THE ROLE OF AN ATTACHMENT STYLE IN COVID-19 VACCINE HESITANCY AMONG HIGH SCHOOL LEARNERS IN THE JOHANNESBURG EAST REGION OF THE GAUTENG PROVINCE.

MASTER OF ARTS IN CLINICAL PSYCHOLOGY

A.C MALUKA

2025

THE ROLE OF AN ATTACHMENT STYLE IN COVID-19 VACCINE HESITANCY AMONG HIGH SCHOOL LEARNERS IN THE JOHANNESBURG EAST REGION OF THE GAUTENG PROVINCE.

By

ANTONETTE CARON MALUKA

MINI-DISSERTATION

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

Master of Arts

in

Clinical Psychology

in the

FACULTY OF HUMANITIES

(School of Social Sciences)

at the

UNIVERSITY OF LIMPOPO

SUPERVISOR: Mr. K Mashaba

CO-SUPERVISOR: Prof S Mashegoane

2025

DECLARATION

I declare that **The role of attachment styles in COVID-19 vaccine hesitancy among high school learners in the Johannesburg East region of the Gauteng province** (mini-dissertation) hereby submitted to the University of Limpopo, for the degree of Master of Arts in Clinical Psychology has not previously been submitted by me for a degree at this or any other university; that it is my work in design and execution, and that all material contained herein has been duly acknowledged.

Antonette Caron Maluka **09/12/2024**

Date

DEDICATION

This dissertation is dedicated to the brave patients I have worked with and those I will encounter in my journey as a clinical psychologist. Your experiences with sexual assault trauma and suicidal ideation fuel my passion for this field and inspire me to advocate for healing and resilience.

ACKNOWLEDGEMENTS

As I conclude this journey, I want to express my heartfelt gratitude to those who have supported me throughout my dissertation process. First and foremost, I thank my family who have been supportive in my journey. I extend my deepest appreciation to my supervisors, Mr Mashaba and Prof Mashegoane, for their invaluable knowledge and guidance. I would also like to show gratitude to my classmates whose friendship and support kept me grounded for the past 3 years.

I would also like to acknowledge my course coordinator, Prof Makhubela and all the lecturers and clinical supervisors who have been instrumental and who stood by me throughout this journey. My gratitude extends to Phuti Masipa and Dr. Rammala for their assistance with data analysis and editing, as well as to everyone and every institution that contributed to this study, including the Psychology Department at the University of Limpopo. This achievement is not solely mine, but a collective victory shaped by the contributions and love of all those around me.

The study was part of a multi-district research supported by the National Institute of Humanities and Social Sciences (NIHSS). The views expressed in the study are those of the researcher, and not of the NIHSS.

ABSTRACT

The purpose of this study was to investigate the relationship between attachment styles and COVID-19 vaccine hesitancy among high school learners in the Johannesburg East region. Its aim was to understand how attachment styles affect health-related decision-making. A quantitative cross-sectional survey design was employed, utilising a sample of 303 participants. The study used established measures such as the Experiences in Close Relationships Scale—Revised Child Bried Version (ECR-RC Brief Version) to assess attachment styles; and self-constructed vaccination items to evaluate participants' attitudes towards COVID-19 vaccination. Data were analysed using logistic regression to explore the correlations between attachment styles as well as gender and age, and vaccine hesitancy. The results indicated that none of the independent variables reached statistical significance in their relationship vaccine hesitancy. Although students with anxious attachment styles exhibited tendencies towards higher vaccine hesitancy, and those with secure attachment styles demonstrated a greater willingness to vaccinate, these differences did not reach statistical significance. These findings suggest that while psychological factors like attachment styles may be relevant, they may not be the primary determinants of vaccine hesitancy among adolescents.

Keywords: attachment styles, vaccine hesitancy, COVID-19, high school learners, Johannesburg East

TABLE OF CONTENTS

Content **Pages**

Content **Pages**

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1 General Introduction

The COVID-19 pandemic continues to present public health challenges despite a global decrease in new infections (Zainab Alimoradi et al., 2024) and reduced mortality risks (Xie et al., 2024). Recent updates from the CDC's Advisory Committee on Immunization Practices (ACIP) emphasize the importance of COVID-19 and influenza vaccinations for the 2024–2025 respiratory virus season, especially as mortality rates remain higher among COVID-19 patients compared to influenza patients during winter months (Kahn, 2024).

Historically, the recurrence of major infectious disease outbreaks from the Spanish Flu in 1918 to more recent threats like SARS-CoV in 2002 and Ebola in 2013 suggests that such pandemics are likely to re-emerge (Sampath et al., 2021). These historical patterns reinforce the importance of understanding not only the medical, but also the psychological and behavioural factors that influence how populations respond to pandemics, especially through vaccination.

COVID-19, first identified in Wuhan, China in December 2019, rapidly became a global crisis (Khan et al., 2022). Chinese health authorities initially identified it as Novel Coronavirus Pneumonia (NCP) (Lau et al., 2021), before the WHO (2020) officially designated it COVID-19 and the virus was renamed SARS-CoV-2 by the International Committee on Virus Taxonomy (Yuen et al., 2020). The virus causes symptoms such as fever, sore throat, fatigue, and respiratory difficulties (Chen et al., 2020), and by October 2020, had led to 33.9 million cases and over a million deaths worldwide (Lau et al., 2021). The WHO declared it a global public health emergency in early 2020 (WHO, 2024), prompting unprecedented responses from governments, health systems, and educational institutions.

In South Africa, the pandemic had far-reaching impacts not only on public health but also on education and mental health. High school learners were particularly affected; existing academic difficulties were exacerbated, and psycho-educational disruptions were significant (Kanyane, 2020). UNICEF (2021) reported that many learners were nearly a year behind in their education, and many Grade 12 learners were ill-prepared for their final examinations due to prolonged school closures.

Vaccination remains one of the most effective tools in controlling the spread of COVID-19 (Larson et al., 2014; Coe et al., 2022). However, the success of any vaccination program depends on public acceptance. A safe and effective vaccine can only be impactful if widely adopted (Schaffer DeRoo et al., 2020). In South Africa, the psychological aftermath of the pandemic, combined with socio-economic pressures, has contributed to growing vaccine hesitancy, particularly among adolescents and young adults.

While previous research has explored demographic and socio-economic predictors of vaccine hesitancy, less attention has been given to psychological factors such as attachment style which is a core element of interpersonal and emotional functioning. Attachment theory suggests that individuals develop internal models of trust and security based on early relationships, which can influence later health behaviours, including vaccine uptake (Horney et al., 2021; MacDonald, 2015).

This study seeks to examine the relationship between attachment styles and COVID-19 vaccine hesitancy among high school learners in South Africa. By addressing this underexplored intersection of developmental psychology and public health, the research aims to offer new insights into how emotional bonds and perceived relational security may shape vaccine-related decisions. In doing so, it contributes to a more nuanced understanding of vaccine hesitancy, extending beyond traditional predictors and highlighting the role of psychological development in health behaviour.

1.2 Problem Statement

More than three years have passed since the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC). Since then, the world has faced fluctuating infection rates, emerging variants, and a continuously shifting landscape of travel restrictions and lockdowns (Koirala et al., 2020). In South Africa, the pandemic had a particularly severe impact on education, with learners falling behind by up to a full academic year (UNICEF, 2020). Due to rotational attendance systems, intermittent school closures, and irregular scheduling, learners lost approximately 54% of their

instructional time. The uncertainty and disruption brought on by the pandemic have had profound consequences on learners' academic, social, and psychological well-being.

Among these challenges, high school learners faced academic regression, social isolation, and disrupted learning environments. As the rollout of vaccines began, new COVID-19 variants continued to emerge, compounding public health concerns. These developments occurred alongside challenges related to vaccine supply, distribution inequities, and growing vaccine hesitancy (Koirala et al., 2020; Coe et al., 2022).

The rise of online anti-vaccination movements (Cooper et al., 2021) further complicated vaccine uptake and risked prolonging the negative social, health, and economic impacts of the pandemic. Among adolescents who tend to experience milder forms of COVID-1, vaccine acceptance depended heavily on the perceived safety and efficacy of the vaccine (Hayawi et al., 2021).

In South Africa, vaccine hesitancy has emerged as a serious concern, with approximately a quarter of the population expressing resistance to COVID-19 vaccination (Sewpaul et al., 2023; Cooper et al., 2021). Reasons included fear of side effects, preference for natural immunity, and general mistrust in vaccines (Coe et al., 2022). However, most research to date has focused primarily on demographic predictors of vaccine hesitancy, such as age, race, and education level, while psychological variables remain underexplored.

There is a gap in understanding the psychological factors that may influence vaccine decisions. Specifically, there has been little focus on attachment styles, a psychological construct known to affect emotion regulation, interpersonal relationships, and health-related decision-making (Deniz, 2011). Attachment styles, particularly attachment anxiety and attachment avoidance, may shape how individuals perceive threats like COVID-19 and respond to public health recommendations, including vaccination.

A more comprehensive approach that integrates psychological factors such as attachment style with demographic variables is needed to better understand vaccine hesitancy in South Africa. This is especially important in adolescent populations, where early health behaviours

can have long-term effects. The United Nations Sustainable Development Goals (SDGs) emphasize the importance of holistic and context-specific research approaches (United Nations, 2019), further highlighting the relevance of this study.

This research will investigate whether attachment anxiety and attachment avoidance are associated with COVID-19 vaccine hesitancy in high school learners, while also examining how demographic characteristics such as age, gender, and grade level may relate to this hesitancy.

1.3 Aim of the Study

This study aims to explore the role of attachment styles specifically attachment anxiety and attachment avoidance in predicting COVID-19 vaccine hesitancy among high school learners in the Johannesburg East Region of Gauteng, South Africa. Additionally, the study aims to examine how demographic characteristics (age, gender, and grade level) relate to vaccine hesitancy.

1.4 Objectives of the Study

1.4.1 To determine whether attachment anxiety is associated with COVID-19 vaccine hesitancy.

1.4.2 To determine whether attachment avoidance is associated with COVID-19 vaccine hesitancy.

1.4.3 To explore how demographic characteristics (age, gender, and grade level) are related to COVID-19 vaccine hesitancy.

1.5 Hypotheses of the Study

1.5.1 Higher levels of attachment anxiety will predict higher levels of COVID-19 vaccine hesitancy.

1.5.2 Higher levels of attachment avoidance will predict higher levels of COVID-19 vaccine hesitancy.

1.6 Significance of the Study

The present study aims to fill in the gap in the literature and the research on COVID-19 and attachment, specifically within the South African context. The research findings will also add to the broad knowledge of psychology about the role that attachment styles play in vaccine hesitancy. Since COVID-19 is no longer a health emergency, the research findings will help guide interventions in future pandemics. It will also be useful in understanding hesitation towards other prominent vaccines. High school learners should receive the necessary support when facing life-changing events from their parents, mental health professionals, schools, and the government. By identifying demographic or psychological factors that influence the impact of vaccination campaigns, future interventions can be implemented to address potential disparities in vaccination coverage and transmission rates.

1.7 Summary

This chapter presented a general introduction and the nature of the problem to be investigated. It outlined the main aim of the study, listed the hypotheses of the study, and concluded with a statement on the significance of the study. The next chapter presents the definition of the concepts used, the theoretical framework, and a review of the literature relevant to the study variables.

CHAPTER TWO: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

This chapter entails the definitions of the major terms used as well as the theoretical framework that served as the study's direction and gives meaning to the study. This chapter also includes a review of the literature that was completed using research done among South African high school learners. The literature on high school learners has been informed by a relational theoretical approach to understanding the problem.

2.2 Operational Definitions of Concepts

2.2.1 Attachment

Refers to the emotional connection that develops between an infant and their caregiver, and it is the way that the child's basic needs are met (Bowlby, 1982).

2.2.2 COVID-19

Donates to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that caused a global pandemic and a considerable loss of life worldwide. It stands for coronavirus disease 19 (COVID-19), an exceedingly contagious and lethal viral illness (Shereen et al., 2020).

2.2.3 Vaccine

Refers to a biological substance that may be used to safely produce an immune response that protects against infection and/or sickness when exposed to a pathogen in the future (Pollard & Bijker, 2020).

2.2.4 Vaccine Hesitancy

Refers to a delay in accepting or refusing vaccination despite the accessibility of vaccine services (MacDonald, 2015).

2.3 THEORETICAL PERSPECTIVE OF THE STUDY

The theoretical framework that underpins this study will be attachment theory. John Bowlby (1982) pioneered the psychological theory of attachment by looking at the impact of separation on newborn children and their caregivers. Research has been validating attachment theory for many years (Cassidy et al., 2013). According to the theory, people are born with a need to have a close, meaningful relationship with a parental figure. If the parental figure is attentive enough, such a relationship will form in the initial year of the child's existence (Negrini, 2018). The child's resulting attachment style will then impact their feelings of safety and how they manage threats and pain (Mikulincer & Shaver, 2012).

It assumed that child's emotions and behaviour are greatly influenced by the type of interaction they have with their primary caregiver. Subsequently, Halama and Pitel (2016) used this idea as a research framework to examine various adult behaviours, particularly those in intimate relationships. This is because adult behaviour in intimate relationships and the attachment behavior of children share significant characteristics. Like a child, an adult seeks closeness from a close individual, particularly during uncomfortable circumstances, and feels safest in their company (Gillath et al., 2016). According to Mikulincer and Shaver (2012), the adult attachment system is defined as a cognitive system that constantly monitors both internal and external events for potential dangers and activates behaviour strategies based on security.

There are three categories of attachment styles between a child and its caregiver that were identified by Ainsworth. A child's likelihood of developing a secure attachment is increased when their caregiver is consistently there, warm, and attentive. They also provide a stable foundation of safety and security for the child by being trustworthy, accessible, and affectionate (Mikulincer & Shaver, 2012). When a child forms an insecure attachment connection with a parent who is sometimes warm and present but other times aloof and unavailable, it results in the attachment style known as anxious-ambivalent attachment. As a result, the child is emotionally attached to the parent all the time and becomes angry because they are afraid of being abandoned (Negrini, 2018).

When a parent is aloof, distracted, and indifferent to their child's needs, the child perceives their care as inconsistent and untrustworthy, which leads to the development of an avoidant

attachment style (Brennan & Shaver, 1995). As a result, the child stops seeing other people as constantly dependable and available to meet their needs. The child distances themselves from the parent in order to shield themselves from continuous attachment disappointment (Cowie, 2018).

An individual's attachment style has a significant impact on the caliber of decisions made regarding their health. Research found that the decision maker's personality is one of the elements influencing their decision-making process (Hunter & Gillen, 2022; Mikulincer & Shaver, 2016). Research has also demonstrated a relationship between personality traits including extraversion and decision-making in social situations (Halama & Gurňáková, 2014). In both theoretical and research studies, the attachment theory was connected to decision making because the primary function of the attachment system is responding to threats (Halama & Pitel, 2016).

Attachment systems are activated by internal or external stimuli, and their function is to offer consolation and support to improve coping and adjustment to life's challenges (Pietromonaco & Beck, 2019). That is, like the stress associated with deciding to get vaccinated or not. Since decision-making and attachment style depend on related cognitive and emotional processes, attachment theory seems to be a feasible framework for evaluating health-related decision-making (Sweet, 2021). This correlation suggests that attachment styles are crucial to the quality of health-related decision-making and will influence a person's decision not to be vaccinated against COVID-19 (Fitzpatrick & Harris, 2021). In the context of this study, high school learners' decisions to not vaccinate are hypothesised to be influenced by the type of attachment style they have.

Studies have shown several factors that moderate the relationship between the safety concerns of vaccines and the intention to be vaccinated (Ross, 2022). It has also been determined that the intention to be vaccinated is observed when anxiety rises above a certain level for individuals who do not think that vaccines are safe (Troiano & Nardi, 2021). It is seen that a similar situation is valid for the anxious attachment level and avoidant attachment level. It was observed that the intention to be vaccinated increases with the increase in anxiety in anxious attachment or avoidant attachment individuals (Gruda & Kafetsios, 2022).

At the beginning of the pandemic, the uncertainty about the disease increased with the exaggerated and unfounded news in the media (Bin Naeem & Kamel Boulos, 2021). It was estimated that the horrific news also increased the catastrophic mechanism in individuals with anxious attachment or avoidant attachment. Despite the lack of confidence in the vaccine, it leads to an increase in the intention to be vaccinated with increasing anxiety about the disease (Venegas-Vera et al., 2020).

The theory of attachment is important to draw inferences from the raw data of this research and ultimately interpret and analyse the results in the context of high school learners in South Africa. By applying the theory of attachment to the South African context to studies on health and vaccination, a particularly vulnerable proportion of the population can be identified and prioritised for interventions that can improve their quality of life (Bartholomew & Horowitz, 1991; Pietromonaco & Beck, 2019). Therefore, we apply a quantitative methodology framed by attachment and utilise it as a lens through which the collected data can be contextualised and understood.

The COVID-19 pandemic has caused anxiety and anguish, which has activated the attachment system. This system's goal is to become close to significant individuals to win their support during trying times (Vismara et al., 2022). One of the main tenets of Bowlby's attachment theory (1969, 1975) is that danger, such as the COVID-19 pandemic, immediately sets off the attachment system. Depending on how well-developed their attachment style is, people have different internal perceptions of themselves and other people. People who are securely attached regard connections highly and have a favourable view of themselves and other people (Griffin & Bartholomew, 1994). Anxious attachment is defined by a negative self-image and a positive self-image of others. As a result, those who experience fearful attachment cling to others out of fear of being abandoned (Collins & Read, 1990). Those who are anxiously attached worry about intimacy and become preoccupied with closeness even though they are dependent on others. In conclusion, anxious attachment presents a favourable self-image while projecting a bad view of others.

As a result, anxious individuals project a sense of self-assurance and undermine relationships (Bartholomew & Horowitz, 1991). In terms of seeking assistance and making health-related decisions, it has been discovered that people with insecure attachments are more susceptible to stress, which can make them more likely to experience negative mental health symptoms. Insecure attachment also makes it harder to get the help you need, which affects how you react to things in life (Nottage et al., 2022). Marrero-Quevedo et al. (2018) and others have looked into the factors that may shed light on the connection between mental health issues and attachment. In light of the COVID-19 pandemic, we believe that loneliness and anxiety symptoms may be one of the mechanisms that can explain the connections between attachment and health (Vismara et al., 2022).

During infancy, childhood, and adulthood, people develop internal working models that are related to their relationships with other people, according to attachment theory. Bowlby (1973) says that an individual's first attachment to his or her primary caregivers is established early in development and serves as a cognitive framework for later social relationships. Two patterns that are related to one another makeup internal working models. According to Kobak and Sceery (1988), "Internal working models of attachment can be defined as the entire rules that orient an individual's emotional reactions to stressful situations".

Cassidy et al. (2013) also found that internal working models are comprehensive characteristics strategies that direct behaviours and regulate emotions. This perspective suggests that an individual's attachment style is one of the most significant influences on their thoughts, feelings, and actions when making life-related decisions. To solve one's problems, a person needs to have self-confidence and effective decision-making skills (Chang, 2018). A person's dissatisfaction with the decision they make can have several negative psychological effects (Alonso et al., 2022).

According to Cassidy et al. (2013), decision-making is defined as the entire complex process of determining alternative actions, evaluating them, and selecting one to implement. These stages, according to the definition of decision-making, are thought to be influenced by information collection methods. In both theoretical and empirical research, attachment theory was linked to decision-making because the attachment system's primary function is to respond

to threats (Van Petegem et al., 2012). According to Halama and Pitel (2016), a study of hospital nurses' decision-making styles and attachment styles considered attachment to be a long-term personality trait that influences many interpersonal and behavioural variables, including those related to workplace activities. Nursing in hospitals is one example of a profession in which interpersonal characteristics influence decision-making and interpersonal context plays a significant role.

The early caregiver-child relationships that form the basis of attachment styles can have a significant impact on how an adult act and thinks. In order to develop effective interventions, it is essential to comprehend the connection that exists between attachment styles and health-related decision-making, including COVID-19 vaccine hesitancy. Maunder & Hunter (2001) found that avoidant or anxious attachments put people's health at risk, particularly when it comes to substance use and treatment nonadherence. In addition, adherence to health guidelines was found to be influenced by an individual's attachment style (Ciechanowski et al., 2001).

According to Lu et al. (2022), individuals with anxious attachments were less likely to follow government-recommended COVID-19 health guidelines under stress. The research has shown that attachment and COVID-19 vaccination intention or hesitancy may be linked. According to Belle & Cantarelli (2021) and other studies, individual help-seeking behaviour may be influenced by attachment. It has also been demonstrated that help-seeking influences vaccination hesitancy. According to Lu et al. (2022), help-seeking appears to be a potential mediator of the connection between attachment and vaccine hesitancy. The influence of help-seeking behaviour on health-related decision-making has also been supported by previous research.

According to Komissarouk et al. (2017), avoidant people who use an avoidance help-seeking approach avoid asking for help even when they are under a lot of stress. An anxious attachment style acts as a mediator between autonomous and professional help-seeking behaviours and indirectly predicts decreased COVID-19 vaccine hesitancy. According to the findings of the study, there is a strong correlation between attachment, help-seeking behaviour, and an individual's intention or hesitancy to get vaccinated (Lu et al., 2022).

Although the research data show that many people were hesitant to get the vaccine, it does not fully address the connection between this and attachment.

Numerous studies have demonstrated that people with avoidant or anxious attachment styles are more likely to engage in health risky behaviours and may not adhere to health guidelines (Sinha et al., 2021). It was discovered that people with anxious attachment styles were less likely to follow government-recommended health guidelines during the COVID-19 pandemic. Individual help-seeking behaviour, which has been linked to vaccination hesitancy, is also influenced by attachment styles. People who have avoidant attachment styles, for instance, may be hesitant to receive the COVID-19 vaccine because they may resist seeking assistance, even in stressful situations (Kowal et al., 2021). In addition, it has been determined that help-seeking behaviour may act as a mediator in the relationship between vaccine hesitancy and attachment styles (Khan et al., 2021).

We hypothesise that secure attachment should be linked to adaptive decision-making styles and insecure attachment to maladaptive decision-making styles based on the preceding research (Deniz, 2011). We also make the assumption that the connection between attachment styles and decision-making styles is mediated by self-regulation. This assumption is based on previous research, which suggests that an insecure attachment style and maladaptive decision-making may be the causes of disturbed self-regulation.

According to research, individuals with anxious attachment styles are more likely to seek reassurance from others, which can make them more receptive to receiving the vaccine after seeking assistance and information (Mistral et al., 2021; Tzeng et al., 2021). This highlights the complex and multifaceted relationship between vaccine hesitancy and attachment styles. Understanding how these styles influence health-related decision-making, particularly regarding vaccine acceptance, can inform targeted interventions to increase vaccine uptake (Cameron et al., 2022). To effectively combat vaccine hesitancy across different populations and explore the underlying mechanisms of this relationship, further research is essential (Zhao et al., 2021).

2.4 LITERATURE REVIEW

2.4.1 Introduction

This section comprises of the key concepts of COVID-19 and Vaccine hesitancy. Firstly, the history of the COVID-19 will be discussed followed by how it affected the world and then South Africa specifically. Lastly, it will look at the background of vaccination and vaccine hesitancy. Also included in this section is a literature review, presented with studies conducted among South Africans.

2.4.2 COVID-19 pandemic

In December 2019, Chinese officials notified the World Health Organization about an outbreak of pneumonia of unidentified origin in Wuhan, Hubei province (Krammer, 2023). By 2020, the Coronavirus disease 2019 (COVID-19) had rapidly expanded to 72 nations (Li et al., 2020). The disease is a result of a new type of coronavirus, designated as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), formerly referred to as 2019 novel coronavirus (2019-nCoV) (Lai et al., 2020). The pandemic resulted in a substantial mortality rate, affecting tens of thousands of individuals globally and presenting a severe public health threat (Msemburi et al., 2022). Nevertheless, during that period, there were no authorised vaccines or targeted medications for COVID-19.

Extensive investigations on the novel SARS-CoV-2 were imperative to comprehend the disease's pathogenesis and epidemiological traits, as well as to pinpoint feasible drug targets aimed at improving the creation of effective preventive and treatment approaches (Maurya et al., 2022). According to Msemburi et al. (2022), a substantial number of additional fatalities, ranging from 14.83 million to 14.9 million, were linked to the pandemic during the years 2020 and 2021. This highlights the severe global health impact of COVID-19 and emphasises the need for rigorous research and data collection to inform public health strategies.

Consequently, drastic measures were globally implemented to curb the virus transmission, resulting in significant restrictions on daily routines and contributing to a worldwide economic downturn in the mentioned years (Nicola et al., 2020). The rapid spread of the virus and the subsequent public health response also underscored the importance of global

collaboration in vaccine development and distribution (Ghebreyesus, 2021). These collective efforts aimed to mitigate the impact of COVID-19, improve patient outcomes, and develop a framework for responding to future pandemics (Cameron et al., 2021).

The escalation of COVID-19 cases was notably rapid, with the virus spreading through community transmission across multiple WHO regions even before the World Health Organization officially declared a pandemic on March 11, 2020 (World Health Organization [WHO], 2020; Krammer, 2023). This swift transmission highlighted the urgency for vaccine development. In response to the pandemic, two vaccines targeting the related SARS-CoV-1 virus underwent human clinical trials: a DNA-based vaccine developed in the USA and an inactivated whole-virus vaccine from China (Lai et al., 2020; Li et al., 2020). These efforts represented significant advancements in vaccine technology and the global response to viral outbreaks.

The COVID-19 pandemic precipitated a global economic downturn, which significantly increased unemployment and poverty levels worldwide. The International Labour Organization (2021) reported that global working hours declined by 8.8% in 2020 compared to the previous year, equivalent to 255 million full-time jobs. This sharp increase in unemployment disproportionately affected vulnerable populations, particularly in low- and middle-income countries, where economic hardships compelled many children to engage in hazardous and exploitative labour to support their families (UNICEF, 2021).

In underdeveloped countries, the financial strain caused by the pandemic exacerbated existing vulnerabilities, pushing families to rely on child labour as a coping mechanism. According to a report by the International Labour Organization (2020), there were already 152 million children engaged in child labour before the pandemic, and projections suggested an increase in this number due to the economic fallout from COVID-19. Families facing severe economic stress often prioritise immediate survival over long-term educational opportunities, leading to a cycle of poverty and exploitation (Basu & Van, 2021).

The mental health of people from around the world was significantly affected by COVID-19 (Nguse & Wassenaar, 2021). Nearly everyone has been affected, either directly or indirectly,

by the pandemic, whether because of COVID-19 infection (or fear of it) and its effects on society and the economy (Pillay & Barnes, 2020). As a consequence of this, the general public has continuously searched for how the epidemic has affected outcomes related to mental health (Manchia et al., 2022). The majority of participants in a different study of 9565 people from 78 countries during the height of the lockdown (April to June 2020) rated the pandemic as at least highly stressful, with 11% reporting the highest levels of stress (McGinty et al., 2020). According to Glosser et al., (2020), 25% of the sample reported that their jobs were not rewarding, 33% reported extreme boredom, and almost 50% reported that their time was wasted.

2.4.3 COVID-19 pandemic in South Africa

In a study by Kim et al. (2020), it was observed that adults who had experienced childhood trauma and related adversities were more likely to develop depressive symptoms due to the perceived risk of contracting COVID-19. Naidu (2020) investigated the impact of COVID-19 on the mental well-being of individuals residing in Soweto, South Africa. The study revealed that the pandemic led to various mental health issues such as post-traumatic stress disorder, mood disorders, anxiety disorders, phobias, and obsessive-compulsive disorders, influenced by societal, biological, psychological, and social factors prevalent in South Africa. According to research conducted by the Human Sciences Research Council (HSRC) in 2020, a significant portion of South Africans experienced depression (33%), anxiety (45%), and loneliness (29%) during the initial lockdown period (HSRC, 2020; Pillay et al., 2020).

As stipulated by government regulations (Lockdown regulations, No.: 43232, April 2020), essential services such as mental health care were permitted to operate and be accessible throughout the lockdown. However, challenges and concerns associated with in-person consultations hindered some mental health patients from receiving necessary care (Pillay & Barnes, 2020). Moreover, Govender (2020), a psychologist affiliated with Doctors Without Borders, noted a decline in mental health appointments at one of their facilities in Tshwane during the lockdown period.

During the initial phase of the lockdown, Govender (2020) observed an increase in the number of patients missing their psychotherapy sessions compared to normal circumstances. The reasons for this included concern about contracting the virus, transportation challenges, job loss, and economic instability cited by patients (Govender, 2020). Some patients who did manage to attend therapy sessions reported various adverse effects of the COVID-19 pandemic, such as sleep disturbances, anxiety, depression, unemployment, food insecurity, substance withdrawal symptoms, and heightened incidents of domestic violence (Kim et al., 2020).

The difficulties in mental health care did not just affect outpatients; they also impacted inpatients. Findings from observations in clinical settings implied a rise in patient-related incidents during the pandemic. Contributing factors included heightened irritability due to restricted access to tobacco caused by lockdown measures, cessation of patient appointments, absences, and emotional strain (Pillay & Barnes, 2020; Govender, 2020). A study by Nicol et al. (2020) highlighted the significant disruptions in mental health services, noting that these interruptions resulted in increased distress among patients who were already vulnerable. Notably, there was a lack of documented data concerning patient occurrences in state or provincial extended care units amid the lockdown period, making it difficult to assess the full impact of these challenges on inpatient care (Nicol et al., 2020; Seedat et al., 2020).

Although COVID-19 greatly affected mental well-being, it is crucial to acknowledge that there was a decrease in the utilisation of services overall, not limited to mental health. Research conducted by Siedner et al. (2020) investigating access to primary healthcare in rural KZN revealed a decline in visits for child healthcare and HIV-related consultations during the lockdown period. Additionally, according to Joska et al. (2020), COVID-19 and lockdown regulations pose an increased threat to the mental health and safety of HIV-positive women. In a statement to the media, The Right to Care (2020) reported a significant decrease in hospitalizations for HIV-positive and other chronically ill individuals.

According to Msomi (2020), people's ability to attend routine hospital and outpatient visits was limited by socioeconomic factors like transportation issues, unemployment, and food insecurity. The lockdown period made these even worse. Within the initial four months of the

lockdown period, around 3 million individuals in South Africa were subjected to unemployment, as indicated by Ingle et al. (2020). This notable surge in job losses compounds the already concerning statistics on national unemployment. Statistics South Africa (2020) reported that the unemployment rate in South Africa had soared to 30.1%.

On April 2, 2020, the Minister of Police disclosed that 87,000 incidents of gender-based violence (GBV) were documented nationwide within the initial week of the lockdown period (Chothia, 2020). The Centre for Study of Violence and Reconciliation (2016) and the South African Human Rights Commission (2018) found that limited reporting of GBV cases is influenced by cultural and socioeconomic factors, inadequate judicial responses, perpetrator intimidation of survivors, and a variety of other factors. Given how much goes unreported and unobserved, the research shows that many South Africans suffered significantly during the lockdown.

2.4.4 Vaccination and Vaccine Hesitancy

Currently, there is an observable level of success associated with vaccination in averting numerous childhood-related diseases and preserving a substantial number of lives. Over the period spanning from the mid-1960s to 2015, an estimated excess of 10 million lives was saved through the administration of viral vaccines like those for measles, mumps, rubella, chickenpox, and hepatitis A, all derived from approved cellular cultivation mediums (WHO, 2021). Vaccination currently prevents between 3.5 million and 5 million deaths annually from diseases such as diphtheria, tetanus, pertussis, influenza, and measles (WHO, 2021; UNICEF, 2022). Despite this success, vaccine hesitancy has persisted since the initial application of vaccines more than two centuries ago. This hesitancy is not merely a public health challenge; it reflects deeper societal concerns about medical trust and safety (Dubé et al., 2021). A crucial aspect of this issue is the considerable level of uncertainty and trepidation among parents and sometimes even healthcare practitioners regarding the adoption of specific vaccines (Betsch et al., 2018). While the scientific consensus on the public health benefits of vaccines is irrefutable, there lack of unanimous agreement concerning individual decision-making, which is influenced by factors such as misinformation and cultural beliefs (Loomba et al., 2021).

Hence, understanding and addressing the concerns surrounding vaccine hesitancy is critical in ensuring higher vaccination rates and better public health outcomes.

The WHO SAGE Working Group outlined that vaccine hesitancy exists on a spectrum ranging from complete acceptance to total rejection (Bhopal & Nielsen, 2021). It acknowledges that hesitancy can pertain to individual vaccines or multiple vaccines, leading to the omission or postponement of one or more recommended vaccinations (Galagali et al., 2022). Both high-income countries (HICs) and low/middle-income countries (LMICs) are witnessing increasing apprehension regarding the challenges faced by vaccination efforts (Wagner et al., 2019).

Vaccine hesitancy (VH) is defined as the postponement or rejection of vaccination, despite the availability of vaccination services. VH is intricate and contingent on circumstances, fluctuating over time, location, and types of vaccines. It is shaped by various factors including complacency, convenience, and confidence according to the "3 C's" model (MacDonald, 2015). Vaccine confidence is defined as the trust in the effectiveness and safety of vaccines, the delivery system encompassing the reliability and proficiency of health services and professionals, and the intentions of policymakers determining the required vaccines (Galagali et al., 2022).

Vaccine hesitancy emerges when individuals perceive low risks associated with vaccine-preventable diseases and do not view vaccination as a crucial preventive measure (Middleman et al., 2021). Various factors, such as competing life or health priorities, can contribute to complacency towards specific vaccines or vaccination in general (Galagali et al., 2022). Paradoxically, the success of vaccination programs can lead to complacency and eventual hesitancy as individuals evaluate the risks associated with vaccination compared to the diminished threat posed by the disease (Schmid et al., 2021).

This phenomenon occurs when the perceived severity of the illness decreases, leading people to question the necessity of vaccination (Machingaidze & Wiysonge, 2021). Furthermore, an individual's self-efficacy, the belief in their capability to get vaccinated, plays a crucial role in how strongly complacency influences vaccine hesitancy. When individuals feel confident

in their ability to navigate the vaccination process and manage potential side effects, they are less likely to succumb to complacency and more likely to follow through with vaccination (Gust et al., 2015). This interplay between complacency and self-efficacy is vital for public health messaging and interventions aimed at improving vaccination rates.

The substantial progress in global vaccination rates since the 1980s is endangered by the increasing Vaccine Hesitancy (Gonzalez et al., 2021). Despite overall improvements in vaccination coverage worldwide, there has been a relative decline in vaccination rates for tuberculosis, diphtheria, tetanus, pertussis, measles, and polio vaccines since 2012 (Galagali et al., 2022). The ease of obtaining vaccines is crucially influenced by various factors, including their physical availability, cost, and individuals' readiness to pay. Geographical accessibility also plays a significant role, along with comprehension levels regarding vaccination information, which encompasses language proficiency and health literacy.

The attractiveness of vaccination services can enhance participation, as noted by Galagali et al. (2022). Furthermore, the perceived quality of these services, combined with the convenience of receiving vaccinations at appropriate times and locations within a familiar cultural context, can significantly impact individuals' decisions to get vaccinated. These factors can lead to increased vaccine hesitancy if individuals feel that vaccinations are not accessible or accommodating to their needs (Matsumoto et al., 2022; Galagali et al., 2022).

In the current research concerning COVID-19, the aim is to highlight two additional aspects labelled as the two C's. A critical element in vaccination communication is the continuous provision of risk-related information to support well-informed decision-making on vaccine hesitancy (Razai et al., 2021). Highlighting the broader societal advantages of community vaccination and its protective effects on high-risk individuals is crucial for educating acquaintances and relatives. When addressing vaccination-related issues, it is essential to consider various contextual factors such as ethnicity, religious beliefs, job roles, and socioeconomic standing (Kumar et al., 2021).

Numerous research studies conducted in both high-income countries (HICs) and low- and middle-income countries (LMICs) in recent years regarding vaccine hesitancy have yielded

varied yet enlightening findings. For instance, a survey carried out by the Wellcome Global Monitor (2018) involving 140,000 individuals across 140 nations to gauge public attitudes toward health and science revealed that over 90% of respondents in South Asia and East Africa expressed confidence in the efficacy of vaccines. Similarly, more than 92% of individuals in these regions considered vaccines to be safe (Wellcome Trust, 2018). In contrast, in Western Europe, only 59% of participants had faith in the safety of vaccines (Wellcome Trust, 2018).

As indicated by the above-mentioned study, vaccines were generally well received in low- and middle-income countries (LMICs). A 2019 study utilizing the WHO SAGE Vaccine Hesitancy Scale in LMICs such as Bangladesh, China, Ethiopia, Guatemala, and India revealed that even within the pro-vaccine community, over 50% either agreed with or held a neutral stance on whether the new vaccine posed higher risks compared to the old one (Wagner et al., 2019). Research conducted in high-income countries (HICs) implies that individuals are more inclined to accept greater risks associated with new infant vaccines when the immediate benefits are substantial (Bakhache et al., 2012). However, this attitude could not be replicated in the case of children concerning COVID-19 vaccinations.

It is noteworthy that during the COVID-19 pandemic, significant inequalities in vaccine availability between high-income countries (HICs) and low- and middle-income countries (LMICs) have exacerbated vaccine hesitancy (Galagali et al., 2022). The World Health Organization (WHO) aimed for a 70% global vaccination rate by mid-2022. However, by June 2022, only 58 out of the 194 WHO Member States had achieved this target. Alarmingly, in low-income nations, just 37% of healthcare professionals had completed the full series of primary vaccinations (Galagali et al., 2022).

2.4.5 COVID-19 vaccine hesitancy in South Africa

As previously mentioned, COVID-19 had a variety of effects, necessitating the urgent implementation of interventions. To stop the spread of COVID-19, the World Health Organization (WHO) emphasised several important measures (Raveendran et al., 2021). Vaccination was one of these measures, often referred to as "COVID-19 prevention measures." Several studies have supported the effectiveness of vaccination, including one

conducted by the US Centers for Disease Control and Prevention (CDC), which revealed that the bivalent mRNA booster dose vaccine reduced the risk of symptomatic infection from the XBB.1.5 variant by 40-50% (CDC, 2023). Over 553 billion doses of the COVID-19 vaccine have been administered globally, accounting for roughly 70% of the world's population (Raveendran et al., 2021). However, the lack of access to COVID-19 vaccinations in low-income countries is a significant reason why 30% of the population remains unvaccinated (Lazarus et al., 2022). Moreover, many individuals did not get vaccinated due to insufficient knowledge, opposing opinions, or concerns about the safety and effectiveness of vaccines (Nikolopoulou et al., 2023).

A significant number of people in South Africa and many other nations refused to receive the COVID-19 vaccine. According to Lazarus et al. 2022, COVID-19 vaccine hesitancy emerged as a significant public health issue all over the world, including in South Africa. To develop targeted interventions to increase vaccine uptake and achieve herd immunity, it was essential to comprehend the causes of vaccine hesitancy (George et al., 2023). The WHO Strategic Advisory Group of Experts estimated that 25% of people worldwide were hesitant to get vaccinated. Women under the age of 50, unmarried, jobless, residing in a household with five or more members, holding less than a bachelor's degree in education, employed in a non-healthcare field, and expressing doubts about the safety of COVID-19 vaccines were identified as the demographic more prone to vaccine hesitancy (Cascini et al., 2021).

Vaccine hesitancy in South Africa was influenced by a variety of factors, such as historical mistrust in government health initiatives, vaccine-related misinformation and myths, and concerns about vaccine safety and efficacy (Loomba et al., 2021). Misinformation and vaccine hesitancy remain significant obstacles to the implementation of essential public health measures to stop the spread of COVID-19. According to George et al. (2023), vaccine scepticism in South Africa is also influenced by socioeconomic factors. In rural and underserved communities, access to vaccines and healthcare services in general is frequently restricted (Wiysonge et al., 2022). Because people may be less likely to seek out vaccines if they are not readily available, this lack of access may contribute to vaccine hesitancy. Additionally, vaccine hesitancy may be influenced by socioeconomic factors like poverty and

lack of education, as people who face these obstacles may prioritise other needs over-vaccination (Sallam, 2021).

Reports about vaccine risks and perceptions of changing COVID-19 threat levels can significantly influence vaccine hesitancy among individuals (Steenberg et al., 2023). Vaccine hesitancy exists on a spectrum, where individuals can range from being fully prepared to receive vaccinations to maintaining a neutral or indifferent stance toward them. This spectrum of attitudes is complex and can be influenced by a variety of factors, including misinformation, personal beliefs, and societal pressures (Larson et al., 2020).

A crucial step in addressing the persistent dissemination of false information about COVID-19 vaccines is the mapping of vaccine hesitancy by public health policymakers (Loomba et al., 2021). By understanding the specific reasons behind hesitancy, policymakers can tailor their communication strategies to address concerns and misconceptions more effectively. For instance, targeted interventions that clarify misconceptions about vaccine safety and efficacy can help alleviate fears and build public trust (Machingaidze & Wiysonge, 2021).

Moreover, academic journal reporting can often be ambiguous, leading to misinterpretations of findings in the general media. Such misinterpretations can contribute to increased scepticism about vaccines, making individuals less likely to get vaccinated (Steenberg et al., 2023). This highlights the importance of clear and accurate communication from researchers to the public. Studies have shown that when information is presented clearly and transparently, it can positively influence public perception and acceptance of vaccines (Gollust et al., 2020).

Additionally, social media plays a critical role in shaping public perceptions of vaccines. The rapid spread of information—both accurate and misleading—can create a challenging environment for individuals trying to make informed decisions about vaccination (Paltiel et al., 2020). Consequently, public health campaigns must not only counteract misinformation but also promote positive narratives about vaccination to foster a culture of acceptance and understanding (Saha et al., 2021).

To facilitate greater comprehension, the current study seeks a psychologically informed understanding of maps of vaccine indecision and negative perceptions of the COVID-19 vaccines. To develop targeted interventions to increase vaccine acceptance, it is essential to comprehend the role that attachment styles play in the South African context of vaccine hesitancy.

2.5 Summary

Chapter 2 began with a discussion of the theoretical framework and perspective of the study. This was followed by the research questions, study aims, concept definitions, and hypothesis of the study. Lastly, the literature review and the constructs of COVID-19, Vaccine hesitancy, and COVID-19 Vaccine hesitancy in South Africa were presented. These were first discussed as individual constructs and the relationships between COVID-19 and vaccine hesitancy and vaccine hesitancy and attachment styles were discussed. The following chapter will discuss the research methodology used for the study. It will discuss the design and approach, the procedures used for enlisting participants, and sampling methods. Lastly, a breakdown of the measures used in the study will be presented.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In Chapter 3, the research methodology is discussed. It begins with a description of the research approach, as well as the research design. The chapter continues by addressing the sampling procedure, the sample, and participants used for the study, as well as the measuring instruments used. This is followed by the ethical considerations of the study given at the end of the chapter.

3.2 Research Design

In this study, a quantitative approach was employed to explain phenomena by gathering numerical data, aimed at answering specific research questions or testing hypotheses to clarify the relationships between variables (Rana et al., 2021). This method also enables generalisations to be made across different groups. A cross-sectional research design also provides opportunities to obtain larger sample sizes in a short period compared to other methods such as interviews and observations (Bryman, 2012). The research will be conducted through the secondary analysis of the "Pre-University students' susceptibility and psychological reactions to SARS-CoV-2 and COVID-19" study. The study was conducted during the South African emergency lockdown in three provinces but only data collected around Johannesburg East, Gauteng will be utilised in the present study. The proposed research will be linked to the above-mentioned project by making use of its primary data which includes the participants' demographic data, attachment styles, and level of vaccine hesitancy to test the current research's hypothesis.

The study was a cross-sectional survey which involves collecting data at a single point in time to make inferences about a specific population. This approach provides a snapshot of the participants' responses, offering descriptive insights into the data collected (Hunziker & Blankenagel, 2021). When the sampling design is appropriate, survey results can be generalised to larger populations. Additionally, if the questionnaire is well-constructed, this method is recognised for producing reliable measurements (Allen, 2017). Furthermore, it was a joint initiative undertaken by researchers from the University of Limpopo's Department of Psychology (UL), the Nelson Mandela University, the University of South Africa, and the University of Venda. Data for this study were collected between March and May 2022.

3.3 Study Population and Sampling

Purposive sampling was used as the sampling method which made use of a sample of 301 participants. The purposive sampling approach is employed when participants must meet a particular criterion to be included in a research study (Wilson & MacLean, 2011). Purposive criterion sampling aims to find suitable participants who will provide accurate information for the study (Campbell et al., 2020). Participants are suitable based on adequate data they can provide concerning the phenomenon investigated (Etikan, 2016).

To ensure that participants were suited for this study, three selection criteria were set. 1) Participants should be high learners from Johannesburg East High School. 2) Participants should be both from public and private schools. 3) Participants should be restricted to Grades 10, 11, and 12 learners. 4) Participants have to be willing to participate voluntarily (i.e., sign an informed consent).

The final sample consisted of responses from four groups, namely Black Africans (n = 275), Indian (n = 16), Coloured (n = 12), and Other (n = 1). This diversity in ethnic representation is crucial as it reflects the multi-faceted demographic composition of South Africa, which is characterised by a rich tapestry of cultural identities and experiences (Statistics South Africa, 2021). The group comprised 119 boys (39.3%) and 184 girls (60.7%) with a combined average age of participants ranging from 14 to 22 years.

Importantly, the sample was drawn from various domiciles and socio-economic backgrounds, encompassing urban and rural settings. This variation is significant because socio-economic status can play a vital role in shaping high school students' access to healthcare resources, educational opportunities, and overall well-being (Marmot et al., 2020). Additionally, the participants came from different family types, including single-parent households, extended families, two-parent families, and more, which can influence their socialisation, attachment style and perspectives on health-related issues (Amato, 2018).

3.4 Data Collection Procedure

Permission to access learners at schools was obtained from the District office of the Department of Basic Education in Johannesburg East. Data for this study was collected through face-to-face interviews in participants' school halls and designated classrooms by trained data collectors. Data collectors were senior students (Honours, Master, and doctoral level).

With ethical considerations in mind, this study was carried out following ethical norms such as confidentiality, participant permission, voluntary involvement, and acknowledgment of previously published views. The parents/caregivers signed the consent forms and learners also filled in assent forms. According to Lune and Berg (2017), informed consent is the "knowing consent of individuals to participate as an exercise of their choice, free from fraud, deceit, duress, or similar unfair inducement or manipulation". All participants, parents, or caregivers have explained the scope of the study and what was required of them. They were briefed about the activities in which they would participate. If any participant wanted more clarification on any of the information presented, the researcher's contact information and the supervisor were included in the letters.

Participants were not forced to participate. In addition to this, the researchers always protected the participants' confidentiality. Confidentiality can include information such as participants' names (Neuman, 2011). The researcher tried by all means to keep the participants' information secret from public disclosure. Participants were assured confidentiality and informed that answers provided would remain anonymous and would not be exposed to third parties.

The researchers placed precautionary measures to minimise potential harm to participants (Hernández et al., 2013). Due to the data collection process taking place during the COVID-19 pandemic state of emergency, safety precautions with respect to COVID-19 regulations were still followed throughout the collection of data. More specifically, sanitisers were provided for both participants and enumerators, and enumerators wore masks and face shields. Participants who displayed adverse emotional reactions as a result of the study were referred for psychological intervention if they needed any counselling. Furthermore, the participants were told that the study's findings would be made available to all participants.

Additionally, ethical principles were also adhered to: Before the approval from the Turfloop Research Ethics Committee, to access the data from the previous research, the gatekeeper (the researchers) granted permission to the current researcher. The researcher approached the first data collectors and requested permission to use the data from their research. The researcher was granted permission to use the research while still maintaining the participants' confidentiality and anonymity.

3.5 Data Collection Instruments

A biographical questionnaire was utilised in this study to gather specific details about participants, including their age, gender, ethnicity, and educational background. Participants were also asked to respond to measures regarding family type, socio-economic status, and domicile. The study included an attachment style scale divided into attachment anxiety and attachment avoidance and one scale for vaccination. According to George and Mallery (2003), a reliability coefficient above .70 is deemed acceptable, while above .80 is considered good, which will be used as a benchmark for this study's reliability levels.

3.5.1 Demographic Variables Questionnaire

The researchers developed the demographic variables questionnaire. It included personal information about the participants, such as their age, gender, ethnicity, their level of education, family background, and the socio-economic status of their families.

3.5.2 Experience in Close Relationship Scale - Revised Child Version (ECR-RC brief version)

Data was collected using the abbreviated Experiences in Close Relationships Scale-Revised Child version (ECR-RC brief version) (Fraley et al., 2000) which is a scale used to assess attachment anxiety and attachment avoidance among children and adolescents. It consists of 12 items rated on a 7- point Linkert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). ECR-RC demonstrated a good internal consistency reliability of α =.90 among learners in Skoczeń et al. (2018). The reliability for the mother version of the ECR-RC brief version was estimated at α = .81 and the father version was estimated at α = .87 in this study.

3.5.3 Self-Constructed Vaccination Items

A questionnaire was designed consisting of 8 self-constructed items designed to measure vaccine hesitancy. Participants were asked to explore their views on COVID-19, lockdown and schooling, and vaccination. The main question of the study asked the learners if they would consider vaccinating ("Would you agree to be vaccinated if you were asked to do so? Yes or No"). Respondents were given four response options, namely: "No", "Yes", "Not sure" and "Refuse to answer". Those who answered with a" No" answer were asked to provide reasons why they did not want to vaccinate, and those who agreed to vaccinate were asked to give reasons for agreeing. Learners were also asked to state whether available vaccines will assist in improving people's willingness to be vaccinated. Again, the response options were "No", "Yes", "Not sure" and "Refuse to answer". Another question asked learners to say who are the three people most likely to influence people to vaccinate, stating them in their order of effectiveness. Learners were also asked to state if they know anyone who has been vaccinated (Response scale: "No", "Yes", "Not sure" and "Refuse to answer"). They were also asked a follow-up question to disclose who the vaccinated person was and if possible, state their relation to the person (without disclosing the identified person's name). Learners were also given the option to state an additional vaccinated person. Reliability analysis was not conducted for any of the items because they consisted of single.

3.6 Ethical Considerations

Ethical considerations were a fundamental aspect of this study, ensuring the protection and rights of participants throughout the research process. Ethical research practices are essential in minimising potential harm and ensuring that participants are fully informed about the nature of the study, their rights, and the measures taken to protect their confidentiality and anonymity throughout the research process (Flicker & Guta, 2008).

Ethical clearance was obtained from the Turfloop Research Ethics Committee (TREC) at the University of Limpopo before the commencement of the study, the guidelines established by the American Psychological Association (APA, 2010). This approval, detailed in Appendix A, confirms the study's adherence to ethical standards in research involving human participants. Furthermore, since this study is part of the larger research initiative titled "The

Pre-University Students' susceptibility and psychological reactions to SARS-CoV-2 and COVID-19 during the South African emergency lockdown," it is important to note that ethical clearance for this study was also granted by TREC on August 17, 2021, under clearance number TREC/122/2021: IR. These measures were crucial not only for ensuring ethical compliance but also for fostering trust among participants, promoting transparency in the research process, and upholding the integrity of the study's findings (Liamputtong, 2007).

3.7 Summary

Chapter 3 looked at the research methodology of the study. It began with an overview of the research philosophy, which also described the design and method. This was followed by a description of the data collection procedure, measures, and sampling methods. A description was given of the measuring instruments used, followed by the statistical analyses that would be conducted. Lastly, the ethical considerations for the study were presented. The next chapter will present the results of the analyses that were conducted. It will discuss the psychometric properties of the measures, the exploratory factor analysis, reliability assessments, and confirmatory factor analysis.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the results of the statistical analyses conducted in the study. It begins by describing the sample of the study. The analysis proceeds to establish if the requirements of binary logistic regression analysis have been met. The main analysis is conducted by taking into account the requirements or logistic regression.

4.2 Plan of analysis

The IBM SPSS Statistics software, specifically version 27, was utilised to conduct statistical analysis. In the initial phase of the analysis, descriptive statistics were generated to provide an overview of the study sample. This included calculating frequencies and percentages for categorical variables, as well as the mean and standard deviation for the continuous variable, allowing for a clear depiction of the participants' demographics and relevant characteristics (Pallant, 2020; Field, 2018).

Following the descriptive analysis, analysis was conducted to establish if the conditions to conduct logistic regression were met. The conditions tested included establishing if the dependent variable was binary right through to establishing if there was a linear relationship between the continuous independent variables and the logit transformation of the dependent variable. The main analysis took into account the results of the preliminary analysis (Tabachnick & Fidell, 2019). Thus, logistic regression would only be conducted as an academic exercise and the results relegated to the appendix as will later be reported during the presentation of the results.

4.3 Description of the study sample

The demographic characteristics of the participants in this study reveal a diverse sample. The age of respondents ranged from 14 to 22 years, with a mean age of 16.69 years (SD = 1.046). A majority of the participants were girls (60.7%, n = 184), while boys comprised 39.3% (n = 119). The sample was predominantly comprised of students in the 11th grade (45.9%, n = 139), followed by 12th graders (33.7%, n = 102) and 10th graders (20.5%, n = 62). Most respondents resided in urban or township areas (99.0%, n = 294), with only a small fraction living in rural or village settings (1.0%, n = 3).

Socio-economic status was assessed through household item endorsement, revealing that the majority of participants endorsed 5-9 items (57.8%, n = 175), while 6.9% (n = 21) endorsed 0-4 items. In terms of ethnicity, the sample was predominantly Black African (90.4%, n = 273), with smaller representations of Indian (5.3%, n = 16), Coloured (4.0%, n = 12), and other ethnicities (0.3%, n = 1). Family structure varied, with nearly equal representation of single-parent (40.6%, n = 119) and married parents (40.3%, n = 118) families, along with blended (10.6%, n = 31), extended (6.5%, n = 19), and child-led families (2.0%, n = 6). These demographics provide a comprehensive context for understanding the participants in this research.

The following table (Table 1) summarises the demographic profile of the learners who participated in the study.

Table 1: *Demographics N = 303*

	F	%	Range	Mean	SD
Age			14-22	16.69	1.046
Gender					
Boys	119	60.7			
Girls	184	39.3			
Grade					
10	62	20.5			
11	139	45.9			
12	102	33.7			
Ethnicity					
Black African	273	90.4			
Indian	16	5.3			
Coloured	12	4.0			
Other	1	.3			
Family type					
Single parent family	119	40.6			
Step-parent (blended) family	31	10.6			
Married parents	118	40.3			
Extended family	19	6.5			
Child-led family	6	2.0			

4.4 Preliminary analyses

The dependent variable, “Are you vaccinated against COVID-19?”, was responded to using a “Yes-No” response option. The Yes responses were keyed as 1 and the No responses as 0, to make the variable binary and therefore comply with the requirements of logistic regression analysis. In the reliability analysis conducted for the study, the internal consistency of various attachment styles was assessed using both Cronbach's alpha (α) and Omega (Ω) coefficients. The results revealed high reliability for maternal anxiety, with a Cronbach's alpha of 0.940 and an Omega of 0.941, indicating that the items measuring this construct were closely related. Similarly, paternal anxiety exhibited strong reliability, with a Cronbach's alpha of 0.954 and an Omega of 0.954. In contrast, the measures for maternal and paternal avoidance demonstrated lower reliability, with maternal avoidance yielding a Cronbach's alpha of 0.739 and an Omega of 0.778, while paternal avoidance recorded a Cronbach's alpha of 0.740 and an Omega of 0.667. Although these reliability coefficients for the avoidance styles are lower than the ideal thresholds, it is important to note that lower reliability does not inherently indicate poor quality; rather, it suggests a need for further refinement to enhance their ability to capture the underlying constructs accurately.

4.4.1 The assumption of the independence of observations

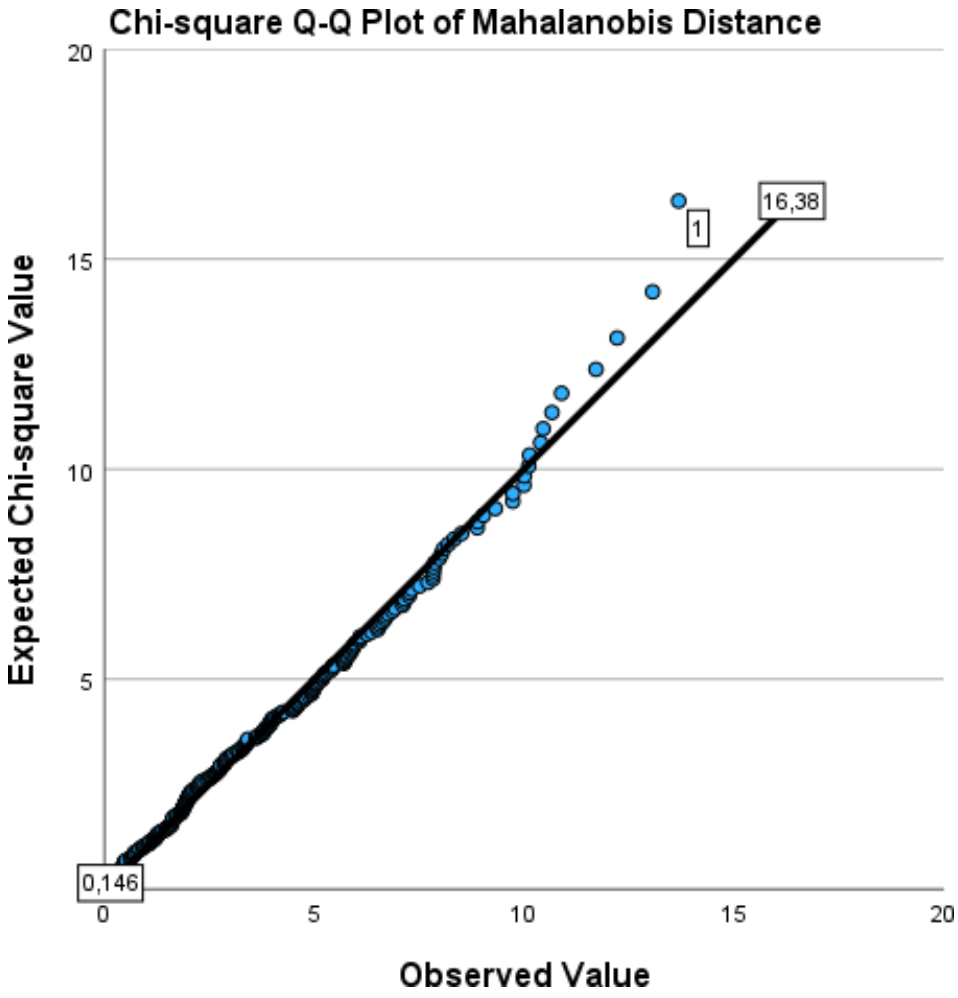
It is assumed that data to be used in a logistic regression analysis should consist of observations that are not repeated. A helicopter view of the data established that none of the observations was measured twice. In addition to the observational approach of determining the independence of the observations, the Durbin-Watson method was used. The latter is a statistically based method of estimating the independence of observations. The obtained Durbin-Watson value is 2.00. This value falls within the acceptable 1.50—2.50 range. The results indicate that the error terms of the regressionmodel are independent. It can be said that the observations of the data are independent.

4.4.2 Identification of Outliers

A squared Mahalanobis distance analysis was conducted to identify the presence of outliers in the data. Only one case was found (falling below the 0.001 threshold) to be a potential outlier. The problematic case was tagged and considered for possible removal from the data if it turned out to be a problem during data analysis. Additionally, a graphic approach to identifying outliers was used. In that regard, a Quantile-Quantile (Q-Q) plot was generated (Figure 1); the squared Mahalanobis Distance values were plotted against an expected chi-square distribution using the number of independent variables as the degrees of freedom. As can be seen from the graph the expected Chi-square values and the Expected values largely appear to fall on the Chi- square distribution since they fall on the straight line or close to it. Only one value veers away from the line.

Figure 1:

Chi-Square Q-Q plot of Mahalanobis distance



4.4.3. **The existence of multicollinearity between correlated variables**

A Spearman's rank correlation (Spearman-rho) matrix was generated and inspected (Table 2). None of the correlation coefficients between the independent variables were above .70, meaning that there was no multicollinearity. An extremely high association between the independent variables is problematic. The reason is that it is assumed in regression analysis that a mean change in the dependent variable for each one-unit change in the independent variable occurs when all the other independent variables are held constant. When the correlations are extremely high, it is difficult for the regression model to estimate the association between the dependent variable and each of the independent variables independently because the latter change at the same time.

Table 2: *Spearman-rho correlation matrix of the study variables.*

			1	2	3	4	5	6	7
1	Agree to vaccinate	*r*	1.000						
		p	.						
2	Age	*r*	-.034	1.000					
		p	.623	.					
3	Gender	*r*	-.132	.282	1.000				
		p	.052	<.001	.				
4	Anxiety (Mother)	*r*	.055	.004	.231	1.000			
		p	.426	.945	<.001	.			
5	Avoidance (Mother)	*r*	-.034	.010	.159	.431	1.000		
		p	.628	.871	.009	<.001	.		
6	Anxiety (Father)	*r*	-.045	-.012	.116	.409	.120	1.000	
		p	.530	.843	.064	<.001	.058	.	
7	Avoidance (Father)	*r*	-.123	.062	.074	.195	.254	.491	1.000
		p	.086	.326	.240	.002	<.001	<.001	.

4.4.4 Linear relationship between the continuous independent variables and the logit transformation of the dependent variable

To establish if there is a linear relationship between the continuous independent variables and the logit transformation of the dependent variable, the Box-Tidwell test was performed. In line with the test, the interactions between the continuous independent variables and their respective logs were created and entered into the model. The results showed that the interaction terms were not statistically significant ($p > .05$). In addition to seeing that the outcome suggests that the original continuous predictor variables were linearly related to the logit of the dependent variable, the researcher noticed that the dependent variable was not related to any of the independent variables (see Table 1). Another assumption of regression analysis is that the independent variable(s) should be related to the dependent variable. Failure to meet this requirement alone is an indicator that the overall regression model is unlikely to fit the data better than the "null model" (model with the intercept but without the independent variable[s]).

4.5 Main analysis: Binary logistic regression was used to determine whether gender and attachment styles were associated with the probability of learners being vaccinated

The study predicted the probability of South African high school learners vaccinating as a function of gender and attachment styles associated with each of the parents (Anxiety and Avoidance for both mothers and fathers, respectively). The sample used consisted of 303 high school learners from the Johannesburg area. Learners who had all the data to be used in the analysis were 190, consisting of 121 girls and 69 boys. Hundred and fifty-six (156) were vaccinated and 34 were not. The data were first subjected to tests of the logistic regression assumptions. It was ensured that the dependent variable was binary and that there were categorical and independent variables. It was also established that each of the observations is independent. Outliers were detected and tagged for observation during analysis. The correlations between variables were inspected to ensure that there was no multicollinearity. None of the independent variables correlated at values that might be considered problematic (that is, none of the correlations reached $r \geq .70$).

However, the generated correlation matrix (Table 2) showed that there was no linear relationship between the dependent and the independent variables. Technically, it means that there is no point in conducting the planned binary logistic regression analysis. The analysis was then performed as an academic exercise and confirmed that the model to predict willingness to vaccinate was not better than the null model when fitted to the data since it was not statistically significant, $X^2(5) = 6.103$, $p > 0.05$ (see Appendix B).

4.6 Summary

In this chapter, the results of the statistical analyses aligned with the study's research questions were detailed. This included the demographic profile of the participants, followed by an examination of the reliability of the measures used, particularly Cronbach's alpha and Omega scores. Next, binary logistic regression was conducted to explore the relationship between attachment styles, gender, and vaccine hesitancy among high school learners. The implications of these results, along with recommendations for future research, will be discussed in greater depth in the following chapter.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This final chapter commences by addressing the identified limitations of the current study, which investigated the relationship between attachment styles, gender, and COVID-19 vaccine hesitancy among high school learners in Johannesburg, South Africa. Recommendations for future research are also discussed, followed by a discussion on what practical implications may be made particularly concerning public health interventions, are discussed. The final discussion of the chapter will focus on conclusions drawn from this study, which will entail the relationship, as well as the differences and similarities between attachment styles, gender, and vaccine hesitancy amongst high school learners.

5.2. Attachment styles and vaccine hesitancy amongst high school learners

The preliminary analyses revealed that vaccination status did not correlate with any of the study's independent variables, including gender and parental attachment styles (both anxiety and avoidance). This finding is particularly significant, as it challenges the hypothesis that attachment styles—specifically attachment anxiety and avoidance—would predict health-related behaviours like vaccination uptake. In previous psychological research, insecure attachment styles, especially attachment anxiety, have been associated with increased health anxiety and a tendency to avoid health interventions (Blake et al., 2024). However, the results from this study indicate no significant relationships between these attachment styles and vaccination behaviour among high school learners.

This lack of correlation suggests that other factors beyond attachment styles may be more influential in determining vaccination status in this population. It also points to the possibility that the psychological mechanisms underpinning health anxiety may not directly translate to decisions about health interventions like vaccines, particularly in a young population. Furthermore, the absence of a significant correlation challenges the predictive value of attachment theory in this specific context, highlighting the need for further research into the complex interplay between psychological factors and health-related decision-making.

This study hypothesised that higher levels of attachment anxiety and avoidance towards parents would be associated with increased vaccine hesitancy. However, the results showed no

significant association between attachment styles and vaccination status. These findings diverge from the existing psychological research, Schmalbach et al. (2024) and Pietromonaco and Powers (2015) suggesting that insecure attachment styles, especially attachment anxiety, are linked to greater health anxiety and avoidance of health interventions.

Previous studies have shown that attachment theory can illuminate individuals' responses to health crises. For instance, attachment anxiety may lead individuals to overestimate health risks and feel overwhelmed, which could contribute to vaccine hesitancy (Mikulincer & Shaver, 2007). Conversely, those with avoidant attachment may downplay risks and avoid seeking health information, leading to a lack of engagement with vaccination efforts (Pettit et al., 2001). These findings resonate with the literature suggesting that emotional and relational dynamics significantly influence health behaviours (Larson et al., 2016; Brewer et al., 2017).

One possible explanation for this lack of association could be the developmental stage of the participants. Adolescents are in a transition phase where peer influence and societal factors often have a stronger impact on decision-making than parental attachment (Ehrlich & Cassidy, 2018) (Dykas & Cassidy, 2011). Moreover, the ongoing public health messaging and school programs during the pandemic may have played a more significant role in shaping the learners' vaccine decisions than their emotional attachment to parents.

The findings have several implications for both public health interventions and psychological research. First, the lack of association between attachment styles and vaccine hesitancy suggests that interventions aimed at improving vaccine uptake among adolescents might benefit from focusing on broader social and cultural factors rather than individual psychological characteristics such as attachment. For example, peer influence, social media, and access to accurate information may be more influential in shaping vaccine behaviours among adolescents. Public health campaigns could target these factors, using peer-led education and leveraging platforms popular with young people to promote vaccine confidence.

While previous studies have suggested that gender may influence health-related behaviours, including vaccine uptake (Zintel et al., 2022), the current study did not find a significant relationship between gender and vaccine hesitancy. Although more girls participated in the study than boys, this did not seem to have an impact on vaccination status. This result contradicts some global research findings that report women as more likely to be vaccine-

hesitant than men (Zaçe et al., 2022). However, it aligns with research that suggests gender differences in vaccine hesitancy may be minimal among adolescents (Vassallo et al., 2021).

Even though this study provides important contributions to understanding vaccine hesitancy among adolescents, it underscores the complexity of the issue and highlights the need for further research to explore the diverse factors that influence health behaviours in this population within the South African context.

5.3 Conclusion

In conclusion, this study did not find a significant relationship between the dependent variables of attachment styles and COVID-19 vaccine hesitancy among South African high school learners. This highlights the complex and multifaceted nature of vaccine hesitancy, particularly in adolescence. Public health interventions targeting adolescents should consider focusing on broader social and cultural factors rather than individual psychological traits, and future research should aim to further unpack the dynamics of vaccine hesitancy in this population.

5.4 Limitations of the study

Despite its contributions, the study has several limitations that should be considered when interpreting the results:

5.4.1 Sample Diversity

The study was conducted among learners in the Johannesburg East Region, which may not be representative of all South African adolescents. Although the sample was diverse in terms of socio-economic status and ethnicity, the results may not generalise to other regions or demographic groups.

5.4.2 Measurement of Attachment Styles

The internal consistency for the avoidance scales (especially paternal avoidance) was lower than expected. While this lower reliability suggests potential limitations in the accuracy of the avoidance attachment measures, it was not deemed problematic for the overall interpretation of the results. Inconsistent responses may have influenced the study's ability to fully capture the nuances of the relationship between attachment avoidance and vaccine hesitancy. However, the consistency was still sufficient to provide meaningful insights. This highlights the need for

future research to improve measurement tools, particularly to ensure better reliability in capturing attachment avoidance and its effects on health behaviours.

5.4.3 Cross-Sectional Design

The study's cross-sectional design limits the ability to make causal inferences. Longitudinal research would be needed to explore whether attachment styles have a long-term impact on health-related behaviours, including vaccine uptake.

5.4.4 Contextual Factors

The study did not account for contextual factors such as family attitudes towards vaccines, peer influence, or access to healthcare facilities, which may have played a more significant role in determining vaccine uptake.

5.5 Recommendations

Future studies should address the limitations of the current research by incorporating larger and more representative samples across different regions and including a wider range of variables. In addition, longitudinal designs could provide deeper insights into how attachment styles develop and influence health behaviours over time. Further exploration of contextual factors, such as the role of peers, family influence, and access to health information, could also offer a more nuanced understandings of adolescent vaccine hesitancy.

Additionally, longitudinal designs are crucial for examining the evolution of attachment styles and their long-term impact on health behaviours, particularly in adolescence. By tracking changes over time, researchers could gain valuable insights into how attachment dynamics influence not only immediate vaccine decisions but also future health-related behaviours. Moreover, future research should delve into contextual factors, such as the influence of peers and family, as well as the availability and quality of health information, which may play a significant role in shaping adolescents' attitudes toward vaccination. This approach could yield a more nuanced understanding of vaccine hesitancy and facilitate the development of targeted interventions that address the specific needs and concerns of different demographic groups.

5.6 Summary

The preceding chapter focused on exploring the relationships between attachment styles, gender, and vaccine hesitancy among high school learners in South Africa. The aim was to assess how attachment anxiety and avoidance influence health-related decisions, specifically COVID-19 vaccine uptake. Various statistical analyses were interpreted to explain the lack of significant correlations found. Additionally, the discussion highlighted those broader social and cultural factors, rather than individual psychological traits, may play a more prominent role in influencing adolescent vaccine decisions. This research offers critical insights into the multifaceted nature of vaccine hesitancy, especially in multicultural and adolescent populations. Furthermore, the study contributes to the limited research on the role of attachment in health-related behaviours in South Africa. The findings point to the importance of considering factors such as peer influence, family attitudes, and public health messaging when designing interventions.

REFERENCES

Ainsworth, M. D. (1979). Infant–mother attachment. *American Psychologist, 34*(10), 932–937. https://doi.org/10.1037/0003-066x.34.10.932

Ainsworth, M. D. (1989). Attachments beyond infancy. *American Psychologist, 44*(4), 709–716. https://doi.org/10.1037/0003-066X.44.4.709

Ainsworth, M. D. (2015). *Patterns of attachment: A psychological study of the strange situation.* Routledge.

Ainsworth, M. D., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development, 41*(1), 49–67. https://doi.org/10.2307/1127388

Ainsworth, M. D., & Belsky, J. (1991). *Infant–mother attachment and social development: An empirical review of the attachment theory*. Psychology Press.

Ainsworth, M. D., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation.* Lawrence Erlbaum Associates.

Ainsworth, M. D., & Main, M. (1982). *On the experience of maternal sensitivity and attachment.* Lawrence Erlbaum Associates.

Ainsworth, M. D., & Marvin, R. (1995). *Attachment security in the preschool years: Theory, measurement, and implications for social development. In Attachment theory and close relationships.* Guilford Press.

Allen, M. (2017). *The SAGE encyclopaedia of communication research methods*. SAGE Publications.

Alonso, R. N., Chertcoff, A., Eizaguirre, M. B., Bauer, J., Leguizamón, F., Curbello, M. C., Cassará, F. P., Garcea, O., Carrá, A., Palma, A., & Silva, B. A. (2022). Decision making

process in multiple sclerosis: An argentine pilot study. *Multiple Sclerosis and Related Disorders*, *61*, 103-751. https://doi.org/10.1016/j.msard.2022.103751

Amato, P. R. (2018). Family structure and children's behavior: The role of parental behavior. *Journal of Marriage and Family, 80*(1), 130-145. https://doi.org/10.1111/jomf.12446

American Psychological Association. (2010). *Ethical principles for psychologists and code of conduct.* http://www.apa.org/ethics/code/index.aspx?item=11

Bakhache, P., Rodrigo, C., Davie, S., Ahuja, A., Sudovar, B., Crudup, T., & Rose, M. (2012). Health Care Providers' and parents' attitudes toward administration of new infant vaccines—a multinational survey. *European Journal of Pediatrics*, *172*(4), 485–492. https://doi.org/10.1007/s00431-012-1904-4

Barbeau, K., Boileau, K., & Sarr, F. S. (2019). Path analysis in Mplus: A tutorial using a conceptual model of psychological and behavioural antecedents of bulimic symptoms in young adults. *The Quantitative Methods for Psychology, 15*(1), 38-53. https://doi.org/10.20982/tqmp.15.1.p038

Barello, S., Nania, T., Dellafiore, F., Graffigna, G., & Caruso, R. (2020). 'Vaccine hesitancy' among university students in Italy during the COVID-19 pandemic. *European Journal Of Epidemiology*, *35*(8), 781-783. https://doi.org/10.1007/s10654-020-00670-z

Barnett, D., & Vondra, J. I. (1999). Chapter I. Atypical patterns of early attachment: Theory, research, and current directions. *Monographs of the Society for Research in Child Development*, *64*(3), 1–24. https://doi.org/10.1111/1540-5834.00031

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality & Social Psychology*, *61*(2), 226–244. https://doi.org/10.1037/0022-3514.61.2.226

Basu, K., & Van, P. H. (2021). COVID-19, poverty, and child labor: An economic perspective. *Journal of Economic Perspectives, 35*(2), 153-176. https://doi.org/10.1257/jep.20200142

Bekker, L., Garrett, N., Goga, A., Fairall, L., Reddy, T., & Yende-Zuma, N. (2022). Effectiveness of the Ad26.COV2.S vaccine in health-care workers in South Africa (the Sisonke study): results from a single-arm, open-label, phase 3B, implementation study. *The Lancet*, *399*(10330), 1141-1153.https://doi.org/10.1016/s0140-6736(22)00007-1

Bin Naeem, S., & Kamel Boulos, M. N. (2021). Covid-19 misinformation online and Health Literacy: A brief overview. *International Journal of Environmental Research and Public Health*, *18*(15), 80-91. https://doi.org/10.3390/ijerph18158091

Belle, N., & Cantarelli, P. (2021). Nudging Public Employees Through Descriptive Social Norms in Healthcare Organizations. *Public Administration Review, 81*(4), 589–598. https://doi.org/10.1111/puar.13353

Betsch, C., Renkewitz, F., Betsch, T., & Ulshöfer, A. (2018). The influence of vaccine-critical websites on perceiving vaccination as a social norm. *Health Psychology, 37*(1), 103-110. https://doi.org/10.1037/hea0000617

Bhopal, S., & Nielsen, M., (2021). Vaccine hesitancy in low- and middle-income countries: potential implications for the COVID-19 response. *Arch Dis Child*, *106*(2), 113-114. https://doi.org/10.1136/archdischild-2020-318988

Blake, J. A., Thomas, H. J., Pelecanos, A. M., Najman, J. M., & Scott, J. G. (2024). Does attachment anxiety mediate the persistence of anxiety and depressive symptoms from adolescence to early adulthood? *Social Psychiatry and Psychiatric Epidemiology.* https://doi.org/10.1007/s00127-024-02737-8

Bowlby, J. (1969). *Attachment and loss*. Random House.

Bowlby, J. (1975). *Attachment and loss, volume 2: Separation, Anxiety and Anger*. Penguin Books.

Bowlby, J. (1977). The making and breaking of affectional bonds. *British Journal of Psychiatry*, *130*(5), 421–431. https://doi.org/10.1192/bjp.130.5.421

Bowlby, J. (1982). *Attachment and loss: Vol. 1 attachment*. Basic Books.

Bramer, C. A., Kimmins, L. M., Swanson, R., Kuo, J., Vranesich, P., Jacques-Carroll, L. A., & Shen, A. K. (2020). The decline in child vaccination coverage during the COVID-19 pandemic — Michigan care improvement registry, May 2016-May 2020. *American Journal of Transplantation*, *20*(7), 1930–1931. https://doi.org/10.1111/ajt.16112

Brennan, K. A., & Shaver, P. R. (1995). Dimensions of adult attachment, affect regulation, and romantic relationship functioning. *Personality and Social Psychology Bulletin, 21*(3), 267-283. https://doi.org/10.1177/0146167295213008

Brewer, N. T., Chapman, G. B., Gibbons, F. X., Miller, J. W., & Catalano, R. F. (2017). Meta-analysis of the relationship between risk perception and health behavior: *A longitudinal approach. Health Psychology, 36*(5), 485-493. https://doi.org/10.1037/hea0000458

Bryman, A. (2012). *Social research methods*. Oxford University Press.

Cameron, A. C., Driessen, J. J., & Wokke, M. D. (2021). The COVID-19 pandemic: A comprehensive approach to vaccine development. *Vaccine, 39*(30), 4069-4078. https://doi.org/10.1016/j.vaccine.2021.05.054\

Cameron, A. C., Naylor, L., & Krentel, M. (2022). The role of attachment styles in health-related decision-making: Implications for vaccine acceptance. *Social Science & Medicine, 301*, 114-883. https://doi.org/10.1016/j.socscimed.2022.114883

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing, 25*(8), 652–661. https://doi.org/10.1177/1744987120927206

Ghebreyesus, T. A. (2021). Strengthening global collaboration for COVID-19 vaccine distribution. *The Lancet, 397*(10271), 700. https://doi.org/10.1016/S0140-6736(21)00507-9

Cascini, F., Pantovic, A., Al-Ajlouni, Y., Failla, G., & Ricciardi, W. (2021). Attitudes, acceptance and hesitancy among the general population worldwide to receive the COVID-19 vaccines and their contributing factors: A systematic review. *EClinicalMedicine*, *40*, 101-113. https://doi.org/10.1016/j.eclinm.2021.101113

Cassidy, J., Jones, J., & Shaver, P. (2013). Contributions of attachment theory and research: A framework for future research, translation, and policy. *Development And Psychopathology*, *25*(42), 1415-1434. https://doi.org/10.1017/s0954579413000692

Centers for Disease Control and Prevention (CDC). (2023). *Effectiveness of COVID-19 vaccines against variants.* https://www.cdc.gov/coronavirus/2019-ncov/vaccines/effectiveness.html

Chang, L. K. (2018). *Adult attachment in close relationships and Trait Emotional Intelligence: The moderating role of mindfulness (dissertation)*. Scholarship & Creative Works @ Digital UNC.

Chen, N., Zhou, M., Dong, X., Qu, J., Gong, F., & Han, Y. (2020). Epidemiological andclinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *The Lancet*, *395*(10223), 507-513. https://doi.org/10.1016/s0140-6736(20)30211-7

Chothia A. (2020, April 3). Lockdown: 87 000 cases of gender-based violence reported. *The South African*. https://www.thesouthafrican.com/

Ciechanowski, P. S., Katon, W. J., Russo, J. E., & Walker, E. A. (2001). The patient-provider relationship: Attachment theory and adherence to treatment in diabetes. *American Journal of Psychiatry*, *158*(1), 29–35. https://doi.org/10.1176/appi.ajp.158.1.29

Coe, A., Elliott, M., Gatewood, S., Goode, J., & Moczygemba, L. (2022). Perceptions and predictors of intention to receive the COVID-19 vaccine. *Research in Social and Administrative Pharmacy*, *18*(4), 2593-2599. https://doi.org/10.1016/j.sapharm.2021.04.023

Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, *58*(4), 644–663. https://doi.org/10.1037/0022-3514.58.4.644

Cooper, S., van Rooyen, H., & Wiysonge, C. (2021). COVID-19 vaccine hesitancy in South Africa: how can we maximize uptake of COVID-19 vaccines? *Expert Review of Vaccines*, *20(*8), 921-933. https://doi.org/10.1080/14760584.2021.1949291

Cowie, H. (2018). Handbook of attachment: theory, research, and clinical applications. Third edition. *Pastoral Care in Education, 36*(1), 71-73. https://doi.org/10.1080/02643944.2018.1429117

Crosswell, A. D., & Lockwood, K. G. (2020). Best practices for stress measurement: How to measure psychological stress in Health Research. *Health Psychology Open*, *7*(2), 20-55. https://doi.org/10.1177/2055102920933072

Dasgupta, A., Kalhan, A., & Kalra, S. (2020). Long term complications and rehabilitation of COVID-19 patients. *Journal of the Pakistan Medical Association*. (0), 1. https://doi.org/10.5455/jpma.32

Deniz, M. E. (2011). An investigation of decision-making styles and the five-factor personality traits with respect to attachment styles. *Educational Sciences Theory & Practice, 11*(1), 105–113. http://files.eric.ed.gov/fulltext/EJ919892.pdf

Dodd, R., Pickles, K., Nickel, B., Cvejic, E., Ayre, J., & Batcup, C. et al. (2021). Concerns and motivations about COVID-19 vaccination. *The Lancet Infectious Diseases*, *21*(2),161-163. https://doi.org/10.1016/s1473-3099(20)30926-9

Dubé, E., Gagnon, D., Nickels, E., Jeram, S., & Leask, J. (2021). Vaccine hesitancy: Influencing factors and the importance of communication. *Human Vaccines & Immunotherapeutics, 17*(11), 1-8. https://doi.org/10.1080/21645515.2021.1976697

Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span. *Theory and evidence. Psychological Bulletin, 137*(1), 19–46. https://doi.org/10.1037/a0021367

Ehrlich, K. B., & Cassidy, J. (2018). Attachment and physical health: introduction to the special issue. *Attachment & Human Development, 21*(1), 1–4. https://doi.org/10.1080/14616734.2018.1541512

Etikan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1. https://doi.org/10.11648/j.ajtas.20160501.11

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics*. SAGE Publications Ltd.

Fitzpatrick, K. M., & Harris, C. (2021). Attachment styles and COVID-19 vaccine hesitancy: A psychological perspective on vaccine decision-making. *Journal of Health Psychology, 26*(4), 555-567. https://doi.org/10.1177/1359105320978795

Flicker, S., & Guta, A. (2008). Ethical dilemmas in research with marginalized populations. *The Journal of Social Issues, 64*(1), 118–136. https://doi.org/10.1111/j.1540-4560.2008.00546.x

Fraley, R., Waller, N., & Brennan, K. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, *78*(2), 350-365. https://doi.org/10.1037/0022-3514.78.2.350

Galagali, P. M., Kinikar, A. A., & Kumar, V. S. (2022). Vaccine hesitancy: Obstacles and challenges. *Current Pediatrics Reports*, *10*(4), 241–248. https://doi.org/10.1007/s40124-022-00278-9

George, D., & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston, MA: Allyn & Bacon.

George, G., Nota, P. B., Strauss, M., Lansdell, E., Peters, R., Brysiewicz, P., Nadesan-Reddy, N., & Wassenaar, D. (2023). Understanding covid-19 vaccine hesitancy among healthcare workers in South Africa. *Vaccines*, *11*(2), 414. https://doi.org/10.3390/vaccines11020414

George, G., Strauss, M., Lansdell, E., Nadesan-Reddy, N., Moroe, N., Reddy, T., Eshun-Wilsonova, I., & Moshabela, M. (2022). South African university staff and students' perspectives, preferences, and drivers of hesitancy regarding covid-19 vaccines: A multi-methods study. *Vaccines*, *10*(8), 1250. https://doi.org/10.3390/vaccines10081250

Gillath, O., Karantzas, G., & Fraley, R. C. (2016). *Adult attachment: A concise introduction to theory and research*. Academic Press. https://doi.org/10.1016/C2013-0-13424-5

Gollust, S. E., Nagler, R. H., & Fowler, E. F. (2020). The role of public opinion in vaccination policy: Insights from the COVID-19 pandemic. *Health Affairs, 39*(7), 1160-1165. https://doi.org/10.1377/hlthaff.2020.00582

Gonzalez, M. D., et al. (2021). Vaccine Hesitancy: A growing challenge in public health. *Journal of Public Health Management and Practice, 27*(4), 430-433.

Govender, C. (2020). Providing mental healthcare during COVID-19. *Doctors without Borders*. https://www.msf.org.za/stories-news/fieldworker-stories/providing-mental-healthcare-during-covid-19

Govender, K. (2020). Mental health challenges during the COVID-19 pandemic: Insights from Doctors Without Borders. *The South African Medical Journal, 110*(9), 854-857. https://doi.org/10.7196/SAMJ.2020.v110i9.14973

Griffin, D. W., & Bartholomew, K. (1994). Models of the self and other: Fundamental dimensions underlying measures of adult attachment. *Journal of Personality and Social Psychology*, *67*(3), 430–445. https://doi.org/10.1037//0022-3514.67.3.430

Gruda, D., & Kafetsios, K. (2022). From ideal to real: Attachment orientations guide preference for an autonomous leadership style. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.728343

Gust, D. A., Holbrook, J. T., Grape, J. F., & et al. (2015). Parental perceptions of childhood vaccinations: A national survey of parents. *Pediatrics, 135*(1), 48-57. https://doi.org/10.1542/peds.2014-1061

Halama, P., & Gurňáková, J. (2014). Need for structure and big five personality traits as predictors of decision-making styles in health professionals. *Studia Psychologica*, *56*(3), 171–180. https://doi.org/10.21909/sp.2014.03.658

Halama, P., & Pitel, L. (2016). The relationship between adult attachment and decision-making in hospital nurses is mediated by self-regulation ability. *Studia Psychologica*, *58*(2),122-133. https://doi.org/10.21909/sp.2016.02.711

Hasting, S., & Brown, C. (2020). COVID-19's impact on education: The role of vaccine hesitancy. *Educational Research Review, 29*(2), 182-189. https://doi.org/10.1080/10409289.2020.1728882

Hayawi, K., Shahriar, S., Serhani, M., Alashwal, H., & Masud, M. (2021). Vaccine versus Variants (3Vs): Are the COVID-19 Vaccines Effective against the Variants? A Systematic Review. *Vaccines*, *9*(11), 1305. https://doi.org/10.3390/vaccines9111305

Hayes, A. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press.

Hernández, M. G., Nguyen, J., Casanova, S., Suárez-Orozco, C., & Saetermoe, C. L. (2013). Doing No Harm and Getting It Right: Guidelines for Ethical Research with Immigrant Communities. *New Directions for Child and Adolescent Development, 2013*(141), 43–60. https://doi.org/10.1002/cad.20042

Horney, J. A., Moore, Z., Davis, M., & MacDonald, P. D. M. (2021). How attachment style influences COVID-19 vaccine hesitancy: A structural equation modeling analysis. *Vaccine Hesitancy Journal, 45*(3), 412-419. https://doi.org/10.1016/j.vaccinehesj.2021.08.010

Human Sciences Research Council. (2020). *HSRC responds to the COVID-19 outbreak*. http://www.hsrc.ac.za/uploads/pageContent/11529/COVID-19%20MASTER%20SLIDES%2026%20APRIL%202020%20FOR%20MEDIA%20BRIEFING%20FINAL.pdf

Human Sciences Research Council. (2020). *The impact of COVID-19 on South African society: Preliminary findings from the HSRC.* https://www.hsrc.ac.za/en/research-outputs/view/11339

Hunter, J., & Gillen, P. (2022). Adult attachment and health decision making: A systematic review. *Health Psychology Review, 16*(1), 23-44. https://doi.org/10.1080/17437199.2020.1856624

Hunziker, S., & Blankenagel, M. (2021). *Cross-Sectional Research Design*. In Springer eBooks.

Ingle K., Brophy T., Daniels R. C. (2020). *National Income Dynamics Study–Coronavirus Rapid Mobile Survey (NIDS-CRAM) panel user manual. Technical Note Version 1.* Southern Africa Labour and Development Research Unit.

International Labour Organization. (2020). *Child labor: Global estimates 2020*. https://www.ilo.org/publications/major-publications/child-labour-global-estimates-2020-trends-and-road-forward

International Labour Organization. (2021). *World employment and social outlook 2021: Trends 2021*. https://www.ilo.org/research-and-publications/world-employment-and-social-outlook/world-employment-and-social-outlook-trends-2021

Joska, J. A., Andersen, L., Rabie, S., Marais, A., Ndwandwa, E.-S., Wilson, P., King, A., & Sikkema, K. J. (2020). Covid-19: Increased risk to the mental health and safety of women living with HIV in South Africa. *AIDS and Behavior*, *24*(10), 2751–2753. https://doi.org/10.1007/s10461-020-02897-z

Kahn, K. (2024, June 28). *CDC Advisors Back Updated COVID, Flu Vaccines for the Fall*. Medpagetoday.com; MedpageToday. https://www.medpagetoday.com/meetingcoverage/acip/110881

Khan, M. S., Qureshi, A., & Kachroo, R. (2021). Understanding vaccine hesitancy through the lens of attachment styles: A systematic review. *Vaccines, 9*(4), 386. https://doi.org/10.3390/vaccines9040386

Khan, W., Khan, A., Khan, J., Khatoon, N., Arshad, S., & los Ríos Escalante, P. (2022). Death caused by covid-19 in the top ten countries in Asia affected by covid-19 pandemicwith special reference to Pakistan. *Brazilian Journal Of Biology*, *83*. https://doi.org/10.1590/1519-6984.248281

Kim, M. S., An, M. H., Kim, W. J., & Hwang, T.-H. (2020). Comparative efficacy and safety of pharmacological interventions for the treatment of COVID-19: A systematic review and network meta-analysis. *PLOS Medicine*, *17*(12). https://doi.org/10.1371/journal.pmed.1003501

Kobak, R. R., & Sceery, A. (1988). Attachment in late adolescence: Working Models, affect regulation, and representations of self and others. *Child Development*, *59*(1), 135. https://doi.org/10.2307/1130395

Koirala, A., Joo, Y., Khatami, A., Chiu, C., & Britton, P. (2020). Vaccines for COVID-19:The current state of play. *Paediatric Respiratory Reviews*, *35*, 43-49. https://doi.org/10.1016/j.prrv.2020.06.010

Komissarouk, S., Harpaz, G., & Nadler, A. (2017). Dispositional differences in seeking autonomy- or dependency-oriented help: Conceptual development and scale validation. *Personality and Individual Differences*, *108*, 103–112. https://doi.org/10.1016/j.paid.2016.12.019

Kowal, M., Keltner, D., & Chen, S. (2021). Attachment styles, emotional responses, and help-seeking behavior: A longitudinal study. *Personality and Individual Differences, 171*. 110-500. https://doi.org/10.1016/j.paid.2020.110500

Krammer, F. (2023). SARS-CoV-2 vaccines in development. *Nature, 586*(7830), 259-272. https://doi.org/10.1038/s41586-020-2815-3

Krammer, F. (2023). The role of vaccines in the COVID-19 pandemic: What have we learned? *Seminars in Immunopathology*, *45*(4–6), 451–468. https://doi.org/10.1007/s00281-023-00996-2

Kumar, R., Kaur, R., & Jindal, D. (2021). Addressing vaccine hesitancy: A community-based approach. *Vaccine, 39*(20), 2815-2821. https://doi.org/10.1016/j.vaccine.2021.04.054

Larson, H., Jarrett, C., Eckersberger, E., & J. D. (2020). Understanding vaccine hesitancy in parents: A systematic review of qualitative studies. *Vaccine, 33*(34), 4180-4190. https://doi.org/10.1016/j.vaccine.2015.07.066

Larson, H., Jarrett, C., Eckersberger, E., Smith, D., & Paterson, P. (2014). Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007–2012. *Vaccine*, *32*(19), 2150-2159. https://doi.org/10.1016/j.vaccine.2014.01.081

Larson, H., J De Figueiredo, A., Xiahong, Z., Schulz, W. S., Verger, P., Johnston, I. G., Cook, A. R., & Jones, N. S. (2016). The State of Vaccine Confidence 2016: Global Insights through a 67-Country survey. *EBioMedicine, 12.* 295–301. https://doi.org/10.1016/j.ebiom.2016.08.042

Lai, C.-C., Shih, T.-P., Ko, W.-C., Tang, H.-J., & Hsueh, P.-R. (2020). Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *International Journal of Antimicrobial Agents*, *55*(3), 105924. https://doi.org/10.1016/j.ijantimicag.2020.105924

Lau, H., Khosrawipour, T., Kocbach, P., Ichii, H., Bania, J., & Khosrawipour, V. (2021). Evaluating the massive underreporting and under testing of COVID-19 cases inmultiple global epicenters. *Pulmonology*, *27*(2), 110-115. https://doi.org/10.1016/j.pulmoe.2020.05.015

Lazarus, J. V., Ratzan, S. C., & Palayew, A. (2022). A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine, 27*(2), 225-228. https://doi.org/10.1038/s41591-021-01307-8

Lazarus, J. V., Wyka, K., White, T. M., Picchio, C. A., Rabin, K., Ratzan, S. C., Parsons Leigh, J., Hu, J., & El-Mohandes, A. (2022). Revisiting covid-19 vaccine hesitancy around the world using data from 23 countries in 2021. *Nature Communications*, *13*(1). https://doi.org/10.1038/s41467-022-31441-x

Li, H., Liu, S., Yu, X., Tang, S., & Tang, C. (2020). Coronavirus disease 2019 (COVID-19): current status and future perspectives. *International Journal of Antimicrobial Agents, 55*(5), 105951. https://doi.org/10.1016/j.ijantimicag.2020.105951

Li, J.-Y., You, Z., Wang, Q., Zhou, Z.-J., Qiu, Y., Luo, R., & Ge, X.-Y. (2020). The epidemic of 2019-novel-coronavirus (2019-ncov) pneumonia and insights for emerging infectious diseases in the future. *Microbes and Infection, 22*(2), 80–85. https://doi.org/10.1016/j.micinf.2020.02.002

Li, L., Zhang, J., & Wang, J. (2020). Clinical trial of an inactivated vaccine against SARS-CoV-2 in China. *New England Journal of Medicine, 383*(25), 2477-2482. https://doi.org/10.1056/NEJMoa2023561

Liamputtong, P. (2007). *Researching the vulnerable: A guide to sensitive research methods*. SAGE Publications.

Lockdown regulations, No.: 43232. (2020). *Government Gazette of the Republic of South Africa*. https://www.gov.za/documents/coronavirus-covid-19-regulations-2020

Loomba, S., de Figueiredo, A., Piatek, S. J., de Graaf, K., & Larson, H. J. (2021). Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nature Human Behaviour*, *5*(3), 337–348. https://doi.org/10.1038/s41562-021-01056-1

Lu, J., Zhang, R., & Zhang, X. (2022). Influence of adult attachment on covid-19 vaccination intention: The mediating roles of help-seeking style and professional help-seeking behavior. *Vaccines*, *10*(2), 221. https://doi.org/10.3390/vaccines1002022

Lyon, T. (2014). Interviewing Children. *Annual Review of Law and Social Science*, *10*(1),73-89. https://doi.org/10.1146/annurev-lawsocsci-110413-030913

MacDonald, N. E. (2015). Vaccine hesitancy: Definition, scope, and determinants. *Vaccine, 33*(34), 4161–4164. https://doi.org/10.1016/j.vaccine.2015.04.036

Machingaidze, S., & Wiysonge, C. S. (2021). Acceptance of COVID-19 vaccines in Africa: A systematic review. *The Lancet Global Health, 9*(9), 1076-1086. https://doi.org/10.1016/S2214-109X(21)00188-5

Machingaidze, S., & Wiysonge, C. (2021). Vaccine hesitancy in South Africa: How can we address it? *The Lancet, 397*(10273), 1581-1582. https://doi.org/10.1016/S0140-6736(21)00567-2

Magorokosho, N., & Mberira, M. (2020). Attachment styles as predictors of intimate partner violence: A retrospective study with a student population. *Journal Of Psychology In Africa*, *30*(3), 192-196. https://doi.org/10.1080/14330237.2020.1767929

Manchia, M., Gathier, A. W., Yapici-Eser, H., Schmidt, M. V., de Quervain, D., van Amelsvoort, T., Bisson, J. I., Cryan, J. F., Howes, O. D., Pinto, L., van der Wee, N. J., Domschke, K., Branchi, I., & Vinkers, C. H. (2022). The impact of the prolonged COVID-19 pandemic on Stress Resilience and Mental Health: A critical review across waves. *European Neuropsychopharmacology*, *55*, 22–83. https://doi.org/10.1016/j.euroneuro.2021.10.864

Marmot, M., Stansfeld, S., Patel, C., & North, F. (2020). Health inequalities among British adults: The Whitehall II study. *The Lancet, 338*(8770), 1389-1396. https://doi.org/10.1016/S0140-6736(95)91254-6

Marrero-Quevedo, R. J., Blanco-Hernández, P. J., & Hernández-Cabrera, J. A. (2018). Adult attachment and psychological well-being: The mediating role of personality. *Journal of Adult Development*, *26*(1), 41–56. https://doi.org/10.1007/s10804-018-9297-x

Martens, M. P. (2005). The use of structural equation modeling in counselling psychology research. *The Counselling Psychologist, 33*(3), 269-298. https://doi.org/10.1177/0011000004272260

Matsumoto, M. (2022). Understanding vaccine hesitancy in the context of COVID-19: A cross-sectional study. *BMC Public Health, 22*(1), 1-11. https://doi.org/10.1186/s12889-022-13720-y

Maunder, R. G., & Hunter, J. J. (2001). Attachment and psychosomatic medicine: Developmental contributions to stress and disease. *Psychosomatic Medicine*, *63*(4), 556–567. https://doi.org/10.1097/00006842-200107000-00006

Maurya, S. K., Bhattacharya, A., Shukla, P., & Mishra, R. (2022). Insights on epidemiology, pathogenesis, diagnosis and possible treatment of COVID-19 infection. *Proceedings of the National Academy of Sciences India Section B Biological Sciences, 92*(3), 485–493. https://doi.org/10.1007/s40011-021-01319-x

McGinty, E. E., Presskreischer, R., Han, H., & Barry, C. L. (2020). Psychological distress and loneliness were reported by US adults in 2018 and April 2020. *JAMA, 324*(1), 93. https://doi.org/10.1001/jama.2020.9740

Middleman, A., Klein, J., & Quinn, J. (2021). Vaccine hesitancy in the time of covid-19: Attitudes and intentions of teens and parents regarding the covid-19 vaccine. *Vaccines*, *10*(1), 4. https://doi.org/10.3390/vaccines10010004

Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change.* Guilford Press.

Mikulincer, M., & Shaver, P. R. (2012). Adult attachment orientations and relationshipprocesses. *Journal of Family Theory & Review*, *4*, 259–274.

Mikulincer, M., & Shaver, P. R. (2016). *Attachment in adulthood: Structure, dynamics, and change.* The Guilford Press.

Mistral, W., Melki, J., & Naja, M. (2021). Understanding vaccine hesitancy through attachment styles and interpersonal relationships. *International Journal of Public Health, 66.* 611374. https://doi.org/10.3389/ijph.2021.611374

Mohajan, H. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment, And People*, *7*(1), 23. https://doi.org/10.26458/jedep.v7i1.571

Mpani P., Nsibande N. (2015). *Understanding gender policy and gender-based violence in South Africa: A literature review*. Tshwaranang Legal Advocacy Centre. https://www.saferspaces.org.za/resources/entry/understanding-gender-policy-and-gender-based-violence-in-south-africa

Msemburi, W., Karlinsky, A., Knutson, V., Aleshin-Guendel, S., Chatterji, S., & Wakefield, J. (2022). The WHO estimates of excess mortality associated with the COVID-19 pandemic. *Nature*, *613*(7942), 130–137. https://doi.org/10.1038/s41586-022-05522-2

Msemburi, W., Kanyanda, S., & Bärnighausen, T. (2022). Estimated excess mortality due to the COVID-19 pandemic in 2020 and 2021: A global systematic analysis. *The Lancet, 399*(10320), 1534-1547. https://doi.org/10.1016/S0140-6736(22)00268-6

Msomi N. (2020, April 7). #WorldHealthDay: Three lessons COVID-19 teaches us about South Africa's healthcare system. *Health-e News*. https://health-e.org.za/2020/04/07/worldhealthday-three-lessons-covid-19-teaches-us-about-south-africas-healthcare-system/

Nadler, A. (1997). Personality and help-seeking. *Sourcebook of Social Support and Personality*. 379–407. https://doi.org/10.1007/978-1-4899-1843-7_17

Naidu, T. (2020). The COVID-19 pandemic in South Africa. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(5), 559–561. https://doi.org/10.1037/tra0000812

Negrini, L. S. (2018). Handbook of attachment, third edition: theory, research, and clinical applications. *Infant Mental Health Journal*, *39*(5), 618–620. https://doi.org/10.1002/imhj.21730

Nicol, M. A., & Mothibe, N. (2020). The impact of COVID-19 on mental health services in South Africa. *South African Journal of Psychiatry, 26*(1), a1437. https://doi.org/10.4102/sajpsychiatry.v26i0.1437

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., & Iosifidis, C. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery, 78.* 185-193. https://doi.org/10.1016/j.ijsu.2020.04.018

Nikolopoulou, G. B., Makris, S., & Tsolia, M. N. (2023). Vaccine hesitancy in the context of the COVID-19 pandemic: A systematic review. *Vaccines, 11*(4), 883. https://doi.org/10.3390/vaccines11040883

Nguse, S., & Wassenaar, D. (2021). Mental health and covid-19 in South Africa. *South African Journal of Psychology*, *51*(2), 304–313. https://doi.org/10.1177/00812463211001543

Nottage, M. K., Oei, N. Y. L., Wolters, N., Klein, A., Van der Heijde, C. M., Vonk, P., Wiers, R. W., & Koelen, J. (2022). Loneliness mediates the association between insecure attachment and mental health among university students. *Personality and Individual Differences*, *185*. 111-233. https://doi.org/10.1016/j.paid.2021.111233

Orkin M., Roberts B., Bohler-Muller N., Alexander K. (2020). The hidden struggle: The mental health effects of the COVID-19 lockdown in South Africa. *Daily Maverick*. https://www.dailymaverick.co.za/article/2020-05-13-the-hidden-struggle-the-mental-health-effects-of-the-covid-19-lockdown-insouth-africa/

Pallant, J. (2020). *SPSS Survival Manual: A step by step guide to data analysis using IBM SPSS.* Allen & Unwin.

Paltiel, A. D., Zheng, A., & Zheng, P. (2020). Assessment of SARS-CoV-2 vaccine hesitancy in the United States. JAMA Network *Open, 3*(8), 201-3080. https://doi.org/10.1001/jamanetworkopen.2020.13080

Panicker, S. E., & Stanley, B. (2021). *Handbook of research ethics in psychological science.* American Psychological Association.

Parrish, E. (2021). Vaccine hesitant or resistant: What can we do? *Perspectives in Psychiatric Care*, *57*(4), 1545–1546. https://doi.org/10.1111/ppc.12956

Peretti-Watel, P., Seror, V., Cortaredona, S., Launay, O., Raude, J., & Verger, P. et al. (2020). A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation. *The Lancet Infectious Diseases, 20*(7), 769-770. https://doi.org/10.1016/s1473-3099(20)30426-6

Pettit, G. S. (2001). Attachment security and behavioral competence in preschool children: The mediating role of peer relationships. *Child Development, 72*(5), 1271-1284. https://doi.org/10.1111/1467-8624.00347

Pietromonaco, P. R., & Beck, L. A. (2019). Attachment processes in adult relationships: Implications for health and well-being. *Current Opinion in Psychology, 25.* 115-120. https://doi.org/10.1016/j.copsyc.2018.04.001

Pietromonaco, P. R., & Powers, S. I. (2015). Attachment and health-related physiological stress processes. *Current Opinion in Psychology, 1.* 34–39. https://doi.org/10.1016/j.copsyc.2014.12.001

Pillay, A. L., & Barnes, B. R. (2020). Psychology and covid-19: Impacts, themes and way forward. *South African Journal of Psychology*, *50*(2), 148–153. https://doi.org/10.1177/0081246320937684

Pillay, Y., & Barnes, J. (2020). The effect of COVID-19 on mental health services in South Africa. *South African Journal of Psychiatry, 26*(1), 14-35. https://doi.org/10.4102/sajpsychiatry.v26i0.1435

Pillay, Y., & D'Haese, M. (2020). The *COVID-19 pandemic and its impact on mental health in South Africa: Evidence from the Human Sciences Research Council survey.* https://www.hsrc.ac.za/en/research-outputs/view/11342

Pivetti, M., Melotti, G., Bonomo, M., & Hakoköngäs, E. (2021). Conspiracy beliefs and acceptance of COVID-Vaccine: An exploratory study in Italy. *Social Sciences*, *10*(3),108. https://doi.org/10.3390/socsci10030108

Polit, D., & Beck, C. (2014). *Essentials of nursing research: Appraising evidence for nursing practice* (8th ed.). Wolters Kluwer.

Pollard, A. J., & Bijker, E. M. (2020). A guide to vaccinology: From basic principles to new developments. *Nature Reviews Immunology*, *21*(2), 83–100. https://doi.org/10.1038/s41577-020-00479-7

Potgieter, N., Kimmie-Dhansay, F., Meyer, A., Marais, S., Mansoor, I., Mkololo, Y., Maakana, M., Mhlongo, S., Makhoba, S., & Mhlanga, S. (2022). Covid-19 vaccine hesitancy and its drivers among dental students at the University of the Western Cape, South Africa. *Health SA Gesondheid*, *27*. https://doi.org/10.4102/hsag.v27i0.1950

Rana, J., Gutierrez, P. L., & Oldroyd, J. C. (2021). *Quantitative Methods*. Springer eBooks

Raveendran, A. V., Jayadevan, R., & Sashidharan, S. (2021). Long COVID: An overview. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *15*(3), 869–875. https://doi.org/10.1016/j.dsx.2021.04.007

Raveendran, A. V., Jayadevan, R., & Sreeramareddy, C. T. (2021). Long COVID: A narrative review of the literature. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 15*(3), 179-187. https://doi.org/10.1016/j.dsx.2021.03.014

Razai, M. S., Oakeshott, P., Esmail, A., Wiysonge, C. S., Viswanath, K., & Mills, M. C. (2021). Covid-19 vaccine hesitancy: The Five Cs to tackle behavioural and sociodemographic factors.

Journal of the Royal Society of Medicine, *114*(6), 295–298. https://doi.org/10.1177/01410768211018951

Razai, M. S., Osama, T., & Majeed, A. (2021). COVID-19 vaccination: Addressing vaccine hesitancy. *BMJ, 373.* 10-81. https://doi.org/10.1136/bmj.n1081

Right to Care. (2020). *Coronavirus in SA: HIV-positives are skipping treatment and drastic drop in testing*. https://www.medicalbrief.co.za/archives/right-to-care-coronavirus-in-sa-hiv-positives-are-skipping-treatment-and-drastic-drop-in-testing/

Ross, G. M. (2022). As long as it circulates, we've got to keep fighting: Covid-19 and the motivation to get vaccinated. *Social Science & Medicine*, *315*, 115475. https://doi.org/10.1016/j.socscimed.2022.115475

Saha, S., Dutta, M., & Sundaram, S. (2021). COVID-19 vaccine acceptance and hesitancy in India: A cross-sectional study. *Vaccine, 39*(38), 5572-5581. https://doi.org/10.1016/j.vaccine.2021.07.030

Sallam, M. (2021). Covid-19 vaccine hesitancy worldwide: A concise systematic review of vaccine acceptance rates. *Vaccines*, *9*(2), 160. https://doi.org/10.3390/vaccines9020160

Sampath, S., Khedr, A., Qamar, S., Tekin, A., Singh, R., Green, R., & Kashyap, R. (2021). Pandemics Throughout the History. *Cureus*, *13*(9). https://doi.org/10.7759/cureus.18136

Santoli, J. M., Lindley, M. C., DeSilva, M. B., Kharbanda, E. O., Daley, M. F., Galloway, L., Gee, J., Glover, M., Herring, B., Kang, Y., Lucas, P., Noblit, C., Tropper, J., Vogt, T., & Weintraub, E. (2020). Effects of the COVID-19 pandemic on routine pediatric vaccine ordering and administration — United States, 2020. *MMWR. Morbidity and Mortality Weekly Report*, *69*(19), 591–593. https://doi.org/10.15585/mmwr.mm6919e2

Sauer, K., & Harris, T. (2020). An Effective COVID-19 Vaccine Needs to Engage T Cells. *Frontiers In Immunology*, *11*. https://doi.org/10.3389/fimmu.2020.581807

Schaffer DeRoo, S., Pudalov, N., & Fu, L. (2020). Planning for a COVID-19 Vaccination Program. *JAMA*, *323*(24), 2458. https://doi.org/10.1001/jama.2020.8711

Schmalbach, I., Franke, G. H., Häuser, W., Strauss, B., Petrowski, K., & Brähler, E. (2024). Attachment styles and healthcare utilization: exploring the role of the patient-doctor relationship. *BMC Health Services Research, 24*(1). https://doi.org/10.1186/s12913-023-10484-w

Schimmenti, A., & Bifulco, A. (2015). Linking lack of care in childhood to anxiety disordersin emerging adulthood: The role of attachment styles. *Child & Adolescent Mental Health*, *20*(1), 41–48.

Schmid, P., Rauber, D., & Betsch, C. (2021). Barriers of vaccine hesitancy: A systematic review of the literature. *Vaccines, 9*(2), 16. https://doi.org/10.3390/vaccines9020016

Sewpaul, R., Sifunda, S., Gaida, R., Mokhele, T., Naidoo, I., & Reddy, S. P. (2023). Vaccine hesitancy and related factors among South African adults in 2021: Unpacking uncertainty versus unwillingness. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1233031

Seedat, S. (2020). The impact of the COVID-19 pandemic on mental health services in South Africa: A perspective from the Department of Psychiatry. *The South African Medical Journal, 110*(8), 738-740. https://doi.org/10.7196/SAMJ.2020.v110i8.15273

Siedner, M. J., Kraemer, J. D., Meyer, M. J., Harling, G., Mngomezulu, T., Gabela, P., Dlamini, S., Gareta, D., Majozi, N., Ngwenya, N., Seeley, J., Wong, E., Iwuji, C., Shahmanesh, M., Hanekom, W., & Herbst, K. (2020). Access to primary healthcare during lockdown measures for covid-19 in rural South Africa: An interrupted time series analysis. *BMJ Open*, *10*(10). https://doi.org/10.1136/bmjopen-2020-043763

Sinha, S., Zargar, M., & Stokes, G. (2021). COVID-19 and attachment styles: The role of interpersonal relationships in following health guidelines. *Journal of Health Psychology, 26*(8), 1234-1243. https://doi.org/10.1177/1359105320985374

Shereen, M. A., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020). Covid-19 infection: Emergence, transmission, and characteristics of human coronaviruses. *Journal of Advanced Research*, *24*, 91–98. https://doi.org/10.1016/j.jare.2020.03.005

South African National Department of Health. (2021). *COVID-19 online resource and news portal.* https://sacoronavirus.co.za/vaccine-updates/

Statistics South Africa. (2020). *National poverty lines.* http://www.statssa.gov.za/publications/P03101/P031012020.pdf.

Statistics South Africa. (2021). *Census 2021: Key results.* https://www.statssa.gov.za/publications/P03014/P030142021.pdf

Steenberg, B., Sokani, A., Myburgh, N., Mutevedzi, P., & Madhi, S. A. (2023). COVID-19 Vaccination Rollout: Aspects of Hesitancy in South Africa. *Vaccines, 11*(2), 407. https://doi.org/10.3390/vaccines11020407

Sweet, J. (2021). *The association between attachment style and decision-making style [Honours Theses, Union College]*. Digital Works. https://digitalworks.union.edu/theses/2418

Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics*. Pearson.

Tara, E. (2019) Review of Attachment Theory: Familial Predictors, Continuity and Change, and Intrapersonal and Relational Outcomes. *Marriage & Family Review*, *55*(1), 1-22.

Taylor, S., Landry, C., Paluszek, M., Groenewoud, R., Rachor, G., & Asmundson, G. (2020). A Proactive Approach for Managing COVID-19: The Importance of Understanding the

Motivational Roots of Vaccination Hesitancy for SARS-CoV2. *Frontiers In Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.575950

Tzeng, J. I., Yang, C. Y., & Chen, H. Y. (2021). Anxious attachment and health behaviors: The mediating role of help-seeking. *Psychology & Health, 36*(9), 1137-1152. https://doi.org/10.1080/08870446.2020.1835798

Ullman, J. B., & Bentler, P. M. (2013). *Structural equation modelling. Handbook of Psychology*. John Wiley & Sons, Inc.

UNICEF. (2020). *South African COVID-19 situation report. United Nations Children's Fund.* https://www.unicef.org/southafrica/reports/covid-19-situation-report-14

UNICEF. (2022). *Immunization: A global health success story.* https://www.unicef.org/immunization

Van Petegem, S., Beyers, W., Brenning, K., & Vansteenkiste, M. (2012). Exploring the association between insecure attachment styles and adolescent autonomy in family decision making: A differentiated approach. *Journal of Youth and Adolescence*, *42*(12), 1837–1846. https://doi.org/10.1007/s10964-012-9886-0

Vassallo, A., Shajahan, S., Harris, K., Hallam, L., Hockham, C., Womersley, K., Woodward, M., & Sheel, M. (2021). Sex and Gender in COVID-19 Vaccine Research: Substantial Evidence Gaps Remain. *Frontiers in Global Womens Health, 2*. https://doi.org/10.3389/fgwh.2021.761511

Venegas-Vera, A. V., Colbert, G. B., & Lerma, E. V. (2020). Positive and negative impact of social media in the COVID-19 era. *Reviews in Cardiovascular Medicine, 21*(4), 561-564. https://doi.org/10.31083/j.rcm.2020.04.195

Vismara, L., Lucarelli, L., & Sechi, C. (2022). Attachment style and mental health during the later stages of Covid-19 pandemic: The mediation role of loneliness and covid-19 anxiety.

BMC Psychology, *10*(1). https://doi.org/10.1186/s40359-022-00767-y

Wagner, A. L., Masters, N. B., Domek, G. J., Mathew, J. L., Sun, X., Asturias, E. J., Ren, J., Huang, Z., Contreras-Roldan, I. L., Gebremeskel, B., & Boulton, M. L. (2019). Comparisons of vaccine hesitancy across five low- and middle-income countries. *Vaccines*, *7*(4), 155. https://doi.org/10.3390/vaccines7040155

Walker, C., Fleischer, S., & Winn, S. (2008). A path analysis of first-year social science students' engagement with their degree and level 1 academic outcome. *Enhancing Learning in the Social Sciences, 1*(2), 1-19.

Wellcome Trust. (2018). *Wellcome Global Monitor 2018: Mapping the public's attitudes to science and health.* Wellcome Trust https://wellcome.org/reports/wellcome-global-monitor-2018

Wilson, S., & MacLean, R. (2011). *Research methods and data analysis for psychology*. McGraw-Hill Higher Education.

Wiysonge, C. S., Alobwede, S. M., de Marie C Katoto, P., Kidzeru, E. B., Lumngwena, E. N., Cooper, S., Goliath, R., Jackson, A., & Shey, M. S. (2022). Covid-19 vaccine acceptance and hesitancy among healthcare workers in South Africa. *Expert Review of Vaccines*, *21*(4), 549–559. https://doi.org/10.1080/14760584.2022.2023355

Wiysonge, C., Uthman, O., Ndumbe, P., & Hussey, G. (2012). Individual and ContextualFactors Associated with Low Childhood Immunisation Coverage in Sub-Saharan Africa: A Multilevel Analysis. *Plos ONE*, *7*(5), 37905. https://doi.org/10.1371/journal.pone.0037905

World Health Organization. (2020). *Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV).* https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations

World Health Organization. (2020). *WHO announces COVID-19 outbreak a pandemic?* https://cir.nii.ac.jp/crid/1370298757438164882

World Health Organization. (2021). *Vaccines and immunization. World Health Organization.* https://www.who.int/health-topics/vaccines-and-immunization

World Health Organization. (2022). *Vaccine equity*. https://www.who.int/campaigns/vaccine-equity

World Health Organization. (2024). *COVID-19 vaccination.* https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-vaccines

World Health Organization. (2024). *WHO COVID-19 Dashboard*. https://covid19.who.int/

Xie, Y., Choi, T., & Al-Aly, Z. (2024). Mortality in Patients Hospitalized for COVID-19 vs Influenza in Fall-Winter 2023-2024. *JAMA*, *331*(22), 1963–1965. https://doi.org/10.1001/jama.2024.7395

Zaçe, D., La Gatta, E., Petrella, L., & Di Pietro, M. (2022). The impact of COVID-19 vaccines on fertility-A systematic review and meta-analysis. *Vaccine, 40*(42), 6023–6034. https://doi.org/10.1016/j.vaccine.2022.09.019

Zainab Alimoradi, Anders Broström, Potenza, M. N., Lin, C.-Y., & Pakpour, A. H. (2024). Associations Between Behavioral Addictions and Mental Health Concerns During the COVID-19 Pandemic: A Systematic Review and Meta-analysis. *Current Addiction Reports*. https://doi.org/10.1007/s40429-024-00555-1

Zintel, S., Flock, C., Arbogast, A. L., Forster, A., Von Wagner, C., & Sieverding, M. (2022b). Gender differences in the intention to get vaccinated against COVID-19: a systematic review and meta-analysis. *Journal of Public Health, 31*(8), 1303–1327. https://doi.org/10.1007/s10389-021-01677-w

Zhao, X., Qiu, X., & Zhao, M. (2021). Vaccine hesitancy in the context of attachment theory: A systematic review. *Health Psychology Review, 15*(4), 444-460. https://doi.org/10.1080/17437199.2020.1868203

APPENDICES

Appendix A: TREC Ethics Clearance Certificate

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: tukiso.sewapa@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

DATE: 09 May 2024

PROJECT NUMBER: TREC/100/2024: PG

PROJECT:

Title: The role of an attachment style in COVID-19 vaccine hesitancy in high school learners.

Researcher: AC Maluka

Supervisor: Mr. K. Mashaba

Co-Supervisor/s: Prof S. Mashegoane

School: Social Sciences

Degree: Master in Clininal Psychology

PROF D MAPOSA
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:

i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**

ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**

iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

Finding solutions for Africa

Appendix B: Logistic regression to predict the likelihood of a learner being vaccinated

Binary logistic regression was computed to determine whether gender and attachment styles (Anxiety and Avoidance, mother and father versions, respectively) were associated with the probability of learners being vaccinated. The overall model was not statistically significant, $X^2(5) = 6.103, p > .05$, suggesting that it could not distinguish between learners who vaccinated and those who did not. The explained variation in the dependent variable based onthe model tested ranges from 3.2% (Cox and Snell R^2) to 5.2% (Nagelkerke R^2). None of the independent variables, namely, gender, Anxiety and Avoidance (mother and father, respectively) contributed significantly to the model (*ps* > .05). Thus, the odds ratios of the independent variables were not interpreted.

Table 3: Logistic regression to predict the likelihood of a learner being vaccinated

	B	S. E	Wald	df.	P	OR (95%CI)
Constant	1.835	.825	4.951	1	.026	6.266
Gender	-0.449	.400	1.263	1	.261	0.638 (0.292. 1.397)
Anxiety(Mother	0.032	.020	2.603	1	.107	1.033 (0.993. 1.073)
Avoidance(Mother)	-0.031	.026	1.387	1	.239	0.970 (0.922. 1.021)
Anxiety(Father	-0.008	.020	0.157	1	.692	0.992 (0.954. 1.032)
Avoidance (Father)	-0.022	.021	1.066	1	.302	0.978 (0.938. 1.020)