

CHALLENGING THE INFALLIBILITY OF DNA EVIDENCE: A CALL FOR REFORM IN THE CRIMINAL JUSTICE SYSTEM

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DECLARATION

I declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Laws in the field of Law of Evidence at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

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“Genes are like the story, and DNA is the language that the story is written in.”

- Sam Keane, 2012.

ABSTRACT

Forensic evidence, particularly DNA, has played a significant role in the criminal justice system for decades. Technological advancements such as Polymerase Chain Reaction (PCR) and Short Tandem Repeat (STR) analysis have significantly enhanced the precision and reliability of DNA testing, making it a critical tool for identifying perpetrators and determining their involvement in criminal activities. However, the growing reliance on DNA evidence raises important questions about its perceived infallibility and the potential risks associated with its use. This thesis critically examines the role of DNA evidence in the criminal justice system, focusing on the legal and practical challenges that undermine its reliability and fairness.

The study investigates the admissibility standards for DNA evidence, comparing the legal frameworks of South Africa and the United States of America. It highlights the legal problems associated with expert testimony in DNA cases and questions whether current standards adequately address the complexities of forensic science. Despite its transformative impact, DNA evidence is not immune to errors. Issues such as sample contamination, mislabelling, improper laboratory handling, and insufficiently trained personnel can compromise the integrity of DNA evidence, leading to wrongful convictions and undermining the constitutional rights of the accused.

This thesis also explores the broader implications of these challenges, questioning the justifiability of convictions based solely on DNA evidence. By critically analysing the limitations and risks associated with DNA evidence, this research aims to contribute to a more nuanced understanding of its role in the criminal justice system and to advocate for reforms that ensure its responsible and equitable use.

KEYWORDS:

DNA evidence, forensic evidence, chain of evidence, admissibility, relevance, reliability, expert evidence, corroboration, Criminal Procedure Act, Federal Rules of Evidence, criminal justice system.

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND

The law of evidence is a fundamental aspect in the justice system. It is particularly important in criminal proceedings where it plays a vital role in establishing the guilt or innocence of an accused person. Since its first application in the 1980s, deoxyribonucleic acid (DNA) profiling has been hailed as the ‘golden standard’ of forensic evidence and subsequently held in high esteem for its perceived infallibility. This widespread perception of DNA evidence being infallible has led to its widespread adoption and great reliance in forensic investigations and courtroom proceedings around the world. However, is this reputation warranted? This thesis delves into the complexities surrounding DNA evidence by exploring the tensions between its apparent infallibility and the nuances of its application in criminal proceedings.

The integration of forensic science (particularly DNA evidence) into the legal framework of South Africa has transformed the criminal justice system. Forensic science involves the application of scientific methodologies to investigate crimes by analysing evidence such as DNA evidence and fingerprint evidence.¹ Its introduction has thus, over the years, garnered support from judicial courts as well as scholars. In South Africa, where soaring crime rates have made perpetrator identification and apprehension increasingly challenging, forensic evidence, especially DNA evidence, has proven invaluable for forensic investigations and identifications.² This owes to the fact that DNA evidence can be used to identify a match between a sample found at a crime scene and a victim and/or suspect.³ It can be used to resolve the facts at issue such as the presence of the accused at the crime scene, their involvement in the commission of the crime, and the prior involvement of the suspect with the victim.⁴

It is thus evident that DNA evidence has revolutionised our legal landscape, however, its efficacy is contingent upon meticulous collection and handling. Before its presentation in court, DNA evidence must meet stringent requirements, including a maintained and demonstrable chain of evidence. This is so as to ensure that the evidence had been securely stored, protected

¹ Franjic S ‘Legal Aspects of Forensics’ (2018) 4 *Forensic Science* 1.

² Meintjes-van der Walt L & Dhliwayo P ‘DNA Evidence as the Basis for Conviction’ (2021) 24 *PELJ* 1 at 2 and 4.

³ Ibid.

⁴ Ibid.

from being tampered with and is contamination free.⁵ The awareness and acknowledgement of potential issues when dealing with DNA evidence – contamination, degradation, human error and DNA transfer – is vital to harnessing the full potential of DNA evidence and promoting a just criminal justice system.

This study, therefore, undertakes a critical examination of the admissibility rules governing DNA evidence in South Africa, with a comparative analysis of the approaches employed in the United States of America (USA). It will investigate the collection and handling of the evidence as an important component of the chain of custody required for it to be admissible. It will also analyse the interpretation of DNA evidence and how interpretation errors could greatly prejudice an accused, if unnoticed. Furthermore, it will also consider whether the categorisation of DNA as circumstantial evidence has an effect on the weight attached to it and if DNA evidence on its own could lead to a conviction. Moreover, this research paper aims to investigate the shortcomings of DNA evidence. To this effect, the paper will use the USA jurisdiction as a comparative framework mainly due to its similar justice system.⁶

1.2 MOTIVATION OF STUDY

The motivation is rooted in the various problems encountered by our judiciary when dealing with DNA evidence. The conducted research will highlight the existence of considerable uncertainty and misconceptions surrounding this type of evidence in the legal community. Despite the uncertainty and misconceptions, it becomes apparent that DNA evidence is still greatly relied upon in criminal proceedings due to the fact that every human being has their own unique DNA.⁷ However, it is this great reliance on DNA evidence and its perceived infallibility that has resulted in judicial courts solely relying on it for a conviction and legal practitioners believing the misconception that DNA evidence is immune to errors. Due to DNA evidence being rooted in scientific principles and methodologies, albeit applied in legal and forensic contexts, it raises a difficulty for legal practitioners as many of them have little to no knowledge regarding DNA collection, testing methodology, nor its interpretation.⁸ This has resulted in judicial officers attaching great weight to DNA evidence, even in circumstances

⁵ Meintjes-van der Walt L *DNA in the Courtroom: Principles and Practice* (2010) 14.

⁶ See 1.4 Methodology below.

⁷ L Meintjes-van der Walt 'An Overview of the use of DNA evidence in South African Criminal Courts' (2008) 21 *South African Journal of Criminal Justice* 22 at 24.

⁸ Visser J *First Generation Evidence and Its Influence on Legal Decision-making – A South African Perspective* (unpublished LLD thesis, University of the Free State, 2013) at 121.

where this would be prejudicial,⁹ such as when the chain of evidence has been broken or there is risk that the sample could have been contaminated.

This research paper will thus shed light on some of the often-overlooked problems encountered when dealing with DNA evidence, such as sample contamination, DNA transfer and improper collection and handling of crime scene samples. By examining these critical issues, the research paper aims to address its implications on the evidentiary system. These practical and technical issues have an adverse effect in the sense that they undermine admissibility standards and raises questions on whether the legal safeguards of our judiciary are sufficient in ensuring that wrongful convictions are mitigated. Essentially, this research will address how too great a reliance on DNA evidence, despite its known limitations, has led to the dire need to develop our admissibility and evidentiary evaluation standards as means of ensuring that justice is served in all cases. This research paper thus aims to enhance the integrity of DNA evidence and ensure competent evaluation of such. Ultimately, the goal is to promote justice through more reliable and efficient criminal proceedings.

To achieve this, the research paper will provide recommendations for addressing the complex challenges surrounding DNA evidence. These recommendations will inform evidence-based policy reforms and guide best practices for handling DNA evidence in criminal proceedings.

1.3 RESEARCH OBJECTIVES AND RESEARCH QUESTIONS

The primary objective of this research is to challenge the infamous notion that DNA evidence is infallible and demonstrate why it should not solely be relied on for a conviction.

The secondary questions that will flow from this objective are:

1. What is DNA evidence and how is collected?
2. What are the admissibility rules for DNA evidence in South Africa and the United States of America?
3. What are the problems associated with DNA evidence?
4. How do courts evaluate DNA evidence, and are the evaluation standards sufficient to safeguard against a wrongful conviction?

⁹ Ibid. See also Sangero B ‘Safety from Flawed Forensic Sciences Evidence’ (2018) 34 *Georgia State University LR* 1129 at 1135.

1.4 BRIEF OVERVIEW OF RESEARCH FRAMEWORK

DNA-containing biological material has been, over the years, presented and admitted as evidence for its ability to serve as an investigation and identification tool.¹⁰ Prosecutors have presented DNA evidence in courts as the only piece of evidence, with hopes of securing a conviction. However, the sole reliance on DNA evidence poses a great danger to the administration of justice because DNA evidence is not as infallible as popularly believed.¹¹

In criminal cases, the burden of proof rests on the prosecuting party, and the guilt of the accused should be proven beyond reasonable doubt. The adversarial nature of both the jurisdictions of South Africa and USA means that litigating parties are free to adduce their own evidence, but such evidence should be relevant.¹² Due to DNA evidence being real evidence in its nature, the opinion of an expert witness is needed in both jurisdictions because such forensic science requires expertise.¹³ Therefore, when DNA evidence is relevant and the expert can offer appreciable help to the court, it may be admitted as evidence. However, in South Africa, where such evidence is obtained unconstitutionally, section 35(5) of the Constitution, 1996 states that such evidence is inadmissible.¹⁴ This is to ensure that the right of the accused to a fair trial is protected.

The admissibility DNA evidence in USA is determined by the reliability of the scientific method used. The landmark case of *Daubert* (the *Daubert* trilogy) states that expert testimony must be reliable and offer the judge with appreciable help; there must not be a great gap between the evidence relied on by the expert and their conclusion; and the gatekeeping function of the judge applies to all expert testimonies.¹⁵ According to the *Frye* standard (which is used by the South African judiciary), expert testimony is only admissible if the scientific method used and relied on by the expert is generally accepted by the scientific community.¹⁶

The problems associated with DNA evidence are hard to ignore, especially in cases where courts are only provided this piece of evidence for a conviction. Albeit South Africa does not keep record of exonerations or wrongful convictions, it does not mean that there has not been

¹⁰ Franjic op cit note 1.

¹¹ Visser op cit note 8 at 121.

¹² Criminal Procedure Act: s 210.

¹³ *Holtzhauzen v Roodt* 1997 (4) SA 766 at 772C-D.

¹⁴ Constitution, 1996: s 35(5).

¹⁵ Olaborede A & Meintjes-van der Walt L 'The Dangers of Convictions Based on a Single Piece of Forensic Evidence' (2020) 23 *PELJ* 1at 9.

¹⁶ *Frye v United States* (1923) 54 App. D.C 46 at 1013-1014. See National Research Council *Strengthening Forensic Science in the United States: A Path Forward* (2009) 88.

any. The sole reliance on DNA poses a risk of wrongful convictions and should thus not be taken lightly.

1.4 METHODOLOGY

The proposed research will make use of a theoretical approach. It aims to focus on the legal framework that governs DNA evidence. It will thus strictly rely on applied research to make findings on DNA evidence, as opposed to qualitative research that make use of questionnaires and surveys. Furthermore, it will make use of both a doctrinal and normative approach. A doctrinal approach will be effective in assessing and gaining an in-depth descriptive and detailed analysis of the regulatory framework of DNA evidence. To this end, primary sources such as case law, legislation and federal rules, as well as secondary sources (books and journal articles) will be used.

A normative approach seeks to develop thorough understanding of DNA evidence and its implications by making use of a comparative analysis between South Africa and the Federal Laws of the USA, as opposed to its State Law. This is due to the diverse evidentiary landscape in the country with the different States having different State law. The significance of Federal law is further underscored by the landmark *Frye* and *Daubert* cases (discussed in Chapter Three). These cases have led to the Federal Rules of Evidence (FRE) that are currently being used and have thus established crucial precedents for expert evidence admissibility in the USA courts, including in relation to DNA evidence. As expert evidence plays a pivotal role in the evaluation of DNA evidence, understanding the implications of *Frye* and *Daubert* is essential.

To compare, engage and assess the implications of DNA evidence when solely relied upon for convictions, this research paper will analyse the views of American scholars, as well as their laws because both jurisdictions are Anglo-American. This specific jurisdiction has been chosen because South Africa does not bar convictions based on DNA evidence alone,¹⁷ unlike the former jurisdiction which has placed limitations and guidelines. A comparative analysis between these jurisdictions will be effective because their evidentiary rules have a foundation of English common law.

1.5 LIMITATIONS OF STUDY

DNA finds its foundation in science. However, this research paper will not explore the medical science of DNA in depth, but rather, it will provide a brief overview of its biochemistry to

¹⁷ Meintjes-Van der Walt & Dhliwayo op cit note 2 at 26.

contextualise the medical science. Furthermore, because this is a comparative study, it focuses on the Federal Law in the USA as opposed to State law (as mentioned above).

The study will also focus on problems encountered when dealing with DNA such as contamination, degradation, laboratory errors and DNA transfer. Albeit this is not an exhaustive list, the research will not delve deep into statistical errors and interpretation, and thus independent research would be required for this purpose. Lastly, the conclusions drawn from this research will be based solely on the findings and analysis of the research presented herein. The recommendations presented herein will be limited to the scope of this investigation, thus ensuring that they are practical and a relevant contribution to the existing body of knowledge.

1.6 CHAPTER OUTLINE

The research paper is structured as follows:

Chapter One introduced the topic, including a brief background to the research objective and questions. It also contained the method, outline, aim and limitation of the study.

Chapter Two will focus on explaining what DNA is as well as the scientific methods and techniques used by scientists to analyse DNA. The methods and techniques focused on are those that are currently preferred in the jurisdiction of South Africa. The study will also assess how DNA-containing material and samples are collected, stored and subsequently presented in criminal proceedings.

Chapter Three will analyse the evidentiary rules governing admissibility and consider whether these rules should be developed. It will firstly focus on the development of the rules of evidence in South Africa, by considering the criteria used to determine the admissibility of evidence in general, as well as DNA and expert evidence. Further, this chapter will use the USA standards and criteria to assess whether the South African admissibility rules should be further developed to match those of the USA.

Albeit believed to be the superior type of forensic evidence for identification, DNA has been met with different challenges, including degradation, laboratory errors, contamination, DNA transfer and the chain of evidence. Therefore, Chapter Four will explore these factors in depth and analyse how they pose a problem to the admissibility of DNA evidence, as well as their effect on wrongful convictions.

Chapter Five will focus on the evaluation of evidence in courts. This will be done taking into consideration the problems explored in Chapter Four. In essence, Chapter Five will look at the process involved, the role that presiding officers play in the evaluation of evidence and how they determine the evidentiary weight. In respect of this, it will also focus on the factors that affect weight. To this effect, this study proposes that the judiciary should concern itself with the inconsistencies, error rates and problems associated with DNA evidence before pronouncing a guilty verdict on one-piece of evidence.

Based on the research conducted, and taking into consideration the USA position, recommendations will be made in Chapter Six for the admissibility, evaluation as well as problems associated with DNA evidence. Furthermore, it will propose ways in which the legislature can make amendments to the CPA in light of the problems highlighted in the previous chapters.

1.7 CONCLUSION

From the brief overview that has been provided within this chapter, it is apparent that there are quite a number of problematic issues regarding DNA evidence in South Africa that are in dire need of being looked into. Despite it being regarded as the ‘gold standard’ of forensic evidence,¹⁸ it has not been without criticism. Such criticism has left the impression that the problems encountered when dealing with DNA evidence have left a dent in our judicial system as it could lead to a lot of wrongful convictions.¹⁹ This is mainly due to judicial courts relying solely on DNA evidence for a conviction because, in South Africa, a conviction based on a single piece of evidence is not prohibited by the law.²⁰

Relying exclusively on DNA evidence for a conviction can be troublesome, especially in cases where there is no corroborating evidence. The South African judiciary has, however, established that DNA evidence alone is enough to support a conviction when it is relevant and admissible.²¹ To the contrary, Meintjes-Van der Walt and Dhliwayo have submitted contentions in this regard and emphasise that great caution should be exercised when relying

¹⁸ DE Shelton *Forensic science in court: Challenges in the twenty-first century* (2011) 27.

¹⁹ Behrouzfar NR ‘Strengths, limitations and controversies of DNA evidence: Trends and issues in scientific evidence’ (2006) 1 *Southern New England Roundtable Symposium LJ* 110 at 112.

²⁰ Meintjes-Van der Walt & Dhliwayo op cit note 2 at 26.

²¹ Ibid. Criminal Procedure Act: sec. 210.

solely on DNA evidence.²² Against this background, this research paper argues that sole reliance on DNA evidence is perilous due to potential errors.

²² Meintjes-Van der Walt & Dhliwayo op cit note 2 at 27.

CHAPTER TWO

DNA EVIDENCE IN SOUTH AFRICAN CRIMINAL PROCEEDINGS: COLLECTION, ANALYSIS AND APPLICATION

2.1 INTRODUCTION

Every human being has a distinctive identifying feature that comes from their DNA (or deoxyribonucleic acid). DNA is defined in the Criminal Procedure Act (CPA)¹ as a ‘deoxyribonucleic acid which is a bio-chemical molecule found in the cells and that makes each species unique’.² There are two sets of DNA – nuclear DNA and mitochondrial DNA.³ The former is the focus of this research paper.

DNA is a great individuating factor because every human being, with identical twins being the exception, has their own unique DNA, which is the same throughout the body.⁴ Nevertheless, every individual shares certain traits with their parent because each individual inherits 23 pairs from their mother and 23 pairs from their father which totals 46 chromosomes.⁵ The chromosomes, in their totality, make up the genetic material that is passed from parent to child.⁶

DNA evidence has evidentiary significance that is well beyond paternity issues, and can thus be used for identification purposes.⁷ This is also true for the identification of deceased persons. With twins being the exception, it has been discovered that humans share 99,99 per cent of DNA and only .01 per cent is unique to every individual.⁸ Owing to its presence throughout the body, DNA can be extracted from almost any human cells for analytical purposes.⁹ There are thus a wide variety of sources from which DNA can be extracted, such as teeth, hair roots, semen, saliva, blood and bone tissue.¹⁰

Due to DNA being a powerful identifying factor, it comes to reason that the use of forensic evidence, in conjunction with other forensic techniques, is very effective in aiding to

¹ Criminal Procedure Act 51 of 1977.

² Criminal Procedure Act at s 36A(1)(fB) as amended by the Criminal Law (Forensic Procedures) Amendment Act 37 of 2013.

³ *S v SB* 2014 (1) SACR 66 (SCA): para 8. Mitochondrial DNA is genetic material that can only be inherited maternally, while nuclear DNA is genetic material that is inherited from both parents.

⁴ *Ibid* at 24-5.

⁵ Bellengere, Theophilopoulos & Palmer (eds) *The Law of Evidence in South Africa* 2 ed (2019) at 470.

⁶ Meintjes-van der Walt L ‘An Overview of the use of DNA evidence in South African Criminal Courts’ (2008) 21 *South African Journal of Criminal Justice* 22 at 24.

⁷ Bellengere, Theophilopoulos & Palmer (eds) *op cit* note 5 at 470.

⁸ Meintjes-Van der Walt *Overview* *op cit* note 6 at 24.

⁹ Bellengere, Theophilopoulos & Palmer (eds) *op cit* note 5 at 470.

¹⁰ Meintjes-van der Walt L & Dhliwayo P ‘DNA Evidence as the Basis for Conviction’ (2021) 24 *PELJ* 1 at 24.

successfully investigate crimes and prosecute offenders.¹¹ Therefore, the aim of this chapter is to briefly explain the biochemical nature of DNA, and investigate how it is collected, stored, used and subsequently tested for analytical purposes.

Prior to understanding DNA analysis, DNA profiles and their use in criminal proceedings, it is imperative that anyone involved familiarises themselves with the medical science of DNA. However, this study merely provides a brief overview to contextualise the medical science underlying DNA testing and will thus not explore it in depth.

2.2 THE BIOCHEMISTRY OF DNA

The human body is made up of cells, each of which contains a nucleus.¹² Each nucleus contains 46 chromosomes, arranged into 23 pairs. Each chromosome contains thousands of genes that are composed of DNA, grouped in pairs in a double helix pattern.¹³ The double helix pattern is formed by base pairs that are linked to each other.¹⁴ The sequence in which base pairs are arranged in each chromosome varies among individuals.¹⁵ Therefore, the identity of a person could be determined by their base pair sequence only.¹⁶ However, this is not a feasible option due to the great number of base pairs that make up the DNA in the nucleus of each human cell.¹⁷ Scientists have since developed techniques aimed at eradicating this problem.

These techniques allow for a limited quantity of DNA sequences to be analysed at specific locations on a chromosome that are known to differ among individuals.¹⁸ This specific location is known as a locus (or loci in plural), which is where a gene can be found. A gene is made up of a pair of alleles, one maternal and the other paternal.¹⁹ This pair of alleles is referred to as a genotype – a unique combination of genetic information that is encoded in the DNA of an individual, and determines, inter alia, their traits and characteristics.²⁰ A group of genotypes at two or more loci make up the DNA profile of an individual.²¹ These profiles are generated

¹¹ De Wet S, Oosthuizen H & Visser J 'DNA Profiling and the Law in South Africa' (2011) 14 *PELJ* 171 at 171.

¹² Meintjes-van der Walt L *DNA in the Courtroom: Principles and Practice* (2010) 9.

¹³ *Ibid.*

¹⁴ *S v SB* supra note 3: para 10.

¹⁵ *Ibid.*

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ *Ibid* para 11.

¹⁹ *Ibid* para 12.

²⁰ *Ibid.*

²¹ *Ibid.*

through the analysis of the part of DNA that is unique to every individual.²² In order to develop these profiles, scientists make use of testing methods which will be discussed below.

2.3 CHAIN OF EVIDENCE

2.3.1 Collection of DNA evidence

The stage of collecting evidence is the first stage where methods, techniques and procedures are applied to retrieve evidence.²³ It is, however, important to note that, at this stage, whatever is collected at the crime scene is merely just information and can only be evidence once it has been admitted at court.²⁴ However, this research paper will refer to it as evidence throughout the paper albeit it has not been formally admitted as such.

When crime scenes are investigated for potential evidence, the crime scene examiners may find a sample of human tissue or bodily fluid that could be used to identify the depositor of the sample through the genetic material or DNA available within the collected sample.²⁵ Crime scene investigations are important for the recording of the scene, identification of physical evidence and the collection of biological and other potential evidence.²⁶ In his work, Pepper²⁷ issues a warning to crime scene examiners to take due diligence in examining the scene and collecting evidence because they only have one chance to recover evidence that might help prove a case; anything not collected may be contaminated and destroyed. It goes to reason that if there is a problem at this stage of the process, which is deemed the most important, the laboratories will produce erroneous statistics, thus making it impossible to obtain accurate results.²⁸

Due to the tedious and time-consuming nature of examining a crime scene, it is imperative that crime scene investigations are carried out by qualified personnel for the proper collection of DNA-containing evidence.²⁹ With respect to the collection of samples from, inter alia, accused persons and suspects, section 36D of the CPA allows for the collection of evidence by

²² De Wet op cit note 11 at 173-174.

²³ Maharaj U *The importance of DNA as an investigation tool* (unpublished Masters' thesis, University of South Africa, 2013) at 59.

²⁴ Bellengere, Theophilopoulos & Palmer (eds) op cit note 5 at 2 & 63.

²⁵ De Wet op cit note 11 at 175.

²⁶ De Wet op cit note 11 at 179.

²⁷ Pepper IK *Crime scene investigation: methods and procedures* (2005) at 13. See also Maharaj op cit note 23 at 42.

²⁸ Meintjes-Van der Walt *Courtroom* op cit note 12 at 13.

²⁹ Ibid.

authorised persons in different circumstances.³⁰ In the case of taking bodily and buccal samples,³¹ the CPA defines an ‘authorised person’ as:³²

...any police official or member of the Independent Police Investigative Directorate, referred to in the Independent Police Investigative Directorate Act, who is not the crime scene examiner of the particular case, but has successfully undergone the training prescribed by the Minister of the Health under the National Health Act, in respect of the taking of a buccal sample.

A buccal sample ought to be taken by an authorised person who is of the same gender as the person whose sample is being taken, and it should be taken in a decent and orderly manner.³³ The authorised person is obliged to take the samples in accordance with the requirements set by the Minister of Police, in ‘a designated area deemed suitable for such purposes’.³⁴ Furthermore, the person must have consented to their sample being taken, or the officer must otherwise be authorised in terms of either section 36D or 36E.³⁵ The two former sections regulate the taking of buccal, bodily and crime scene sample in various scenarios, as well as for investigation purposes, respectively.³⁶

Section 36D expressly deals with the taking of buccal samples and bodily samples that are to be compared to crime scene samples. Subsection (1) regulates the circumstances under which an authorised person and a registered medical practitioner must take a buccal sample and bodily sample, respectively.³⁷ Amongst others, it deals expressly with persons who have been charged or accused of having committed a Schedule 8 offence.³⁸ Any person who is accused of having committed any crime listed under Schedule 8 is obligated to have their samples taken. It is only a medical practitioner that has the necessary authorisation to take intimate samples, such as the genitalia of the individual.³⁹ On the contrary, subsection (2) does not obligate officers and medical practitioners to take samples because it does not deal with specific offences committed, but rather any offence. In accordance with this subsection, it is not mandatory that these samples are taken when the person has committed any other offence but may, under certain

³⁰ Criminal Procedure Act: s 36D.

³¹ A bodily sample is an intimate or buccal sample taken from a person, while a buccal sample is cellular material taken from the inside of a person’s mouth.

³² Ibid: s 36A(1)(b)(ii).

³³ Ibid: s 36A(3).

³⁴ Ibid: s 36A(5).

³⁵ Ibid: s 36A(4).

³⁶ This should be done in accordance with The Forensic DNA Regulations, 2015 as stated under s 15A-D of the South African Police Service Act 68 of 1995.

³⁷ Criminal Procedure Act: s 36D(1).

³⁸ Ibid. Schedule 8 offences include, for example, murder, rape and treason. See further Criminal Procedure Act: Schedule 8.

³⁹ Ibid: s 36D(7)(d). See also De Wet op cit note 11 at 179-180.

circumstances, be taken.⁴⁰ Lastly, in accordance with subsection (7)(a), any forensic DNA profile derived from any of the samples obtained through the application of this section, may be used for a comparative search.⁴¹

Section 36E deals with samples which have been taken for investigative purposes. If there are reasonable grounds for an authorised person to suspect that an individual or a group of individuals have committed any Schedule 8 offence, such authorised person may take a buccal sample of the suspect if he is of the belief that the sample or results of the forensic DNA analysis thereof will be useful in the criminal investigation by including or excluding the individual or individuals as potential perpetrators.⁴² Any individual who wishes to take their own sample has to do so under the supervision of the authorised person. Where an individual refuses to consent to the taking of the sample, a warrant may be issued to this effect.⁴³

The taking of blood samples is regulated by section 37 of the CPA which focuses on the ascertainment of body-prints and bodily appearance of accused and convicted persons. Subsection (2) states that authorised medical professionals, including prison medical officers or registered nurses, may take necessary measures (such as blood samples) to ascertain whether an individual ‘has any mark, characteristic or distinguishing feature or shows any condition or appearance’.⁴⁴ Furthermore, a registered medical practitioner, working at a hospital, may take or authorise a blood sample from a patient if he or she has reasonable grounds to believe that the blood contents of the patient may be relevant in future criminal proceedings.⁴⁵ This includes a comparative search for forensic DNA profiles.

Section 37 thus does not allow police officers to take any blood samples but rather gives authority to registered medical practitioners or a registered nurse. Furthermore, according to section 225(2) of the CPA, evidence of the blood samples will not be excluded based only on the fact that it was not obtained in compliance with section 37.⁴⁶ However, the collection of these blood and buccal samples has not been met without challenges.

⁴⁰ Ibid: s 36D(2).

⁴¹ Ibid: s 36D(7)(a). According to s 36D(7)(c), anyone who acts contrary to this section is guilty of an offence and is thus liable for imprisonment or a fine.

⁴² Ibid: s 36E(1).

⁴³ Ibid: s 36E(2).

⁴⁴ Criminal Procedure Act: s 37(2).

⁴⁵ Ibid.

⁴⁶ Ibid: s 225(2). See also Meintjes-Van der Walt *Courtroom* op cit note 12 at 16. However, this exclusion could be justified by s 35(5) of the Constitution, 1996.

In the case of *S v Orrie and Another*,⁴⁷ the accused contested the constitutionality of a statutory provision authorising the state to collect the blood sample of an accused person for DNA testing in criminal investigations. The accused contested that such invasive procedures infringed upon his constitutionally guaranteed rights to dignity and bodily integrity.⁴⁸ However, upon examination, the court determined that while the taking of blood did indeed constitute a limited infringement on the constitutional rights of the accused person, the infringement was reasonably justified and necessary to advance the interests of justice.⁴⁹ The court conducted a balancing exercise by weighing the constitutional rights of the individual against interests of the state in effective law enforcement. Ultimately, the court upheld the constitutional validity of the statutory provision, finding that it struck a balance between individual constitutional rights and the broader interests of justice in investigating and prosecuting crimes.⁵⁰

The abovementioned sections outline the manner in which DNA samples ought to be collected in order to be admissible in court as evidence. In his work, Ellis emphasises the importance of using the correct methodology to collect the evidence by stating that the admissibility of the DNA evidence will be challenged in court based on the methodology used.⁵¹ On the contrary, Goodwin and Meintjes-Van der Walt contend that DNA evidence, if relevant, is admissible despite the methodology used and only the weight to be attached to such evidence would be affected.⁵² This research paper is in support of the latter argument as the current admissibility rules only require the evidence to be relevant to the facts in dispute. This argument was supported and confirmed in *S v SB* where the court emphasised the importance of a maintained chain of evidence in respect of properly taken and safeguarded samples.⁵³ However, it is not only the manner in which the samples are collected that play a part in the admissibility of DNA evidence, the manner in which they are sealed, stored and handled also plays a role.

2.3.2 Handling DNA evidence

The correct handling of any piece of evidence attributes to a maintained chain of evidence, which is crucial in a criminal investigation and the subsequent trial. Chain of evidence is the continuous line of responsibility that ensures that the samples, data and any other documents

⁴⁷ *S v Orrie and Another* 2004 (1) SACR 162 (C).

⁴⁸ *Ibid* para. 6.

⁴⁹ *Ibid* para. 20.

⁵⁰ *Ibid*.

⁵¹ Ellis A 'A Baby Rape: Why Does the Law Not Protect Them?' (2003) 28 *Tydskrif vir Regswetenskap* 68. See De Wet op cit note 11 at 180.

⁵² Goodwin JA & Meintjes-van der Walt L 'The Use of DNA Evidence in South Africa: Powerful tool or prone to pitfalls?' (1997) 114 *SALJ* 151 at 168-169.

⁵³ *S v SB* supra note 3 para 18. As was confirmed in *United States v Tatum* 548 F.3d 548 (7th Cir. 2008).

used for criminal investigation purposes are protected.⁵⁴ It essentially comes into existence the minute that a sample is discovered and collected.⁵⁵

Chain of evidence plays such a significant role in criminal proceedings that it cannot be simply overlooked.⁵⁶ It is essential in determining whether the sample that has been submitted for testing is authentic and reliable.⁵⁷ Therefore, the proper, or improper, collection, preserving and handling of DNA evidence has a direct effect on its admissibility in court as it may be challenged by the defence if any irregularities are discovered,⁵⁸ as was the case in *Botha v S*.⁵⁹ It remains the responsibility of the prosecution to demonstrate and prove that the evidence, while being handled, analysed, transported and stored, had not been tampered or altered in any way until the results thereof had been received from the laboratory.⁶⁰ The court, in *S v Matshaba*, stated:⁶¹

The importance of proving the chain of evidence is to indicate the absence of alteration or substitution of evidence. If no admissions are made by the defence, the State bears the onus to prove the chain of evidence. The State must establish the name of each person who handles the evidence, the date on which it was handled and the duration.

The concept of chain of evidence is aimed at achieving two objectives. The first goal is ascertaining whether there exists a link between the crime scene, the perpetrator and the crime scene sample.⁶² The second goal is aimed at establishing whether the evidence is what it is claimed to be.⁶³ Essentially, it establishes whether there is a link that exists between the admitted evidence and the crime committed, whether the sample has undergone analysis, and whether it was stored and preserved properly so as to eliminate contamination.⁶⁴ These goals are achieved by eliminating any possibility of significant alteration, manipulation or

⁵⁴ Mainali LP & Soti BP 'Chain of custody management as a major strategic component in the criminal justice system in Nepal' (2021) 15 *National Judicial Academy LJ* 67 at 67-68.

⁵⁵ Meintjes-Van der Walt *Courtroom* op cit note 12 at 14.

⁵⁶ McDonald R 'Juries and Crime Labs: Correcting the weak links in the DNA chain' (1998) 24 *American Journal of Law and Medicine* 345 at 358.

⁵⁷ Meintjes-Van der Walt & Dhliwayo op cit note 10 at 9.

⁵⁸ Holobinko 'A Forensic Human Identification in the United States and Canada: A Review of the Law, Admissible Techniques and the Legal Implications of their Application in Forensic Cases' (2012) 222 *Forensic Science International* 394. See also Maharaj op cit note 23 at 43 and Becker RF *Criminal investigation* 3 ed (2009) 34.

⁵⁹ *Botha v S* [2017] ZAGHC 29.

⁶⁰ Maharaj op cit note 23 at 59.

⁶¹ *S v Matshaba* 2016 (2) SACR 651 (NWM) para 14.

⁶² Meintjes-Van der Walt *Courtroom* op cit note 12 at 14.

⁶³ *Ibid.*

⁶⁴ *Ibid.*

substitution.⁶⁵ Meintjes-Van der Walt and Dhliwayo further add that, in order to achieve this, a suitable bagging, labelling and recording system needs to be implemented to prove that the entire process of collection, handling and transporting was free of contamination.⁶⁶ This was also confirmed in *S v Moraba* where the court held that the proper labelling and packaging of exhibits is of paramount importance in ensuring the reliability of the chain of evidence.⁶⁷ In the event that a material that is tested for DNA has undergone significant manipulation or alteration, it becomes a material that is different from the one that was seized and loses its significance in the case.⁶⁸

In order to prove that the chain of evidence was maintained, the prosecution, when challenged, may submit an affidavit that testifies to its claims. This is in accordance with section 212(8) of the CPA which allows for an affidavit to be submitted as *prima facie* proof where, in criminal proceedings, the:⁶⁹

collection, receipt, custody, packing, marking, delivery or despatch of any fingerprint or body-print, article of clothing, specimen, bodily sample, crime scene sample, tissue (as defined in section 1 of the National Health Act), or any object of whatever nature is relevant to the issue.

In the case of DNA evidence, the affidavit must state that any person who received, delivered or dispatched the evidence described in the affidavit to any other person, institution, state department or other body specified in the affidavit, while carrying out their official duties, had packed or marked the evidence in the manner described in the affidavit.⁷⁰ In addition, the affidavit must specify the precise timeframe during which such persons had custody of said evidence.⁷¹

The South African National Accreditation Systems (SANAS) has also provided technical guidelines that must be adhered to by laboratories.⁷² With respect to these guidelines, laboratories are required to establish a quality system, ensure that the personnel is suitably qualified and implement procedures to prevent contamination and safeguard evidence integrity.

⁶⁵ Ibid.

⁶⁶ Meintjes-Van der Walt & Dhliwayo op cit note 10 at 10.

⁶⁷ *S v Moraba* [2017] ZALMPPHC 6 para 109-110.

⁶⁸ Meintjes-Van der Walt *Courtroom* op cit note 12 at 14.

⁶⁹ Criminal Procedure Act: s 212(8)(a).

⁷⁰ Ibid: s 212(8)(a)(ii)(aa)-(bb).

⁷¹ Ibid: s 212(8)(a)(ii)(cc).

⁷² See South African National Accreditation Systems 'Technical guidelines for forensic DNA testing laboratories' available at <https://www.sanas.co.za/Publications%20and%20Manuals%20Files/TG%2042-03.pdf>, accessed on 14 July 2024. SANAS is a public entity established as the sole accreditation body in South Africa for the accreditation of conformity assessment and calibration and monitoring of good laboratory practice in terms of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act 19 of 2006.

They must also use validated methods and suitable equipment, as well as establish guidelines for data protection while retaining evidence samples, where possible. In order to ensure compliance with these guidelines, laboratories must also conduct annual audits and maintain the highest level of integrity and reliability in their results.⁷³

These guidelines have been put in place to ensure that the DNA results are reliable.⁷⁴ In addition, laboratories are required to have and follow their respective evidence control systems as means of ensuring that the integrity of evidence is kept intact and such evidence is not altered during the process.⁷⁵ This system should be able to mark evidence for identification, provide secure storage areas for evidence, ensure that the chain of evidence is maintained, and that the protocols in place to alleviate loss and contamination of evidence are followed.⁷⁶ However, despite the guidelines and preventative measures put in place, problems still occur.⁷⁷

2.4 DNA TESTING METHODS

As mentioned above, an individual could be identified through the analysis of the sequence of their base pairs. However, because this is an inhumanly possible task that would be time-consuming, scientists have developed techniques that allow them to use a shorter method. These techniques involve using non-coding or ‘junk’ DNA.⁷⁸ Non-coding DNA is the ‘parts of DNA sequence which are not genes’ known to vary greatly among individuals.⁷⁹ This DNA is currently used for forensic purposes because of its great variability to differentiate between individuals.⁸⁰ With only .01 per cent of DNA unique to individuals, scientists have managed to develop scientific techniques that enable them to identify differences in the sequences of individuals.⁸¹ These developed techniques are commonly referred to as DNA profiling methods.

A DNA profile is ‘a set of genotypes possessed by a person at two or more loci’.⁸² In the CPA, it is defined as:⁸³

⁷³ Ibid at 1-19.

⁷⁴ De Wet op cit note 11 at 188.

⁷⁵ Op cit note 72 at 8.

⁷⁶ Ibid.

⁷⁷ See Chapter Four.

⁷⁸ Meintjes-Van der Walt *Courtroom* op cit note 12 at 9.

⁷⁹ Ibid.

⁸⁰ Ibid.

⁸¹ Meintjes-Van der Walt *Overview* op cit note 6 at 25.

⁸² Ibid.

⁸³ Criminal Procedure Act: s 36A(1)(fD).

The results obtained from forensic DNA analysis of bodily samples taken from a person or samples taken from a crime scene, providing a unique string of alpha numeric characters to provide identity reference: Provided this does not contain any information on the health or medical condition or mental characteristic of a person or the predisposition or physical information of the person other than the sex of that person.

The first DNA profile to be published was discovered by Sir Alex Jeffreys in 1986.⁸⁴ Since then, there have been direct and indirect use of DNA profiles in the legal system. The first DNA profile to be used in a conviction was in England in *R v Melias*, where blood samples matched semen traces on the clothing of the rape victim. When confronted with the evidence, Melias admitted to having raped the victim and committed five additional burglaries.⁸⁵ DNA profiles are highly varied across two individuals, making it improbable for two separate person to have the same exact profile.⁸⁶ This attributes to DNA testing methods being an effective tool for identification.⁸⁷ The two most common used methods of DNA profiling are Polymerase Chain Reaction (PCR) and Short Tandem Repeats (STR).⁸⁸

2.4.1 Polymerase Chain Reaction (PCR)

The Polymerase Chain Reaction is ‘an amplification technique that simulates the cell replication process under controlled circumstances in the laboratory’.⁸⁹ It amplifies the exact copies of DNA at a specific locus that requires analysis. It is used nationally and internationally.⁹⁰ In the past, this method was used in instances where the DNA sample was small or degraded due to various factors such as chemical contaminants.⁹¹ In the recent times, however, PCR is utilised regardless of how restricted or degraded the sample is, and forms part of the techniques used to target short tandem repeats (STR).⁹² STR refers to a ‘sequence of bases which is repeated numerous times and is attached one after the other, in tandem’.⁹³ The PCR method involves a three step cycle.

The process starts off with the double-stranded DNA helix being heated at high temperatures (72 degrees Celsius) to split it into single strands. During this step, the enzyme that replicates

⁸⁴ R Kirby ‘DNA Evidence in South Africa: Fallacies and the Future’ 25 (2004) 386.

⁸⁵ *R v Melias* 1987, as cited in J Taitz ‘The first-ever conviction based on DNA-fingerprinting’ 105 *SALJ* 32.

⁸⁶ Meintjes-Van der Walt *Overview* op cit note 6 at 27.

⁸⁷ *Ibid.*

⁸⁸ Both methods are commonly used both in South Africa and the United States.

⁸⁹ De Wet op cit note 11 at 176.

⁹⁰ Meintjes-Van der Walt *Overview* op cit note 6 at 29.

⁹¹ *Ibid.*

⁹² *Ibid.*

⁹³ *Ibid* at 31.

the original DNA is activated. In the second step, synthesised DNA fragments that border the region to be duplicated (commonly referred to as primers) are attached to specific segments of the single-stranded DNA. These primers simplify the duplication process and helps with the identification of the specific locus to be copied. During the last step, an enzyme duplicates the DNA using the primers as a starting point. This process is repeated numerous times until millions of copies of the necessary portions of the initial DNA sequence are produced.⁹⁴

2.4.2 Short Tandem Repeats (STR)

‘STR’ is used to describe the particular DNA sequence targeted during the PCR process.⁹⁵ It is a method that has been adopted and used worldwide.⁹⁶ This technique creates numerous duplicates of the DNA at a specific locus that has to be analysed, thus simulating the process that occurs during the replication of DNA prior to cell division in the body.⁹⁷ Every person has unique STRs at a specific locus based on the number of repeats.⁹⁸ The loci that vary significantly among individuals are used for DNA profiling purposes.⁹⁹

The great variation in length between individuals, these tandem repeats are ideal for forensic purposes. The surrounding DNA is identical from person to person, thus providing a consistent reference point across different individuals in the population.¹⁰⁰ This makes it possible to amplify the tandem repeat area through the PCR technique, resulting in DNA fragments of varying lengths.¹⁰¹ Kirby and Downing thus contend that STR analysis is a great marker for identification.¹⁰²

In South Africa, the STR technique is used frequently by the scientific analysts of the Forensic Science Laboratory of the South African Police Service (SAPS) by using the AmpFISTR Profiler Plus PCR Amplification kit.¹⁰³ It amplifies 10 different loci of DNA using short tandem repeats in order to generate an STR.¹⁰⁴ The tenth locus indicates the gender of the person.¹⁰⁵

⁹⁴ De Wet op cit note 11 at 177. See also Meintjes-Van der Walt *Overview* op cit note 6 at 29-30.

⁹⁵ Meintjes-Van der Walt *Overview* op cit note 6 at 31.

⁹⁶ EUROFORGEN ‘Making sense of forensic genetics: What can DNA tell you about a crime?’ *Sense About Science* (2017) at 12. See also Meintjes-Van der Walt & Dhliwayo op cit not 10 at 3; Meintjes-Van der Walt *Courtroom* op cit note 12 at 12.

⁹⁷ *S v SB* supra note 3 para 13.

⁹⁸ Ibid para 14. See also Meintjes-Van der Walt *Overview* op cit note 6 at 31; De Wet op cit note 11 at 178.

⁹⁹ De Wet op cit note 11 at 175.

¹⁰⁰ Meintjes-Van der Walt *Overview* op cit note 6 at 31.

¹⁰¹ Ibid.

¹⁰² De Wet op cit note 11 at 178.

¹⁰³ Meintjes-Van der Walt *Courtroom* op cit note 12 at 32, 43.

¹⁰⁴ Ibid at 43. See also De Wet op cit note 11 at 178; Meintjes-Van der Walt *Overview* op cit note 6 at 34.

¹⁰⁵ De Wet op cit note 11 at 179.

This different from the USA position, which uses a 13-locus STR system.¹⁰⁶ The more STR loci that a study covers, the more discriminating power and distinctive STR profile it will have.¹⁰⁷ This is because, in a multiplex PCR approach, discriminatory levels increase considerably when a second or third locus is used.¹⁰⁸

There are a variety of reasons why STR DNA analysis is the commonly used method for forensic purposes. Unlike other forensic techniques, STR-based DNA analysis has the advantage of sensitivity because it requires only a small amount of DNA extracted from any nuclei-containing tissue for a result.¹⁰⁹ This includes genetic material that is too old or has been exposed to different environmental factors and conditions. Furthermore, research shows that, compared to older techniques, using the STR technique increases the detection of DNA, particularly in cases where the DNA is degraded, by targeting smaller DNA fragments that are more likely to be preserved.¹¹⁰

The STR technique also offers a key benefit by minimising the risk of human error in forensic analysis and interpretation of the profiles. This is achieved through the use of specialised software that incorporates enhanced controls and internal validation checks. The technique is also advantageous because it significantly alleviates human error in the analysis and interpretation of forensic science findings. The reason for this is because the software utilised expands the number of controls and internal checks. Therefore, this means that any data generated by this method can be digitally preserved for later use and reanalysis.

Albeit these DNA testing methods provide great accuracy and efficiency in generating DNA profiles, they are not met without problems. A great variety of the problems that can be encountered when dealing with such methods will be discussed in Chapter Four to warn against great reliance DNA evidence.

2.5 CONCLUSION

In conclusion, this chapter has provided a brief overview of the fundamental biochemical principles underlying DNA evidence, as well as the crucial procedures for its collection, handling and analysis. The integrity of the chain of evidence and the strict adherence to protocols is of paramount importance in ensuring the reliability of the evidence and maintaining

¹⁰⁶ Meintjes-Van der Walt *Courtroom* op cit note 12 at 44.

¹⁰⁷ Meintjes-Van der Walt *Overview* op cit note 6 at 32.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

its probative value. Furthermore, the developments in the scientific DNA profiling methods have improved the field of forensic genetics, thus enabling the identification of individuals with accuracy.

As DNA evidence continues to play an increasingly pivotal role in criminal proceedings, it is imperative that legal practitioners equip themselves with a thorough understanding of its biochemical basis, its collection, handling and analysis. This will ensure that, where DNA evidence is the sole basis for a conviction, the judiciary and litigating parties are aware of the manner in which it is collected, tested and presented so as to eliminate wrongful convictions.

CHAPTER THREE

ADMISSIBILITY RULES FOR DNA EVIDENCE

3.1 INTRODUCTION

South Africa and the United States of America (USA) follow the Anglo-American accusatorial system and, as a result, exhibit numerous similarities. These two jurisdictions adhere to the common law where judicial decisions and precedents contribute to shaping the law.¹ The general rule, in accordance with this system, is that a decision must be supported by a rational relationship that exists between it and previously decided cases.² In the Anglo-American system of evidence, the law of evidence governs the process of presenting facts and making judicial decisions in criminal proceedings.³

The South African law of evidence follows an adversarial system in nature,⁴ similar to that of the USA.⁵ The system prohibits courts from dictating how opposing parties should present their cases, but rather only requires adherence to the court rules.⁶ With respect to fact-finding, it is considered the most effective system as it allows each litigating party the freedom to collect and present evidence that supports and strengthens their own case.⁷ The generally accepted rule in criminal cases is that the burden of proof to prove the guilt of the accused lies with the prosecuting party.⁸ The prosecuting party has to prove such guilt beyond reasonable doubt,⁹ and the evidence presented and admitted in court plays a significant role in the success or failure of achieving this goal.¹⁰

To analyse and understand forensic scientific decision-making within the criminal justice system, a thorough understanding of the existing evidentiary rules is necessary.¹¹ Therefore, against the background of the adversarial system, this chapter aims to gain an in-depth understanding of the rules governing the admissibility of deoxyribonucleic acid (DNA)

¹ S Lewis 'Precedent and the Rule of Law' (2021) 41 *Oxford Journal of Legal Studies* 873 at 874.

² J D Hyman 'Brief Introduction to the Anglo-American Legal System' available at <https://www.accord.edu.so/web/content/> accessed on 12 August 2024.

³ Visser J *First Generation Evidence and Its Influence on Legal Decision-making – A South African Perspective* (unpublished LLD thesis, University of the Free State, 2013) at 342.

⁴ PJ Schwikkard & SE Van der Merwe *Principles of Evidence* 4 ed (2016) 8.

⁵ Olaborede A & Meintjes-van der Walt L 'The Dangers of Convictions Based on a Single Piece of Forensic Evidence' (2020) 23 *PELJ* 1 at 6.

⁶ Pete et al *Civil Procedure: A Practical Guide* 3 ed (2016) 38.

⁷ Schwikkard & Van der Merwe op cit note 4 at 11.

⁸ Olaborede & Meintjes-Van der Walt op cit note 5 at 7.

⁹ Ibid.

¹⁰ Ibid.

¹¹ Visser op cit note 3 at 342.

evidence, as well as determine whether, taking into consideration the USA position, the South African admissibility rules require further development.

3.2 ADMISSIBILITY OF DNA EVIDENCE IN SOUTH AFRICA

DNA evidence is classified as real evidence. In *S v M*,¹² the court defined real evidence as ‘any object which, upon proper identification, becomes, of itself, evidence’.¹³ In general, where the prosecution wishes to adduce real evidence for review by the court, in the absence of a formal admission by the accused person, the prosecution must summon a witness that is able to identify and testify to the evidence.¹⁴ Therefore, when leading DNA evidence, the prosecution must summon an expert witness. The testimony of the expert witness would then fall under the category of opinion evidence. Expert testimony has two aspects namely, showing the efficacy and relevance of the real evidence, and also influencing the probative weight of the real evidence.¹⁵ Therefore, given the importance of experts in presenting DNA evidence, it is cogent to consider the admissibility requirements for expert witness testimony in addition to the admissibility requirements for real evidence.

3.2.1 Relevance as an admissibility requirement for real evidence

The general admissibility rule in South Africa is that the evidence must be relevant to an issue in the proceedings in order to be admitted.¹⁶ The admissibility of evidence, including forensic evidence, in South African criminal proceedings is regulated by the Criminal Procedure Act (CPA). Section 210 of the CPA states that:¹⁷

No evidence as to any fact, matter or thing shall be admissible which is irrelevant or immaterial and which cannot conduce to prove or disprove any point or fact at issue in criminal proceedings.

In its positive sense, section 210 implies that evidence is only admissible if it is relevant to the facts in dispute. This, then, means that DNA evidence, too, is admissible when it is relevant and can assist the court in proving a fact in dispute. Irrelevant evidence is thus excluded because it has no effect on the disputed issues.¹⁸ It is trite that admitting irrelevant evidence would needlessly prolong the trial, waste money, be time-consuming and subsequently result in

¹² *S v M* 2002 (2) SACR 44 (SCA).

¹³ *S v M* para 31. See also Schwikkard & Van der Merwe op cit note 4 at 421.

¹⁴ Schwikkard & Van der Merwe op cit note 4 at 421.

¹⁵ Discussed in Chapter Five herein.

¹⁶ Bellengere, Theophilopoulos & Palmer (eds) *The Law of Evidence in South Africa* 2 ed (2019) 52.

¹⁷ Criminal Procedure Act: s 210.

¹⁸ Bellengere, Theophilopoulos & Palmer (eds) op cit note 16 at 159.

additional expenses for the litigating parties which would have otherwise been avoided.¹⁹ Furthermore, admitting irrelevant evidence into the proceedings could potentially lead to the actual issues being obscured or ignored as a result of the extraneous evidence,²⁰ and ultimately, infringe on the constitutional right to a fair trial of the accused person.

According to the judgment in *R v Matthews*,²¹ a judge ought to apply a ‘blend of common sense, judicial experience and logic lying outside the law’ when tasked with determining whether a specific piece of evidence is relevant to the proceedings or not.²² Therefore, when a piece of evidence is considered irrelevant, it is an indication that, from a common-sense standpoint, the evidence lacks relevance for the purposes of the trial, and admitting such evidence would be a legal setback.²³ This standpoint was confirmed in *S v Zuma*²⁴ where the presiding officer stated that, in addition, ‘no court can ever separate such a determination from the facts of the particular case’.²⁵

In *R v Randall*,²⁶ the court stated that relevancy is determined using common sense and knowledge.²⁷ However, Bellengere *et al*²⁸ suggest developing a test for presiding officers to use when tasked with determining relevancy. The test is understood to consist of a three-legged inquiry, which will be discussed below.

3.2.1.1 The three-legged inquiry

The three-legged inquiry is understood to be applied by jurisdictions which follow a strict system of evidence, including South Africa and the USA.²⁹ In the first inquiry, whether an evidentiary fact is relevant or irrelevant, is assessed using logic and inferential reasoning based on probability.³⁰ It is an investigation into the logical relevance of the fact. The second inquiry determines, by balancing a variety of procedural issues, the degree to which it is procedurally undesirable to receive relevant evidence.³¹ In instances where a piece of evidence is likely to result in prejudice, confusion or any other material disadvantage, a court will not admit that

¹⁹ Schwikkard & Van der Merwe op cit note 4 at 50.

²⁰ Ibid.

²¹ *R v Matthews and Others* 1960 1 SA 752 (A).

²² Ibid at 758.

²³ DT Zeffert, AP Paizes & A ST Q Skeen *The South African Law of Evidence* (2003) 84.

²⁴ *S v Zuma* 2006 (2) SACR 191 (W).

²⁵ Ibid at 199. See also Visser op cit note 3 at 396-397.

²⁶ *R v Randall* [2004] 1 WLR 56 (HL).

²⁷ *R v Randall*: para. 20.

²⁸ Bellengere, Theophilopoulos & Palmer (eds) op cit note 16 at 161.

²⁹ Ibid at 7.

³⁰ Ibid at 161.

³¹ Ibid.

evidence; instead, it will require that the evidence have a substantial high level of probative value before it can be admitted.³² As abovementioned,³³ in cases where the chain of evidence was broken or not maintained, the court cannot admit the DNA evidence. This does not inherently mean that the DNA evidence is irrelevant to the facts at dispute, but rather that its likelihood to result in prejudice outweighs its probative value.

The concept of prejudice in the second inquiry encompasses not only procedural fairness, but also substantive fairness, where the presiding officer may be misled, biased or unduly influenced by the evidence.³⁴ This distinction, rooted in common law, underscores the importance of safeguarding against unfair prejudice to ensure a fair trial.³⁵ The case of *R v Trupedo*³⁶ provides a great example of a piece of evidence being excluded because its potential material prejudice outweighs its probative value. In this case, the court was faced with determining whether tracker dog evidence is admissible or not and in deciding its admissibility, the court held that the probative value of the evidence was too tenuous, irrelevant and thus inadmissible.³⁷ This position was confirmed in *S v Shabalala*³⁸ where the court reasoned that this piece of evidence was inadmissible because its probative value is ‘so inconsequential and its relevance so problematic there would be little point in receiving the evidence’.³⁹

The third inquiry states that, based on exclusionary legal rules, relevant evidence may be excluded due to particular policy reasons, such as privilege, or an unjustified violation of the Constitution.⁴⁰ The assessment of evidence involves a nuanced balancing act of weighing logical relevance against competing concerns that influence the effectiveness and integrity of the justice system.⁴¹ Among these considerations are trial duration and efficiency, risk of confusing issues, unfair surprise to witnesses or opposing parties, and undue prejudice.⁴² These factors may render logically relevant evidence legally irrelevant, thus prioritising trial efficiency and integrity.⁴³

³² Ibid.

³³ See 2.3.2 Handling DNA evidence herein.

³⁴ South African Law Reform Commission Discussion Paper 113 (Project 126) *Review of the Law of Evidence (Hearsay and Relevance)* (2008) at 17.

³⁵ Ibid.

³⁶ *R v Trupedo* 1920 AD 58 62.

³⁷ Ibid at 62.

³⁸ *S v Shabalala* 1986 4 SA 734 (A) at 742-743.

³⁹ Bellengere, Theophilopoulos & Palmer (eds) op cit note 16 at 15.

⁴⁰ Ibid at 161.

⁴¹ SALRC op cit note 34 at 16-17.

⁴² Ibid.

⁴³ Ibid.

In summary, the first inquiry is an investigation into the logical relevance of the fact, while the second inquiry investigates the admissibility of the evidence by considering its potential prejudicial effect against its probative value.⁴⁴ The third and last inquiry is based on unconstitutionally obtained evidence. Therefore, it becomes evident that the relevance of a piece of evidence to legal proceedings does not automatically deem it as legally admissible.⁴⁵ Courts have a qualified obligation to exclude relevant evidence under our current constitutional framework, particularly if its admission would impair the trial and administration of justice.⁴⁶ Thus, albeit relevant, DNA evidence may be excluded if obtained in contravention of section 35(5) of the Constitution which states that:⁴⁷

Evidence obtained in a manner that violates any rights in the Bill of Rights must be excluded if the admission of that evidence would render the trial unfair or otherwise be detrimental to the administration of justice.

According to this section, criminal courts must exclude any evidence that was obtained in violation of any Bill of Rights if admitting it would unfairly affect the outcome of the trial or impair the administration of justice in any other way. This right was created to uphold, defend, and advance judicial integrity in addition to upholding and defending fundamental human rights.⁴⁸ It was also aimed at ensuring that unlawful police conduct throughout the investigation and pre-trial proceedings was kept at a minimum.⁴⁹ However, it is also important to emphasise that the exclusion of unconstitutionally obtained evidence does not apply automatically.

The section 35(5) test is applied where the court must first determine whether the evidence was obtained in violation of a constitutional right and, secondly, whether its admission would render the trial unfair or interfere with the manner in which justice is administered, before it can be ruled as inadmissible.⁵⁰ The court in *S v Mthembu*⁵¹ confirmed this when it held that evidence gathered in a manner that breaches the Constitution is less likely to be excluded if the conduct of the police officers was reasonable and justified.⁵² Consequently, the court ought to consider the nature of the breach, as well as the long-term effects that the evidence gathered in violation

⁴⁴ Bellengere, Theophilopoulos & Palmer (eds) op cit note 16 at 161. See also DT Zeffertt and AP Paizes *The South African Law of Evidence* 2 ed (2009) 238-241.

⁴⁵ Bellengere, Theophilopoulos & Palmer (eds) op cit note 16 at 54.

⁴⁶ Ibid at 175.

⁴⁷ Constitution, 1996: s 35(5).

⁴⁸ Schwikkard & Van der Merwe op cit note 4 at 200.

⁴⁹ JJ Joubert (ed.) *Criminal Procedure Handbook* 12 ed (2017) 28.

⁵⁰ Ibid.

⁵¹ *S v Mthembu* 2008 (2) SACR 407 (SCA).

⁵² *S v Mthembu* para 26.

of the Constitution will have on the integrity of the administration of justice.⁵³ Therefore, the constitutionality of obtaining DNA evidence needs to be considered when determining its admissibility,⁵⁴ however the in-depth discussion of section 35(5) of the Constitution is beyond the scope of this research paper.

It becomes apparent that the application of relevance as an admissibility requirement is reliant on the common sense and logic of the presiding officer.⁵⁵ This great reliance presents a profound challenge to the consistency and fairness of the application of the relevance rules.⁵⁶ As the common sense of presiding officers is shaped by their individual experiences, biases and values, the enforcement of the relevance rules may be susceptible to unconscious biases, cultural influences and personal prejudices. This places a risk on perpetuating existing social inequalities and undermining the principle of equal justice.⁵⁷ Furthermore, this subjective framework raises concerns regarding the potential for unequal treatment, as the same evidence may be deemed relevant or irrelevant depending on the individual perspective of the presiding officer. For instance, the admissibility of DNA evidence in a case can be influenced by the individual beliefs of the presiding officer.

Furthermore, in the judicial system of South Africa, reliability is not regarded as a requirement for the admissibility of forensic evidence.⁵⁸ The reliability of forensic evidence, such as DNA evidence, is taken into consideration when assessing the probative value of the evidence, as opposed to it being a determining factor for admissibility.⁵⁹ This means that presiding officers, in their judicial capacity, are presented with challenges in verifying the inferential conclusions drawn by expert witnesses in their conclusions.⁶⁰ Consequently, judges and magistrates must rely on their judicial expertise to evaluate the reliability and probative value of expert opinions, rather than verifying the underlying scientific or analytical assumptions.⁶¹

⁵³ Ibid.

⁵⁴ See in general *S v Orrie and Another* 2004 (1) SACR 162 (C).

⁵⁵ Bellengere, Theophilopoulos & Palmer (eds) op cit note 16 at 161. C Theophilopoulos & A Bellengere 'Relevance, Admissibility and Probative Value in a Rational System of Evidence: A South African Perspective' (2022) *PELJ* 1 at 7.

⁵⁶ SALRC op cit note 34 at 25.

⁵⁷ Ibid.

⁵⁸ Olaborede & Meintjes-Van der Walt op cit note 5 at 11.

⁵⁹ L Meintjes-Van der Walt 'Ruling on Expert Evidence in South Africa: A Comparative Analysis' (2001) *The International Law Journal of Evidence and Proof* 226 at 233. See also Visser op cit note 3 at 405.

⁶⁰ DT Zeffert, AP Paizes & A ST Q Skeen op cit note 23 at 305, 352.

⁶¹ Visser op cit note 3 at 406.

3.2.2 Expert evidence

The exclusionary rules of evidence in South Africa states that opinion evidence, whether that of an expert or layperson, is generally irrelevant and inadmissible in criminal proceedings.⁶² A witness may only attest to what they have seen with one or more of their five senses.⁶³ However, in *Holtzhauzen v Roodt*,⁶⁴ it was ruled that expert evidence is admissible where the expert witness can furnish the court with evidence that can prove or disprove the facts at issue, but which require expertise in a field or discipline.⁶⁵ Therefore, in order for the opinion of an expert to be admissible, it must be relevant to the proceedings, which is, per *Genturico AG v Firestone SA (Pty) Ltd*,⁶⁶ determined by ‘whether or not the court can receive appreciable help from that witness in the particular issue.’⁶⁷

In their work, Zeffert *et al*⁶⁸ explain this position by stating that expert testimony is admissible in instances where such an expert is in a better position to draw inferences than the court, owing to their specialised knowledge and skill. In *A M and Another v MEC for Health, Western Cape*,⁶⁹ the court outlined the role played by expert witnesses which encompasses three distinct functions. First, expert witnesses provide factual testimony based on their personal observations of the evidence, thereby providing first-hand evidence informing the understanding of the case by the court.⁷⁰ Beyond this, they furnish the court with specialised knowledge illuminating the theoretical and practical contexts relevant to the case.⁷¹ Ultimately, expert witnesses offer opinion-based testimony by articulating their inferences and conclusions regarding the central issues of the case. They must also elaborate on the underlying rationale and evidentiary basis for these opinions, thus enabling the court to critically evaluate their validity and reliability.⁷²

In addition to these, according to the criteria defined by Satchwell J in *S v Engelbrecht*,⁷³ expert testimony is admissible where the expert is expressly qualified to present the evidence, and the court has sufficient proof of such qualifications and expertise.⁷⁴ Moreover, they have an

⁶² Schwikkard & Van der Merwe op cit note 4 at 49. See also op cit note 57 at 228.

⁶³ Meintjes-Van der Walt *Ruling* op cit note 59 at 228.

⁶⁴ *Holtzhauzen v Roodt* 1997 (4) SA 766.

⁶⁵ *Holtzhauzen v Roodt* at 772C-D.

⁶⁶ *Genturico AG v Firestone SA (Pty) Ltd* 1972 (1) SA 589 (A).

⁶⁷ *Ibid* at 616H.

⁶⁸ DT Zeffert, AP Paizes & A ST Q Skeen op cit note 23 at 299.

⁶⁹ *A M and Another v MEC for Health, Western Cape* [2020] ZASCA 89; 2021 (3) SA 337 SCA.

⁷⁰ *Ibid*: para. 17.

⁷¹ *Ibid*.

⁷² *A M and Another v MEC for Health*: para 17. See also *Twine v Naidoo* [2018] 1 All SA 297 (GJ).

⁷³ See in this regard *S v Engelbrecht* 2005 (2) SACR 41 (W): para 26.

⁷⁴ DT Zeffert, AP Paizes & A ST Q Skeen op cit note 23 at 291, 302. See also Visser op cit note 3 at 401.

obligation to assist and advise the court, but they also have an obligation to offer the fundamental details that supported their conclusions so that the court could reach its own conclusions.⁷⁵

There are also instances where real evidence, including DNA evidence, may be proved by way of an affidavit. Section 212(4) of the CPA allows for an affidavit, made by a person with the necessary and required powers, to be presented as *prima facie* proof of the DNA evidence being presented in court.⁷⁶ The affidavit can be presented as *prima facie* proof instead of calling an expert to testify and thus calls for the chain of evidence to remain intact at all times. The case of *Khauta v S*⁷⁷ demonstrates the adverse effects that a broken chain of evidence can have on criminal proceedings when the prosecution fails to properly prepare affidavits.

In this case, the court *a quo* was presented with DNA evidence as the only piece of evidence for a conviction. The appellant was arrested twelve months after the crime was committed based on DNA evidence found in the vaginal swabs of the complainant. He was charged on two counts of robbery, one count of attempted murder and one count of rape, and subsequently sentenced to life imprisonment. The state had only presented a section 212(4) affidavit which stated that the DNA profile of the appellant could be read into the DNA profile found in the vaginal swabs.⁷⁸ In the absence of corroborating evidence or clarification from the defence, the appeal court noted that the record revealed a critical lack of information regarding the origin of the forensic samples, their corresponding reference numbers, and the circumstances under which they were transported to the forensic analyst.⁷⁹

The SCA found it erroneous that the magistrate in the court *a quo* found that the presented evidence placed the appellant ‘right at the scene’. The court quoted *S v Matshaba*⁸⁰ where it was held that ‘the failure of the state to establish the chain of evidence affects the integrity of such evidence and thus renders it inadmissible’. The appeal was thus upheld and the conviction, and its subsequent sentence, was set aside. This case, thus, did not only demonstrate the importance of maintaining the chain of evidence, the proper preparation of affidavits, or the

⁷⁵ *Coopers (South Africa) (Pty) Ltd v Deutsche Gesellschaft für Schädlingsbekämpfung MBH* 1976 (3) SA 352 (A) at 371F-G.

⁷⁶ CPA: s 212(4)(a).

⁷⁷ *Khauta v S* 2020 (2) SACR 547 (FB).

⁷⁸ *Ibid* para 6.

⁷⁹ *Ibid* para 7.

⁸⁰ *S v Matshaba* 2016 (2) SACR 651 (NWM).

need to summon expert witnesses where necessary, but also the dire need to have evidence corroborated.

The South African judicial system diverges from other jurisdictions in its approach to admitting forensic evidence, particularly the USA. Notably, reliability is not a prerequisite for the admissibility of expert testimony.⁸¹ Instead, the reliability of the testimony of an expert witness is assessed during the evaluation of its probative value, rather than serving as a threshold criterion for admissibility.⁸² This distinction has significant implications for the role of presiding officers in evaluating expert testimony. As reliability is not a condition for admissibility, judges and magistrates must navigate the complexities of expert opinions without the benefit of a prior reliability assessment. Consequently, they must rely on their judicial expertise to critically evaluate the reliability and weight of expert opinions, rather than verifying the underlying scientific or analytical assumptions.⁸³

This approach underscores the importance of judicial expertise in navigating the intricacies of forensic evidence. Judges and magistrates must develop a nuanced understanding of the strengths and limitations of expert testimony, as well as methodologies and assumptions that underpin it. By doing so, they can ensure that expert opinions are properly contextualised and that the weight or probative value of forensic evidence is accurately assessed. Furthermore, this approach highlights the tension between the need for reliable expert testimony and the potential risks of judicial gatekeeping. By not requiring reliability as a condition for admissibility, the South African judiciary may be seen as striking a balance between the need for relevant evidence and the potential judicial overreach. However, this approach also underscores the importance of ongoing judicial education and training, as judges and magistrates must stay abreast of developments in forensic science and expert testimony to effectively evaluate the reliability and probative value of expert opinions.⁸⁴ It is for reasons such as these that this research paper now turns to the federal law of the USA to determine whether our evidentiary rules can be further developed in accordance to their law.

⁸¹ Olaborede & Meintjes-Van der Walt op cit note 5 at 11.

⁸² Meintjes-Van der Walt op cit note 59 at 233. See also Visser op cit note 3 at 405.

⁸³ Visser op cit note 3 at 406.

⁸⁴ See 4.5.2 herein.

3.3 ADMISSIBILITY OF DNA EVIDENCE IN THE USA

Physical evidence can be synonymous for real evidence and, similar to the South African evidentiary system, DNA evidence is categorised as real evidence in the USA.⁸⁵ It can be described as any material that had a direct bearing on the incidents at question in the case,⁸⁶ and often requires scientific analysis.⁸⁷ However, there is no specific rule in the Federal Rules of Evidence (FRE) that specifically deals with the admissibility of DNA evidence. As a result, to determine whether DNA evidence is admissible, the USA judiciary relies on expert testimonies,⁸⁸ which is also similar to the South African position. The experts are brought in because they are more knowledgeable on the ever-changing and current scientific techniques used for DNA analyses, and can thus accurately explain the scientific results.⁸⁹

The reliability of the scientific techniques used determines the admissibility of DNA evidence.⁹⁰ Therefore, having an expert testify about the scientific methodology involved and the results thereof will assist the court with the function of deciding the admissibility of the DNA evidence.⁹¹ In addition to the involvement of knowledgeable experts, the USA has admissibility standards in place to prevent the admission of junk or misleading science in criminal proceedings.⁹²

3.3.1 Relevance

As is the position in South Africa, the FRE require that, prior to being admitted as evidence, any piece of evidentiary fact must undergo the test of relevancy and be deemed relevant.⁹³ This is in accordance with Rule 401 of the FRE which states that evidence is only relevant if:⁹⁴

- (a) It has any tendency to make a fact more or less probable than it would be without the evidence; and
- (b) The fact is of consequence in determining the action.

⁸⁵ A Rosenfeld 'Admissibility of DNA Evidence: Italy Under Attack' 40 (2012) *South University Law Review* 197 at 215.

⁸⁶ Ibid at 215.

⁸⁷ Ibid at 210.

⁸⁸ Unknown 'Admissibility of DNA evidence' 12 (1996) *Touro Law Review* 625.

⁸⁹ Z Alter 'Unpacking Frye-Mack: A Critical Analysis of Minnesota's Frye-Mack Standard of Admitting Scientific Evidence' 43 (2017) *Mitchell Hamline Law Review* 626 at 627.

⁹⁰ Unknown op cit note 88.

⁹¹ Ibid at 627.

⁹² Ibid.

⁹³ NR Behrouzfard 'Strengths, limitations and controversies of DNA evidence: Trends and issues in scientific evidence' 1 (2006) *Southern New England Roundtable Symposium Law Journal* 110 at 117.

⁹⁴ FRE Rule 401.

In essence, this means that an evidentiary fact is only significant if it tends to increase or decrease the probative weight of a fact relative to its absence, and the fact plays a significant role in deciding the course of action. Rule 402 further states that irrelevant evidence will not be admissible, and relevant evidence will be admissible unless stated otherwise by the USA Constitution, a Federal Statute, rules of evidence or a decision made by the Supreme Court.⁹⁵ This rule reiterates the general evidentiary rule that relevant evidence is admissible and irrelevant evidence is inadmissible.

Similar to the South African evidentiary rules, relevant evidence in the USA can also be excluded. There are factors that are considered before relevant evidence can be excluded in proceedings. Unlike the USA, South Africa does not adhere to a strict exclusionary rule, whereby illegally obtained evidence is automatically excluded. Rather, the USA approach allows for the admission of relevant evidence, even if obtained illegally, if it is material to the facts at issue. Relevant evidence is excluded in instances where, as stipulated by Rule 403, its probative value is outweighed by a number of factors such as ‘unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence’.⁹⁶ This rule demonstrates that relevant evidence may be excluded for something as excessive as misleading the jury, but also for something less excessive like time-wasting. It essentially calls for balance between the probative value and need for the evidence and the potential harm that might be a result of its admission,⁹⁷ which is similar to the South African position.

Once the evidence has passed the relevancy test, a court has to apply additional legal standards to determine its admissibility. With respect to expert witnesses, the admissibility standards differ to those of South Africa and will be further discussed below. The USA standards have, over the years, been developed and changed and its earliest development can be traced back to the twentieth century in the case of *Frye v United States*.⁹⁸

⁹⁵ FRE Rule 402.

⁹⁶ FRE Rule 403.

⁹⁷ Legal Information Institute ‘Rule 403: Excluding Relevant Evidence for Prejudice, Confusion, Waste of Time, or Other Reasons’ available at https://www.law.cornell.edu/rules/fre/rule_403, accessed on 16 August 2024.

⁹⁸ *Frye v United States* (1923) App. D.C 46.

3.3.2 Expert evidence

3.3.2.1 The *Frye* standard

The *Frye* standard was developed in 1923 in *Frye v United States* (hereinafter ‘the *Frye* case’). In this case, the appellant had taken a systolic blood pressure deception test (lie detector test) and had attempted to bring an expert witness to testify to the results thereof. In the trial court, he was convicted of second degree murder after the expert testimony was deemed inadmissible. The court held that scientific evidence must have been ‘sufficiently established to have gained general acceptance in the particular field in which it belongs’ before it can be admissible, and the court thus declared the lie detector test inadmissible.⁹⁹

The *Frye* test simply states that any scientific evidence that has not gained ‘general acceptance’ in the scientific community is unreliable and thus inadmissible.¹⁰⁰ It also implies that it is crucial that the expert shows that their testimony about the scientific evidence and methods employed have gained general acceptance in the community.¹⁰¹ This standard excludes any experimental, novel and theoretical methods that have not gained recognition and acceptance in that specific scientific field.¹⁰² The courts were in charge of determining the specific scientific community that ought to ‘generally accept’ the evidence. In order to do this, only scientists with the specific scientific expertise and background, and who are knowledgeable about the scientific technique that was employed, were considered by the courts.¹⁰³ The experts had to be capable of forming an opinion regarding that particular scientific method. Therefore, not every scientist who is knowledgeable about the scientific evidence was considered, but there was additional criterion that must be met and satisfied.

The *Frye* test gained popularity and was applied in a number of jurisdictions because it was the ‘primary requirement for scientific evidence admissibility’.¹⁰⁴ However, this test was not without criticism. Critics accused the test of being ‘too vague, too narrow and subject to multiple interpretations’.¹⁰⁵ Federal courts, as well as State courts, struggled with the application of the test because, instead of focusing on the reliability of the presented evidence,

⁹⁹ Ibid at 1018. See also Goodwin JA & Meintjes-van der Walt L ‘The Use of DNA Evidence in South Africa: Powerful tool or prone to pitfalls?’ 114 (1997) *SALJ* 151 at 167; and Behrouzfarid op cit note 93 at 117-118.

¹⁰⁰ *Frye* supra note 98 at 1017-1018. See also National Research Council ‘Strengthening Forensic Science in the United States: A Path Forward’ (2009) 1 at 88.

¹⁰¹ Olaborede & Meintjes-Van der Walt op cit note 5 at 8.

¹⁰² Unknown op cit note 88 at 626. See also EA Youngstrom & CP Busch ‘Expert testimony in psychology: Ramifications of Supreme Court decision in *Kumho Tire Co., Ltd v Carmichael*’ 10 (2000) *Ethics & Behavior* 185 at 186.

¹⁰³ RA Fialat ‘DNA testing and the *Frye* standard’ 59 (1990) *FBI Law Enforcement Bulletin* 26 at 28.

¹⁰⁴ Visser op cit note 3 at 55.

¹⁰⁵ Ibid.

it focused on the general reliability of the evidence as a whole.¹⁰⁶ Furthermore, its reliability underwent scrutiny as it was discovered that the application of the test unjustly discredited novel tests and principles.¹⁰⁷ The test had the potential to exclude new evidence and techniques that would have otherwise been appreciable help to the court. It additionally underwent scrutiny because there was uncertainty surrounding the proof that was required to substantiate that the claims of the expert were founded on evidence and methods that were generally accepted in the specific scientific community.¹⁰⁸ Jurists, presiding officers and legal practitioners were unclear of what would suffice as proof that the scientific method or technique has been generally accepted in the specific scientific community.

The *Frye* standard was later rejected by the Federal courts and Supreme courts because, inter alia, there was a possibility that the test would exclude new, pertinent evidence despite being relevant.¹⁰⁹ This led to the promulgation and application of the Federal Rules of Evidence discussed below.

3.3.2.2 The *Daubert* Standard and Federal Rules of Evidence

The Federal Rules of Evidence (FRE) were promulgated in 1975 solely for the purposes of guidance in civil and criminal proceedings.¹¹⁰ Prior to its amendment, Rule 702 stated that:¹¹¹

If scientific, technical, or other specialised knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise.

The introduction of Rule 702 meant that the discretion of admitting relevant evidence was given back to the presiding officer. Despite this new development, Federal courts still applied the *Frye* standard inconsistently with Rule 702.¹¹² The latter standard, however, contrasted with the *Frye* standard and led to questions regarding the admissibility of forensic evidence derived from scientific methods and techniques. These questions were answered by the Supreme Court in what is commonly referred to as ‘the *Daubert* standards’.

¹⁰⁶ Behrouzfard op cit note 93 at 118.

¹⁰⁷ Ibid.

¹⁰⁸ Ibid.

¹⁰⁹ LD Whitmore ‘The Admissibility of DNA Evidence in Criminal Proceedings’ 39 (1993) *Wayne Law Review* 1411 at 1412.

¹¹⁰ Olaborede & Meintjes-Van der Walt op cit note 5 at 8.

¹¹¹ FRE Rule 702 (Before amendment).

¹¹² Youngstrom & Busch op cit note 102 at 186.

The *Daubert* standard was formulated by the Supreme Court in *Daubert v Merrell Dow Pharmaceuticals, Inc.* (hereinafter ‘the *Daubert* case’).¹¹³ The development of this standard relied on the Federal Rules of Evidence. In the trial court, scientific evidence was rejected on the basis that it did not conform to the general acceptance requirement stipulated in the *Frye* test.¹¹⁴ The Supreme Court overruled this judgement and held that the Federal Rules provide the standard that should be used in federal trials when tasked with admitting expert scientific testimony. The court maintained that Rule 702 made no mention of the general acceptance test and ‘a rigid “general acceptance” requirement would be at odds with the “liberal thrust” of the Federal Rules and their “general approach of relaxing the traditional barriers to opinion testimony”’.¹¹⁵ The court ruled that, in accordance with Rule 702, ‘a trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant but reliable’.¹¹⁶ This approach thus did away with the *Frye* standard and led to the subsequent formation of the *Daubert* standard, which was deemed as a more relaxed admissibility test that sets its focus on relevance and reliability.

The current standard used to admit expert evidence, however, owes its success to what is collectively referred as the ‘*Daubert* trilogy’ which comprises of two other cases decided after the *Daubert* case, namely *General Electric Co. v Joiner*,¹¹⁷ and *Kumho Tire Co. v Carmichael*.¹¹⁸ Collectively, these three cases have created what is now the current standard for the admissibility of expert evidence which, inter alia, states that expert testimony may be excluded where there is a gap between the evidence and the conclusion of the expert, and that the gatekeeping function of the judge applies to all expert testimony.¹¹⁹

The establishment of the *Daubert* standard led to the further amendment of the Federal Rules. The amendment of the statute came into effect in 2000, in response to the *Daubert* standard.¹²⁰ The Rule has since then been amended further and now states that:¹²¹

A witness who is qualified as an expert by knowledge, skill, experience, training or education may testify in the form of an opinion or otherwise if the proponent demonstrates to the court

¹¹³ *Daubert v Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S. 579.

¹¹⁴ *Ibid* para 575.

¹¹⁵ *Ibid* para 588. See also National Research Council op cit note 100 at 91.

¹¹⁶ National Research Council op cit note 100 at 90. See also Olaborede & Meintjes-Van der Walt op cit note 5 at 9.

¹¹⁷ *General Electric Co. v Joiner*, 522 U.S. 136 (1997).

¹¹⁸ *Kumho Tire Co. v Carmichael*, 526 U.S. 137 (1999)

¹¹⁹ Olaborede & Meintjes-Van der Walt op cit note 5 at 9.

¹²⁰ National Research Council op cit note 100 at 92.

¹²¹ FRE Rule 702.

that it is more likely than not that: (a) the expert's scientific, technical or other specialised knowledge will help the trier of fact to understand the evidence or to determine a fact in issue; (b) the testimony is based on sufficient facts or data; (c) the testimony is the product of reliable principles and methods; and (d) the expert's opinion reflects a reliable application of the principles and methods to the facts of the case.

According to this amendment, the prosecuting party is required to prove the reliability of the technique used for the scientific evidence. There are also four guidelines that have been set in place for application when using the *Daubert* standard, namely testability, peer review and publication, error rate and general acceptance.¹²² These guidelines are generally in accordance with the accurateness and objectivity scientific guidelines, and are meant to strengthen and improve the evidence presented in court.¹²³ Testability, a fundamental component of scientific hypothesis testing, refers to the ability of the theory, method or claim of an expert to be empirically tested.¹²⁴ It refers to the idea that the technique used by the expert should be testable by other experts. Peer review and publication refers to whether the claim, theory or method offered by the expert is based on peer-reviewed publications, where the evaluation of this has been vetted for internal validity and statistical reliability.¹²⁵ Error rate describes the known or probable error rate of a specific scientific method or technique that supports the assertions of the expert.¹²⁶ It also indicates whether the method is internally, externally and statistically valid for the present case.¹²⁷ Where the error rate of the scientific method or technique is substantially low or unknown, it is a probable indication that such technique or method has not been previously or adequately tested.¹²⁸ Lastly, general acceptance is used to describe the consensus of the professionals in the field (such as the scientific community) on the evidence of the expert.¹²⁹ The evidence and technique must be accepted in the specific scientific community of the scientific evidence.

The Supreme Court was of the opinion that this was not an exhaustive list of guidelines instead, these guidelines would assist the judiciary in the elimination of expert opinion that has 'no

¹²² *Daubert* supra note 113 at 593-594. See also L Fournier 'The Daubert Guidelines: Usefulness, utilization and suggestions for improving quality control' 5 (2016) *Journal of Applied Research and Cognition* 308.

¹²³ Fournier op cit note 122 at 308.

¹²⁴ *Ibid.*

¹²⁵ *Ibid.*

¹²⁶ *Ibid.*

¹²⁷ *Ibid* at 308-309.

¹²⁸ L Meintjes-van der Walt 'The Proof of the Pudding: The Presentation and Proof of Expert Evidence in South Africa' 47 (2003) *Journal of African Law* 88 at 102.

¹²⁹ Fournier op cit note 122 at 309.

empirical scientific basis'.¹³⁰ However, it has been argued that only two of these guidelines are of paramount importance namely, testability and error rate. These two guidelines are deemed the most important because of their direct relevant capability of assessing the scientific validity of the evidence that the court relies on, including DNA evidence.¹³¹

The *Daubert* guidelines were implemented to ensure that, even in instances where there are conflicting expert opinions, the expert testimony based on empirical scientific evidence should be preferred over that which shows no foundation of being empirically tested, but rather based on reason or tradition.¹³² Judicial courts have since recognised the validity of DNA profiling, but its admission as evidence cannot be guaranteed.¹³³ In some cases, a *Daubert* hearing may be required to assess the reliability of the DNA evidence before it can be presented in court.¹³⁴ In doing so, the judiciary aims to alleviate the admission of junk science and unreliable expert testimonies, thus reducing prejudice.

3.4 CONCLUSION

Due to both jurisdictions using the Anglo-American accusatorial system, it is expected that they may be similarities in their laws. The law of evidence in both countries is adversarial in nature which means that they follow the same procedures when adducing evidence and litigating in court. DNA is classified as real evidence in both countries, and requires the testimony of an expert in order to be admissible. Albeit this is the case, there are also notable differences.

Relevant evidence is admissible in both countries but may still be excluded for various reasons. In the USA, evidence is excluded for something as minor as time-wasting and something as major as misleading the jury.¹³⁵ This is also the case in South Africa. Furthermore, evidence is excluded in South African courts where it has been obtained in contravention of the Constitution.¹³⁶ Where evidence would render the trial unfair or otherwise be detrimental to the administration of justice, the court is obliged to rule it as inadmissible.¹³⁷ Despite the fact that both jurisdictions use relevance as the foundational requirement to admit evidence, the methods and standards employed by each jurisdiction to evaluate the admissibility of expert

¹³⁰ Ibid.

¹³¹ Ibid.

¹³² Ibid.

¹³³ *U.S v. Coleman*, 202 F. Supp. 2d 962 (E.D. Mo. 2002) para 6.

¹³⁴ Ibid.

¹³⁵ FRE Rule 403.

¹³⁶ Constitution, 1996: s 35(5).

¹³⁷ Ibid.

testimony differ significantly. In the USA, there exists no explicit rules that regulate the admission of forensic scientific evidence. Instead, they rely on the FRE to assess the admissibility of expert testimony. To this effect, they use the FRE together with the *Daubert* standards which consider, inter alia, the reliability of the evidence. However, the South African position is different because, as mentioned above, reliability is not a prerequisite for the admissibility of evidence.¹³⁸ This means that relevance is a *sine qua non* for the admissibility of any type of evidence, including DNA evidence but relevance does not always equal reliability.¹³⁹

In light of this, this research paper recognises that there is a gap in the South African admissibility criteria for its failure to consider reliability when admitting forensic evidence. The lack of a reliability test in South Africa subsequently means that, in the case of DNA evidence, any expert testimony may be admitted as true and relevant where it is not challenged by the opposition.¹⁴⁰

¹³⁸ Olaborede & Meintjes-Van der Walt op cit note 5 at 11.

¹³⁹ G Edmond & L Meintjes-van der Walt 'Blind Justice? Forensic Science and the Use of Closed Circuit Television Images as Identification Evidence in South Africa' (2014) *SALJ* 109 at 112.

¹⁴⁰ Ibid. See also *S v Nyathe* 1988 (2) SA 211 (O) at 215.

CHAPTER FOUR

PROBLEMS ASSOCIATED WITH DNA EVIDENCE

4.1 INTRODUCTION

Deoxyribonucleic acid (DNA) analysis is renowned for its exceptional ability to individualise forensic evidence, linking it to a specific suspect or exonerating those who have been wrongfully accused.¹ DNA evidence has been established as the ‘golden standard’ of forensic evidence.² According to the 2009 National Academy of Science (NAS) Report, no other forensic technique, except nuclear DNA, has been able to thoroughly show capability of being able to consistently establish and demonstrate a link between the evidence and a specific individual with high certainty.³ Furthermore, owing to its extensive history and widespread use, DNA evidence is afforded great evidentiary significance and thus holds significant weight in judicial settings.⁴ Albeit it is important that legal practitioners are aware of and understand the medical science underlying DNA evidence and its recent developments, it is crucial that they are aware of the potential challenges that may be brought by this type of evidence and must thus be able to assess their merit and validity.⁵

Forensic DNA evidence undoubtedly plays a vital role in the criminal justice system, and its benefits are well-deserved. It offers a gold standard for evidence validity and reliability, surpassing other forensic comparison methods, and thereby providing a robust tool for justice. However, the idea that forensic DNA analysis is an infallible, objective science that is completely resistant to error is a misconception. Similar to any scientific practice, it is susceptible to errors and misrepresentation.⁶ The exclusive reliance on DNA evidence as the basis for a conviction has resulted in a great number of wrongful convictions.⁷

A wrongful conviction occurs when a person is found guilty and subsequently convicted of a crime that they did not commit.⁸ The democratic nature of South Africa, as well as its

¹ Olaborede A & Meintjes-van der Walt L ‘The Dangers of Convictions Based on a Single Piece of Forensic Evidence’ (2020) 23 *PELJ* 1 at 5.

² DE Shelton *Forensic science in court: Challenges in the twenty-first century* (2011) 27.

³ National Research Council *Strengthening Forensic Science in the United States: A Path Forward* (2009) 7.

⁴ V Tonic & A Silva *The Contamination and Misuse of DNA Evidence: Are We There Yet?* (2021) 47.

⁵ Meintjes-van der Walt L ‘An Overview of the use of DNA evidence in South African Criminal Courts’ (2008) 21 *South African Journal of Criminal Justice* 22.

⁶ E Murphy ‘The art in the science of DNA: A laypersons guide to the subjectivity inherent in forensic DNA typing’ 58 (2008) *Emory Law Journal* 101 at 101-102.

⁷ Ibid.

⁸ See The Innocence Project available at <http://www.innocenceproject.org/the-issues>, accessed on 18 August 2024.

commitment to upholding and protecting the rights and values of its citizen, has shifted the focus of its criminal justice system.

Under the apartheid regime, the focus of the justice system on reducing crime might have led to wrongful convictions.⁹ Its criminal justice system, characterised by the prevailing Crime Control Method, emphasised the attainment of high arrests and conviction rates, as well as the implementation of crime reduction strategies.¹⁰ This approach was predicated on an optimistic assumption that errors would be rare, and consequently, the system tolerated a certain margin of error, including wrongful convictions, until such errors became so pronounced that they undermined the ability of the system to effectively achieve its crime-reduction objectives.¹¹ Under the new political order, the South African judiciary is focused on upholding human rights values and thus ensuring that everyone enjoys the ‘equal protection from errors of justice that cause deprivation of exactly those rights for which South Africans have fought for a very long time’.¹² This drives the judiciary to ensure that convictions are based on evidence that is as accurate as possible. However, there exists no official record of the number of factually innocent people who have been exonerated in South Africa,¹³ and the only existing proof of wrongful convictions are those of individuals who tell their story after being acquitted on appeal.¹⁴

The criminal justice system in both South Africa¹⁵ and the United States of America (USA) is adversarial in nature.¹⁶ As a result, specific adversarial safeguards like cross-examination, appellate procedures and a high standard of proof are set up and used to ensure that convictions are accurate, and are thus heavily relied on as means of excluding information which may be prejudicial and consequently lead to injustice.¹⁷ However, research has revealed the

⁹ J Visser & D Scholtz ‘Warnings from the West: Identification and Expert Evidence as Causes of Wrongful Convictions and the Implications for South Africa (Part 1)’ (2023) 31 *African Journal of International and Comparative Law* 536 at 540.

¹⁰ Ibid at 539.

¹¹ Ibid.

¹² Ibid.

¹³ Ibid at 537.

¹⁴ Ibid. See also Wits Justice Project ‘The Wits Justice Project submission to the Parliamentary Portfolio on Justice and Correctional Services: Case studies on restorative justice and wrongful convictions in parole’, October 2014.

¹⁵ PJ Schwikkard & SE Van der Merwe *Principles of Evidence* 4 ed (2016) at 8.

¹⁶ Visser J *First Generation Evidence and Its Influence on Legal Decision-making – A South African Perspective* (unpublished LLD thesis, University of the Free State, 2013) at 6.

¹⁷ Visser & Scholtz op cit note 9 at 539.

insufficiency of the adversary system to achieve this goal. It is therefore believed that the high number of wrongful convictions in USA are a result of this institutional structure.¹⁸

In USA, DNA evidence is being used to exonerate wrongfully convicted people.¹⁹ However, a large number of those wrongful convictions are a result of DNA evidence.²⁰ Boies²¹ argues that DNA evidence is not one hundred per cent accurate and reliable because there are possibilities of cross-contamination, mixing up samples and biased interpretation. It is argued that because of the misconception that it is infallible, it has led to innocent people being wrongfully convicted.²² For example, in the *Sutton* case,²³ the defendant, Sutton, was convicted of murder based on DNA evidence found on a hat at a crime scene. An employee of the crime laboratory erroneously represented that the DNA evidence was uniquely identifiable to the defendant.²⁴ Whereas, in reality, the characteristics of the DNA sample were consistent with a far broader population, specifically, a one in sixteen probabilities of matching a randomly selected African-American male.²⁵ This potentially implicated a larger pool of individuals, thus casting doubt on the reliability and claimed uniqueness of the DNA evidence proffered against the defendant. This case is a clear demonstration of the dangers of DNA evidence, in the absence of corroborating evidence.

This chapter, therefore, aims to discuss the various problems encountered when dealing with DNA evidence to demonstrate that it is not as infallible as commonly perceived. It will also focus on the impact that these problems have on criminal proceedings, especially where this evidence is the only piece of evidence available.

4.2 CONTAMINATION

Contamination of DNA is usually a result of the sensitivity of DNA profiling.²⁶ Due to its sensitivity, DNA is vulnerable to contamination from a wide variety of sources, which might have a significant impact on the profile results.²⁷ Contamination occurs when the DNA sample

¹⁸ CR Huff 'Wrongful convictions: The American experience' (2004) 46 *Canadian Journal of Criminology and Criminal Justice* 107 at 113.

¹⁹ See The Innocence Project in general, available at <http://www.innocentproject.org>.

²⁰ Boies KC 'Misuse of DNA Evidence is Not Always a Harmless Error: DNA Evidence, Prosecutorial Misconduct, and Wrongful Convictions' (2011) 17 *Texas Wesleyan Law Review* 403 at 435.

²¹ Ibid.

²² Ibid.

²³ *People v Sutton* 2002.

²⁴ Visser & Scholtz op cit note 9 at 435-436.

²⁵ Ibid.

²⁶ De Wet S, Oosthuizen H & Visser J 'DNA Profiling and the Law in South Africa' (2011) 14 *PELJ* 171 at 180.

²⁷ Ibid at 180.

relevant to the criminal case gets mixed with foreign DNA, commonly referred to as exogenous DNA.²⁸ Due to the PCR amplification technique being extremely sensitive to even the smallest amounts of DNA, it is crucial that crime scene examiners as well as scientists take the necessary precautions to avoid contamination when collecting and analysing DNA samples.²⁹ Contamination of DNA evidence can occur during collection, transportation or at the DNA testing laboratory. The DNA sample should thus be properly collected, kept and stored in a manner that is up-to standard so as to avoid cross-contamination.³⁰

DNA evidence left at a crime scene for an extended period is susceptible to contamination from external sources.³¹ Moreover, human error during evidence collection by crime scene examiners or police officials, as well as laboratory handling can lead to unintentional contamination or sample misidentification.³² This could potentially compromise the integrity of the evidence. The presence of background DNA at a crime scene thus poses a significant challenge to ensuring that a DNA sample is not contaminated.³³ Background DNA can obscure or masquerade as relevant evidence, thus making it essential to distinguish between pre-existing DNA and DNA traceable to the crime itself for accurate analysis.³⁴ Moreover, crime scene examiners must be mindful of their own potential to contaminate the scene through unintentional contact or handling.³⁵ This will ensure that the integrity of the evidence is not compromised and the reliability of the subsequent analysis is not undermined, albeit it being theoretically avoidable with stringent protocols and precautions.³⁶

It has, however, been established that laboratories go to extensive lengths to ensure that DNA contamination is significantly reduced. This is achieved by putting in place techniques such as elimination databases.³⁷ These databases are able to make comparisons between the outcomes of every sample processed against staff DNA profiles and those that had been processed in the

²⁸ See Puritan Medical 'Identifying and Preventing DNA Evidence Contamination' available at https://blog.puritanmedproducts.com/identifying-and-preventing-dna-contamination?hs_amp=true, accessed on 13 April 2024.

²⁹ Ibid.

³⁰ Meintjes-van der Walt L & Dhliwayo P 'DNA Evidence as the Basis for Conviction' (2021) 24 *PELJ* 1 at 10.

³¹ Goodwin JA & Meintjes-van der Walt L 'The Use of DNA Evidence in South Africa: Powerful tool or prone to pitfalls?' 114 (1997) *SALJ* 151 at 158. See also De Wet op cit note 26 at 181.

³² Ibid at 158.

³³ P Gill 'Misleading DNA evidence: Reasons for miscarriages of justice' (2021) *International Commentary of Evidence* at 56.

³⁴ Ibid.

³⁵ Ibid at 60.

³⁶ Ibid at 60.

³⁷ See Puritan Medical op cit note 28.

same batch, as well as stringent cleaning and exhibit handling protocols.³⁸ Therefore, in an effort to alleviate the possibility of sample contamination, South African laboratories have guidelines in place.³⁹ Furthermore, Kirby and Downing provide a few guidelines which include handling samples with gloves that are consistently changed between sample handling, and ensuring that samples are immediately transferred to the forensic laboratory where they should be ‘stored as soon as possible in labelled, sealed containers and at temperatures below 4° C’.⁴⁰

In addition, Ellis⁴¹ adds that those collecting samples should always ensure that their collection instruments are sterilised before each use. It remains clear that the skills of laboratory technicians align with the steps involved in DNA profiling.⁴² However, this means that DNA profiling results cannot be considered in isolation of human error, or rather laboratory error.⁴³

4.2.1 Laboratory errors

Albeit laboratory errors during the process of DNA profiling may not be significantly high due to great precautions taken by the laboratories, we may still find that these errors do occur and may often lead to false matches.⁴⁴ The majority of the mistakes discovered in these laboratories is mainly due to the scientists unintentionally contaminating the DNA samples with their own work, or performing sloppy and inadequate work by mislabelling the samples, or having inexperienced lab technicians carrying out the procedures.⁴⁵ In other instances, the errors are not a result of the abovementioned but rather, laboratory staff purposefully manipulating the results in order to mislead the presiding officer.⁴⁶

In the 2001 case of *S v Maqhina*,⁴⁷ where DNA evidence was admitted and brought in for consideration, the court pointed out several errors with regard to the evidence. Inter alia, the court found that the scientist who carried out the test was not suitably qualified, the laboratory used was not accredited and the expert failed to comply with the appropriate protocol in place.⁴⁸ Furthermore, the defence claimed that it was impossible for the reliability of the test to be

³⁸ Ibid.

³⁹ Discussed in Chapter Two.

⁴⁰ R Kirby and TG Downing ‘The principles and problems of DNA-profiling for legal purposes in South Africa’ 2 (1999) *Obiter* 307 at 316, 317 & 324. See also De Wet op cit note 26 at 181.

⁴¹ Ellis A ‘A Baby Rape: Why Does the Law Not Protect Them?’ (2003) 28 *Tydskrif vir Regswetenskap* 68.

⁴² Goodwin & Meintjes-Van der Walt op cit note 32 at 163.

⁴³ Behrouzfar NR ‘Strengths, limitations and controversies of DNA evidence: Trends and issues in scientific evidence’ (2006) 1 *Southern New England Roundtable Symposium LJ* 110 at 128.

⁴⁴ Ibid at 131. See also R Kirby ‘DNA Evidence in South Africa: Fallacies and the Future’ 25 (2004) *Nelson Mandela University Journal* 386 at 393.

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ *S v Maqhina* 2001 (1) SACR 241 (T).

⁴⁸ Ibid at 250F & 251 C-D.

assessed due to the failure of the laboratory expert to conduct duplicate tests.⁴⁹ This case stresses and highlights the importance of knowledge about DNA and its processes because, in the absence of such knowledge, the defence, as well as the presiding officer, would not have been able to point out the errors and unreliability of the evidence. Furthermore, it highlights some of the problems relating to contamination and laboratory errors that could be encountered when dealing with DNA evidence. Therefore, it is imperative that legal practitioners handle such evidence with great caution.

4.3 DEGRADATION

Degradation is the process where DNA is quickly broken down as a result of the death of a cell and the subsequent nuclease activity.⁵⁰ It is easy for samples exposed at the crime scene to undergo degradation, especially due to factors such as heat, time spent exposed, UV light as well as humidity.⁵¹ The rate at which DNA deteriorates is dependent on the host tissue and the conditions that such tissue is exposed to.⁵² Thus, it is imperative that those who collect, handle and store DNA or DNA-containing material do so properly, under appropriate conditions.⁵³ This is so as to alleviate DNA degradation. However, degradation does not invalidate DNA profiling.⁵⁴ Where a DNA sample has significantly deteriorated, it becomes difficult for scientists to accurately identify samples.⁵⁵ Therefore, an STR profile may not be able to produce a DNA profile.

4.4 DNA TRANSFER

The enhanced sensitivity of modern DNA testing technologies has enabled the successful analysis of minute biological samples, including single cells.⁵⁶ However, this increased sensitivity has also raised concerns regarding the reliability of DNA evidence, particularly in cases where DNA may have been transferred through indirect means, such as contact or proximity, rather than through direct involvement in the crime.⁵⁷

⁴⁹ Ibid at 251 C-D.

⁵⁰ De Wet op cit note 26 at 182. See also Goodwin & Meintjes-Van der Walt op cit note 32 at 159.

⁵¹ Op cit note 5 at 40.

⁵² De Wet op cit note 26 at 182. See also Goodwin & Meintjes-Van der Walt op cit note 32 at 159.

⁵³ Ibid.

⁵⁴ Meintjes-Van der Walt op cit note 5 at 41.

⁵⁵ Ibid at 40.

⁵⁶ Meintjes-Van der Walt & Dhliwayo op cit note 30 at 10.

⁵⁷ Ibid.

In some cases, DNA evidence may point to a single possible source, with the DNA of the perpetrator being transferred to the victim or crime scene.⁵⁸ This is referred to as primary transfer.⁵⁹ However, in other situations, the DNA evidence may be more complex, with multiple individuals potentially contributing to the DNA found at the scene or on the victim, making it necessary to consider multiple possible sources.⁶⁰ This forms the basis of DNA transfer which involves the direct or indirect transfer of the DNA of a person to another person or object.⁶¹

The activity level of DNA transfer plays a crucial role in criminal investigations. The first literature on DNA transfer in relation to criminal law dates back to 1997 where van Oorschot and Jones⁶² discussed the crucial role that DNA transfer plays. In recent literature, Daly *et al* describes the different manners in which secondary transfer occurs.⁶³ Secondary DNA transfer occurs where DNA is transferred from one source to another person or object through an intermediate.⁶⁴ One of the main factors that influences this type of transfer is the amount of DNA that is shed by different individuals, and the type and duration of contact.⁶⁵ In an instance where DNA is transferred from one person to another person or object, and then further transferred from this source to another person or object creates what is commonly referred to as tertiary DNA transfer.⁶⁶

In the landmark Australian case of *R v Jama*,⁶⁷ a miscarriage of justice occurred wherein the defendant was wrongfully convicted of murder predicated solely on DNA evidence. The victim, an unconscious woman, was found in a toilet cubicle with minimal DNA evidence, including a single intact sperm and fifteen sperm-heads, which were tested and matched to the DNA profile of Jama.⁶⁸ He was later exonerated after subsequent investigation revealed that the DNA evidence was compromised due to secondary DNA transfer.⁶⁹ This contamination could have occurred in the laboratory that processed the samples, or the medical facility that

⁵⁸ Meintjes-Van der Walt & Dhliwayo op cit note 30 at 22.

⁵⁹ Ibid.

⁶⁰ Ibid.

⁶¹ Ibid.

⁶² Sessa et al 'Indirect DNA Transfer and Forensic Implications: A Literature Review' (2023) 14 *Genes* 2153.

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Ibid at 2154.

⁶⁶ Ibid at 2153.

⁶⁷ *R v Jama* (Unreported, Supreme Court of Victoria, Court of Appeal, 2009), as cited in M Smith & M Mann 'Recent Developments in DNA evidence' available at <https://www.aic.gov.au/sites/default/files/2020-05/tandi506.pdf>, accessed on 22 July 2024.

⁶⁸ Ibid.

⁶⁹ Meintjes-Van der Walt & Dhliwayo op cit note 30 at 22.

examined both the deceased victim and the woman that Jama had previously sexually engaged with.⁷⁰

In another case, *Fitzgerald v The Queen*,⁷¹ the conviction of murder of the appellant was set aside on appeal, wherein it was successfully argued that the conviction verdict was unreasonable.⁷² This was due to the reliance on circumstantial DNA evidence susceptible to secondary transfer.⁷³ The arguments of the prosecution were predicated on DNA that had been recovered from a didgeridoo (a musical instrument) found at the crime scene. The arguments were deemed insufficient, in the absence of corroborative evidence, to establish the direct involvement of the appellant in the violent acts perpetrated against the victims.⁷⁴

The egregious miscarriage of justice, resulting in the 16-months incarceration period for Jama, highlights the critical need for courts to exercise extreme caution when relying on DNA evidence,⁷⁵ while the *Fitzgerald* case emphasises the notion that DNA significance greatly depends on other available information on the accused.⁷⁶ Furthermore, they also highlight the important role that expert witnesses play in criminal proceedings involving scientific evidence. The prevalent question, therefore, that should be asked in courts is how and when DNA found at a crime scene was deposited.⁷⁷ They should concern themselves with the investigation of whether such DNA was innocently transferred or related to criminal activity.⁷⁸ Per the words of Meintjes-Van der Walt and Dhliwayo:⁷⁹

As minute quantities of DNA trace material, such as non-visible staining, can at present be captured and analysed, the exact source of a DNA sample is no longer regarded as the most important question. The question “whose DNA is this?” has moved to the crucial question “how did it get there?”.

4.4.1 DNA Mixtures

The analysis of DNA mixtures, comprising genetic material from multiple individuals, poses a significant challenge to forensic experts. This is owing to the intricate complexities that arise

⁷⁰ Ibid.

⁷¹ *Fitzgerald v The Queen* [2014] HCA 28. See also op cit note 30 for discussion.

⁷² Meintjes-Van der Walt & Dhliwayo op cit note 30 at 23.

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Ibid at 22.

⁷⁶ Ibid at 26.

⁷⁷ L Weathered, K Wright & J Chaseling ‘Dealing with DNA Evidence in the Courtroom: A Plain English Review of Current Issues with Identification, Mixture and Activity Level Evidence’ (2020) 1 *The Wrongful Conviction LR* 59 at 67.

⁷⁸ Ibid.

⁷⁹ Meintjes-Van der Walt & Dhliwayo op cit note 30 at 24.

with each additional contributor.⁸⁰ Notwithstanding the employment of modern techniques, including the utilisation of STR genetic markers, the precise determination of the number of individuals who contributed to a given DNA sample remains an impossible task, as highlighted by Biedermann *et al.*⁸¹ This inherent limitation necessitates a critical re-evaluation of the notion that DNA evidence constitutes the gold standard for forensic evidence, particularly in instances where DNA mixtures are relied upon as the primary evidentiary basis. Specifically, DNA mixtures are decidedly more susceptible to errors, bias and contamination as compared to single-source DNA samples.⁸² This can significantly impact the admissibility, weight and reliability of such evidence in criminal proceedings.

The *S v SB*⁸³ case is a stark reminder of the complexities and challenges posed by DNA mixtures in criminal investigations. In this case, a 4-year-old girl was brutally raped and killed. At the crime scene, the investigating officer placed a sanitary pad on the private parts of the body of the deceased, as means of retaining any fluid emanating therefrom.⁸⁴ The appellant, the father of the deceased, was convicted on a charge of rape by the High Court based on DNA evidence provided by the state expert witness. The expert witness testified that, upon testing the sanitary pad, semen from three males was identified and the DNA profile of the appellant was a match.⁸⁵ The presence of a DNA mixture in this case gave rise to several problems, such as interpretation difficulties, because it was unclear whether the DNA of the appellant was present due to the alleged rape or some other innocent contact.

The mixture of DNA profiles created a complex scenario which made it difficult to determine the origin, timing and actual circumstances of the DNA deposit. It further resulted in inconclusive results which made it impossible for the court to draw definitive conclusions about the involvement of the appellant in the alleged crime. However, in the Supreme Court of Appeal (SCA), the conviction was set aside as a result of the unreliability of the DNA evidence. The SCA recognised and highlighted the impact that DNA mixture and interpretation difficulties has in criminal proceedings, particularly where DNA evidence is the only evidence

⁸⁰ Tonic & Silva op cit note 4 at 49.

⁸¹ A Biedermann et al 'Inference about the number of contributors to a DNA mixture: Comparative analysis of a Bayesian network approach and the maximum allele count method' 6 (2012) *Forensic Science International Genetics* 689. See also Tonic & Silva op cit note 4 at 50.

⁸² Tonic & Silva op cit note 4 at 50.

⁸³ *S v SB* 2014 (1) SACR 66 (SCA).

⁸⁴ *Ibid* para 6.

⁸⁵ *Ibid* para 21.

available. It stated that where the crime scene DNA is a mixture, the ‘match of the accused person and the crime scene DNA will have little or no probative value’.⁸⁶

Ultimately, this case illustrates the importance of approaching DNA evidence with caution, particularly when faced with mixtures, and not relying solely on DNA evidence for a conviction. The complexities and uncertainties associated with DNA mixtures can result in the court being presented with misleading results, thus emphasising the need for corroborative evidence.

4.5 PRE-TRIAL DISCLOSURE AND INEFFECTIVE LEGAL REPRESENTATION

Pre-trial disclosure and ineffective legal representation are critical issues within the criminal justice system, albeit they are not exclusive to cases involving DNA evidence. While these challenges do not directly concern the technical handling or analysis of DNA, they can still have profound implications for the fairness and integrity of trials, including those that rely on forensic scientific evidence. Inadequate pre-trial disclosure can result in the withholding of crucial evidence that may significantly impact the defence strategy of the accused, while ineffective legal representation can hinder the ability of the accused to challenge or properly address evidence, including DNA. These issues are essential to address because they can distort the pursuit of justice by skewing the trial process, influencing verdicts, and ultimately affecting the accuracy of outcomes in cases where DNA plays a crucial role. Therefore, it is important to examine the systemic problems to ensure that the legal process is fair for all those involved.

4.5.1 Pre-trial disclosure in South African criminal proceedings

The chain of evidence is of paramount importance in the pre-trial stages of criminal proceedings, as it directly impacts the admissibility of scientific evidence. Should the evidence be deemed admissible, it has the potential to influence the weight attributed to it, which would subsequently affect the manner in which the accused person prepares their defence, as well as their strategy.

Given the intricate nature of DNA evidence and its critical role in criminal trials, it is essential that comprehensive pre-trial disclosure of such evidence occurs.⁸⁷ The disclosure of evidence prior to trial is a crucial step in ensuring the right to a fair trial of the accused person, as it provides the defence with sufficient time to prepare and adequately challenge the case of the

⁸⁶ *S v SB* supra note 84 para 21.

⁸⁷ Bellengere, Theophilopoulos & Palmer (eds) *The Law of Evidence in South Africa* 2 ed (2019) at 472.

prosecution.⁸⁸ This is in line with section 35(3)(b) of the Constitution, which states that an accused person has the right to have adequate time and facilities to prepare a defence.⁸⁹ The complexity of DNA analysis, including the technical methodologies and potential for interpretation errors, necessitates that both litigating parties – particularly the defence – are provided with detailed access to all relevant DNA evidence well in advance of the trial. The primary objective of pre-trial disclosure is to inform the defence of all the evidence in the possession of the prosecution, thereby enabling and facilitating informed preparation for trial.⁹⁰ The quality of information available to both parties is fundamental in safeguarding fairness and ensuring access to justice.⁹¹

Historically, the prosecution was entitled to withhold information contained in the police docket and other case-related documents, thereby invoking docket privilege.⁹² Under this practice, the prosecution would only disclose to the defence medical reports, a list of expert witnesses, and the results of scientific tests.⁹³ However, this privilege was challenged following the adoption of the Interim Constitution,⁹⁴ and particularly in the case of *Shabalala v Attorney-General of Transvaal*.⁹⁵ The challenge of docket privilege was based on the argument that it unjustifiably limited several rights,⁹⁶ including section 35(3)(a), which guarantees the accused person the right to be informed of the charges with sufficient detail to respond, as well as section 35(3)(i), which protects the right of the accused person to adduce and challenge evidence.⁹⁷ The limitation of these rights undermined the ability of the accused person to prepare a defence and participate meaningfully in the trial.

The right of the accused person to a fair trial and access to justice necessitates that the prosecution discloses all relevant information, including evidence that may benefit the defence.⁹⁸ Concealing or withholding such evidence would undermine the principles of justice and impede the right to a fair trial that the accused has.⁹⁹ Notably, the duty of the prosecution

⁸⁸ Meintjes-van der Walt L *DNA in the Courtroom: Principles and Practice* (2010) at 27; op cit note 88 at 472.

⁸⁹ Constitution, 1996: s 35(3)(b).

⁹⁰ Meintjes-Van der Walt 'Pre-trial Disclosure of expert evidence: lessons from abroad' 13 (2000) *South African Journal of Criminal Justice* at 145.

⁹¹ Meintjes-Van der Walt *Courtroom* op cit note 89 at 27.

⁹² Meintjes-Van der Walt *Disclosure* op cit note 91 at 146-147.

⁹³ *Ibid* at 147.

⁹⁴ Constitution of the Republic of South Africa, Act 200 of 1993.

⁹⁵ *Shabalala and Others v Attorney-General of Transvaal and Another* 1996 (1) SA 725.

⁹⁶ Meintjes-Van der Walt *Disclosure* op cit note 91 at 147.

⁹⁷ *Ibid* at 150.

⁹⁸ *Ibid* at 156.

⁹⁹ DWM Broughton 'The South African Prosecutor in the face of adverse pre-trial publicity' (2020) 23 *PELJ* at 15.

to disclose evidence is unilateral, as the defence has no reciprocal obligation to disclose evidence to the prosecution.¹⁰⁰

Pre-trial disclosure of scientific evidence, like DNA evidence, offers several advantages, which promote a more equitable and just trial process. By providing the defence access to all relevant evidentiary material, pre-trial disclosure facilitates and fosters greater equality between the litigating parties by ensuring that both the prosecution and defence have access to the same information. It also enables more effective preparation for the defence by providing essential resources and insight into the case. In addition, pre-trial disclosure enables the defence to become aware of potential witnesses that the prosecution intends to call, thereby allowing for more effective cross-examination and defence strategy.¹⁰¹ Finally, pre-trial disclosure allows the defence to scrutinise the investigation process by allowing it to identify potential weaknesses in the case of the prosecution, and ultimately support the search for the truth.¹⁰²

Therefore, it becomes evident that the inadequate disclosure of scientific evidence (like DNA evidence) can have severe consequences, such as compromised trial outcomes and hindered justice. In DNA cases particularly, the criminal justice system relies heavily on the proper use of its science in the courtroom, thus inadequate disclosure can lead to miscarriages of justice.¹⁰³ It is, therefore, essential that the prosecution fulfils its duty to disclose all the evidence relevant to the case, including a DNA match, in order to ensure a just and fair trial. Thus, the importance of pre-trial disclosure cannot be overstated. It is a critical component of a fair and just trial, and its absence (as demonstrated above) can have far-reaching consequences. As such, it is imperative that the prosecution prioritises disclosure and provides the defence with all relevant evidence in a timely and transparent manner.

4.5.2 Ineffective legal representation

One of the significant challenges in the presentation of scientific evidence, particularly DNA evidence, in legal proceedings is the limited understanding of such evidence among legal practitioners.¹⁰⁴ This knowledge gap is particularly problematic in the context of criminal trials, where the right to a fair trial of the accused is paramount. The consequences of inadequate legal

¹⁰⁰ Meintjes-Van der Walt *Disclosure* op cit note 91 at 150.

¹⁰¹ Ibid.

¹⁰² Ibid at 156.

¹⁰³ Ibid at 155.

¹⁰⁴ Boies op cit note 20 at 439.

representation in cases involving DNA evidence can be severe, leading to wrongful convictions and miscarriages of justice.

Section 35 of the Constitution of the Republic of South Africa, 1996 guarantees that every accused person has the right to a fair trial, which includes the right to choose and be represented by legal counsel, and to be promptly informed of this right.¹⁰⁵ This constitutional provision plays a crucial role in safeguarding access to justice. However, its effectiveness would be undermined if it failed to ensure that legal representation meets a standard of competence and ethical practice.¹⁰⁶ In the landmark case of *S v Tandwa and Others*,¹⁰⁷ the court further clarified that the right to legal representation extends beyond mere access to a lawyer and encompasses the right to a defence lawyer who is both competent and adequately skilled to ensure a fair trial.¹⁰⁸ This principle is vital to the notion of a fair trial, which rests upon the provision of quality legal representation.

Similarly, the right to legal representation is enshrined in the Sixth Amendment of the USA Constitution. This right guarantees that, in criminal proceedings, the accused shall enjoy the right to a speedy and public trial, along with the assistance of counsel for their defence.¹⁰⁹ The USA Supreme Court, in *Gideon v Wainwright*,¹¹⁰ expanded upon this right by interpreting the Sixth Amendment in conjunction with the due process clause enshrined in the Fourteenth Amendment.¹¹¹ The court determined that the right to legal representation is fundamental to a fair trial, and it cannot be waived without a knowing, voluntary and intelligent decision. In this regard, legal representation is not simply a procedural safeguard, but a core element in ensuring that justice is served.

Moreover, legal practitioners are expected to possess specialised knowledge, skills and expertise in their field, thereby meeting the standard of competence that a reasonable man or professional in their position would be expected to uphold.¹¹² While it is not required for legal representatives to be experts in all areas of the law, they must have a working knowledge of the relevant legal frameworks and principles that apply to the case at hand.¹¹³ As scientific and

¹⁰⁵ Constitution of the Republic of South Africa, 1996: s 35.

¹⁰⁶ JJ Joubert (ed.) *Criminal Procedure Handbook* 12 ed (2017) 101.

¹⁰⁷ *S v Tandwa and Others* 2008 (1) SACR 613 (SCA).

¹⁰⁸ Ibid para 7. See also RK Moletsane 'Access to justice: The right to adequate legal representation in criminal proceedings' (Unpublished LLB thesis, University of the Free State, 2021) at 10.

¹⁰⁹ United States Constitution, Sixth Amendment.

¹¹⁰ *Gideon v Wainwright* 372 U.S. 355 (1963).

¹¹¹ Ibid.

¹¹² Mohamed (ed.) *Clinical Law in South Africa* (2016) 36. See also op cit note 110 at 9.

¹¹³ Joubert op cit note 108 at 102. See also op cit note 110 at 9.

technological advancements continue to evolve, the application of scientific evidence such as DNA evidence, particularly in criminal matters, becomes increasingly complex.¹¹⁴ Legal practitioners, therefore, must develop a more robust understanding of scientific principles in order to effectively engage with such evidence in the courtroom. Given the widespread use and significant probative value of DNA evidence, it is imperative for legal practitioners to acquire at least a foundational understanding of forensic science.¹¹⁵ Without such knowledge, defending and challenging the admissibility and interpretation of DNA evidence becomes an arduous task, often requiring reliance on expert testimony or the presentation of independent forensic evidence from the defence.¹¹⁶

In contrast to legal representatives for the accused, prosecutors typically benefit from access to forensic scientists and law enforcement officers during the investigation and pre-trial phases, which facilitates a more integrated approach to presenting scientific evidence.¹¹⁷ Defence representatives, however, are often constrained by limited resources and must rely primarily on their own expertise and experience in building a case for the accused.¹¹⁸ An analysis of the criminal process in South Africa indicates that forensic science evidence is often introduced by the State without significant opposition from the defence.¹¹⁹ This lack of challenge is largely attributed to the budgetary and time constraints faced by the defence, which inhibit their ability to effectively contest the validity of scientific evidence or scrutinise the methods used in its collection and analysis.¹²⁰ As a result, challenges to the scientific validity and interpretation of evidence, particularly in the context of DNA, are relatively rare in South African criminal trials.

This disparity in resources and expertise highlights the need for the defence to not only possess a comprehensive understanding of the law, but also to be equipped with sufficient knowledge of scientific methodologies in order to ensure a fair adversarial process, particularly in cases where forensic evidence plays a pivotal role. The growing reliance on scientific evidence in criminal trials underscores the importance of competent legal representation that can

¹¹⁴ L Meintjes-Van der Walt 'Science Friction: The nature of expert evidence in general and the scientific evidence in particular' 117 (2000) *SALJ* at 771.

¹¹⁵ Boies op cit note 20 at 439.

¹¹⁶ J Visser 'Defence challenges of forensic scientific evidence in criminal proceedings in South Africa' 28 (2015) *South African Journal of Criminal Justice* at 34.

¹¹⁷ Ibid at 29-30.

¹¹⁸ Ibid.

¹¹⁹ Ibid at 25.

¹²⁰ Ibid.

adequately challenge such evidence, thereby safeguarding the rights of the accused and against wrongful convictions.

4.6 CONCLUSION

This chapter has underscored a variety of the challenges and limitations that are inherent in DNA evidence, which collectively militate against its reliance as the sole basis for a criminal conviction. Issues such as contamination, laboratory errors, degradation, DNA transfer, and DNA mixtures underscore the imperative need for a more nuanced and cautious approach to the use of DNA evidence in the criminal justice system.

While DNA evidence is capable of undoubtedly being a powerful tool in the search of the truth and serving justice, its fallibility and susceptibility to error necessitates a more comprehensive strategy of the entire evidentiary landscape. Thus, this calls for legal practitioners to realise and acknowledge that DNA evidence is not the claimed ‘gold standard’ and is neither infallible. Its probative value can be significantly diminished by a range of factors, including the abovementioned.

Notable cases such as *R v Jama*, *S v Maqhina*, as well as the *S v SB* case, are a few demonstrations of the issues that can arise from relying on DNA evidence. It is, therefore, incumbent upon legal practitioners to ensure that they approach DNA evidence with a critical and discerning eye by recognising its potential to both support and undermine the truth and should thus carefully consider its reliability and weight in the context of the whole case. It is thus crucial that DNA evidence is considered in conjunction with other forms of evidence and is further subjected to rigorous scrutiny. This will ensure that the judiciary prevents convictions based on incomplete or misleading evidence. Furthermore, the aforementioned cases raise concerns regarding the capacity of the South African judiciary, particularly its presiding officers, to accurately evaluate and assign the appropriate probative value to DNA evidence, especially in instances where it constitutes the sole basis for a conviction.

CHAPTER FIVE

EVALUATION OF DNA EVIDENCE IN JUDICIAL COURTS

5.1 INTRODUCTION

The power of DNA to identify perpetrators, exonerate the innocent, and solve crimes has been amply demonstrated in the previous chapters. However, the interpretation and application of DNA evidence are far from straightforward, requiring a delicate balance of scientific expertise, statistical analysis and legal acumen. As DNA evidence assumes an increasingly central role in criminal investigations in South Africa, it is crucial to examine the standards and practices governing its evaluation.

The evaluation of evidence constitutes a meticulous and comprehensive process wherein the court undertakes a thorough examination and assessment of the evidence presented.¹ The ultimate objective involves ascertaining the precise facts that have been substantiated by the evidence, distinguishing alleged facts that lack evidentiary support, and synthesising the established facts into a cohesive narrative that facilitates the ability of the court to draw informed conclusions.² This evaluative process enables the court to critically assess the probative value of the evidence, assign weight to each piece of evidence, and ultimately render a verdict grounded in a thorough understanding of the underlying facts and circumstances of the case.³

This chapter, therefore, explores the evaluation of DNA evidence in both South Africa and USA. By examining the strengths and limitations of the current approach, it aims to identify strategies to enhance the integrity, reliability and effectiveness of DNA evidence in the pursuit of justice and truth. Ultimately, this chapter seeks to contribute to the ongoing quest for a more just and efficient criminal justice system, where the full potential of DNA evidence can be harnessed to serve the interests of justice and accountability. To this effect, it will first examine the burden and standard of proof required in criminal proceedings to convict an accused person.

¹ Bellengere, Theophilopoulos & Palmer (eds) *The Law of Evidence in South Africa* 2 ed (2019) 374.

² Ibid.

³ Ibid.

5.2 BURDEN AND STANDARD OF PROOF IN CRIMINAL PROCEEDINGS

In terms of section 35(3) of the Constitution, an accused person has the right to have their case proven against them or, rather, to remain innocent until proven guilty.⁴ Arising from this right is the principle of the burden of proof. Zeffert *et al* explains burden of proof as:⁵

‘... metaphorical expression for the duty which one or other of the parties has of finally satisfying the court that he or she is entitled to succeed on his claim or defence whichever it may be’.

The burden of proof, also referred to as the onus of proof, is a fundamental concept in the adversarial system. It embodies the procedural mechanism by which the court evaluates the efficiency and reliability of admitted evidence, thereby determining whether a party has successfully discharged their obligation to prove their case.⁶ Burden of proof can thus be defined as the imperative duty imposed upon a party to convincingly demonstrate, by the end of the trial, the truth of certain claims or allegations.⁷ In essence, it necessitates that a litigating party persuades the court, through the presentation of credible evidence and compelling argumentation, of the truth and validity of their claims or defences.⁸

The burden of proof is inextricably linked to the standard of proof which dictates the level of certainty required to establish the truth of a claim.⁹ The standard of proof, in criminal matters, must be proved beyond a reasonable doubt, as opposed to a balance of probabilities in civil matters.¹⁰ In accordance with the constitutionally protected presumption of innocence and the right to remain silent, the prosecution bears the onus to prove that the accused person is guilty of the act or omission charged with.¹¹ This means that the state has to prove the guilt of the accused person beyond a reasonable doubt.

The ‘beyond a reasonable doubt’ standard is a stringent threshold that demands a remarkably high probability of guilt, rendering alternative explanations as exceedingly improbable.¹² This high burden of proof requires the presiding officer to possess no reasonable uncertainty

⁴ Constitution, 1996: s 35(3)(h).

⁵ DT Zeffert, AP Paizes & ST Q Skeen A *The South African Law of Evidence* (2003) 45.

⁶ De la Rey JH *The Fact-Finding Process and Burden of Proof During Litigation* (unpublished LLM dissertation, University of Pretoria, 2007) at 72.

⁷ Op cit note 1 at 63.

⁸ Ibid.

⁹ Op cit note 1 at 63.

¹⁰ Op cit note 5 at 602-603.

¹¹ Ibid.

¹² Judicial Institute for Africa ‘A Practical Approach to Evidence for Judicial Officers: Common law sources and African applications’ at 02-05 available at <https://lawlibrary.org.za/akn/za/doc/guide/2023-03-01/a-practical-approach-to-evidence-for-judicial-officers/eng@2023-03-01>, accessed on 8 October 2024.

regarding the guilt of the accused person.¹³ The rationale for imposing such a stringent standard on the prosecution is rooted in two primary policy considerations. First, there exists a significant disparity between the resources available to the prosecution for investigation and evidence collection, and the relatively limited means at the disposal of the defence.¹⁴ This imbalance underscores the necessity for the prosecution to bear the burden of proof. Second, and more importantly, this standard acts as a vital safeguard against wrongful prosecution and conviction. By distinguishing this standard from the lower civil threshold, it aims to protect individuals from unjust legal action and ensures that the state fulfils its obligation to prove guilt beyond reasonable doubt.¹⁵

Therefore, in order to secure a conviction, the prosecution bears the burden of establishing all essential elements of criminal liability, including the identity of the accused person, *mens rea* (guilty mind or intent), the unlawfulness of the act or omission, and the absence of any valid defence raised by the accused.¹⁶ This necessitates presenting comprehensive evidence that convincingly demonstrates each of these components beyond a reasonable doubt. In *S v Mattioda*,¹⁷ the court summarised this process by stating that the correct approach in criminal cases requires a comprehensive evaluation of the entire evidentiary record by considering the strengths and weaknesses of both the cases of the prosecution and defence, as well as the overall probabilities and credibility of all witnesses.¹⁸ The presiding officer went on to state that it would be impermissible to automatically presume that the defence evidence is inherently false merely because the witnesses of the prosecution have provided satisfactory testimony.¹⁹

In assessing the evidence presented, the court must, therefore, engage in a rigorous evaluation to determine whether any reasonable doubt exists regarding the innocence of the accused person. The inquiry of the court should be guided by the principle that any lingering uncertainty or ambiguity must be resolved in favour of the accused. Where doubt is cast, the court would have to acquit the accused, as the prosecution would have failed to meet their burden of proof.²⁰ This, then, raises a critical question: what processes, standards, factors or considerations do

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Op cit note 5 at 604.

¹⁷ *S v Mattioda* 1973 (1) PH H 24 (N).

¹⁸ Ibid: para. 49; see also *S v Singh* 1975 1 SA 227 (N):228G.

¹⁹ Ibid.

²⁰ *R v Difford* 1937 AD 370 at 383.

judges or presiding officers use to determine whether the standard of proof has been met? This question will be answered in the section below.

5.3 EVALUATION OF EVIDENCE IN COURT

Establishing the factual basis of a case is a critical step in the evaluation of evidence.²¹ It involves a thorough and meticulous process of gathering and verifying facts from various sources, including expert testimony. In cases where facts are disputed, it is particularly important to carefully examine the evidence and determine which facts have been proven to the required standard of proof.²² When undertaking the task of determining which facts have been proven according to the required standard of proof, the court is able to build a clear and reliable picture of the facts, which is essential for resolving the legal issues before the court.²³ In addition, it is able to make informed decisions, apply relevant laws and principles, as well as deliver a just verdict.

In *Stellenbosch Farmers' Winery Group Ltd and Another v Martell et Cie and Others* ('the Stellenbosch case'),²⁴ the SCA provided guidance on the approach that a court should take in order to reconcile factual disagreements and determine, with reasonable certainty, the accurate version of events. The court stated:²⁵

To come to a conclusion on the disputed issues a court must make findings on (a) the credibility of the various factual witnesses; (b) their reliability; and (c) ... the probability or improbability of each party's version on each of the disputed issues. In light of the assessment of (a), (b) and (c), the court will then, as a final step, determine whether the party burdened with the onus of proof has succeeded in discharging it.

The presiding officer went on further to state that there exists challenging scenarios where, albeit rare, the credibility assessments and probabilistic evaluations of the court point in conflicting directions.²⁶ In such cases, the court noted that the greater the persuasive force of credibility findings, the less compelling the probabilistic considerations become.²⁷ However, in instances where credibility and probability factors are evenly balanced, the court will place its reliance on probabilistic evaluations to guide its ultimate decision.²⁸ The difficult task of

²¹ Ibid.

²² Ibid.

²³ Ibid.

²⁴ *Stellenbosch Farmers' Winery Group Ltd and Another v Martell et Cie and Others* 2003 (1) SA 11 (SCA).

²⁵ Ibid: para 5.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid.

evaluating all admitted evidence and assessing their weight then begins after all respective parties have closed their arguments.²⁹

5.3.1 The process of DNA evaluation in South Africa

In their work, Bellengere *et al*³⁰ briefly described the process of evaluating evidence in court. They explain that, in the course of rendering a judgment, the court must first identify and articulate the discrete questions of law and facts that require determination. Similarly, in a case that deals with DNA evidence, the court would first have to identify the disputed issues, such as the verification of the identity of the perpetrator or determining whether a DNA match between the accused and crime scene sample establishes guilt. As the judgment progresses, the findings of the court should logically unfold, addressing each issue in sequence, while acknowledging potential overlaps. This process would include establishing the reliability of the DNA evidence by assessing whether the chain of evidence was maintained, and laboratory procedures were followed. It would also entail verifying whether the DNA match is accurate by considering factors such as the DNA profiling techniques used, contamination and laboratory and/or human errors. Thereafter, the court must scrutinise the evidence and other relevant materials in order to assess their credibility, reliability and sufficiency in establishing or refuting the factual propositions at hand.³¹ This entails a meticulous evaluation of the probative value, relevance and weight of the evidence, as well as any inconsistencies, contradictions and ambiguities that may have an impact on its reliability.³² For example, in the case of *S v SB*, the court ruled that a DNA match between a crime scene sample and the profile of the accused constitutes circumstantial evidence and its weight is thus dependent on several factors.³³ These factors may include the reliable interpretation of the test results, statistical probability of the match, as well as specific case circumstances.³⁴

The court then engages in a cumulative evaluation of the proven facts supporting each material allegation to determine whether they collectively satisfy the burden of proof.³⁵ This involves assessing the persuasiveness of the evidence, the coherence of the narratives of the parties, and the overall probability of the facts as alleged. Ultimately, the court is tasked with determining

²⁹ PJ Schwikkard & SE Van der Merwe *Principles of Evidence* 4 ed (2016) 566.

³⁰ Op cit note 1 at 375-376.

³¹ Ibid.

³² Ibid.

³³ E Du Toit & Others *Commentary on the Criminal Procedure Act* (2018) 98B.

³⁴ Ibid.

³⁵ Ibid.

whether the evidence and other probative material substantiates the version of events of the State, or conversely, the version of events of the accused person.³⁶

Therefore, the failure of a court to conduct a thorough and nuanced analysis of the evidence, as set out above, and as required by the principles of judicial adjudication, can result in denying the involved parties a fair and impartial hearing.³⁷ This can ultimately infringe upon the right of an accused person to a fair trial, enshrined in section 35 of the Constitution, 1996. It is thus imperative that the judiciary carefully considers each individual factor that affects the weight of the evidence³⁸ before deciding on the verdict.

Ultimately, the evaluation of evidence by the court serves as the foundation for its verdict, and it is only by rigorously assessing the evidence, that the court can ensure that the appropriate weight is attached to the evidence.

5.3.2 The process of DNA evaluation in USA courts

The significance of DNA evidence in criminal proceedings has been proven to be primarily determined during the evaluation process by the jury.³⁹ The jury is tasked with assigning the appropriate weight to such evidence. In the context of the USA legal system, DNA evidence is categorised as circumstantial evidence (as is the case in South Africa),⁴⁰ meaning it provides indirect support for proving facts in question.⁴¹ Circumstantial evidence, including DNA evidence, does not directly prove the fact but allows the fact finder (jury) to infer the likelihood of its truth based on the data presented.⁴² As such, DNA evidence is typically used to build a broader picture of the case, with the fact finder tasked with evaluating its probative value in relation to other evidence.

The process of evaluating DNA evidence in the USA courts requires the jury to consider various factors. Crucially, forensic scientists present factual data related to DNA testing but are prohibited from directly offering conclusions about the guilt or innocence of the accused person.⁴³ This distinction is vital as forensic experts can only explain the methods, results and reliability of the testing, thereby leaving the ultimate interpretation and conclusions to the

³⁶ Ibid.

³⁷ Op cit note 1 at 375.

³⁸ Refer to 5.4.1 below.

³⁹ In accordance with the Constitution of the United States, Article III, Section 2, Par. 3 all criminal trials, except cases of impeachment, shall be by jury.

⁴⁰ See 5.5.1.1 below.

⁴¹ Dash, Shrivastava & Lorente (eds) *Handbook of DNA Profiling* (2022) 806.

⁴² Ibid.

⁴³ Ibid at 811.

jury.⁴⁴ The role of the expert witness is to clarify the scientific evidence, but it is the jury who possesses the authority to draw conclusions from it.

When assessing DNA evidence, courts in the USA give considerable weight to the validity and reliability of the testing methods used. The acceptance of DNA evidence hinges on whether the testing procedures conform to established scientific standards.⁴⁵ The reliability of forensic testing methods, such as Polymerase Chain Reaction (PCR) and Short Tandem Repeats (STR) analysis, must adhere to rigorous protocols to ensure accurate results and establishing the credibility of the evidence presented. Further, the chain of evidence is an essential factor in evaluating the weight of DNA evidence. Any discrepancies or gaps herein can undermine the integrity of the evidence and, consequently, its weight in court.⁴⁶ The jury is instructed to scrutinise how the sample was handled and transferred from collection to analysis, as well as any potential points where mishandling could have occurred. Additionally, the court also considers the random match probability, which provides a statistical measure of the likelihood of a coincidental DNA match between the accused person and the crime scene.⁴⁷

In addition to procedural reliability, the evaluation of DNA evidence in USA courts is not merely a matter of scientific interpretation, but also involves legal safeguards. According to the *Daubert* standard, courts must evaluate whether the scientific principles underlying DNA testing are reliable, whether the methods have been tested and peer-reviewed, whether the potential error rates are known, and whether the techniques have gained widespread acceptance within the scientific community.⁴⁸ This standard ensures that only scientifically sound and reliable evidence is presented in court. Furthermore, the jury must weigh DNA evidence within the context of the entire case.⁴⁹ While DNA can be a powerful tool in linking a suspect to a crime, it is not the sole determinant of guilt or innocence. Other factors, such as eyewitness testimony, motive, opportunity and the presence of corroborating evidence must be considered. The jury is instructed to evaluate DNA evidence in conjunction with all other evidence presented, and to assess its significance based on its reliability, accuracy and relevance to the case.

⁴⁴ LA Robinson 'United States v Two Bulls: Eighth Circuit addresses admissibility of forensic DNA evidence' 37 (1991) *Loyola Law Review* at 186.

⁴⁵ See in general the *Daubert* case.

⁴⁶ Meintjes-van der Walt L & Dhliwayo P 'DNA Evidence as the Basis for Conviction' (2021) 24 *PELJ* 1 at 9.

⁴⁷ Op cit note 44 at 812.

⁴⁸ *Daubert* at 593-594. See also *U.S v. Coleman*, 202 F. Supp. 2d 962 (E.D. Mo. 2002) at 6.

⁴⁹ Op cit note 44 at 812.

If DNA evidence is presented in court without corroborating evidence, the evaluation of such evidence becomes more complex, as the jury must consider the extent to which DNA alone can establish the guilt or innocence of the accused person. When DNA evidence stands alone – without additional supporting evidence – the jury is tasked with scrutinising its reliability and significance more closely.⁵⁰ The jury must thus be cautious about over-relying on DNA evidence alone, as the absence of corroboration may raise questions about how the DNA was obtained, whether it has been compromised in any way, and whether there might be other explanations for its presence.

In conclusion, the evaluation of DNA evidence the USA courts involves a complex process that incorporates scientific, legal and procedural considerations. Jurors are tasked with evaluating the reliability and significance of DNA testing methods, the integrity of the chain of evidence, the sensitivity of forensic tools, and the strength of the random match probability. Through this multifaceted approach, the jury determines the weight of the evidence in relation the guilt or innocence of the accused person, thereby gaining assistance from the *Daubert* factors in ensuring that their conclusions are based on a comprehensive assessment of all the facts presented during the trial.

5.4 WEIGHT

The concept of weight and admissibility are foundational to the law of evidence and play a critical role in legal proceedings. Although they are often treated as separate subjects, they are intricately linked and can sometimes overlap in practical application.⁵¹ In the courtroom, evidence is presented with the objective of persuading the court regarding the truthfulness of the claims made by a party, establishing specific facts or undermining the credibility of the arguments of an opposing party.⁵² However, the presentation of evidence is contingent upon adherence to established legal rules and standards which dictate that not all evidence may be permissible.

As elaborated in Chapter Three herein, the initial step in the evidentiary process involves determining whether the evidence in question is admissible.⁵³ This assessment is crucial, as only evidence that meets the relevant legal criteria can be submitted for consideration –

⁵⁰ Ibid.

⁵¹ Op cit note 1 at 52.

⁵² Ibid.

⁵³ See in this regard Chapter Three herein.

relevance.⁵⁴ Relevance, in this context, refers not only to the direct connection between the evidence and the legal issues being litigated but also necessitates an examination of the potential weight of the evidence.⁵⁵ In conducting this preliminary investigation, the court seeks to ascertain whether the evidence, once admitted, will provide meaningful assistance in ultimately determining whether the contested facts have been sufficiently established.⁵⁶ This process involves assessing whether the evidence can significantly influence evaluation of the facts in issue by the court.⁵⁷

Once the court has ruled the evidence admissible, it becomes subject to scrutiny by the opposing party and, to a lesser extent, the court itself.⁵⁸ This stage involves a rigorous examination where the evidence is tested for reliability and credibility. Following this examination, the court will engage in a critical analysis of the evidence to ascertain its weight – essentially, its persuasive power and significance in the context of the case.⁵⁹ The determination of weight by the court reflects how influential the evidence is in shaping the outcome of the case.⁶⁰

This relationship, between admissibility and weight, is sequential and interdependent. However, the two concepts should not be confused. In their work, Lansdown and Campbell⁶¹ explain this by stating that:

If what is adduced can in law properly be put before the court, it is admissible. It is only once it has been or could be admitted that its persuasiveness, alone or in conjunction with other evidence, in satisfying the court as to the *facta probanda* has to be considered.

Therefore, the concept of admissibility must be addressed first; only after the evidence is accepted can the court assess its weight. Thus, it is evident that evidence cannot be evaluated for its weight unless it has first been deemed admissible. In essence, the interplay between admissibility and weight is central to the functioning of the law of evidence, highlighting the critical nature of these concepts in judicial processes.

⁵⁴ Op cit note 1 at 52. See also op cit note 32 at 50-51.

⁵⁵ Op cit note 32 at 22.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Op cit note 1 at 52.

⁵⁹ Ibid.

⁶⁰ Ibid.

⁶¹ AV Lansdown & J Campbell *South African Criminal Law and Procedure: Criminal Procedure and Evidence* Vol 5 (1982) 852. See also op cit note 32 at 22.

While an exhaustive framework for evaluating evidence does not exist, several guiding principles have developed over time to aid courts in this critical process.⁶² Among these, two fundamental principles stand out. First, the court must weigh all the evidence collectively, recognising the interconnectedness of evidentiary elements and cumulative impact of the evidence presented.⁶³ Second, it is imperative that the court draws proper inferences, which are conclusions based solely on established facts, while avoiding conjecture and speculative reasoning that relies on hypothetical scenarios.⁶⁴

When considering evidence in its totality, the court must acknowledge the relationships between its constituent parts.⁶⁵ Although individual components may be analysed separately for clarity, the court cannot overlook how each piece contributes to the overall context of the case.⁶⁶ To this effect, in *S v Zitha*,⁶⁷ the court held that ‘it is axiomatic that the trier of fact must have regard to all the evidence and to all such considerations as reasonably invite clarification...’.⁶⁸ Disregarding these interrelations between the different pieces of evidence could lead to misinterpretation or distortion of the case narrative.⁶⁹ Additionally, it would be fundamentally flawed to reject certain pieces of evidence without considering their collective impact on the overall admitted evidence.⁷⁰

Moreover, before any inferences can be drawn, the court must establish proven facts. This foundational step is crucial in the evaluation process, as conclusions based on unproven facts are inherently flawed.⁷¹ If a particular fact has not been established through the evidence presented, any inference relying on that fact becomes speculative and, thus, impermissible.⁷² This principle was reaffirmed in *S v Ndlovu*,⁷³ highlighting the necessity of basing conclusions on established facts to uphold the integrity and validity of the findings of the court.⁷⁴

In essence, the process of evidence evaluation demands a careful and comprehensive approach to ensure that the conclusions of the court are substantiated and reliable. By adhering to these

⁶² Ibid at 57.

⁶³ Ibid.

⁶⁴ Ibid.

⁶⁵ Op cit note 32 at 568.

⁶⁶ Op cit note 1 at 57.

⁶⁷ *S v Zitha* 1993 (1) SACR 718 (A).

⁶⁸ *S v Zitha*: para 142.

⁶⁹ Op cit note 1 at 57.

⁷⁰ Ibid.

⁷¹ Ibid.

⁷² Ibid. See also *De Wet and Another v President Versekeringsmaatskappy Bpk* 1978 (3) SA 495 (C) at 500F-G.

⁷³ *S v Ndlovu* 1987 (1) PH H37 (A).

⁷⁴ Ibid at 68.

principles, the court can avoid speculation and conjecture, thus emphasising the importance of rigorous analysis in upholding the rule of law and the integrity of legal proceedings. This commitment enables courts to effectively navigate the complexities of evidence evaluation and achieve fair and just outcomes.

5.4.1 Factors affecting evidentiary weight

In evaluating the evidence presented in a trial, the court engages in a careful and methodical process that involves applying coherent and logical reasoning.⁷⁵ This objective analysis is essential for ensuring that the conclusions drawn are well-founded and justifiable. The court will rely on its accumulated experience and knowledge, as well as refer to a variety of factors that are pertinent to the specific circumstances of the case at hand.⁷⁶ The factors that will guide the court in its evaluation are diverse and may include, but are not limited to, those outlined below.

5.4.1.1 Circumstantial evidence

DNA evidence does not fall under the category of direct evidence but rather circumstantial evidence because it does not directly prove that a crime has been committed.⁷⁷ Direct evidence refers to a testimony from witnesses who have personal knowledge or first-hand experience or knowledge of a disputed fact, providing clear and unequivocal assertions regarding the event or circumstance in question.⁷⁸ On the other hand, circumstantial evidence is evidence that does not directly prove a fact, but instead provides indirect proof through other related facts.⁷⁹ It requires the court to analyse surrounding facts and draw reasonable conclusions, rather than relying on explicit assertions.⁸⁰ In *Tom v S*, the court defined circumstantial evidence as ‘evidence of a fact or facts from which the court is asked to infer another fact in issue’.⁸¹

Although it may sometimes seem like it, it is important to note that circumstantial evidence is not a weaker form of direct evidence.⁸² In *S v Reddy*, the court quoted Best where he stated that:⁸³

⁷⁵ Op cit note 1 at 57.

⁷⁶ Ibid at 57-58.

⁷⁷ Op cit note 49 at 5.

⁷⁸ Op cit note 1 at 59.

⁷⁹ Ibid.

⁸⁰ Op cit note 49 at 6; op cit note 1 at 57.

⁸¹ *Tom v S* [2022] ZAECKMKHC 98.

⁸² *S v Shabalala* 1966 (2) SA 297 (A) at 299.

⁸³ *S v Reddy and Others* 1996 (2) SACR 1 (A) at 81 quoting *Best on Evidence* 10 ed para 297.

even two articles of circumstantial evidence, though each taken by itself weigh but as a feather, join them together, you will find them pressing on a delinquent with the weight of a mill-stone.

Furthermore, in *Musingadi and Others v S*,⁸⁴ the court noted that there are even instances where circumstantial evidence, or the inferences drawn from it, can be more compelling than direct. It went further to state that, however, there will be instances where the inverse is also true.⁸⁵ As a result, circumstantial evidence is not inherently considered to be less reliable.⁸⁶

DNA evidence is categorised as circumstantial evidence because it relies on inferences in order to link it to a conclusion of fact, which usually involves an expert witness. The expert witness plays the role of analysing and providing the scientific background and explanation for the DNA evidence when it is admitted in court.⁸⁷ In addition, it is regarded as circumstantial evidence because of its mere ability to offer a compelling inference in support of a point, but its failure to prove the argument that it must prove.⁸⁸ Circumstantial evidence thus allows for a fact at issue to be derived indirectly, and is employed in proceedings by providing factual information from which a determination of the likelihood of the fact in issue can be made.⁸⁹ To this end, the court ought to use ‘coherent, logical thought to the objective analysis of the evidence’ in assessing and deciding the weight of the evidence that has been admitted.⁹⁰

Albeit circumstantial evidence does not directly prove the commission of a crime, there exists no law in South Africa against a case being judged based on a single piece of evidence, even if such evidence is circumstantial evidence.⁹¹ However, this does not mean that circumstantial evidence has not been met without any challenges. Circumstantial evidence poses a risk of misinterpretation due to the potential of multiple inferences being drawn from the same facts.⁹² To mitigate the risk, specific guidelines have been developed for assessing circumstantial evidence. In the landmark case of *R v Blom*,⁹³ the court formulated two ‘cardinal rules of logic’ to guide its evaluation. These are:⁹⁴

⁸⁴ *Musingadi and Others v S* 2005 (1) SACR 420 (SCA).

⁸⁵ *Ibid*: para 20.

⁸⁶ *S v Shabalala* at 299.

⁸⁷ Olaborede A & Meintjes-van der Walt L ‘The Dangers of Convictions Based on a Single Piece of Forensic Evidence’ (2020) 23 *PELJ* 1 at 3.

⁸⁸ *Ibid* at 6.

⁸⁹ *Op cit* note 44 at 806.

⁹⁰ *Op cit* note 1 at 57.

⁹¹ Criminal Procedure Act: s 208.

⁹² *Ibid* at 412.

⁹³ *R v Blom* 1939 AD 188.

⁹⁴ *Ibid* at 202-203.

(1) The inference sought to be drawn must be consistent with all the proved facts. If it is not, the inference cannot be drawn.

(2) The proved facts should be such that they exclude every reasonable inference from them save the one sought to be drawn. If they do not exclude other reasonable inferences, then there must be a doubt whether the inference sought to be drawn is correct.

In accordance with the first rule, when DNA evidence is admitted, it must be consistent with the proven facts at issue and be a viable link to them. The second rule simply emphasises the principle that the prosecuting party has to prove guilt beyond reasonable doubt.⁹⁵ It demands that the established facts preclude alternative reasonable inferences as a result of the elevated standard of proof. Notably, even where a reasonable inference excludes all other plausible explanations, the court is still required to evaluate this inference as persuasive beyond a reasonable doubt before it can rely on it for a criminal conviction.⁹⁶ The case of *S v Godla*⁹⁷ is a clear demonstration of this position because the court applied the two rules to two different charges, and there were different outcomes, with the appellant being found guilty on one charge and acquitted on the other.⁹⁸ These rules thus act as a safeguard against potential pitfalls and logical fallacies because they enable the court to fully consider all relevant factors and arrive at a well-informed decision.

The *Blom* rules of logic place great emphasis on the importance of a step-by-step evaluation of the evidence. It encourages the court to methodically assess each piece of circumstantial evidence and its connection to the alleged crime. This approach helps to identify potential gaps or weaknesses in the admitted evidence and allows the court to carefully weigh the probative value of each item. In addition, the rules promote a consideration of alternative explanations and hypotheses, thereby ensuring that the court does not prematurely jump to conclusions or overlook plausible alternative scenarios. In the context of DNA evidence, where DNA is the only piece of evidence available, these rules are particularly relevant because they ensure that the court critically evaluates the reliability and significance of the evidence.

Ultimately, these rules provide a vital safeguard against the potential pitfalls of circumstantial evidence, including DNA evidence. By adhering to them, courts are able to ensure that their

⁹⁵ Op cit note 24 at 579.

⁹⁶ Op cit note 1 at 413.

⁹⁷ *S v Godla* (A98/2009) [2011] ZAFSHC 46.

⁹⁸ See *S v Godla* in this regard.

evaluation of such evidence is rigorous, systematic and legally sound, and thus leading to more reliable and just conclusions.

In *Tom v S*, the court stated that, due to the fact that there currently exists no law that distinguishes between circumstantial and direct evidence in terms of its weight and importance, both types of evidence suffice in meeting the proof of standard required in each case.⁹⁹ The cardinal rules test was subsequently confirmed in *S v Reddy*.¹⁰⁰ Moreover, the court held that circumstantial evidence should not be evaluated in a piece-meal fashion, but in its totality.¹⁰¹

The value of circumstantial evidence thus lies in all the individual pieces of evidence being evaluated together as one.¹⁰² The court stated, in *Godla v S*, that the circumstantial evidence presented by the state and that by the defence should be looked at and considered together as a whole when assessing its probative value.¹⁰³ It is also important for the court to take into consideration the cumulative effect of circumstantial evidence. To this effect, the state must satisfy the court that all circumstantial evidence, when evaluated together, is inconsistent with the innocence of the accused person beyond reasonable doubt.¹⁰⁴ This was confirmed in *R v De Villiers*¹⁰⁵ where the court pointed out that a criminal conviction should only occur if the totality of the evidence leaves no reasonable doubt about the guilt of the accused.¹⁰⁶

5.4.1.2 Witness credibility

In the case of expert testimony, once the relevance and admissibility of the expert opinion has been determined, courts are oftentimes faced with other dilemmas such as being incapable of evaluating and verifying the reliability of the conclusions of experts.¹⁰⁷ This may result in presiding officers making erroneous decisions based on forensic evidence that is considered to be trustworthy and infallible.¹⁰⁸ In the case of *S v Nthati en 'n Ander*,¹⁰⁹ the court acknowledged that, had the defence not brought attention to the inconsistencies of the forensic evidence before it, it would have accepted the evidence and convicted the accused.¹¹⁰

⁹⁹ Supra note 85 para 13.

¹⁰⁰ *S v Reddy* 1996 2 SACR 1 (A).

¹⁰¹ Ibid at 8C-D.

¹⁰² Op cit note 1 at 413.

¹⁰³ Supra note 101 para 9.

¹⁰⁴ Op cit note 24 at 578.

¹⁰⁵ *R v De Villiers* 1994 AD 493.

¹⁰⁶ *R v De Villiers* at 508-9.

¹⁰⁷ Visser J *First Generation Evidence and Its Influence on Legal Decision-making – A South African Perspective* (unpublished LLD thesis, University of the Free State, 2013) at 402.

¹⁰⁸ Ibid at 402.

¹⁰⁹ *S v Nthati en 'n Ander* 1997 (1) SACR 90 (O).

¹¹⁰ Ibid at 94E-F.

The South African admissibility criteria for expert testimony is mainly founded on whether the expert can be of appreciable help to the court, and the evaluation of their evidence is mainly founded on witness credibility and demeanour.¹¹¹ However, Meintjes-Van der Walt¹¹² contends that is unlikely for presiding officers to be able to ascertain the reliability of an expert testimony by simply taking into consideration the credibility and demeanour of the expert. The problems faced by presiding officers are even more pronounced where there are conflicting expert opinions. Notably, two high profile cases – *S v Maqhina*¹¹³ and *S v SB* (on appeal)¹¹⁴ – have featured contentious debates surrounding the reliability of forensic DNA evidence where expert opinions are contradictory to each other. In both instances, the courts ultimately sided with the defence experts, thereby leading to acquittals.

In *S v Maqhina*, the defence DNA scientist identified significant flaws in the DNA analysis report of the state expert. The court accepted the arguments of the defence, citing insufficient evidence to secure a conviction.¹¹⁵ Similarly, in *S v SB*, the SCA favoured the testimony of the defence expert due to its logical coherence that contrasted with the less convincing presentation of the state expert.¹¹⁶

Furthermore, in *JA obo DA v MEC for Health, Eastern Cape*,¹¹⁷ the court considered the *Daubert* test (discussed in Chapter Three) and its admissibility criteria, when it was describing the different types of conflicts that may arise when dealing with conflicting expert opinions.¹¹⁸ Together with the judgment made in *SMD Telecommunications CC v Mutual and Federal Insurance Company Ltd*,¹¹⁹ it was noted that the criteria applied in the *Daubert* case would be of great use in the South African criminal proceedings when the expertise of an expert is in need of assessment.¹²⁰ This owes to the fact that the *Daubert* test factors in reliability in its admissibility criteria. However, despite this consideration, the court relied on the credibility and demeanour of the expert witness.¹²¹ This is despite the contentions made by Edmond and

¹¹¹ Op cit note 111 at 406.

¹¹² L Meintjes-van der Walt 'The Proof of the Pudding: The Presentation and Proof of Expert Evidence in South Africa' 47 (2003) *Journal of African Law* 88 at 352.

¹¹³ *S v Maqhina* 2001 (1) SACR 241 (T).

¹¹⁴ *S v SB* 2014 (1) SACR 66 (SCA).

¹¹⁵ J Visser 'Defence challenges of forensic scientific evidence in criminal proceedings in South Africa' 28 (2015) *South African Journal of Criminal Justice* at 37.

¹¹⁶ *Supra* note 118 at 73.

¹¹⁷ *JA obo DA v MEC for Health, Eastern Cape* 2022 (3) SA 475 (ECB).

¹¹⁸ *Ibid* para 15.

¹¹⁹ *SMD Telecommunications CC v Mutual and Federal Insurance Company Ltd* [2009] ZAWCHC 147.

¹²⁰ *Supra* note 121: paras. 57-61.

¹²¹ Op cit note 111 at 409.

Meintjes-Van der Walt¹²² where they state that the reliability of evidence is properly assessed during trial through cross-examination or contradictory evidence adduced by the opposing party.

Cross-examination is a legal safeguard used within the adversarial system to uncover contradictory evidence and assess the reliability of expert testimonies. However, this is not always the best safeguard because it places an undue burden on the defence to assess the reliability of the evidence. As noted in Chapter Four, legal practitioners for the accused may not always possess the specialised scientific knowledge required to fully challenge expert testimony, particularly when it comes to complex forensic evidence, such as DNA evidence.¹²³ This is especially problematic in criminal cases where the stakes are high, and scientific evidence such as DNA evidence plays a pivotal role. Without adequate resources or expertise, the defence may struggle to effectively scrutinise the methods and conclusions of state experts, leaving the accused person at a disadvantage. In these instances, relying on cross-examination alone as a tool to assess reliability may undermine the fairness of the trial, as it fails to address the fundamental issue of whether the methods and findings of the expert are scientifically valid in the first place.

These landmark decisions underscore the critical role of expert testimony and the need for their scrutiny, as well as rigorous evidence evaluation in ensuring just outcomes in criminal proceedings. Moreover, they demonstrate that reliance on expert testimony and DNA evidence alone can be problematic, as seen in the successful challenges of its reliability in both cases. This underscores the need for corroborating evidence and meticulous scrutiny of expert testimonies, especially where they are contradictory to each other. This would ensure that potential miscarriages of justice are prevented.

5.4.1.3 Corroboration

The independent corroboration of certain aspects of the evidence presented is crucial in the context of legal proceedings. Corroboration occurs when evidence is reinforced by supplementary evidence that is substantiated through independent means, thereby owing its credibility to the original evidence.¹²⁴ In other words, corroboration is achieved when evidence is validated through a separate and distinct source, as opposed to relying on the evidence itself

¹²² G Edmond & L Meintjes-van der Walt 'Blind Justice? Forensic Science and the Use of Closed Circuit Television Images as Identification Evidence in South Africa' (2014) *SALJ* 109 at 113.

¹²³ *Ibid.*

¹²⁴ *Op cit* note 6 at 42.

for substantiation. However, while corroboration serves as a valuable tool in the evaluation of evidence, its role should not be misconstrued. In *DPP v Kilbourne*,¹²⁵ the court described corroboration as follows:

The word ‘corroboration’ is not a technical term of art, but a dictionary word bearing its ordinary meaning... Corroboration is therefore nothing other than evidence which ‘confirms’ or ‘supports’ or ‘strengthens’ other evidence... It is, in short, evidence which renders other evidence more probable. If so, there is no essential difference between, on the one hand, corroboration and, on the other, ‘supporting evidence’...

In evidentiary terms, corroboration essentially refers to the validation of a piece of evidence through support or confirmation from another piece of evidence originating from a different source.¹²⁶ Specifically, it is intended to facilitate assessments of ‘credibility, truthfulness and consistency, rather than [being] an additional requisite in bridging the barriers of proof’.¹²⁷ In this context, corroboration operates as an evidentiary aid and underscores the necessity for diverse evidence to bolster claims made in court.¹²⁸

Although contemporary evidentiary law does not universally mandate corroboration, its significance is acknowledged in specific contexts through statutory provisions and rules of practice.¹²⁹ This safeguard is deemed necessary in certain situations as the potential for deception is vast and the means of detection are limited. Historically, South African legislation incorporated statutory requirements for corroboration in cases involving treason,¹³⁰ perjury,¹³¹ and accomplice testimony.¹³² These provisions were justified by the peculiar circumstances surrounding the witness or the subject of their testimony.¹³³

The importance of corroboration in these contexts is underscored by the understanding that ‘the power of lying is unlimited, the causes of lying and delusion are numerous, and many of them are unknown, and the means of detection are limited’.¹³⁴ This acknowledgment highlights the

¹²⁵ *DPP v Kilbourne* 1973 All ER 440 at 447H.

¹²⁶ Op cit note 1 at 58.

¹²⁷ Op cit note 6 at 43. See also *S v Van As* 1976 2 PH H205 (A).

¹²⁸ Op cit note 1 at 58.

¹²⁹ GL Peiris ‘Corroboration in Judicial Proceedings: English, South African and Sri Lankan Law on the Testimony of Accomplices Compared’ 30 (1981) *International and Comparative Law Quarterly* 682 at 688.

¹³⁰ Criminal Procedure Act 56 of 1955: s 256(b). See also *R v Henning* 1943 AD 172; *R v Leibbrandt* 1944 AD 253; and *R v Strauss* 1948 (1) SA 934.

¹³¹ Ibid: s 256. See also *R v Smith* 1929 AD 377; and *R v Rajah* 1936 AD 45.

¹³² Ibid: s 257.

¹³³ Op cit note 132 at 689.

¹³⁴ J Stephen *A General View of the Criminal Law* 2 ed (1863) 249.

need for caution when relying on uncorroborated testimony, particularly in cases where the witness may have a vested interest in the outcome.

However, the Criminal Procedure Act 51 of 1977 ('the CPA') implicitly abolished these mandatory corroboration requirements, save in certain instances such as confessions.¹³⁵ Consequently, convictions can now be secured based on the testimony of a single witness, even in cases of treason or perjury. Previously, the CPA 56 of 1955 stipulated that a conviction could not be based solely on the uncorroborated testimony of an accomplice.¹³⁶ Instead, the offence had to be substantiated by independent evidence. The effect of this provision was that, however convinced the court may be of the guilt of the accused person, the court was prevented by a rule of law from convicting the accused on the uncorroborated testimony of an accomplice. Critics of this rule argued that it 'elevates the untrustworthiness of an accomplice's evidence into a presumption of perjury, and shows a low opinion of the court's power to detect falsehood'.¹³⁷ Following the enactment of the CPA 51 of 1977, there is no longer a legal requirement for corroboration, although a cautionary rule remains in place regarding the use of uncorroborated evidence in respect of an accomplice and co-accused.

The cautionary rule comprises two key components. First, courts must be cognisant to the potential pitfalls associated with specific types of evidence and approach their evaluation with corresponding caution.¹³⁸ However, courts are also reminded that while they must remain vigilant, they must be cautious against allowing caution to override sound judgment and common sense.¹³⁹ Second, courts ought to identify suitable safeguards to minimise the likelihood of erroneous findings.¹⁴⁰ This can be achieved through corroboration, however, it is not the only manner in which the cautionary rule can be satisfied.¹⁴¹

The concept of corroboration is often used interchangeably with the concept of cautionary rules in legal practice, simply because corroboration often serves as a means of satisfying the requirements of a cautionary rule.¹⁴² In essence, the presence of corroboration typically alleviates the concerns that underlie the cautionary rule, therefore, where there is corroboration,

¹³⁵ Criminal Procedure Act 51 of 1977: s 208.

¹³⁶ Criminal Procedure Act 56 of 1955: s 257.

¹³⁷ LH Hoffmann *The South African Law of Evidence* 2 ed (1970) 398.

¹³⁸ Ibid at 395. See also op cit note 32 at 587.

¹³⁹ Ibid. See also op cit note 32 at 588; and *S v Snyman* 1968 (2) SA 582 at 585.

¹⁴⁰ Ibid.

¹⁴¹ Op cit note 32 at 588.

¹⁴² Op cit note 6 at 43.

the cautionary rule is deemed to have been satisfied.¹⁴³ The cautionary rule is a principle that guides courts in evaluating evidence. Essentially, it places an obligation on courts to exercise caution when relying on evidence that appears questionable or untrustworthy.¹⁴⁴ This is particularly imperative when dealing with types of evidence that have been shown to be problematic in the past. It is thus essential to note that corroboration and cautionary rules are not interchangeable terms.

Corroboration is simply a tool that can help alleviate concerns raised by a cautionary rule. When relying on evidence subject to a cautionary rule, the court will consider various factors to assess its reliability.¹⁴⁵ Notably, once corroboration is established, the original evidence is no longer considered to be isolated. For instance, the testimony of a single witness would be reinforced, thereby transforming them from a single witness to a corroborated one. This is essential against the backdrop of understanding that the mere repetition of evidence by the same witness does not constitute corroboration.¹⁴⁶ When a witness reiterates their testimony, it may demonstrate their consistency, however, this consistency does not enhance the likelihood of the truthfulness of their account. While consistent testimony can be important for various reasons, such as establishing the credibility of a witness, it does not inherently increase the reliability of the narrative itself.¹⁴⁷ It is through the provision of supplementary evidence (corroboration) that the evidence of a single witness can demonstrate truthfulness and reliability.

As mentioned above, section 208 of the CPA 51 of 1977 explicitly did away with the mandatory requirement of corroboration.¹⁴⁸ Despite the existence of various safeguards, corroboration remains a valuable tool in ensuring the reliability of evidence. The repeal of the corroboration requirement has certainly impacted criminal trials by shifting the focus toward evaluating evidence in its entirety. But this has also led to concerns about wrongful convictions, particularly in cases where a single piece of evidence, such as witness testimony, is given undue weight.

While DNA evidence has a high degree of scientific reliability, it is not immune to errors or misrepresentation. This is why corroboration, in its broader sense, can be more successful in

¹⁴³ Op cit note 1 at 395.

¹⁴⁴ Ibid at 394.

¹⁴⁵ Op cit note 6 at 44.

¹⁴⁶ Op cit note 32 at 570.

¹⁴⁷ Op cit note 1 at 395. See also op cit note 32 at 570.

¹⁴⁸ CPA 51 of 1977: s 208.

providing a safeguard – by ensuring that DNA evidence is considered within the context of all other available evidence, whether it be physical evidence or other forensic findings. Presiding officers do not automatically consider whether DNA has been corroborated because of the presumption that DNA is objective and definitive. However, without corroborating factors to support the DNA evidence, its credibility could be called into question, especially in cases where its presence or interpretation is central to the case of the prosecution. In this way, corroboration is still an important safeguard as it ensures a more holistic and cautious approach to evaluating critical evidence in criminal trials.

It is thus evident that corroboration serves a pivotal role in strengthening the overall case, as it introduces an additional layer of validation. When multiple independent sources provide support for a particular fact or claim, the court can be more confident in its accuracy. This multiplicity of evidence helps to mitigate the risk of relying on the account of a single witness, which may be subject to personal bias, error or misunderstanding.¹⁴⁹ In legal practice, the absence of independent corroboration can raise significant concerns about the reliability of the evidence presented.¹⁵⁰ Courts often seek to ensure that crucial elements of a case are substantiated by multiple, credible sources.¹⁵¹ This does not only enhance the evidentiary weight, but also safeguards against wrongful convictions by ensuring that decisions are based on a robust foundation of verified information.

Thus, the process of seeking corroboration is not merely a procedural formality, it is a fundamental aspect of ensuring justice and upholding the integrity of the legal system. By requiring evidence to be corroborated through independent means, the courts strive to build a more comprehensive and accurate understanding of the facts at hand, ultimately leading to more informed and equitable outcomes.

5.6 CONCLUSION

The evaluation of evidence is a cornerstone of the criminal justice system, serving as the mechanism through which the truth is established, and justice is served. Understanding the burden and standard of proof, alongside the rigorous processes involved in evaluating evidence, is fundamental to ensuring that outcomes are fair and just.

¹⁴⁹ Op cit note 1 at 395.

¹⁵⁰ Ibid.

¹⁵¹ Ibid.

This chapter has highlighted the complexities involved in the evaluation of evidence, especially in criminal proceedings where the stakes are high. The burden of proof rests with the prosecution, which must establish the guilt of the accused beyond a reasonable doubt. This standard is not only a legal requirement but also a safeguard against wrongful convictions, reinforcing the principle that it is better for a guilty person to go free than for an innocent person to suffer unjust punishment. Therefore, meticulous evidence weighing is paramount, demanding a systematic approach to reduce the risk of error.

Central to this evaluation are three critical factors: circumstantial evidence, witness credibility and corroboration. Each factor significantly influences understanding of the presented evidence by the court. While circumstantial evidence can provide compelling narratives, it requires careful scrutiny to avoid misinterpretation.

The credibility of witnesses is also vital. Expert testimony can heavily sway case outcomes, making it essential for the court to assess the qualifications, reliability and potential biases of these witnesses. The weight of evidence is closely tied to the expertise of those who interpret it, highlighting the need for judges to discern the credibility of such testimonies. Corroboration is another crucial principle, especially concerning forensic evidence like DNA. This chapter has emphasised the necessity of corroborating DNA evidence with additional reliable evidence to enhance its probative value. Developed evaluation standards reflect the importance of a multifaceted approach that considers not just the scientific reliability of evidence but also its integration with other evidentiary elements. This enhances the integrity of the judicial process, ensuring decisions are based on a comprehensive view of the evidence.

Ultimately, the evaluation of evidence is not merely procedural; it safeguards individual rights within the criminal justice system. The standards and practices developed in South Africa demonstrate a commitment to achieving justice through careful consideration of all available evidence. The interplay of circumstantial evidence, witness credibility, and corroboration is vital in constructing robust cases that can withstand judicial scrutiny. In light of these discussions, it is evident that rigorous evidence evaluation goes beyond determining guilt or innocence; it ensures the judicial process is fair and just.

The ongoing refinement of evaluation standards, particularly regarding DNA evidence, will be crucial for maintaining the integrity of the criminal justice system. This chapter lays the groundwork for further exploration into how these principles can be applied in practice, reinforcing the overarching goal of justice for all.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This research paper has undertaken a comprehensive examination of the role of deoxyribonucleic acid (DNA) evidence in the South African criminal justice system. Through a multidisciplinary approach, drawing on insights from law, forensic science and biochemistry, this research has sought to demonstrate the limitations and vulnerabilities of DNA evidence.

While DNA is often regarded as one of the most reliable forms of evidence and the unequivocal ‘gold standard’ of proof¹ which offers unparalleled accuracy in identifying individuals, this research paper has highlighted significant vulnerabilities that challenge its presumed infallibility. Issues related to the collection, handling and testing of DNA, together with the associated difficulties of interpreting complex DNA mixtures and dealing with contamination and degradation, has raised critical questions regarding the reliability and weight attached to DNA evidence in criminal proceedings. Moreover, the legal frameworks governing its admissibility and evaluation do not always adequately address the uncertainties associated with its use, thus making it susceptible to errors and inconsistencies in its application. These challenges have demonstrated the difficulties in determining the true probative value of DNA evidence.

In light of these findings, it becomes clear that the need for reform is urgent. The potential for wrongful convictions, especially in cases where DNA evidence is treated as infallible, calls for a more cautious and rigorous approach to its use in criminal proceedings. This chapter will thus reflect on the broader implications of the challenges posed by DNA evidence, and also offer recommendations aimed at addressing the shortcomings that have been identified herein. These recommendations seek to prioritise the integrity of the justice system, ensuring that the use of DNA evidence serves the pursuit of truth and fairness, rather than perpetuating potential miscarriages of justice. It aims to improve the reliability of DNA evidence by ensuring that it is evaluated with greater rigor so as to protect the rights of individuals within the criminal justice process.

By taking into consideration both the scientific complexities and legal procedures governing the use of DNA evidence, this chapter aims to propose measures that will be able to enhance

¹ DE Shelton *Forensic science in court: Challenges in the twenty-first century* (2011) 27.

the integrity of the criminal justice system. These include, inter alia, developing the admissibility standards for DNA and expert evidence, as well as implementing stronger legal safeguards to prevent DNA evidence from being unduly relied on in isolation. Ultimately, the goal is to establish a more balanced and transparent system that preserves the benefits of forensic evidence (particularly DNA evidence), while mitigating the risks associated with its unreliability.

6.2 SUMMARY OF CHAPTERS

DNA evidence has had a transformative impact on the criminal justice system of South Africa, mainly because of its undeniable ability to link suspects to crime scenes and victims. With crime rates exponentially increasing and South Africa being one of the top 30 most violent countries globally,² DNA has become an invaluable tool for identifying perpetrators.³ Despite its great power, the problems associated with DNA evidence highlight the critical need for its cautious use in criminal proceedings.

The biochemistry of DNA plays a pivotal role in the application of DNA evidence in the legal field – it offers a powerful tool for criminal justice. Gaining an understanding of the molecular structure of DNA, its unique ability to store vast amounts of genetic information underpins techniques like polymerase chain reaction (PCR) and short tandem repeat (STR) analysis, which allow precise identification of individuals.⁴ DNA evidence has not only revolutionised criminal investigations and proceedings, but also enabled investigators to link suspects to crime scenes, exonerate the wrongfully convicted, as well as secure convictions with unprecedented accuracy.

The process of collecting and handling DNA evidence is critical in maintaining the integrity and reliability of its analysis. Proper collection methods, such as preventing contamination, using the appropriate and sterile equipment, and preserving the samples in controlled conditions, are essential in ensuring that DNA evidence remains uncontaminated and, subsequently, admissible in court.⁵ Once collected, DNA samples undergo profiling through PCR, which amplifies small or degraded samples,⁶ and STR analysis, which targets unique,

² S Writer “South Africa ranks as one of the most violent and dangerous places in the world” available at <https://businesstech.co.za/news/lifestyle/699927/south-africa-ranks-as-one-of-the-most-violent-and-dangerous-places-in-the-world/>, accessed on 25 May 2024.

³ Bellengere, Theophilopoulos & Palmer (eds) *The Law of Evidence in South Africa* 2 ed (2019) 470.

⁴ L Meintjes-van der Walt ‘An Overview of the use of DNA evidence in South African Criminal Courts’ (2008) 21 *South African Journal of Criminal Justice* 22 at 27.

⁵ See in general Chapters Two and Four.

⁶ De Wet S, Oosthuizen H & Visser J ‘DNA Profiling and the Law in South Africa’ (2011) 14 *PELJ* 171 at 176.

repeating DNA sequences for individual identification.⁷ These methods are particularly effective in criminal cases, however, the STR analysis technique has been the most commonly used and preferred method in South African criminal investigations and has, consequently, become the standard in forensic DNA analysis due to its reliability and precision.

The incorporation of these techniques into the legal framework has not only improved the manner in which criminal cases are resolved, but has also raised important questions regarding the collection, handling and ethical implications of DNA evidence. The accuracy of DNA profiling methods has led to them being widely accepted in judicial courts but has also raised great caution in the manner in which DNA evidence is handled as means of avoiding contamination and degradation. This is because these issues have the potential to compromise the integrity of the DNA profiling results.⁸

It thus becomes evident that the biochemistry of DNA, together with the rigorous protocols for evidence collection and analysis, forms the backbone of forensic science and plays an indispensable role in the legal field. It is evident that it attempts to bridge the gap between scientific discovery and the pursuit of justice, thereby ensuring that DNA evidence can be used effectively in support of legal decisions while protecting the rights of all those involved.

6.2.1 Admissibility rules

Physical or real evidence, like DNA evidence, plays a crucial role in both the jurisdictions of the United States of America (USA) and South African legal systems. It requires scientific analysis to determine its relevance and reliability. In both systems, evidence must pass a relevancy test prior to being admitted in court. In the USA, Rule 401 and Rule 402 of the Federal Rules of Evidence (FRE) emphasise the requirement that evidence must be relevant, and irrelevant evidence is inadmissible.⁹ Similarly, South African law requires evidence to be relevant and assist in proving or disproving facts in issue,¹⁰ with judicial experience and discretion guiding relevance assessments.¹¹ Irrelevant evidence is thus excluded to ensure fairness and avoid undue delay, costs and confusion,¹² and could further be excluded if its probative value is outweighed by potential prejudice, as seen in *R v Trupedo*.¹³

⁷ *S v SB* 2014 (1) SACR 66 (SCA) para. 13.

⁸ See Chapter Four in this regard.

⁹ See FRE Rule 401 and 402, respectively.

¹⁰ CPA: s 210.

¹¹ See *R v Matthews* at 758 and *S v Zuma* at 199, respectively.

¹² PJ Schwikkard & SE Van der Merwe *Principles of Evidence* 4 ed (2016) 50.

¹³ *R v Trupedo* at 62.

In both jurisdictions, the admissibility of expert testimony has evolved over time. In the USA, the *Daubert* decision in 1993 replaced the older *Frye* standard which required evidence to be ‘generally accepted’ in the scientific community prior to being admitted.¹⁴ The *Daubert* standard, refined through later decisions like *General Electric Co. v Joiner* and *Kumho Tire Co. v Carmichael*,¹⁵ focused on the relevance and reliability of scientific evidence and subsequently empowered presiding officers as gatekeepers of ensuring that expert testimony is scientifically valid.¹⁶ In 2000, Rule 702 of the FRE was amended to require expert testimony to be based on reliable methods like testability, peer review, error rate and general acceptance to assess the reliability of scientific methods used by expert,¹⁷ thereby ensuring that unreliable ‘junk science’ is excluded. This amendment, therefore, introduced guidelines

Similarly, in South Africa, expert testimony must be based on specialised knowledge that contributes meaningfully to the case, as seen in *Holtzhauzen v Roodt*.¹⁸ Therefore, expert evidence in South Africa is admissible when it is relevant and can be of appreciable help to the court.¹⁹

Therefore, in South Africa, the admissibility of evidence is primarily based on its relevance. The reliability of such evidence is, however, not subject to a strict reliability standard as in the USA. This focus on relevance, without a strict reliability standard, can lead to challenges in ensuring the probative value of forensic evidence, such as DNA evidence. Courts must balance legal standards with maintaining trial integrity while assessing the strength of the evidence, and the subjective nature of relevance, based on judicial experience and common sense. This can create inconsistencies and fairness concerns. Unlike the USA, where the reliability of evidence is rigorously assessed through standards like *Daubert*, South African courts do not always prioritise reliability. This gap may negatively impact the consistency and fairness of rulings, as relevant but unreliable evidence could be admitted, thus potentially undermining the integrity of the trial process.

¹⁴ *Frye v United States* (1923) at 1017-1018. See also National Research Council *Strengthening Forensic Science in the United States: A Path Forward* (2009) 88.

¹⁵ See in general *General Electric Co. v Joiner* and *Kumho Tire Co. v Carmichael*.

¹⁶ *Olaborede & Meintjes* at 9.

¹⁷ *Daubert v Merrell Dow Pharmaceuticals, Inc.* at 593-594. See also L Fournier ‘The Daubert Guidelines: Usefulness, utilization and suggestions for improving quality control’ 5 (2016) *Journal of Applied Research and Cognition* 308.

¹⁸ *Holtzhauzen v Roodt* at 772C-D.

¹⁹ *Ibid.*

6.2.2 Problems associated with DNA evidence

It has already been established in the preceding chapters that DNA evidence is a powerful tool in criminal investigations. However, its reliability can be compromised by factors such as contamination, degradation and the complexities of DNA mixtures.

Contamination can occur at any stage (during collection, transportation or analysis) especially because DNA is highly sensitive.²⁰ Exogenous DNA can be introduced through human error such as mishandling and improper storage.²¹ Albeit laboratories implement strict protocols, including elimination databases and proper storage, to minimise the risk of contamination, human error is inevitable. In *S v Maqhina*, for instance, DNA evidence was deemed unreliable because of unqualified scientists and improper laboratory practices, thus emphasising the need for rigorous standards in handling DNA evidence.²²

Degradation is another challenge because environmental factors such as heat, humidity and UV light can cause DNA to break down over time, particularly at crime scenes where samples may be exposed for extended periods.²³ While degradation does not invalidate DNA profiling, it makes it more difficult for scientists to extract usable profiles.²⁴ Modern DNA testing, however, can sometimes work with degraded samples, although this may increase the risk of false conclusions, especially in cases where DNA was transferred indirectly through contact or proximity, rather than directly from the accused or suspect.²⁵ This increases the risk of wrongful convictions and miscarriages of justice where DNA evidence is the only piece of evidence presented.

Moreover, DNA transfer is a key issue in understanding how DNA might be interpreted because DNA can be transferred from one individual to another through intermediate contact with objects.²⁶ As a result, secondary DNA transfer complicates the interpretation of DNA even further, as illustrated in *R v Jama* case.²⁷ The issue of DNA mixtures, where multiple people contribute to a single sample, also raises challenges to dealing with DNA evidence. While advancements in DNA testing have improved the ability to analyse mixed DNA profiles, it remains inherently difficult to determine how many individuals contributed or when the DNA

²⁰ Op cit note 6 at 180.

²¹ See Puritan Medical 'Identifying and Preventing DNA Evidence Contamination' May 2021.

²² *S v Maqhina* paras 250F & 251 C-D.

²³ Op cit note 4 at 40.

²⁴ Ibid at 40-41.

²⁵ Ibid.

²⁶ Sessa et al 'Indirect DNA Transfer and Forensic Implications: A Literature Review' (2023) 14 *Genes* 2153.

²⁷ Meintjes-van der Walt L & Dhliwayo P 'DNA Evidence as the Basis for Conviction' (2021) 24 *PELJ* 1 at 22.

was deposited.²⁸ In *S v SB*, DNA found at a crime scene was linked to the appellant, but the presence of multiple DNA contributors made it impossible to conclusively determine the origin and timing of the DNA deposit,²⁹ thus leading to an acquittal due to the Supreme Court of Appeal (SCA) recognising the limitations of DNA evidence in complex cases.

To safeguard the right to a fair trial of the accused, comprehensive pre-trial disclosure of DNA evidence is essential. This allows the defence adequate time to prepare and challenge the case of the prosecution, as guaranteed by section 35(3)(b) of the Constitution, 1996.³⁰ Given the complexity of DNA analysis and potential for interpretation errors, it is critical that both parties, especially the defence, have detailed access to all relevant DNA evidence in advance. Pre-trial disclosure enables informed trial preparation, thus ensuring fairness and access to justice.

Another significant challenge is the limited understanding of such evidence among legal practitioners. This knowledge gap can lead to wrongful convictions and miscarriages of justice. The right to a fair trial includes the right to competent legal representation. However, this right is undermined if the defence lacks the expertise to effectively engage with complex scientific evidence like DNA. Courts have emphasised that legal practitioners must possess the necessary skills to defend their clients effectively, as seen in *S v Tandwa and Others*.³¹

These challenges highlight the need for caution when relying on DNA evidence in criminal cases.

6.2.3 Evaluation standards and evidentiary weight

Establishing the factual basis of a case is essential for the evaluation of evidence – a process that involves gathering and verifying facts from various sources, including expert testimony.³² When resolving such disputes, judicial courts need to carefully examine the evidence to determine which facts meet the required standard of proof,³³ scrutinise the credibility and reliability of witness, as well as the probability of the narrative of each litigating party.³⁴ When

²⁸ A Biedermann et al ‘Inference about the number of contributors to a DNA mixture: Comparative analysis of a Bayesian network approach and the maximum allele count method’ 6 (2012) *Forensic Science International Genetics*) at 689. See also V Tonic & A Silva ‘The Contamination and Misuse of DNA Evidence: Are We There Yet?’ (2021) at 50.

²⁹ *Supra* note 7: para 21.

³⁰ Constitution, 1996: s 35(3)(b).

³¹ *S v Tandwa and Others* 2008 (1) SACR 613 (SCA).

³² *R v Difford* 1937 AD 370 at 383.

³³ *Ibid.*

³⁴ *Stellenbosch Farmers’ Winery Group Ltd v Martell et Cie*: para 5.

credibility and probability conflict, the court prioritises credibility, and when they are balanced, probability guides the decision.³⁵ The role of the court is thus to build a clear and reliable picture that helps apply the law and reach a just verdict.

The two fundamental concepts in the law of evidence are admissibility and weight. Evidence must first meet the legal standards for admissibility – it must be relevant and legally acceptable before it can be assessed for weight.³⁶ Once evidence is deemed admissible, it is subject to scrutiny for credibility, reliability and its impact on the case. The court must evaluate the evidence wholly, considering how each piece of evidence contributes to the overall narrative.³⁷ This is of paramount importance because overlooking the relationships between the pieces could lead to misinterpretation.³⁸ This process requires the court to draw inferences based only on established facts and avoid speculation. In *S v Zitha*, the court stressed that all evidence must be considered in its totality, and conclusions must be based on proven facts to avoid speculation.³⁹ This was also reiterated in *S v Ndlovu*.⁴⁰

In evaluating evidence during a trial, the court engages in a careful, logical and objective process that ensures that its conclusions are well-founded and justifiable. The court draws on its accumulated experience and knowledge by considering various relevant factors that are specific to the case in order to arrive at a decision that accurately reflects the facts.⁴¹

DNA evidence, although powerful, is classified as circumstantial evidence, which requires the court to make inferences about the facts in issue.⁴² While it is often perceived as weaker than direct evidence, circumstantial evidence can be equally reliable and compelling, particularly when it is consistent and supports a coherent narrative.⁴³ However, circumstantial evidence, including DNA, requires careful scrutiny. As noted in *R v Blom*, the court outlined two key rules for evaluating circumstantial evidence: (1) the inference drawn must be consistent with the proved facts, and (2) the proved facts must exclude all other reasonable inferences.⁴⁴ These rules help ensure that the evidence leads to a single, reasonable conclusion. Yet, even when

³⁵ Ibid.

³⁶ Op cit note 3 at 52. See also PJ Schwikkard & SE Van der Merwe *Principles of Evidence* 4 ed (2016) 50-51.

³⁷ Op cit note 3 at 57.

³⁸ Ibid.

³⁹ *S v Zitha*: para 142.

⁴⁰ *S v Ndlovu* at 68.

⁴¹ Op cit note 3 at 57.

⁴² Op cit note 27 at 5.

⁴³ See *S v Reddy* at 81, and *Musingadi and Others v S*: para 20.

⁴⁴ *R v Blom* at 202-203.

circumstantial evidence excludes all other plausible explanations, the prosecuting party must still prove the guilt of the accused beyond a reasonable doubt.⁴⁵ This principle emphasises the need for rigorous scrutiny of circumstantial evidence, including DNA, to ensure that it meets the high standards required for a conviction, and should thus avoid placing undue weight on it in isolation.

Corroboration from independent sources is essential to ensure the accuracy and credibility of the evidence.⁴⁶ The absence of corroboration raises concerns about misinterpretation and wrongful convictions. Expert testimony, particularly in cases involving complex DNA evidence, plays a critical role, but courts must rigorously evaluate its reliability, especially when conflicting expert opinions arise. South African courts have thus emphasised the importance of critically assessing expert testimony based on witness credibility and demeanour,⁴⁷ highlighting instances where flawed forensic DNA evidence led to acquittals. While important, DNA should be considered part of a comprehensive assessment of all evidence. Over-reliance on DNA evidence without corroboration can compromise the fairness and reliability of the trial, leading to unjust outcomes.

Ultimately, the duty of the court is to apply rigorous standards that ensure that any inference drawn from circumstantial evidence is both logical and supported by the totality of the case. It is only when all the evidence, including corroborated circumstantial evidence, meets the standard of proof beyond a reasonable doubt can a just conviction be made.

6.3 RECOMMENDATIONS

As DNA evidence has become a cornerstone of modern forensic science, its role in the criminal justice system is undeniable. However, as research and case studies have revealed, the reliance on DNA evidence is not without its flaws. It is crucial that we recognise and acknowledge that DNA evidence, while being the unequivocal ‘golden standard’ of forensic evidence, is not infallible and, like other forms of evidence, can be subject to errors, misrepresentations and overestimated accuracy. With this in mind, it is imperative that a series of reforms are made in order to ensure that DNA evidence is used appropriately, fairly and with great caution. This section, therefore, outlines key recommendations that aim to address the limitations of DNA evidence and its application in the criminal justice system.

⁴⁵ Op cit note 3 at 413.

⁴⁶ Ibid.

⁴⁷ Visser J *First Generation Evidence and Its Influence on Legal Decision-making – A South African Perspective* (unpublished LLD thesis, University of the Free State, 2013) at 406.

6.3.1 Chain of evidence

In order to ensure the integrity and credibility of DNA evidence within the criminal justice system, it is imperative to implement strict and comprehensive protocols for the chain of evidence. The management of DNA evidence from collection through to analysis and presentation in the courtroom must be carefully controlled at every step.⁴⁸ Without such safeguards, the risk of contamination, degradation or laboratory errors increases significantly. This could potentially compromise the accuracy of forensic findings, as illustrated in Chapter Four herein.

Contamination can occur at any point and,⁴⁹ similarly, degradation of DNA samples due to improper storage or delays in processing can lead to the loss of critical genetic material, thereby making it unusable or unreliable as evidence.⁵⁰ Moreover, laboratory errors, including mishandling or incorrect analysis, can result in faulty conclusions that directly impact the fairness of legal proceedings.⁵¹ Therefore, the process surrounding the integrity of handling evidence could improve with regard to the chain of evidence. Instances where real evidence such as DNA evidence is mishandled or improperly documented have led to significant miscarriages of justice, as seen in *Khauta v S*.⁵² This case underscores the critical importance of maintaining an unbroken and reliable chain of evidence.

In order to mitigate such risks, South Africa should ensure that it introduces stricter and more transparent protocols for handling evidence. One way of achieving this is having all parties involved in the handling of evidence (police officers and forensic experts) subject to heightened accountability measures that have clear guidelines on the proper procedures for packaging, labelling and transferring evidence. This would not only ensure that the chain of evidence remains unbroken, but the evidence presented could have its reliability enhanced, knowing that those who handled it did so diligently to avoid being held accountable and liable for any inconsistencies or doubts that may arise in court. Therefore, ensuring that forensic experts and police officers are well trained in such procedures is critical to ensuring that the integrity of evidence is preserved. In turn, this would uphold the credibility of the criminal justice system in its entirety.

⁴⁸ Op cit note 28 at 47.

⁴⁹ Op cit note 27 at 10.

⁵⁰ Op cit note 4 at 40.

⁵¹ Behrouzfar NR ‘Strengths, limitations and controversies of DNA evidence: Trends and issues in scientific evidence’ (2006) 1 *Southern New England Roundtable Symposium LJ* 110 at 131.

⁵² *Khauta v S* 2020 (2) SACR 547 (FB).

6.3.2 Admissibility rules

The South African criminal justice system, like many others, has undergone significant reforms over the past decades, especially in the manner in which it handles and evaluates evidence, particularly real and expert evidence. While existing legal frameworks for the evaluation of evidence are robust in many areas, there are several aspects where developments could be made in order to improve the consistency, reliability and overall fairness of the legal process. These developments are particularly important as they pertain to expert evidence, the integrity of handling evidence, as well as the standards by which evidence is assessed for admissibility in court.

6.3.2.1 Relevance

The process by which evidence is admitted in court is one area that could benefit from more detailed standards that focus on the relevance and probative value of evidence. Currently, the South African law holds that evidence must be relevant to the case at hand, but the assessment of relevance can sometimes be subjective as it relies heavily on the discretion and accumulated experience of the presiding officer.⁵³ This subjective assessment can lead to inconsistencies in rulings across different cases, which could potentially undermine the overall fairness of trials. In order to improve this, the judiciary should consider implementing a clearer criterion for the admissibility of evidence that would apply consistently across the cases. The adoption of a more formalised framework for assessing the relevance of evidence would facilitate a more objective and consistent decision-making process among presiding officers.

To this end, this paper advocates for the development of guidelines that provide clear definitions of relevance and its application, as well as, where necessary, categorise the types of evidence that are likely to be deemed relevant in specific contexts. By establishing such guidelines, presiding officers would be well-versed in the relevance standards applicable to various types of evidence, thereby ensuring a more efficient and effective process for admitting relevant evidence. Furthermore, the introduction of these guidelines would provide both the prosecution and defence with a clearer understanding of what constitutes relevant evidence, thus enabling them to present their cases more effectively within a well-defined framework.

6.3.2.2 Real and expert evidence

The current admissibility standards for real evidence, including DNA evidence, and expert evidence primarily focus on relevance, but should place a greater emphasis on the reliability of

⁵³ See *R v Matthews* at 758 and *S v Zuma* at 199, respectively.

such evidence. DNA and expert evidence play a pivotal role in criminal cases, and its potential impact on determining guilt or innocence is enormous. However, the reliability of such evidence can vary significantly on a case-to-case basis, due to factors such as errors in handling, contamination, degradation, DNA mixtures and the quality of the testing methods used. The inclusion of the reliability criteria, similar to the approach adopted in the USA under the *Daubert* standard, would significantly strengthen the integrity of forensic evidence and testimony in the criminal justice system. To this extent, it is recommended that the *Daubert* standard is codified into our law and guidelines are put in place to enable the courts to properly evaluate the reliability of forensic evidence, such as DNA.

The *Daubert* standard, which requires scientific evidence to be both relevant and reliable, offers a robust framework for ensuring that expert testimony and forensic evidence meet the highest standards of scientific rigor before being admitted in court. By incorporating such similar guidelines into the CPA, the judiciary would be better equipped in assessing the credibility of DNA and expert evidence, ensuring that it is not only relevant to the case, but also scientifically valid. This would help address the growing concerns regarding the potential for wrongful convictions based on unreliable forensic analysis.

If the abovementioned recommendations are implemented the courts will need to assess the scientific validity of the methods used in the collection, preservation and analysis of the DNA evidence. This could involve requiring expert witnesses to provide supporting documentation such as peer-reviewed literature, established methodologies and proven success rates, in order to demonstrate that the forensic techniques employed are widely accepted within the scientific community. In addition, courts would need to consider the error rates associated with specific forensic techniques and carefully scrutinise those with known or high error rates and, where applicable, exclude them from consideration if they fail to meet established reliability standards. Furthermore, they should assess whether the techniques meet the testability requirement, which is another critical factor in determining the reliability of evidence for admissibility.

The incorporation of reliability into the admissibility of real (DNA evidence) and expert evidence could potentially improve the accuracy of legal proceedings by ensuring that only scientifically valid and reliable evidence is presented in court. This would reduce the risk of wrongful convictions based on unreliable or flawed forensic evidence. Furthermore, requiring such evidence to meet rigorous reliability standards would ensure that the trial process becomes

fairer, as all litigating parties would be assured that the evidence under consideration is both relevant and trustworthy.

6.3.3 Pre-trial disclosure and ineffective legal representation

A crucial area for reform in the handling of forensic evidence in South Africa is the training of legal representatives when dealing with scientific evidence, such as DNA evidence, where it plays an increasingly central role in criminal trials. Prosecutors typically do not see it as their responsibility to ensure that only reliable forensic evidence is admitted during a trial.⁵⁴ Similarly, the defence legal representatives often fail to effectively use the adversarial tools traditionally designed to challenge the inclusion of flawed forensic evidence.⁵⁵

A practical recommendation is to implement specialised training programs for legal representatives, focusing on the interpretation of forensic evidence, including DNA analysis. The programs should be designed to enhance the ability of these representatives to assess the scientific validity and reliability of expert testimony, and forensic methodologies. By increasing their familiarity with the strengths, limitations, and potential pitfalls of scientific evidence, defence legal representatives would be better positioned to make informed, balanced decisions that enable them to competently defend the accused person. This would also ensure that only reliable evidence is considered in court. Such training should thus also emphasise the importance of understanding the inherent limitations and vulnerabilities of forensic science, particularly in relation to factors like contamination, degradation and laboratory errors, which can affect the integrity of the evidence presented.

Additionally, to further safeguard fairness in criminal proceedings, a system of transparency should be implemented. This would involve the use of alternative or independent forensic laboratories and the external verification of forensic analyses, whenever feasible. As much as this measure would help to guard against potential biases or errors in forensic evaluations, it would be prejudicial to indigent accused persons who do not have the financial means to pursue this option. It remains a great injustice that the defence and accused persons do not have access to equal resources as the prosecution, especially in cases where forensic evidence like DNA

⁵⁴ J Visser 'Defence challenges of forensic scientific evidence in criminal proceedings in South Africa' 28 (2015) *South African Journal of Criminal Justice* at 25.

⁵⁵ Ibid.

evidence plays a pivotal role. This injustice continues to place indigent accused persons at risk of being wrongfully convicted.⁵⁶

It is thus, to this end, it is recommended that compulsory disclosure should be codified into South African law, particularly in the CPA. Therefore, it is submitted that ensuring that the defence has full access to all evidence and expert testimony presented, as well as resources employed, by the prosecution, through pre-trial disclosure, would allow for effective challenge and cross-examination of the forensic evidence. This would help maintain a fair and balanced trial process. This transparency would further reinforce the principle of fairness and ensure that criminal proceedings are not skewed by flawed or unreliable forensic science.

6.3.4 Evaluation standards and evidentiary weight

In light of the principles governing the evaluation of evidence in criminal trials, there are several recommendations that can be made in order to enhance the effectiveness, fairness and integrity of the South African justice system. The recommendations are designed to address the challenges identified herein to improve the evaluation of circumstantial and expert evidence, as well as to safeguard the constitutional rights of the accused while upholding the rule of law.

6.3.4.1 Circumstantial evidence

One of the first areas wherein reform can be made is in the treatment of circumstantial evidence, especially in cases involving forensic analysis like DNA evidence. While it is often seen as weaker than direct evidence,⁵⁷ the potential for circumstantial evidence to provide a compelling narrative makes it indispensable in many criminal proceedings. Therefore, while the South African judiciary already applies the *Blom* rules of logic⁵⁸ to assess such evidence, there is a dire need for a more structured and comprehensive approach to ensure that this evidence is handled with the appropriate scrutiny and caution. The existing *Blom* rules provide a solid foundation for evaluating circumstantial evidence however, these rules alone may not fully address the complexities and nuances of circumstantial evidence, specifically in cases where DNA plays a central role.

One key recommendation that this paper makes is to strengthen the application of the *Blom* rules by incorporating more rigorous guidelines that are specific to forensic and scientific

⁵⁶ A full discussion on access to justice concerning indigent accused persons goes beyond the scope of this research.

⁵⁷ *S v Shabalala* 1966 (2) SA 297 (A) at 299.

⁵⁸ *R v Blom* 1939 AD 188 at 202-203.

evidence, such as DNA evidence. While these rules already require that the inference drawn from circumstantial evidence be consistent with the established facts, it is essential to ensure that the court does not overstate the weight of DNA evidence, unless it is sufficiently corroborated. DNA, as a form of circumstantial evidence, may be highly accurate and may establish a potential link between the accused person and the crime scene, but it must be viewed within the broader context, and consideration must be taken to the fact that it is not direct proof that a crime has been committed.⁵⁹ The court must, therefore, carefully evaluate the totality of the evidence, including the reliability of the DNA analysis (through the codified *Daubert* standards), the possibility of contamination, and the presence of any corroborative evidence that strengthens the DNA link.

6.3.4.2 Witness credibility

Currently, the process for assessing and evaluating expert evidence relies heavily on judicial discretion, precedent and the general experience of the presiding officers.⁶⁰ However, this approach may lead to inconsistencies in how expert evidence is assessed in different cases. To address this issue, the criminal justice system could benefit from adopting more structured guidelines that are specifically designed to assess the scientific validity and reliability of expert evidence. Drawing from the best practices of the USA, such as the *Daubert* standard, the South African judiciary could implement criteria that does not only focus on the specialised knowledge of the expert, but also the testability of the methods used, their general acceptance in the scientific community, and the potential for replication or error.⁶¹ By incorporating these criteria, the judiciary would be better equipped to exclude unreliable expert evidence, thereby ensuring that only credible and reliable scientific evidence is presented in the courts.

While expert evidence plays a vital role in the evaluation of complex evidence such as DNA evidence, there is a need for greater scrutiny of expert opinions in instances where conflicting opinions arise. It is imperative that courts move beyond an over-reliance on subjective assessments of the credibility and demeanour of an expert. Instead, they should prioritise objective criteria – such as those set out in the *Daubert* framework – to ensure that expert testimony is evaluated on the basis of its scientific reliability and relevance. Furthermore, the judiciary should ensure that expert witnesses are not only credible, but are also thoroughly

⁵⁹ Op cit note 27 at 5.

⁶⁰ Op cit note 3 at 161. C Theophilopoulos & A Bellengere ‘Relevance, Admissibility and Probative Value in a Rational System of Evidence: A South African Perspective’ (2022) *PELJ* 1 at 7.

⁶¹ See the *Daubert* case in general.

vetted for their qualifications and experience in the specific field in which they are presenting evidence.

Where conflicting expert opinions arise, judicial courts must be prepared to assess not only the qualifications, credibility and demeanour of the experts, but also the methods employed to reach their conclusions. To assist with this, it would be practical to introduce a requirement for pre-trial expert reports that include a thorough analysis of the forensic evidence by independent, court-approved experts. As opposed to relying solely on the testimony of a state expert witness (where the defence cannot afford to call their own expert), this recommendation would involve the appointment of another neutral expert by the court, selected from a panel of qualified professionals, whose role is to assess the methods and findings of the forensic expert of the state. This independent expert would provide a report that either supports or challenges the reliability of the evidence before it is presented in court.

This recommended additional layer of verification would provide a crucial safeguard against flawed or biased expert testimony, ensuring that evidence is subject to another layer of rigorous scrutiny. This, in turn, would assist to level the playing field for the defence, enabling them to rely on impartial expert reports when challenging the validity of the evidence of the prosecution. By introducing this extra layer of verification, the risk of biased expert testimony influencing the outcome of criminal trials would be significantly mitigated. Furthermore, it would also improve public confidence in the judicial process, by ensuring that expert opinions are subject to rigorous scrutiny and the presiding officers are provided with a balanced perspective.

6.3.4.3 Corroboration

While DNA evidence can be a powerful tool in criminal proceedings, its effectiveness is significantly influenced by the presence of corroborating evidence. Without such support, DNA evidence risks being seen as inconclusive or insufficient to establish guilt beyond a reasonable doubt, irrespective of its perceived accuracy and reliability. The prosecution thus needs to present additional arguments regarding the reliability and relevance of the DNA evidence, and the presiding officer would have to carefully assess whether the evidence, standing alone, is enough to support a conviction. It is clear that the absence of corroboration increases the potential for legal challenges and could lead to greater uncertainty about the weight of the DNA evidence in the absence of other supporting evidence.

The repeal of mandatory corroboration requirements in South African law warrants further reconsideration. The previous legislative framework that required corroboration in cases dealing with certain crimes served as an essential safeguard against wrongful convictions, especially when dealing with testimony that could be unreliable. Although the legal system now permits convictions based on the testimony of a single witness, this shift may inadvertently compromise the reliability of judgments. A more balanced approach could involve the reintroduction of corroboration requirements in the CPA, particularly for Schedule 8 crimes. The reintroduction of corroboration for serious crimes could ensure that a verdict is pronounced on evidence that is not only relevant and reliable, but also corroborated irrespective of its perceived infallibility. This would provide an essential safeguard against wrongful convictions and would ensure that prosecution cases rely on multiple, corroborating sources of evidence.

Furthermore, the judiciary should prioritise corroboration from independent sources to support DNA evidence as a critical factor in assessing the reliability and credibility of the evidence. This corroboration requirement should be codified so as to prevent reliance on single, potentially flawed pieces of evidence. Corroboration from independent sources, such as eyewitness testimony, real evidence or documentary evidence, would strengthen the case of the prosecution while simultaneously reducing the likelihood of miscarriages of justice.

Lastly, the criminal justice system must continue to emphasise the constitutional right to a fair trial.⁶² This includes a commitment to ensuring that all evidence is evaluated based on its inherent reliability and not simply its perceived strength or importance in a case. Judicial courts should avoid the temptation to reach conclusions based on the weight of evidence alone, especially when the evidence has not been properly scrutinised. A holistic and systematic approach to evaluating all evidence will help ensure that the ultimate verdict is based on facts that are reliable, accurate and supported by the totality of the case.

Therefore, strengthening the South African criminal justice system requires a more comprehensive and rigorous approach to the evaluation of evidence, particularly circumstantial and expert evidence. By developing the standards for corroboration, improving judicial training on scientific evidence, ensuring transparency in forensic analysis, and emphasising fairness in the trial process, the justice system can better safeguard against wrongful convictions and uphold the rights of all parties involved. These changes will not only improve the reliability of

⁶² Constitution, 1996: s 35(3).

convictions, but also reinforce public confidence in the integrity and fairness of the judicial system.

6.4 CONCLUSION

While DNA evidence has undoubtedly revolutionised the criminal justice system, its widespread acceptance as an infallible tool requires urgent reconsideration, particularly within the South African context. This thesis has critically examined the challenges associated with DNA evidence, highlighting not only the potential for human error but also issues such as contamination, mishandling, and the limitations inherent in forensic analysis. While DNA has been portrayed as an objective and unassailable form of evidence, its application is far from fool proof, and overreliance on it can lead to wrongful convictions. The South African legal system, which increasingly depends on DNA evidence in criminal trials, must confront these risks head-on.

The cases analysed in this paper underscore the need for a more cautious and nuanced approach to the use of DNA evidence in courtrooms. It is essential to recognise that DNA evidence, though powerful, is not immune to flaws or manipulation. The lack of rigorous forensic standards, inadequate training, and the potential for bias in interpretation all contribute to the fallibility of DNA evidence. In the absence of a robust framework for managing and evaluating DNA evidence, the justice system may inadvertently prioritise a misleading sense of certainty over the principles of fairness and accuracy.

Reform is crucial to addressing these challenges and ensuring that DNA evidence is applied justly. This includes the establishment of more stringent forensic protocols, greater transparency in the handling and analysis of DNA samples, and enhanced oversight of forensic laboratories. Moreover, it is vital to provide presiding officers and legal practitioners with specialised training on the complexities and limitations of DNA evidence, thereby ensuring that they are equipped to scrutinise such evidence critically. The judicial system must also be more cautious in its reliance on DNA as conclusive proof, particularly when it stands alone or is not corroborated by other forms of evidence.

In addition, there must be greater public and legal awareness of the limitations and potential errors associated with DNA evidence. Public trust in the legal system hinges on the recognition that justice cannot be served solely through scientific means but must also incorporate the principles of fairness, accountability and accuracy. By implementing these reforms, South Africa can better safeguard against the risk of wrongful convictions, ensure more reliable

criminal justice outcomes, and reinforce the integrity of its legal system as a whole. Ultimately, it is not a question of whether DNA evidence should be used, but rather how it should be used with the necessary caution, rigor and oversight to protect the rights of individuals and uphold justice.

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