of as organisational terrors.

2.1.4 Outsiders Within

Given the challenges outlined above; this section explores how black women in academia navigate the patriarchal nature of this territory and other challenges they are met with. Like Puwar (2004), Alexander-Floyd (2015) contends that women's bodies are simultaneously visible and invisible. On the one hand the bodies of space invaders are highly visible; pursued and painted as representatives of difference and diversity while on the other hand, they are invisible in that they are seen as incompetent and incapable of doing their jobs (Ahmed, 2007). The Social Sciences Feminist Network Research Interest Group (2017) takes this matter of invisibility further by moving beyond the body and extending the idea of invisibility to the different roles involved in academia. They argue that the roles of women in academia are also invisible in a sense that the roles that are considered to be more "masculine" are regarded as possessing more value as opposed to those that are regarded as being "feminine" (Social

Sciences Feminist Network Research Interest Group, 2017). For example, roles such as teaching where more care is practiced are feminised while research is masculinised and better rewarded. The issue of invisibility extends to other roles that women hold in what is considered to be their private lives (John, 2014). In John (2014), Ramani gives the example of how universities do not have lactoriums or lactation rooms where new mothers can help themselves. This is an indication of how the details of a women's life are not taken into account within the space of academia.

2.1.5 Black women academics in South African HEIs

Scholars such as Kiguwa (2019), Khonou (2019), Mabokela and Magubane (2004) and Khoza-Shangase (2019) have reported and shared their experiences as black women academics within South African HEIs. In their narratives, some of the women reflect on how their multiple and intersecting identities lead to them assuming a complex standpoint as both insiders and outsiders (Kiguwa, 2019). In their study on black women academics across three South African universities, Raymond and Canham (2022) expand our understanding of the experiences of black women academics functioning within the South African context. The pair highlight that not only are the women's experiences centred around stories of pain, suffering and exclusion, but that they also speak on how they combat and reject the oppression enforced on them through counter-storytelling, the decision to walk away or stay in the institution and creating spaces of belonging (Raymond & Canham, 2022). The experiences of these women appears to be a complete juxtaposition of the experiences of black men within the academy. Black men use the patriarchal nature of the South African academy as a protective factor that allows them to navigate their careers relatively better than black women (Canham, 2022).

2.2 Conceptual Framework

This section outlines the theories that provide the conceptual basis for the study. The theories cohere around a broadly feminist orientation to higher education. However, since women are always raced, classed and geographically located, the lens embraces an African feminist and intersectional approach to theorising. I therefore begin by outlining the feminist register before pausing on intersectionality, African feminism and Critical Race Theory and Habitus.

At its foundation, feminism aims to ensure that men and women are awarded equal rights and opportunities; politically, socially and economically. Consequently, hooks (2000, p. 1) defines feminism as a "movement to end sexism, sexist exploitation and oppression". She suggests that men gain from patriarchy and its assumption that women are inferior to men and therefore need to be under the authority of men. At its basic level, mainstream feminist theory is based on the argument that the manner in which society expresses and models sexuality divides society into two sexes which are male and female (MacKinnon, 1989). The theory is of the school of thought that gender is a social construct. Therefore, everything that we assume to be feminine or masculine is due to what society has deemed so (Butler, 1990). The feminist movement fought to address issues relating to women's bodies, reproductive rights, employment rights and issues of sex vs gender amongst others. Regardless of the attempts to define feminism above; scholars such as Mohanty (2002) argue that the term "feminism" is continually contested due to the fact that there isn't a simple way to represent and incorporate the diverse struggles and histories as will be evident as this section unfolds.

2.2.1 Intersectionality

In order to understand the experiences of black women in the various science disciplines, I theorise their lives and identities through the framework of intersectionality. In *Mapping the Margins: Intersectionality, Identity Politics, and Violence Against Women of Color,* Kimberlé

Crenshaw (1991, p. 1245) introduces the concept of intersectionality to call for the need to reflect on "multiple grounds of identity when considering how the social world is constructed". She highlights that the flaw of identity politics is that it often negates internal differences that exist within groups (Crenshaw, 1991). Crenshaw (1991) explores this further by looking at violence against African American women and how they were either politicised on the basis of race by the antiracists or on the basis of gender by feminists; as though the two are mutually exclusive. She shows how violence against women of colour is also determined by other markers that include race and class. By delving deeper into the experiences of women of colour, Crenshaw (1991) shows how both the feminist and antiracist movements have failed to highlight the intersection of patriarchy and racism thus failing to show how the experiences of African American women are often the product of the intersection racism and sexism.

Crenshaw (1991) continues to differentiate between structural and political intersectionality. In defining structural intersectionality, she provides an observation about a shelter for battered women of colour. She offers that women of colour have limited access to housing, employment, health care and are overall associated with poverty. These women seemingly struggle to receive assistance from relatives and friends as they too are confronted by the same challenges relating to lack. Therefore, when considering some of the reasons that influence women of colour seeking external assistance such as shelters, it is important to consider factors of socioeconomic status and inequality. Moreover, Crenshaw (1991) suggests that understanding continues to show how it would also not the representation of women of colour's experience of violence through class as the only factor would be inadequate since the intersections of race and gender also play an important role. However, the politics of shelters for battered women often follow the narrative of positioning the women's subordination within the psychological effects of male domination thus neglecting the socioeconomic factors contributing to them seeking external help (Crenshaw 1991; Crenshaw & Bonis, 2005). Therefore, structural intersectionality refers

to the multiple forms of oppression compounded by structural discriminatory practices (Crenshaw, 1991; Lee & Brotman, 2013). Political intersectionality on the other hand is concerned with the positioning of women of colour in at least two marginal groups that often pursue conflicting political mandates (Crenshaw, 1991). Being part of these two groups presents a unique experience of disempowerment for women of colour that neither men of colour nor white women experience (Crenshaw, 1991). Racism experienced by men of colour sets the parameters of the antiracist agenda while and the same is true for sexism as experienced by white women being in the forefront of the women's movement (Crenshaw 1991; Crenshaw & Bonis, 2005). Therefore, these two movements fail to recognise the extra burden that women of colour experience pertaining to matters of racism and sexism.

Given the above, the concept of intersectionality is particularly important for the research as it considers both the meaning and consequence of the multiple classifications of identity, difference and disadvantage (Cole, 2009). Therefore, intersectionality is crucial for this research as the aim is to explore the experiences of black women academics. To capture their experiences more fully, it is important to highlight and understand the intersecting nature of their identity markers such as race, gender and class.

Canham and Maier (2018, p. 5) argue that "we cannot partial out gender from the rest of who we are for we are simultaneously classed, raced and gendered." In this regard, Crenshaw (1991) explains that even within the same group of people, issues of race, gender and class play a significant role in shaping how they experience the same challenges. Therefore, the experiences of black women with race and gender are significantly different from those of white women and black men even though there are some commonalities between them (Collins, 2002; Crenshaw, 1991; Crenshaw & Bonis, 2005). Equality for black women therefore means fighting both as women and as black (Collins, 2002).

Therefore, in as much as one can be oppressed in one area they can be privileged in another (Johnson, 2013; Cole, 2009). An example of this can be that of white women. On the one hand, they are privileged due to their race and the social dividend of whiteness but on the other hand they are oppressed because they are women. Phakeng (2015) gives an example of how this can be seen in a South African context. She explains that even though the introduction of democracy has opened doors for previously marginalised groups, there is a separation and differentiation in experiences between black women and white women in academia. Phakeng (2015) argues that white women are the direct beneficiaries of democracy in that they centralised at senior professorial positions and executive management.

Furthermore, intersectionality critiques mainstream feminist theory by pointing out the ways in which it does not make room for how gender, race and class shape the ways that people of colour, specifically, experience certain challenges (Crenshaw, 1991). Crenshaw (1989) argues that the ways in which feminist theory looks at black women further marginalizes them. Intersectionality was thus born out of the need to figure African American women in recognition of the ways that they are overlooked in mainstream Euro-American feminist theory.

2.2.2 African Feminism

Even with the integration of feminist theory and intersectionality, scholars such as Mohanty (2002) highlight that these concepts exclude African women as they do not fully capture their context and history. Scholars often look at African women and "third world women" in general from a lens of highly illiterate rates, poverty and oppressive traditions (Mohanty, 2002). They then attempt to fit these within greater feminist theories. African feminism puts emphasis on location, context and history. Consequently, scholars such as Azodo (1997) argue that mainstream feminism does not fully address some of the issues that African women are faced with. Therefore, it is essential that it be known from the onset that African Feminism is not

concerned with essentialism, radical feminism and women's bodies which are often the main concerns of western feminism (Ahikire, 2014). The main argument here goes as far back as pre-colonialism. Some scholars challenge western feminists by saying that before colonialisation, African women were in fact independent, self-reliant and contributed to the economy of the African continent (Tamale, 2010). In pre-colonial times roles for men and women complimented each other but patriarchy was introduced by colonialism (Azodo, 1997). The above does not however imply that African feminists do not raise issues of sex and gender but it means that they also focus on other aspects that are particular to African women such as challenging African men on why they portray black women as second class citizens (Azodo, 1997).

2.2.3 Critical Race Theory

Critical Race Theory (CRT) is a framework that promotes storytelling in a manner that allows for black people to deconstruct racialised content (Smith et al., 2012) and generate new racialised knowledge and understandings of their experiences (Love, 2004; Gillborn, 2008). By so doing, CRT challenges the inclination of avoiding issues of history and race through historicism and colour-blindness (Henry & Glenn, 2009). It is particularly considered imperative in studies on race; more so as race is considered to be a day-to-day reality for black people (Essed, 1991). Critical Race Feminist Theory (CRFT) as a subset of critical race theory deepens the understanding of the experiences of black women by separating the experiences of black women from those of black men (Rodriguez & Boahene, 2012). The theory solely focuses on how women of colour experience multiple forms of discrimination on the basis of race, gender and class and how all these factors come together within the system of white male patriarchy and racial oppression (Hilal, 1998). The separation of the experiences of black men from those of black women is the core foundation of the theory and of this research. Black men are oppressed on the basis of race but their gender identity in a patriarchal world protects them

against gendered oppression. They, in fact, benefit from the patriarchal dividend. Furthermore, the aim of CRFT is to allow Black women the opportunity to challenge popular stories that maintain racial and gendered inequalities, challenge the status quo, and aim to empower other black women and to validate experiences (Rodriguez & Boahene, 2012). CRFT is significantly supported by Feminist standpoint epistemology which at its core aims to place women's experiences at the centre of knowledge production thus allowing us to view and understand the world through the lens and experiences of oppressed women and to apply the vision and knowledge of oppressed women to social activism and social change (Brooks, 2007). Feminist standpoint epistemology draws from the fact that there are many documented experiences of men across cultures yet the same cannot be said about women thus disempowering women (Brooks, 2007). In order to bring about empowerment, women need to be put at the centre of research and allow their experiences to be the basis of knowledge thus making way for black women's reality as told by those who live it daily (Collins, 2002). Additionally, the framework is imperative for understanding how social interactions are shaped by race as it interacts with gender, sexuality and class (Brah & Phoenix, 2004).

With the above in mind, the most appropriate theoretical lens for this study is African Feminism. This is because the research is centred on black women in South Africa who are constantly faced with balancing their race, gender and class characteristics and experiences.

2.2.4 Habitus

Bourdieu (1998) argues that the social space is organised around economic and cultural capital that people in the space possess. This means that the closer people are to one another based on these two dimensions, the more they have in common and the further away they are, the more different they are (Bourdieu, 1998). Habitus therefore refers to the "generative principles of distinct and distinctive practices" (Bourdieu, 1998, p. 8). Simply put, this means that every

social space has particular practices that are unique to it due to their similarities in economic and cultural capital (Bourdieu, 1998). These unique practices are learnt from our everyday experiences and operate at an unconscious level (Ngarachu, 2014).

The habitus functions as a classificatory tool within the various social spaces. It guides what is acceptable and what is not, what is right and what is wrong, what is acceptable and what is unacceptable and so forth. These classifications separate the different social spaces from each other hence one type of behaviour can be deemed acceptable by one group and frowned upon by another. For example, in reading social spaces in the classroom, Mupotsa (2017) contends that those from disadvantaged backgrounds face similar situations relating to finances, transportation and coming from schools that had limited resources, while on the other hand, those who come from more advantageous backgrounds may have challenges and experiences that are similar to each other.

Based on Bourdieu's (1998) principles we can suggest that black women academics in science might not possess the cultural capital that is valued in the field and largely have an incompatible habitus to science. This is because the academic space was not initially made for them. To a large extent, they have little in common with the other people within the field. They are a minority based on both gender and race identities. Science is historically masculine. This means that the valued capital is largely masculine. In the South African context, black people were actively excluded from entering science fields. This would suggest that the valued capital is largely white in character and that black people inhabit the space as outsiders. Since black women are not valued on both dimensions of race and gender, they exist on the margins of science.

Moreover, the theory of habitus assumes that when agents move from one social space to another, they change form and mimic the actions of the members of the new social space in

order to be accepted (Reay, 2015). It is important that we recognize that the constant switching back and forth is taxing on the bodies that are caught in this as they are constantly at war with two irreconcilable spaces. In thinking about Black women academics in science, we can anticipate the constant switch between their habitus and the field. Given that the science field is dominated by white males we can expect to see black women mimicking or being at odds with some of the peers' mannerisms and behaviours.

Bourdieu refers to structured social contexts that generate rules and practices which foster particular ways of being and thinking as "fields" (Telford & Beames, 2013). Fields are therefore, the context in which the habitus operates (Ngarachu, 2014). Other scholars define fields as "a social arena where people position themselves in order to compete against themselves for capital or resources" (Gorski, 2013, p. 132). Positions in fields are by design defined by opposition (Hanks, 2005). Swartz (2013) takes the definition further by referring to fields as power arenas as a way to highlight the importance of understanding the existing power relations and the constant struggle to maintain power in these fields. Each field has its own customs and practices that are maintained by both individuals and institutions. These practices determine what is acceptable and what is not within the habitus (Telford & Beames, 2013). The ongoing tensions to maintain power also exist in the habitus. However, with habitus the power struggle is in relation to the individual and the space while with the field it is within institutions (Ngarachu, 2014).

Furthermore, societal processes outside of the field such as urbanization, technological advancements and the increase in the number women entering the labour market have the potential to transform existing structures of power thus the overall structure of the field (Husu, 2013). The transformation of the field would have different consequences for the agents in the field as fields are also seen as "arenas of ongoing struggle in which each agent aims to either

improve or conserve his or her own position" (Husu, 2013, p. 5). This is particularly crucial for this research Husu (2013) shows that women's increased higher education attainment or their entry into certain labour markets increases their cultural and economic capital thus significantly shifting the balance of power in the field.

This chapter was divided into two parts. The first part provided an overview of existing literature on the topic of space in relation to which bodies are denied or granted access into certain spaces and how they are thought about in those spaces when they are granted access. The second part of the chapter presented a feminist conceptual framework through homing in on intersectionality, African feminism, Critical Race Theory, and the theory of habitus as the underpinning theories through which the research is conducted. Together, the literature reviewed and the conceptual framework highlight how black women in academia face multi-faceted challenges due to their intersecting identities as black women and how their challenges may be different from those of other women given their geographical location. Through acknowledging their multiple identities, black women are given the opportunity to provide counter stories from the hegemonic stories told about black women. Furthermore, as those who may not be considered to be the somatic norm for in STEM field of academia, black women may lack the valued traits that allow them to be considered as rightful occupants of academia. The next chapter proceeds to elaborate on the methodology followed in the research.

3. CHAPTER THREE: METHODOLOGY

This chapter provides an outline of the methodology employed in this research. It engages the research design, participant sampling and the data collection process. A reflexive note is provided by the researcher on how her positionality may have influenced the research. In addition, the ethical considerations pertaining to the study are engaged.

3.1 Research Design

This is a qualitative research study that relies on the theories of African Feminism, Critical Race Feminist Theory, intersectionality and Bourdieu's theory of the Habitus. Qualitative research is interested in how people make meaning of the world and their experiences (Willig, 2014). For this reason, the intention of the research is not to generalise findings but to think deeply about the cohort of women that participated in the research.

The study adopted an interpretivist orientation. This is of the school of thought that considers reality to be constituted by people's subjective experiences thus implying that reality is socially constructed (Schwandt, 1994). In this paradigm there are no correct or incorrect theories of the world. Accounts of truth are considered to be subjective. This research functions on the basis that the accounts that were given by the participants are true to their experiences and that is how the participants have made meaning of their experiences and the world around them. Furthermore, the paradigm puts emphasis on context. This suggests that truth is always read in context as what is true for one context may not apply in another. This aligns with the overall research design as the methods of data collection and interpretation allow for context to be taken into account. Since the narrative is always contextual, this study adopts a narrative approach that enables storytelling.

3.2 Narrative Research

Narrative research adopts the standpoint that people are storytellers by nature and these stories are important if we are to understand people's experiences and behaviour (Lieblich et al., 1998). Through this method of research, we get to understand and dig deeper into people's inner thoughts and how they make sense of their experiences and understanding of the world they live in. Puwar (2004) argues that research on race and minority groups has mainly focussed on quantifiable aspects. She contends that this does not allow members of these groups to fully express their unrestricted thoughts. Hence, this research took a narrative approach, to allow black women academics to tell their experiences of being both black and woman in the science field.

Narrative research honours the view that truth is relative and complex (Josselson, 2011). This means the narrative accounts given by participants were not be taken as complete representations of reality but were understood as how they as people make sense of their experiences. Narrative research is of the view that even though stories are centred around life events and facts they also allow people the freedom to be themselves through the use of emphasis and the choice to add and subtract and the interpretation of the accounts that they remember. This is important in this research as the focus is not on the factual account of what transpires in the science field but on the experiences that these women have and how they understand and organize their experiences.

Narrative research is based on the principle that people understand their lives and experiences in a storied manner. They connect events in an attempt to make meaning therefore the accounts given adopt a temporal frame with a beginning, middle and end (Josselson, 2011). This was particularly important for this research as the aim was to understand how black women

academics account for their experiences of being in the science field. This required that we understand the broader context of their lives.

This research framework also seeks to understand prominent thematic areas that arise in the narration as well as how they link to each other. This point was of significance to this research given that thematic analysis was used as a method of analysis. Narrative research allows for the themes extracted from the narratives to be linked to each other thus contributing to a rich analysis.

3.3 Sample

The sample consisted of 10 black women academics at a South African university. They were between the ages of 25 and 65 at the time of data collection. The sample size was adequate as the aim of the research was not to make generalisations but to obtain an in-depth understanding of the matter at hand. The inclusion criteria required that the participants have worked as academics for a minimum of three years in order for them to have stories to tell about the workplace. The participants were recruited through the combination of purposive and snowball sampling. Purposive sampling is defined as the deliberate choice of participants due to the qualities that they possess (Etikan et al., 2016). Snowball sampling on the other hand is characterised by referrals made by participants to other prospective participants who match the criteria and can potentially take part in the research (Biernacki & Waldorf, 1981). The first participant was secured through purposive sampling by browsing through the various departments' staff lists and emailing staff members that appeared to match the sampling criteria. Once the participants were identified, they were sent an email by the researcher informing them about the study and asking if they would be willing to take part. Interested participants then responded to the call by either confirming that they meet the criteria and indicating their interest to partake in the research, or indicating that they do not match the

criteria or were not interested thus excluding them from participating. After the identified women agreed to be part of the study, an electronic copy of the consent form was emailed to them along with a permission form to ask for permission to have the interviews conducted in their offices.

3.4 Research Participants

The study was focused on ten participants. All participants identified as black women, made up part of the academic staff and are in the STEM fields. Of the ten participants, one identified as a professor, one as an associate professor, three as senior lecturers and five as lecturers. To preserve their anonymity, table 1 below only gives the participant pseudonyms and their academic positions at the time of the interviews. The names of academic departments are not provided.

Table 1: Table showing the pseudonyms and participant's positions:

Pseudonym	**Academic Position**
Ntombizodwa	Senior lecturer
Jamie	Senior Lecturer
Bonolo	Lecturer
Priyashni	Lecturer
Lesedi	Associate Professor
Reitumetse	Lecturer
Fatima	Lecturer
Nicole	Senior Lecturer
Mathapelo	Lecturer
Fezeka	Professor

3.5 Data Collection

3.5.1 Interviews

The data was collected between June 2019 and November 2019 through the use of semi-structured interviews with black women in academia within the sciences who teach and research in any of the STEM related fields. The semi-structured interviews allowed for clarifications to be made and for follow-up questions. The interviews allowed the participants to share what they want to share without limitations and/or restrictions and the semi-structured nature of the interviews also aided in this regard. The interview questions were divided into three parts (beginning, middle and end) in line with the narrative frame adopted by the research. The beginning explored life before academia, the middle focused on life within academia and the end looked at the future. The interviews were approximately an hour long and were audio-recorded and transcribed. Audio-recordings and transcripts are stored in a password protected computer.

3.5.2 Data Analysis

This research used thematic analysis to analyse the data. Willig (2014) defines thematic analysis as a method that takes note and organises patterns in content and meaning. Attride-Stirling (2001) notes that this is a method that is widely used to gather and analyse patterns with multiple possibilities that the researcher can use. Furthermore, this method of analysis is said to be one of the methods that has the potential to provide a rich and detailed account of the data collected (Braun & Clarke, 2006). While the process of analysing the data took a more inductive approach in that the data collected was strongly linked to the data itself, the framing and arrangement of the data was informed by principles of narrative research. As indicated above, narrative research views people as natural story tellers and like every story, there needs to be a beginning, middle and end (Josselson, 2011). Therefore, the themes were grouped in a

manner that reflects the past, present and future to symbolise the beginning, middle and end as premised by narrative research.

Guided by the principles of narrative research that emphasise the thickness of data and temporality of storying people's lives, this research thematised the data based on Braun and Clarke's (2006) framework whose application I outline here. Prior to following the six-step guide offered by Braun and Clarke (2006), the audio recordings of the interviews were transcribed verbatim. The first step is for one to familiarise themselves with the data and this was achieved through personally conducting the interviews and the interview transcriptions. The second step was to generate the initial codes which was conducted through compiling a list of what is being said in the data and using different colour highlighters in the transcriptions to track the codes. The third step is to search for themes and this was achieved through grouping concepts that relate to each other. It was also at this stage that themes were also divided to correlate with the beginning, middle and end frame to stay true to narrative research. The following and fourth step is to refine the themes from the third step and this was achieved through investigating which different themes go well together and how do some of the themes highlighted also differ from one another. It also entails ensuring that the overall themes ensure the validity of the data set in its entirety. The fifth step is to further define and name themes and the sixth step is to produce the final report.

3.6 Reflexivity

Reflexivity is one of the concepts that are deemed to be significant in qualitative research particularly for the credibility and analysis of the data (Dodgson, 2019). Researchers are expected to have knowledge of the self and to make room to monitor the impact on their beliefs, biases, intersecting identities and personal experiences on the research (Berger, 2015). The research is based on my interest of how people who are considered as "outsiders" and are often

in the minority, navigate certain spaces. As a black woman from a working class background who has also been in privileged university spaces, I have had to formulate creative ways of being in order to match the hegemonic standard and habitus of the spaces that I often find myself in or affiliate with. However, given the risks of conflating my own experiences with those of participants and their stories, I chose a sample that is distant from me in terms of profession, fields of study and age in an attempt to avoid instances of over identifying with them. However, it is also worth noting that to a great extent, I found that my positioning as a black woman pursuing a Masters degree allowed me to easily build rapport with the participants which in turn made room for genuine conversations. In the same breadth, I had to also be in the position to separate my experiences with those of the participants to avoid colluding with them and ensuring that I remain true to the data and their experiences. To maintain a distance between my own experience and that of participants, I often returned to the data. In addition, my supervisor, a black man, regularly reinforced the need to read the data for what it was saying instead of conflating it with my own perceptions and experiences.

3.7 Research Ethics

Ethical clearance was obtained from the University's Human Research Ethics Committee (non-medical), with protocol number: **MACC/19/006 IH**. Participants were informed that the research report will be made available to them on request. It will however also be accessible from the University library portal after the research has been successfully examined.

Prior to the interviews, participants were provided with an Information Sheet, via email. It outlined the purpose of the research, what participation entails including where the interviews will take place and the approximate duration of the interviews. The principle of informed consent was applied. Participants were informed that participation is voluntary and they can discontinue their participation in the research at any point. Once the participants gave their

approval, they signed two consent forms; one consenting to the interview and the other to the use of an audio recording device.

The principle of anonymity was also applied. However, total anonymity could not be guaranteed as the participants were known to the researcher and some, to the research supervisor. All personal and identifiable data was removed and the use of pseudonyms was employed. The name of the university where the study took place is not disclosed, nor are the departments that the participants work in as some experiences can be traced back to the participants. Furthermore, to ensure confidentiality, the data, transcripts and audio recordings, are stored in a password device. They are only accessible to the researcher and the research supervisor.

This chapter engaged the methodology employed in the research through elaborating on the research design, sampling of participants and the data collection process. The researcher also provided a reflexive note on how her positionality may have influenced the research. Additionally, the chapter highlighted the ethical steps that were considered to ensure that the research is carried out in a manner that is fitting and not harmful to the participants. In the next chapter, the research provides the findings and discussion of the data through exploring three major themes that are organised in a manner that honours a narrative approach.

4. CHAPTER FOUR: FINDINGS AND DISCUSSION

This chapter presents the findings that emerged through the process of analysis informed by the conceptual framework of the study. The chapter adopts an interpretative lens that makes meaning of the narrative accounts provided by the participants. Three themes emerged through a conceptual reading of the data. The themes that are presented in this chapter are, "we struggled for everything", "permanent scars on my body" and "the future has got to be different." The first theme which focuses on the early lives of the participants engages with the first research question which is interested in the stories that the participants tell about their careers and earliest memories. The second theme simultaneously addresses the questions of how women in sciences negotiate the raced and patriarchal cultures of science disciplines and the disruptive possibilities enabled by black women academics in the sciences by exploring three sub-themes pertaining to the isolating nature of the STEM fields, difficulties around the availability of support structures and the multiple demands on women academics' time. Lastly, the third theme looks to the future as it explores the hopes that the women have for themselves and other black women in academia by amplifying their narratives on matters concerning pedagogy and rupture and the need for more women academics in STEM fields.

4.1 Early life: "We struggled for everything!"

Based on the temporal frame of narrative research, the first theme traces the earliest parts of the participants' lives. The data indicates that most of the participants, six of the ten people interviewed, grew up in working class households. In this study, it appears that socioeconomic status may have played a significant role in shaping and informing the experiences of the participants. Factors such as the types of jobs the participants' parents held and the type of

education the participants received seem to have played a role in their career choices. Additionally, these histories seem to contribute greatly to their experiences within the academy and informed the stories they choose to tell about their earliest memories and careers. The following excerpts point to the participants' backgrounds.

> *The background I come from is that of a poor black child… My father was not working for most of his life, so I was raised by my mom who was a cashier. That on its own, raising nine kids with a small salary sort of speaks volumes about my kind of socio-background. Bonolo*

> *So, the village itself is a very impoverished place and then over and above that I also come from a very poor family. I grew up with five siblings. So, family of six and my mother was not working so we were that poor. My father had a job. He was working in Joburg and he was not living with us. But all in all, we were very poor. Ntombizodwa*

> *No, I grew up in a family of seven. My mother was a homemaker, and my father was a postman so we were really from a disadvantaged background if I can put it like that. We struggled for everything. Fezeka*

The preceding excerpts by Bonolo, Ntombizodwa and Fezeka provide context to some of the earliest experiences of the participants. The quotes provide insight into the general social context of impoverishment within which the women were raised. The women's accounts encapsulate the experiences of many black South Africans in the late apartheid period. Fezeka and Ntombizodwa's narratives provide a window into women's experiences of patriarchy where their mothers were compelled into home bound roles of child rearing without paid employment. Most of their parents did not attain post matric qualifications and mostly held odd or service jobs such as being domestic workers, cashiers, and postmen. It is against this

background that the education system in which the participants went to school is discussed below.

Engelbrecht (2006) shows that prior to 1994, the South African education sector was fragmented along racial lines. The 1953 Bantu Education Act was one of the cornerstones that facilitated the National Party's strategy for a separate education system categorized along racial lines. The Act was founded on the National Party's fear that by desiring education, the "natives" were emulating and becoming like the white man (McConkey, 1972). The government was of the view that the education system was not appropriate for black people as it did not prepare them for the jobs that they were to ultimately take up (Christie & Collins, 1982). Universities were established for white people. For instance, writing with colleagues, Canham observes that he works at a university that "was built a century ago for the English-speaking European youth living in the British colony" (Bell et al., 2020, p. 5). This illustrates the historical purpose and segregation of the education system. Rakometse (2008) believes that black peoples' education during this time was aimed at supporting the economy which was for the benefit and service of white people. Christie and Collins (1982) offer that given the utopian white dominated space the National Party was trying to achieve, they needed blacks as non-competitive cheap labour. This was achieved through jobs such as manual labour, service work, low-skilled and unskilled work. Those who could pursue post matric qualifications, were limited to service professions such as social work, nursing, and teaching which were offered to black people in the so-called homelands and black townships in the urban peripheries (Canham & Maier, 2018; Cochrane, 1975).

Table 2: Table showing the jobs of the participants' parents:

Participant	**Participants' academic position & Qualification**	**Occupation: father**	**Occupation: mother**
Reitumetse	Lecturer, PhD	Postman	Teacher
Ntombizodwa	Senior Lecturer, PhD	General worker	Unemployed
Priyashni	Lecturer, MSc	Electrical engineer	Homemaker
Nicole	Senior lecturer, PhD	Draftsman	Homemaker
Bonolo	Lecturer, MSc	Unemployed	Cashier
Fatima	Lecturer, MSc	Computer programmer	Secretary
Fezeka	Professor, PhD	Postman	Homemaker
Mathapelo	Lecturer, PhD	Teacher	Teacher
Jamie	Senior lecturer, PhD	Truck driver, owned a shoe shop and joined the church	Teacher

Table 2 shows the occupations of the participants' parents. From the table, we can see how the data correlates with the sentiments shared by Canham and Maier (2018) and Cochrane (1975) who observed that black people generally occupied low-skilled, unskilled, service work and/or manual labour except for Fatima and Priyashnis' fathers who were computer programmers and an electrical engineer respectively. Furthermore, the data illustrates that the occupations were also significantly gendered. Women fall neatly within the home bound roles of child rearing and service jobs of teaching.

Regardless of the occupations that the participants' parents held, there was also a general sense of how the parents acknowledged and imparted the importance of education in their homes. This formed part of their earlier habituation towards the educational field.

…We really showed a lot of interest in books because my mother used to tell us that education was the only way to get out of the cycle of poverty. You have to get yourself educated so that you can open your mind to other possibilities. Fezeka

I sort of followed my brother's trail. He went as far as getting his B-Tech well... he was ahead of me so I did everything that he had do; he studied maths and science, I studied maths and science. He was the first one to go to tertiary so I thought oh wait so there's such a thing… and that's how it unfolded. Bonolo

My parents were really interesting. So, they were very education focused. Long before the end of apartheid, my father foresaw the end of apartheid and the need for education as a means of economic independence thus they pushed for education. Jamie

The reports given by Fezeka, Bonolo and Jamie highlight that their parents advocated for education and encouraged them to follow academic pursuits regardless of their occupations. Fezeka's report shows how her mother encouraged her along with her siblings to read and value education as a tool to break the cycle of poverty. The same can be said for Jamie's parents whose father held multiple jobs and her mother was a teacher. Bonolo's excerpt deviates slightly from that of Fezeka's and Jamie's in that it was her older brother who implicitly modeled the importance of education. From the excerpts above, we can see how the family environment as a field played a significant role in shaping the participants' views of education. Their parents' view of education as important became internalized predispositions thus shaping their perceptions and acted as a guide for how they needed to behave (Asimaki & Koustourakis, 2014). We can see how some of these principles were internalised by the likes of Fezeka whose mother advocated for education. She thus spent most of her time reading in the library and more focused on her academic pursuits. We can also see how Bonolo internalised her brother's

actions. She actively mimicked and embodied them by studying mathematics and science and pursuing a university degree just like he did.

CRT suggests that education and access to education can be seen as a structure that helps the dominant group, men, maintain their power (Adams et al., 2017). However, through their educational pursuits and achievements, these participants challenge the hegemonic ideology where men are encouraged to pursue academic pursuits and women are mostly encouraged to pursue childbearing and child-rearing activities. Moreover, education is seen as a tool to foster financial freedom thus limited access to it hinders social mobility and freedom. Therefore, through education, the women in the study are not only challenging hegemonic views on the masculinity of education but also breaking the financial glass ceiling as education is a key factor in decreasing unemployment (Brende, 2015; Nortje, 2017).

Furthermore, the above is particularly important when we consider that the women in the study were not only fighting hegemonic ideologies but systemic structures since education was used by the apartheid government to widen the financial gap between white and black people. Limited education was equivalent to a minimal access to financial resources. From the participants, six women reported that they went to government schools, three reported going to semi-private schools and one woman went to both public and private schools. While some of the participants may have undergone their formal training in the post-apartheid period, it is important to recognize that the education system at the end of the apartheid era remained racially fragmented (Engelbrecht, 2006). In the post-apartheid period, the effects are still felt and evident as the fight for inclusivity from the basic education level all the way to the academy continues (Chisholm, 2012; Engelbrecht, 2006).

As they continued to speak about their schooling, six of the participants indicated that they had to move from under resourced working-class township or rural government schools to private

or historically white schools in the later parts of their schooling before their tertiary education. However, this move was not particularly easy as it presented other implications as a result of the segregation along geographical lines (Christie & Collins, 1982). Through the Promotion of Bantu Self-Government Act of 1959, Africans were systematically removed from urban and "white" areas to the "homelands" where they could exercise limited political rights (Cochrane, 1975). Therefore, it is important to note that some of the participants did not only change schools but had to commute between segregated communities where they lived and the areas that they were lawfully forbidden or limited access to. This is particularly important for the data as it shows how some of the women permeated these boundaries thus allowing them to have access to certain resources and perhaps shaping their narratives as black women from mostly low-income households navigating a space that was unfamiliar to them. This suggests that there was a level of permeability that participants were able to exploit in late apartheid.

> *…so Standard 4 then I went to the farm school and then Standard 5 I came back to the township to another school and then um...what do you call it...? Grade... Standard 6. I went to high school in town, but it was these private schools. Somebody started a private school and then I went to that school...um...and then yah...I finished my high school there. Reitumetse*
>
> *I went to St Mathews in Rockville. So, the way that it was back then it's um...it's a semi-private primary school because it was subsidized by the government, so they had to pay right around R500 a year or something. So, ja, that's where I went to school from Grade R all the way to matric. Lesedi*
>
> *So, it's quite interesting. So, I went to St Barnabas which is a school which was funded through Anglo-American and mostly through the international… So, it was*

basically a stance against apartheid by providing private school education for non-whites so that was the focus of the school... Jamie

All three accounts by Lesedi, Reitumetse and Jamie, suggest that their early schooling had some mix between public and private schooling. This suggests a common protective feature against the relatively poor outcomes of state sponsored black education. Moses, van der Berg and Rich (2017) argue that former black schools typically suffer from poor management and produce poor cognitive outcomes; factors which are poorly rewarded in the labour market and often resulting in low wages and poor job opportunities. Through the lens of CRT, we can see how access to education was one of the tools used to maintain white supremacy and privilege (Bennett-deMarrais & LeCompte, 1998). Segregation across racial lines was used to limit access to adequate schooling for the black population thus ensuring that white monopoly continues to hold power over their black subordinates. By virtue of being able to cross this divide and have access to private or semi-private education, the women in the study were already challenging the hegemonic belief pertaining to the access of education for the black population.

Private school education can also be seen as having presented a foreshadowing of some of the experiences that the women were to encounter later within the academy. In relation to matters of the demographics of both the learners and the teachers in these schools, it seems that the demographic profile of the teachers mimicked what they would encounter at university.

It was 1 or 2...primary school I think ja first. Mostly white...1 or 2 black... I don't remember any Indian teachers. In high school there was 1 or 2 Indian, 1 or 2 black mostly white again. yah. Fatima

Researcher: "...I mean you went to public schools so I'm guessing the demographics of the teachers were pretty much all black...?"

Bonolo: "Hundred percent correct"

Once again, we can see that there are marked differences due to the varying structure of the education system. The excerpts above indicate how private/Model C schools had more white teachers as compared to the public schools that had more black teachers. This can be seen in how participants like Jamie and Fatima were exposed to private schooling and were mostly taught by white teachers while participants like Bonolo who stayed within the public-school system only had black teachers.

Through the lens of habitus, we observe how the women's move to private schools that were mostly in town may have started to expand their social and cultural capital. This would be useful for the coming years as they entered the academy. The move appears to have been the starting point of exposure to meaningful interactions across racial, geographic, and class differences in relation to peers and teachers. Therefore, this may have been the start of their adjustment to a world that presented them with different rules and ways of living to those that they were initially socialized into. For example, when we consider Jamie and Reitumetse's accounts, they note that their private schools were in town. This suggests that that they were moving between two worlds and thus had to navigate these places in different ways as the rules of engagement and the ways of being are different. Therefore, we can see how private/Model C schools as a field, may have been a place where the participants first started learning, internalising and mimicking "acceptable" behaviour from the members of those spaces along with values and social norms of the field that they did not originally belong to (Reay, 2015). Additionally, these experiences of private or hybrid public/private education along with some of the participants whose parents were teachers, may have prepared them or acted as a protective factor for the current white masculine field in which they are now located.

From the above, one of the questions that arises is whether the experiences of the women in the study allowed them enough social and cultural capital to survive in the university space. Moreso as the data shows that only one of the participants studied at a historically black university; six studied at historically white universities; two studied at history black universities for their undergraduate degrees and went on to study further at historically white universities. A potential weakness in my data is that it is unclear where one of the participants completed their studies. The data highlights that the women in the study were breaking barriers long before they were academics. Given that most of them attended historically white universities where they were enrolled for science and engineering degrees, we can see how they continued to challenge to hegemonic beliefs pertaining to black women in education. However, it is important to note that for some of them, the demographics that they were met with at a university level mimicked those from their high school years. For others, this was their first encounter with such a skewed representation.

> *The University of Zululand is a black university. It is a very black university. The student body is entirely black and at the time, majority of the lectures were graduates from Potchefstroom University. My lecturers were mostly white and predominately Afrikaner…in fact, I only had one black lecturer during my Bsc Degree. Ntombizodwa*
>
> *…for geology there were a lot more men than women and especially when I was doing my undergrad. In the school of geo-science there were more Caucasian students than African students which is the opposite in the school of mining. In terms of the lecturers, we had a good spread of female and male… Lesedi*
>
> *So, I'll go back to when I was doing my undergraduate; there were only white lecturers. There were no Indians and there was no one else of any other race when I was at the University of Natal. When I came here, and I started off in this department,*

majority of the academics were white. My supervisor was a white man and initially I found talking to him quite difficult, but he was a very open, welcoming and supportive person. Nicole

The excerpts above provide a sense of some of the experiences that the participants encountered as students at university. The data suggests that the women mostly had white male lecturers regardless of whether they studied at historically black or white universities. Lesedi's account expands the conversation as it indicates that most of her peers where black. Furthermore, Nicole's perspective provides insight on her experience as a woman who went to a historically black university for her undergrad and then proceeded to further her postgraduate studies at a historically white university. Once again, the women show how even at university they experienced the academic space as masculine and white. The demographics of both students and lecturers at university suggest that their respective universities acted as another steppingstone in gaining/learning valued traits in the academy that subsequently aided their survival in the academy in their roles as academics. We can see specific departments being dominated by white men while others were dominated by black students; thus reflecting the historical context of South Africa's history. However, this is not say that the transition to university was smooth and without challenges.

This theme tracked the earliest experiences of the participants by looking at the socioeconomic context in which they were raised, what their parents did for work, the types of schools they attended and their experiences as university students. The data showed that despite the fact that the majority of the participants grew up in working class households and held jobs that fit somewhat neatly into the structure of apartheid stratification, they were still encouraged to engage in academic pursuits. This suggests that their home environments through the value of education set out behaviours of what was expected and acceptable in their homes and delineated this from what was unacceptable. In their narratives, the women showed how they

internalised these valued traits and adopted them through various actions. There appear to be several factors that acted as protective factors that may have prepared the participants for the university space. Some of these factors include: some had parents that were teachers, some had parents that particularly emphasised the value of education, some attended Model C/private schools prior to enrolling at universities. Here, it was important to recognise the opportunities enabled by the transition period from apartheid to democracy since most participants attended school in this period of dynamic change and possibility. Thus, all these experiences not only acted as protective factors but also allowed the participants to gain and learn valued traits and acceptable ways of being in spaces that were either white and/or masculine in nature. Moreover, the experiences of the women also showed that from early on in life they were challenging hegemonic standpoints of black women in education and pursuing careers that were not the norm. In attempting to answer whether the participants are trespassers or not, it may seem that they were trespassers in some areas but they were also shielded and gained some cultural capital that enabled them to navigate this foreign space in many ways.

4.2 University life: "Permanent Scars on my body"

In this theme, I move from the earlier temporality of participants' lives in order to consider the stories that participants told about their lives at university as academics. When talking about their experiences as academics and as scientists in the STEM fields, the women mainly narrated the various forms of abuse, racism and micro-aggressions that appear endemic to the academic field. They showed how these experiences often lead to feelings of isolation, lack of support and placed limitations on the various roles that they hold or want to venture into.

When narrating their experiences in academia, the women in the study painted a picture of their habituation and how they often experienced acts of racism, sexism, disrespect and various forms of abuse. Five of the women in the study shared that they were either the first black

women to become lecturers in their departments or in their school at large. On the other hand, for the schools that already had women academics, the women were often white.

> *When I was hired I was told during my welcome party that I was the first black South African - not female, just the first black South African to work, to be a lecturer, to be an academic in this department. This department is close to a 100 years old. So, it is those firsts that you hear and you are just like: "why are you even saying this?" Ntombizodwa*

> *When I started there were very few black males actually... very few...I was the only black female lecturer. I don't even remember if there was any...there were mostly white males and then a few white female lecturers so yah. Fezeka*

> *It's been really challenging. When I first came here and I realised that in the department I was probably... I was the youngest and it was completely majority male dominant, older fifties and I just felt, it's very difficult to relate or to latch onto someone or kind of find someone... Priyashni*

Both Ntombizodwa and Fezeka's narratives flag their introduction into the field as academics. The pair highlighted how they were the first black women in their departments and further show how at the time, there were also fewer black men. Priyashni's account highlights how being the youngest in her department surrounded by mostly white men in their fifties shaped her experience in academia. The experiences of being the only one or the first are not surprising as white men were previously seen as the rightful occupants in academia (Alexander-Floyd, 2015). Currently, despite the increase of women academics in the sciences, they are still outnumbered by their male counterparts especially at the higher levels of these professions (Hill et al., 2013; Floyd, 2021). Bourdieu (1998) argues that spaces are arranged and organised according to the economic and cultural capital of those found within the space. The cultural

and economic capital are what influences what constitutes appropriate behaviour within the space (Bourdieu, 1998). Based on the experiences articulated by the women, it is fair to suggest that the culture in the STEM fields is arranged in a manner that accommodates a white and masculine character which may not be suitable for the women in the study since they are women and black. Furthermore, this suggests that the men in these fields have already set the tone for what is acceptable and what is not. Therefore, anyone who comes into the field will have to adhere to these unwritten rules or stand the risk of not being accepted or being an outcast.

Honing further on the women's experiences within the various disciplines, one participant noted that she has noticed some change in the demographics of her school where there appears to be an increase in the number of black women as a result of the various transformation initiatives. However, other participants noted that while there are more black women and men entering the departments, most of them are found at administrative and junior levels where they do not have "power" or a "voice" to make "significant" change or contributions.

> *It was largely white but then I think slowly it's sort of transforming even though the transformation is so minimal in a sense that many times when we get people that are being hired there will be at the lower scale you see maybe your what do you call this…? Associate lecturers so they don't really have a voice or a say. So, the guys who really make decisions would still be white. Bonolo*

> *It's still predominantly white. I mean it's very evident. We do have, you know, a board with the pictures of the different academics. If you go and look at that picture board you know...It's there. What we find... So far um what's been the case is that the majority of the academics, so the people who are employed as lecturers, senior*

lecturers etc. are mostly white. I find that the technicians, the tutors and the TAs are mostly black. Nicole

The women went on to describe some of the challenges they face as a result of the above mentioned factors emanating from working in spaces that are white and dominated by men. These pertain to matters of isolation, lack of support and puts limitations on their pursuit of advancement opportunities (Mahabeer et al., 2018).

4.2.1 Isolation

When asked on their experiences in academia, all ten of the women observed that academia was very isolating for them. Five of the women in the study came into academia after working in industry or are significantly involved with the industry where projects are managed in groups and there are more interactions between them and their colleagues. They juxtaposed their industry experience to their experience of working at the university. According to the women, the isolating nature of academia appears to limit access to information, support, funding and resources. Furthermore, the women indicated that the lack of support often occurs at three levels of interaction; lack of support between colleagues, from their superiors and at the greater university level.

Firstly, academia is very isolating. For example, my neighbour "Prof B" from across the hall from me is a very interesting person. However, sometimes one does not even know what the people closest to you are working on. I'm using the example of "Prof B" because he is the person that sometimes walks over to your office or he will call you to have a chat with him. The reality is that we are all working in silos so it is incredibly lonely. Ntombizodwa

Ntombizodwa's account paints a picture of the extent of the isolation. She identifies the lack of interactions between academics and observes that sometimes they do not know each other on a personal level. In addition, they often do not know what projects or research others are working on. Below, Priyashni narrates her habituation in relation to what was initially an isolating environment. Reitumetse explicates the individual style of work in the academy and Fezeka shares her strategies of breaking the isolation.

> *I felt that it was a lot more difficult starting off but I think overtime I got accustomed to the nature of academia. It is kind of...it's kind of your own journey to some extent so it's very isolated. You do your work and you get on with it whereas in industry, it was a lot of group work where multiple disciplines became involved. It has been quite a change for me. Priyashni*

> *I think people here... Everyone works independently. But, I guess that's how it should be. If I want to focus on a particular research area, I have to go there and find those people who are doing that type of research that I am. Reitumetse*

> *I've tried to push the type of projects that are multidisciplinary so that I don't work in isolation. I give more benefit to industry because I am looking at projects or work that can be done in different ways. Alternatively, if you are just doing a hydro-metallurgy related project, because it is very isolating, and for students I think it's worse because they are going to be focusing on a particular aspect of a project and that's the only thing they do and they can be isolated unless if you put them in a group… Fezeka*

The four preceding narrative accounts all engage how the women in the study have found academia in the STEM related fields to be isolating. Applying Bourdieu and Wacquant's (1992) concept of field to consider these women's accounts of isolation, we might suggest that the STEM academic disciplines are a lonely field that values isolation, single minded focus,

and an aloof attitude normally associated with a masculine habitus. These attributes might be juxtaposed to warmth, empathy, relation, and team-based collegiality typically associated with a feminine habitus. In addition, since fields of practice are historical and objective relations invested with power, those best poised to succeed in a field are those vested with power in the confluence of historical relations. The science or STEM academic 'field' might therefore be read as gendered in favour of a masculine habitus. Moreover, given the masculine, raced and classed foundations of the academic field, men academics might not even experience the STEM field as isolating.

However, it is important to note the differences in how the participants speak of the isolation. For instance, Priyashni illustrates how women might become habituated to isolated fields. Consequently, while she initially struggled to adjust to the academic field, with time and work, she was able to create a more bearable habituation to the field. The narratives represent some of the strategies they have employed to counter some of the difficulties they encounter due to the isolation. Prior to becoming academics, some of the women started by working in industry where they more easily engaged and shared ideas with others. This cohort of women like Fezeka has been able to maintain some links with industry and adopted some strategies for more collaborative work. Industry experience outside the university is therefore used to break some of the loneliness that has been normalised in the STEM disciplines of the academic field. In addition, those like Fezeka have deliberately cultivated interdisciplinary projects and relationships to break the affective and epistemic isolation of the academy. To counter the lack of disciplinary interaction in the academic field, Fezeka works on projects that require a multidisciplinary team. The accounts by Ntombizodwa, Reitumetse and Fezeka show how the women manoeuvre to make things easier for themselves. Here, we see that to combat the experiences of isolation, the women actively seek companionship by being intentional in their interactions and by being strategic in the various projects that they choose to engage in.

4.2.2 Support

While some of the women seem to have found ways to cope within an academic field whose histories and conditions was not built with them in mind (Puwar, 2004), others spoke about how isolation can lead or contribute to whether they feel supported or not. All ten of the women narrated stories of support. Some of the women indicated that the level of support they receive is often dependent on the department and school one is in or who the Head of School is. Different department heads have different goals and interests. This suggests that the level of support offered is often dependent on what they consider to be important during their tenure.

> *But that's the only issue that I have and then with respect to support; I don't know… It depends on each school I guess. Here we have an MQA development fund. The fund is for when we want to attend different courses and allows us to continue improving ourselves, study further and improve our teaching. Lesedi*

> *I'll be very honest. When my previous Head of School was in place, I felt that I had less support and I'm not sure what the reason was. But, it seems that maybe her vision for teaching and learning was different from the Head of School that she replaced when she came in. This is not the same person that is Head of School now, it was someone else. Um so, I feel that my growth as an academic was stunted during that time. Nicole*

> *I was offered a mentor. The Head of School actually offered to mentor me through the process and I mean she did a very good job in doing that. But, sometimes you need somebody that you can relate to not only in the work environment but also on a personal level and that was kind of not there… Mathapelo*

The women's accounts highlight the importance of academic leadership in providing an enabling environment. The experience of whether or not one feels supported can be influenced

by the school that they are in and the primary goals of the Head of the School. Lesedi's narrative suggests that her school has programmes that encourage staff development and allow them to study further. In that way, she feels supported by her department. She goes on to emphasise her awareness that not all academics in STEM related fields are awarded the same privileges. We can assume that her knowledge is from interactions with other black women. This is nevertheless her experience. Nicole and Mathapelo's accounts further highlight how different experiences of support can be dependent on one's superiors and personal needs. Nicole's account illuminates the varying experiences that she had under different leadership. On the one hand she felt as though she was not supported by her previous head due to the areas that they decided to focus on. In the same breadth she currently feels supported as the Head of School has changed along with the systems and strategies implemented to support to the staff. Furthermore, Mathapelo indicates that her Head of School offered her mentorship however, due to external factors, she felt as though the support was limited.

As indicated above, the STEM disciplines appear to value isolation and a detached attitude that is often associated with a masculine habitus while the feminine habitus is mostly associated with relational and team-based collegiality. Thus, for one to survive and thrive in the field, they need to maintain and retain power through exhibiting the aloof and detached character as opposed to the risk of appearing weak through seeking support. In continuing with their narratives in the excerpts below, the women spoke to the different areas in which they experienced a lack of support and the strategies they have employed to create a bearable and productive habituation. This cast light on how they negotiate the raced and patriarchal nature of their disciplines. The accounts show how the lack of support extends beyond the aspects of staff development, funding and research to the very basic duties of an academic - teaching.

Uh what you notice with academia is that we sort of get thrown into the deep end and you are expected to swim… Not enough information is being shared or is in the forefront, in the open. Most of the things that are supposed to be in the open are not. I can give you an example, let's say you are given a course to teach, the only thing that you will be given will be the name of the course that you are going to teach and that's pretty much about it, you see…? And then they'll probably indicate the number of things you'll need to prepare; you need a course brief, blah blah blah you know... Bonolo

No support. Nothing! Nothing at all and I know that I started with somebody else, another lady who was white and she got a bit more support. She was given a mentor, some sort of mentor, but I... I got nothing. I was just told you are going to be teaching… Apparently the school doesn't really have a policy of mentorship so I've never really had a formal mentor. The only way that I can say that I got mentorship was having some people that I looked up to, that I thought would guide me and assist me. So, I would sit with them, and I must say actually that I had a very nice guy who was white you know. Fezeka

So, when I came, I asked outright for one I was told: "oh no! In this school we don't have a mentoring program" but you know… you are awake. You're not sleeping on the job. I could see that other junior staff members were actually getting mentorship. It's this thing of its informal, it's like when all your colleagues are at a braai and you weren't invited because they hate you and this has nothing to do with work yet they are talking about work; discussing grants and partnerships and… Ntombizodwa

So I've had a really amazing supportive structure but it hasn't been from the University and I mean I'm talking about a wide range. From Oxford to the

Netherlands to Australia and all of them I have on speed dial. That for me has been a way to get out of the pit that you get put in. Jamie

Bonolo is one of two of the women who gave accounts of how, when they started lecturing, they were not provided with any materials, tools or support on what they needed to teach and what elements are considered important. Fezeka's narrative raises the question of inequitable treatment in relation to the concept of mentorship as part of the support offered to academics and how her white counterparts received mentorship while she did. Ntombizodwa highlighted how navigating the issue of mentorship can be difficult as it is often not formalised and therefore difficult to label as unfair treatment. Additionally, Jamie's account highlights how as a result of the lack of support experienced, the participants rely on loose networks sources beyond their departments, schools and the university for support (Hassim, 2005). While Mahabeer et al. (2018), argue that South Africa has made attempts at ensuring that "space invaders" make a smooth transition into the new spaces that they now occupy through diversity and equity initiatives, Ahmed (2007) suggests that these efforts often lack commitment thus contributing to why women and minority groups are met with challenges within these spaces. Furthermore, Maodzwa-Taruvinga and Divala (2014) argue that black South African women are in fact not given adequate support and not taken seriously as knowledge producers in academia. Thus, as a result of poor institutional support, peer support and informal networks have come to signify a crucial strategy for the women striving for survival within academia (Macoun & Miller, 2014).

As noted above, the women have made connections with those in industry either by having worked there themselves, consulting, or through the people they know. In that way, they have been able to maintain and maximise on these relationships to allow them to make the unsupportive habitus of academia more bearable. We might propose that some of the experiences they have had such as having parents that were teachers, going to Model C/private

schools, engaging with a diverse range of peers during their time as students, increased their social and cultural capital which they can sometimes draw from now as academics. However, it is also important to note that most of the women's support networks are external to the university which may not necessarily be as beneficial as having networks within the university for better support and upward mobility (Mohope, 2014). In their paper on black women academics in the UK, Wright et al. (2007) show how white women who have contacts within the university are trained and received opportunities that fast-tracked their progress in their respective departments particularly as men dominate editorial boards and research committee. Bearing in mind that the participants are black women habituated in a white and masculine dominated field, the accounts of Ntombizodwa and Fezeka can be understood through a combination of social capital and intersectionality with a focus on gender and race.

One of the notorious performances of masculinity in male dominated spaces is through forming what is colloquially known as a "boys' club". Scholars such as Fisher (2011), Kantola (2008) and van den Brink and Benschop (2012) report that the phenomenon is endemic to academia. These clubs are used to maintain power, dominance and masculinities over women in academia (Knights & Tullberg, 2012). They do this in a manner that is covert and presented as harmless social interactions (Fisher & Kinsey, 2014). This is highlighted by Ntombizodwa's account of her career. Research by Pesonen et al. (2009) and, van den Brink and Benschop (2012) has found that social networks are important for the facilitation of adjustment, opportunities, and advancement in the academy. Segregated social networks often pose negative consequences for the women that are excluded (Canham and Maier, 2020). This suggests that the women may be excluded from these social gatherings on the basis of gender and race or the lack of social capital. They are excluded for not having the valued traits of being gendered as men and as white. In Puwar's (2004) formulation, they are not the somatic norm of STEM fields. Boys

clubs thrive on making it difficult for others to enter. Furthermore, Crenshaw (1991) and Johnson (2013) show how even within the same group of people, there could be differing experiences of the same challenge. Based on Fezeka's account, we observe that the women experience challenges based on racial prejudice. Fezeka illustrates how she and her white counterpart started working at the same time. However, her white counterpart received mentorship while she did not. Despite both parties being women, they received different benefits and we can infer that this was on the basis of race. The same can be suggested for Ntombizodwa's case where it can be inferred that some women may have access to the exclusive "boys' club" on account of their race. Here, white women may obtain limited access while black women are often overlooked from participating in informal social spaces. In her auto-ethnographic study, Mohope (2014) illustrates that while there may be women who could offer mentorship to other women in academia, they too are often swamped with meeting the expectations set out in the field. They often do not have the capacity to carry out an additional role of mentorship.

We can understand that to a large extent, the women academics represented here have less in common with their counterparts in the field as they are in the minority from the standpoint of gender and race. Given that the sciences have historically been dominated by white men, the valued capital would mostly be masculine and white in character. In this way we observe how race and gender mediate access to support along with other and how other experiences contribute to experiences of isolation of black women academics.

It is also worth noting that when talking about support and mentorship, some of the participants noted that things are changing from how they used to be when they first entered their respective departments and that others were in fact at the forefront of this change. The participants noted

a change in how the new cohort of lecturers are better supported, mentored and perhaps even given more opportunities. While some women attributed the change to their own efforts, others also shared that this comes as a result of the university's transformation mandate that the university has embarked on. Mathapelo's excerpt below illustrates that the university has made means of supporting academics and their development while Ntombizodwa shows that she was in the forefront of ensuring that there are formalised mentoring programs in her department.

> *I think it's gradually becoming more supportive. I mean, I'm looking at people that are actually coming in now and they are far much better supported than when I came in. Apart from that, the university has structures on areas that you can go for support whether in terms of developing your teaching skills or in terms of research skills. I think the university has actually moved quite a lot from when I started. Mathapelo*

> *We have a different head of school now and he listened to my cries because I literally worked years for us to have a mentoring program in this school and thankfully we actually have that now and it is formalized. Ntombizodwa*

Using CRT, we can see how the actions of women like Ntombizodwa have challenged the hegemonic belief of loose networks that tend to exist in predominantly male spaces through practices such as "boys' clubs". By formalising such structures, the women have limited the reliance on social capital to access support systems within the university and their departments for both men and women. They have attempted to level the playing field by ensuring that one does not need to present any desirable qualities to receive support but rather that everyone is treated equally despite their gender and race. By so doing, they counter the field's nature of isolation and aloofness and create space for women academics to interact with others in their field. Thus we can see that the presence of the women in the STEM fields appears to be creating some change not only for upcoming black women academics but all academics.

4.2.3 Multiple demands on women's time

With reference to their experience in academia, the participants observed that being academics is not the only role that they play. They emphasised that they have other roles and areas of interest that they would like to pursue, however, their role as academics often limits them in pursuing said ventures. Five of the women shared how the lack of work-life balance in the field takes away from their other roles and responsibilities. Historically white institutions are notorious for cultures that make extensive demands for excellence in teaching and research (Acker, 1997; Nixon, 1996). The women shared the difficulties of the experiences but some also surfaced the strategies they have implemented to ensure that they do not only focus on being academics but also on other roles that are important to them.

> *I'm a mother so I have certain responsibilities. When working, it's difficult to balance those two. I mean, every day I miss my kid when I'm at work. My heart is in one place but I also want to do this because I enjoy my research. I love my job and get torn between these two quite easily. I think that's more difficult as a female than it is as a male. Your male colleagues maybe don't understand certain things about the female perspective. I mean, they set meetings sometimes for like 06:30 in the morning. For me to get to work at 06:30am when I have a baby at home is really difficult. They don't understand all the things I have to do in the morning before I get here obviously because they are not in that sort of position. Fatima*

> *What is challenging about being a woman is that despite the field you are in, you still need to do so many other things other than just focusing on your career. So, for women to grow in their careers, it takes them a lot longer because of the fact that you need to be a mother and still do this. It does not fast track their progress in their careers. So, as a result you find that women don't necessarily get promoted as quickly*

or as fast as their male counterparts would. Be it for blacks or white you see...? So that is the reality that women face unfortunately. Bonolo

The preceding accounts illuminate some of the practices that make a healthy work-life balance difficult for some of the participants. Fatima's account shows how the institutional culture and the masculine nature of the field makes it difficult for her to be juggle being a mother and an academic. In her account she highlights her belief that the men in her department do not understand or consider how certain practices in the department may be a hindrance to women. Other scholars on the experiences of black women such as Mohope (2014), Mokhele (2013) and Henry & Glenn (2009) have also noted how black women often have to sacrifice their domestic duties to meet their academic responsibilities. Furthermore, Mokhele (2013), shares that women have much more family and care duties which they need to attend to as compared to their male counterparts.

Bonolo shares similar sentiments and makes the observation that the field of academia is demanding on one's personal life and makes little to no room for one to adequately fulfil other roles and activities that they want. Bonolo's account further explores the difference in how men appear to progress faster in the academia as compared to women. These accounts point to the complexities of women's intersecting identities. The participants in the study are black women living in a deeply patriarchal society with traditional beliefs about the role of women (Coetzee, 2001). This means that there are other roles that are unique to black women living in South Africa that they may need attend to or pursue that their black men or white women counterparts do not need to adhere to.

At its core, patriarchy and some traditional ways of being are meant to keep men in positions of power while ensuring that women remain subordinates that are dependent on men. Consequently, black women in South Africa experience oppression from a patriarchal African

culture (Henry and Glenn 2009). Therefore, the intersection of their race and gender, coupled with their context presents unique challenges pertaining to upholding certain roles while also facing the challenges that come with being black women academics. Albertyn (2009) argues that women are faced with great contestation as they challenge the picture of what patriarchy has deemed as the rightful place for a woman. Not only do they face this challenge but they also have to deal with the resistance that comes from fighting the hegemonic practices of culture and tradition.

Men are the beneficiaries of patriarchy and can be inconsiderate about the needs of their women peers. For instance, Fatima complained about early morning meetings called by men without childrearing demands. In her reflection of her journey in academia as a black woman who was also a wife and a mother, Msimanga (2014) provides an account of the challenges she experienced and how she negotiated between her family and the academy. She explicates the difficulties of navigating culture and what was expected of her as a Ndebele woman with children while also trying to meet the chronological and fast paced expectations of the academy. This supports the assertions of participants who contended that black women constantly need to negotiate and manoeuvre through the field of academia.

> *On a physical level I'm not very feminine I just...I'm very open to what I wear and how I look. The problem I foresee coming for me is when I do have a family and the challenges that it's going to pose because I'm not going to be wanting to stay past four o'clock. God forbid! I want to be going home to pick up my kids from creche or so on and so forth. I will probably want a lighter working load or teaching load and how is the school going to accommodate me in that way? I don't know if that has been done as yet... And I say that because we had a colleague that has given birth right... I don't think those types of discussions have taken place and they need to. I don't think academics are very mindful of one's time and space. They send emails and they*

expect you to have a reply like yesterday and I keep telling my colleagues that my phone is not stapled to my head. Priyashni

Priyashni's sentiments cohere with those of Bonolo and Fatima as she agrees that academia is demanding and that colleagues can sometimes be inconsiderate. She shares her fears of potentially having children while working as a STEM academic. At the core of her fear is that she may struggle in both roles of being a mother and a black woman academic. She therefore worries about the impact that having children might have on her career progression. The women's accounts suggest a forced choice between their careers and being mothers. Priyashni began with a contention that she is not feminine in a way that almost suggests that because she is not feminine, she may be better able to survive the masculine nature of her department. However, the one thing that may be an obstacle in her way is the possibility of her having children.

As already noted, black women academics do not possess valued cultural capital to contribute significantly to what is acceptable behaviour in the academy and in their various STEM department. Therefore, masculine characteristics and whiteness determine what is right and wrong. This is particularly important when we consider the theory of habitus which indicates that individuals often mimic the dominant culture or the valued trait of the space they are in (Reay, 2015). Priyashni therefore suggests that in order for one to thrive and be accepted into academia as a black woman, they may need to align themselves with masculinity. For her, this seems to be achieved in her way of being and how she dresses. Priyashni continues by comparing and contrasting two of her colleagues; one with children and one without.

I have a colleague who is… let me not say a difficult female but she is not married, doesn't have kids and is a senior academic. For me it is not a case of female or male. She just does her job and she is happy. She's not concerned about wanting to have

kids or having those needs addressed whereas I know my younger colleague she's had two kids and now her pressing thing is how am I going to manage my job and my kids. Teaching doesn't end here. There's marking, tests and other things so it's a really difficult thing to balance. I really feel that we need to have more females in the industry, not because it's a quota thing, but because just having their interests and input is valuable and their presence more than anything else um... Priyashni

Once again, we witness how the beliefs of the dominant ideologies shape the experiences of women in academia. In the account above, Priyashni describes a woman academic who has moved up the academic ladder to a senior position but also shares that said academic is not married and does not have nor does she want children. She further suggests that for one to thrive and succeed as an academic, you need to follow the roles set out by the dominant culture. She also subtly described her as cold which is something that is often attributed to masculinity as juxtaposed with softness as presented by femininity. Thus, it almost suggests that she had to distance herself from wanting children and marriage in order to fit into a masculine work environment. Once again suggesting the alignment to masculinity and the performance of what is accepted and valued in the academic field. On the other hand, Priyashni's second colleague with children suggests that those with children fail to assimilate and mimic the actions of the men and are consequently left with their needs unmet. In addition, they experience limited career progression. This is a significant concern as black women academics are deemed to not have benefitted like white women from the gender initiatives with regards to pay and promotions (Mahabeer et al., 2018; Mohope 2014).

This theme explored the narrative accounts of women in their roles as academics in STEM disciplines at the university. In their accounts, they reflected how they are often faced with various challenges that are both gendered and racialized. These challenges appear to be rooted in the dominant belief that whiteness and masculinity are the rightful occupants of the STEM

disciplines. The women started out by mapping the demographics of the field that they are working in and they indicated that it is dominated by white older men and black women are in the minority. Black women are often at the lower ranks of the academic chain and in the administration where they work as support staff. The culture and practices in the STEM fields often lead women to experience feelings of isolation which in turn limits access to information, resources, funding and support. When speaking of support, they showed how it is inaccessible at multiple levels of the university ranging from the departmental level to the greater university level. However, they also noted that their counterparts often receive support such as informal mentorship but it is often conducted through closed doors. Lastly, in storying their lives, the women narrated how the demands of academia often limit them from pursuing other interests and roles such as mothering and how one needs to adopt a masculine character in order to thrive in the academy.

4.3 Creating new futures: "The Future has got to be different"

Following the frame of narrative research, this theme unpacks the final part in the sequence which focuses on the future that the participants hope for. Of the ten women interviewed, all of them seem to be of the view that the future must be different to what it currently is. In addition, it appears that they are of the belief that there is hope for that change. In their hope, they highlighted areas that need attention as they would be the driving force towards the desired change. Some of the areas highlighted include matters relating to funding and finances both for students and for staff, curriculum changes and the need for more black women academics.

4.3.1 Epistemic rupture and pedagogy

When looking towards the future and what changes are needed, academics such as Priyashni and Reitumetse alluded to the need to explore the way STEM related courses are viewed, studied, and taught. Reitumetse and Priyashni spoke of their experiences and observations of

how institutions of higher learning in other countries attend to these courses. They are of the view that there is a gap in South African universities that does not allow for progress and encouragement of women to pursue careers in STEM. In addition, this appears to be related to matters already highlighted such as funding, mentorship, and different people's needs exacerbated by their financial standing or socio-economic status. From the narratives presented below, it can be concluded that some academics are of the view that the way research in particular is viewed needs to change to allow for a new appreciation not only for women but the greater South African population.

> *I think I would really like to see the industry grow in terms of research for anyone joining in and having a vested interest in it because there is a real gap. For example, when I was overseas in Switzerland and India, there was this yearning for knowledge whereas in South Africa the goal is to get a piece of paper, make money and live a big lifestyle. I hope that soon things would change because in that way it will also encourage more people to come into the field. In that way, things like how we accommodate women, their needs, and their demands will be addressed. If there are no women in the field, we cannot address their needs because we do not know what the needs are. Priyashni*

> *There is a research school that I attended in Angola. I believe it was at that research school that I saw that there are a lot of gaps in the courses on offer to be able to do research… if I am to stay here for some time, I think those are the gaps that we need to close so that research can happen in a more meaningful and impactful manner… I feel like the courses on offer are not built in such a way that they form a comprehensible story about Mathematics, nor do they have a focused goal for which we want to produce quality research for. Reitumetse*

> *It is important to continually interact with students over the years because the needs of the cohort change. The cohorts in themselves change so you need to understand what kind of context they are coming in from. For instance, recent documents provided by the faculty of science recently highlighted that we have a high percentage of second language students in the sciences. So, we must understand how teaching and learning needs to transform to help those students as well. Things are not the way they were ten years ago in terms of the demographics of our student body so if our teaching is the same as it was ten years ago that is problematic as it is not necessarily meeting the needs of the cohort. Nicole*

While not directly the same, the statement by Nicole heightens the sentiments conveyed by Priyashni and Reitumetse and goes to the heart of this research. The statement speaks to a greater need for transformation within STEM related fields to accommodate the various demographics of students found in the field on matters that speak to their intersecting identities. Furthermore, it is important to note the comparisons of the South African education system to that of other countries. Both Reitumetse and Priyashni mentioned gaps in in how STEM related fields are taught, studied and applied. The call here seems to be for a curriculum that is relevant, applicable and relatable. The participants imagine these possibilities for a different future based on their own experiences of navigating the academy as students and as academics.

As already mentioned, CRT views education as a structure that helps the dominant group, men, to maintain their power (Adams et al., 2017). The low retention of women students and academics coupled with the ratio of men to women in the sciences further suggests that the existing structures are not made to accommodate and retain women at both a student and professional level within the South African academy. Therefore, by hoping and making the call for curriculum transformation and methods of teaching, the women are in fact continuing to challenge structures that simultaneously embrace the exclusion and marginalisation of black

women thus making it permissible for men to continue being the dominant group and determining the nature and character of the science field.

By making a call for a curriculum that does not only acknowledge the political and socioeconomic realities of post-apartheid South African but one that caters and accommodates the cohort that it is presented with beyond the basis of race, gender, socioeconomic status and other identity markers goes beyond the bounds of dismantling male dominance in academia (Tella, 2020). This is a call that extends to the global world that appears to reward and value western knowledge production which promotes western epistemic hegemony. South African universities also play into this as they are seen to be reproducing colonial, Eurocentric and apartheid designs through hyper-representation of western scholarship and white academics (Tella, 2020). Promoting curriculum transformation thus promotes African scholarship and places value on African knowledge production.

4.3.2 The need for more women academics in science

When imagining the future, the participants spoke of how more women are needed in academia. Thus, the field needs to make more room for women and make the requisite changes that will ensure that they are supported. It appears that in order to do this, representation and mentorship are deemed to be important, not only in attracting more women to the field, but also in ensuring that they stay.

> *I hope that in the near future, things will change as that will encourage more people to come into the field. That way, things like how do we accommodate women, their needs, and their demands will be addressed. If there are no women in the field, we cannot address their needs as we do not know what their needs are… I really feel like we need to get people into academia. I'd love to have more females especially in my department. Priyashni*

For me, the future should be us encouraging more black South Africans to be in academia. They often become discouraged by the salary, treatment, and other challenges that they face, thus, end up going to industry especially in my discipline. Bonolo

I teach first years and I think that it is nice for them to see that they can also teach. I didn't know that I could teach and had it not been for my supervisor asking me if I wanted to pursue a Masters degree I would not have done it. I thought teaching was for special and smart people. I never thought that I could do it too. So, for them to see that it is possible, leads to a possible career path for them. Reitumetse

As indicated above, the call for more women to join the field, is also a call for women's representation in science. For women like Reitumetse, this is to say that the more black women are seen in academia, the more the field will become attractive to other black women. As noted above and in Bonolo's preceding account, black women academics face challenges of low salaries compared to their counterparts in industry and unfair treatment amongst other challenges; all of which come as a result of the standards set by those with the dominant social, cultural, economic and symbolic capital (Huang, 2019). Habitus would suggest that the call for more women to join the field is suggestive of the need for the STEM fields to be saturated. As indicated, currently the face of academia in relation to STEM fields is white and masculine. Thus the call for more women will ensure that the current state of affairs is altered consequently creating a new field with a new set of rules and valued traits that can also be beneficial and applicable to black women. This can also be seen in Priyashini's account as she suggests that the increase in the number of black women academics will bring about the necessary change needed to ensure that a pathway is created for more women to not only enter the field but to also allow them to embrace all aspects of their lives that they deem significant.

Beyond the role of representation, the increase of black women in academia will also deconstruct the hegemonic belief that white men are the rightful occupants of academia. This suggests that black women also have the ability and capability to succeed in academia as the women in the study have shown and most importantly, counter some of the challenges that the women have noted. The deconstruction of the hegemonic belief and the creation of a new one may also aid in ensuring the upward mobility of black women academics in a way that allows them to infiltrate positions of authority and power to make decisions that will allow for the retention and acceptance of more black women.

When talking of the need for more women in the field, participants highlighted mentorship as another aspect necessary to ensure that black women academics are supported. In relation to the practice of mentorship in academia, the participants referred to their experiences with how mentorship has shaped their careers and how it is currently being practiced or not in their departments. Some went to the extent of showing how they are ensuring that those coming after them do receive mentorship while others are personally providing mentorship to their students and offering them other opportunities to develop in their careers.

> *Maybe for younger black females that are coming on, it would be nice to have a mentor you know I think that's one thing that I didn't benefit from. Fezeka*
>
> *I literally worked tears for us to have a mentoring program in this school and thankfully we now have one and it is formalized. When you're hired as an academic you're assigned a mentor. Obviously I can't guarantee that because we have a mentoring program, everyone is receiving the same quality of mentorship… Ntombizodwa*
>
> *Entirely! I'm quite optimistic when I see some of the students (my students) they are bright um they start off being reticent, I try and build students. So, just as an example*

> *I was at a conference recently and I made my student present his work and he was extremely nervous. He was constantly phoning, checking and practicing and I said present your own work…One of my colleagues presented at the same workshop and she presented her student's work and she came off as amazing and the work was stunning… Here was a student who is inexperienced, young and he got the opportunity to grow whereas the other student only gets their work presented, they don't get the opportunity to grow. Jamie*

In the preceding excerpt, Ntombizodwa's account shows how much she fought to have a formalised mentoring program in her department for incoming academics. While on the other hand, Jamie's account shows how her mentorship reaches down to the students. It is important to recognise how through their efforts, academics such as Ntombizodwa and Jamie are challenging the hegemonic norm and practices of aloofness and detachment through ensuring that there are support structures in place regardless of whether they are for students or for academics. This is also bearing in mind that these are women who were barely mentored if at all nor did they receive adequate support from their respective departments. They are challenging the norm that power needs to be maintained through isolation, not seeking or offering assistance to others and that one needs to possess specific forms of capital to access certain privileges.

In their accounts, the women show how while they are taking strides in correcting and reformulating certain practices and ways of being, there are still some elements that they cannot control. In Ntombizodwa's account, we can see how she contends that despite having fought for the mentorship program in her department, she cannot guarantee that all incoming academics are receiving adequate mentorship. On the other hand, Jamie gives an account of how despite her trying to support her students by affording them certain opportunities, not all the staff members are following the same practice.

When thinking of the future, the women mostly spoke about the hopes and dreams they have for current and future black women academics and some of the strategies that can be implemented. One of the participants, Priyashni, shared that the next step in her life includes having children. However, she quickly went on to speaking about the challenges that this would bring as she would like to stay home with her children for approximately three to four years of which as we have come to learn, would have implications for her career. She went on to highlight her uncertainty of whether she would come back to academia or go back to industry given the lack of work-life balance and all other expectations placed on women academics. Through her narrative, we can see how the patriarchal habituation of the sciences and academia limits women academics in embracing other roles that they may already have or want to have. We can also see how the character of the field and the hegemonic belief concerning childrearing may have women considering multiple factors including their careers in their decision to have children; an exercise that their man counterparts may relatively have the privilege to negate.

> *I always joked that I want to do a PhD, have kids and that's it... And, I know in my mind that I would be bored silly but I'm the type of person that if I do have kids, I will take time off, three to four years, to be with my kids and then I will come back. Whether I come back into academia or go back into industry I don't know…Priyashni*

In following the narrative framework, this theme moved from the experiences of the women within the academy and honed in on their hopes for the future for themselves and the women that will come after them. In their narratives, the women indicated that the future needs to be different from the current state of affairs. They highlighted two areas in which they believe significant change can be made to ensure the retention of black women in academia starting from a student level all the way through to academia. The women noted that black women students often struggle to meet the financial burden of entering and staying in university more so for first-generation students. They showed how this limits the throughput of black students

as some encounter financial exclusions or acquire increased debt. Furthermore, they showed how for academics, low salaries are often an area of concern. As a result, some black women opt for industry roles as opposed to staying in academia. The second element that the women spoke to was the need for more black women in academia as they are of the view that the presence of more black women will allow for structural and cultural changes that may be beneficial for all parties functioning in the field of academia.

This chapter reported on the findings that emerged from the process of analysis by exploring three major themes. The first theme titled "we struggled for everything" highlighted the participant's early lives including the socioeconomic backgrounds they grew up in, the types of schools they attended and the kind of jobs that their parents held; all of which appear to have influenced their choice of careers and either increased or limited their social and cultural capital. The second theme simultaneously addressed the question of how black women in science negotiate the raced and patriarchal cultures of science disciplines and the disruptive possibilities enabled by black women academics in science. This was achieved through elaborations on two subsections titled "isolation" and "support" where the women narrated their experiences of isolation and the little to no support available to them. Lastly, the chapter explored the women's hopes for the future for themselves and for other black women academics. They suggested an epistemic rupture in the nature and type of curricula taught in STEM fields and made a call for more black women academics to be appointed to universities. The subsequent chapter provides a conclusion of the research report.

5. CHAPTER FIVE: CONCLUSION

This study has attempted to narrate the experiences of black women academics in STEM fields. It explores their occupation of STEM through the prism of trespassers. This is however framed as a question rather than an assertion. Ultimately, there is no categorical answer to this question since the women simultaneously occupy these spaces agentically and they are circumscribed by remnants of the apartheid racism and patriarchy. Consequently, they both create inclusion and are excluded from masculinist disciplines. Through various social movements, we have seen the call for more women to participate in the STEM disciplines and have also observed the increase in black women students and academics assuming these roles. However, various scholars have noted the hardships and complexities that black women confront with within the South African academy despite their increase in numbers. It is for this reason that the study sought to understand how black women academics with their multiple intersecting identities navigate the science academic field given its white and masculine character.

The findings highlight that while most of the women are from working class, they were surrounded by family members that valued education and imparted the value of education which acted as a protective factor for the women. Some of them started building their cultural and social capital at a school going age. This is because some received Model C or private education which provided them with some tools to use when navigating the academic field. However, it is difficult to ascertain the degree to which the cultural capital they acquired was useful as they still continue to experience difficulties of marginalisation and exclusion. The women's narration of their experiences in the academy accords with existing studies on the experiences of black women in the academy (e.g. Raymond & Canham, 2022). The women all told stories of racism, bullying and patriarchal micro-aggressions that lead to feelings of isolation, lack of support and limitations on the roles that they can assume.

Through a CRT lens, we observed that women's narratives provided a glimpse into how they constantly resist hegemonic beliefs concerning the rightful occupants of the STEM academics field and the maintenance of power. Their presence, hopes and choices challenge the valued habitus, ways of being and procedural elements within the academic field. They do this by challenging the way things are done, attempts to provide equal opportunities and their attention to factors that their male and white counterparts may be indifferent to. The findings suggest black women academics in science have created strategies of survival within the habituation that is the academic field by choosing to either mimic some of the ways that things are done or by rejecting them and establishing new norms. As such, it is important to note that the women in the study did not regard themselves and their experiences passively. Their narratives suggest that employ different strategies that counter these experiences for themselves, current academics and future generations of academics.

The women noted two important factors that need to be considered moving forward. This is the need for more women in academia and epistemic rupture where the nature of STEM would radically alter to imagine the life worlds and knowledges of Africans. For them, the South African academy should be centred around African knowledge production along with an education that reflects and engages with the political and economic realities of the South African context.

Theoretically, this research pointed to the value of bringing complex theoretical orientations to bear in order to engage the complexity that characterises black women's working lives and experiences. Through the counter storytelling advocated by CRT, the participants told stories that inserted their realities and aspirations into the frame. Importantly, through leaning into African feminist sensibilities, the study demonstrated the value of articulating women's refusals as generative ways of inhabiting the academy as they work to habituate science disciplines for their survival so that they can shake off the sense of being trespassers. Thus,

regardless of whether the women are considered to be trespassers or are also deemed as rightful occupants of the academy, it is apparent that they are determined to build roots, develop functional structures and create epistemic safety for themselves and other women. In demonstrating an African feminist ethic, the participants looked to how they may contribute and dream of a future that benefits everyone else.

While the study was not aimed at generalising the experiences of black women academics in STEM, its limitation is that it was conducted at one institution across multiple departments with nuanced departmental cultures. In attempting to maintain the anonymity of the institution and the participants, while still providing adequate context, cultural dynamics such as the location of university and departmental names have not been provided. This means that the study is not contextualised in ways that attend to the nuances of geographical, institutional and departmental cultures. Therefore, I recommend that future studies explore the cultures of STEM departments and that others attend to the complexities that characterise particular geographical locations where universities are located. In addition, the exploration of the experiences of black women in STEM could be span across multiple institutions to gain a much wider understanding of the women's experiences. However, notwithstanding these limitations, this study has provided an insightful spotlight on the experiences of black women in STEM fields.

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7. APPENDICES

7.1 Appendix 1: Information Sheet

Department of Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, Wits, 2050
Tel: 011 717 450 Fax: 011 717 4559

Greetings,

My name is Felicia Ramafalo, a Masters student at the Department of Psychology at the University of the Witwatersrand. I am conducting research as required to complete my degree. The study explores the experiences of black women academics in the science field.

In order to adequately conduct this research, I appeal to you to take part in this study in a way of a one-on-one interview, which should take approximately 60 minutes to complete. This is a substantial investment of your time; however, your participation is valuable as it will contribute towards a broader understanding of how gender and race contribute to people's experiences in science disciplines. I would therefore like to invite you to participate in this research.

Participation is voluntary, and involves being interviewed by me. Identifying information and everything you say will remain confidential. Some direct quotations may be used when reporting the data however; pseudonyms will be used such as Participants A or Participants B. The interview will be audio-recorded and the recordings and transcripts will be stored on a password protected computer and only me and my supervisor, Prof Hugo Canham will have access to them. You have the right to withdraw from the study at any time. You also have the right to refrain from answering any question should you wish to do so.

Should you have any queries about this study, please contact me using the details that appear below. Before beginning the interview, you will need to read through and sign the two consent forms attached. Please detach and keep this sheet.

Yours sincerely,

Felicia Ramafalo (feliciaramafalo@Gmail.com)

Supervisor: Prof Hugo Canham (hugo.canham@wits.ac.za)

7.2 Appendix 2: Informed Consent Form

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, Wits, 2050
Tel: 011 717 450 Fax: 011 717 4559

Consent Form (Interview)

I, _____, consent to being interviewed by Felicia Ramafalo, for a study exploring the experiences of black women academics in the science related disciplines. Please tick relevant boxes. I understand that:

- Participation in this study is voluntary. ☐
- I may refrain from answering any questions. ☐
- I may withdraw my participation and/or my responses from the study at any time before the research report is examined. ☐
- There are no risks or benefits associated with participation in this study. ☐
- All information provided will remain confidential, although I may be quoted in the research report. ☐
- If I am quoted, a pseudonym (Participant A, Respondent B etc.) will be used. ☐
- None of my identifiable information will be included in the research report. ☐
- I am aware that the results of the study will be communicated in the form of a research report or journal articles. ☐
- The research may also be presented at a local/international conference and published in a journal and/or book chapter. ☐

Signed: _____

Date: _____

7.3 Appendix 3: Consent Form (Recording)

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, Wits, 2050
Tel: 011 717 450 Fax: 011 717 4559

Consent Form (Recording)

I, _____ give my consent for my interview with Felicia Ramafalo, to be audio recorded for a study exploring the experiences of black women in the science related disciplines. Please tick the relevant boxes. I understand that:

- The audio-recordings and transcripts will not be seen or heard by anyone other than the researchers and/or their research assistants. ☐

- The audio-recordings and transcripts will be kept in a password protected computer. ☐

- No identifying information will be used in the transcripts or the research report. ☐

- Although direct quotes from my interview may be used in the research report, I will be referred to by pseudonym. ☐

Signed: _____

Date: _____

7.4 Appendix 4: Interview Schedule

Department of Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, Wits, 2050
Tel: 011 717 450 Fax: 011 717 4559

Interview Schedule

The interview will commence by:

1. Explaining the purpose of the research openly with no deception.

2. Going through the Informed Consent Form (Appendix 2) and the Permission to Record Form (Appendix 3).

3. When the above is complete and the participants have signed the Informed Consent and Permission to Record Forms, the recorders will be switched on and the discussion will begin.

4. The following are just a few guideline questions aimed at getting the discussion going. New questions may come up as the interview proceeds and those will be explored.

    a. Please describe the socio-economic status that you grew up under.

    b. What made you choose the science field?

    c. What has been your experience in the field?

    d. What does the future look like for you and other black women in this field?

7.5 Appendix 5: Ethical Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (SCHOOL OF HUMAN & COMMUNITY DEVELOPMENT

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: MACC/19/006 IH**
PROJECT TITLE:	Trespassers? A narrative study on black women academics in science at a South African university.
INVESTIGATORS	Ramafalo Felicia
DEPARTMENT	Psychology
DATE CONSIDERED	16 May 2019
DECISION OF COMMITTEE*	Approved

This ethical clearance is valid for 2 years and may be renewed upon application

DATE: 16 May 2019

CHAIRPERSON
(Dr Vinitha Jithoo)

cc Supervisor: Prof. Hugo Canham
Psychology

DECLARATION OF INVESTIGATOR (S)

To be completed in duplicate and **one copy** returned to the Secretary, Room 100015, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure be contemplated from the research procedure, as approved, I/we undertake to submit a revised protocol to the Committee.

This ethical clearance will expire on 31 December 2021

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES