

TIME FOR CINDERELLA TO GO TO THE BALL: REFLECTIONS ON THE RIGHT TO FREEDOM OF SCIENTIFIC RESEARCH*

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Despite the fact that the Constitution explicitly protects the right to freedom of scientific research, this right features neither in the preamble to any legislation, nor in any reported case law. If the right to freedom of scientific research remains in obscurity, South Africa could slip into totalitarian control of the scientific enterprise, to the detriment not only of scientists, but also of society in general. The right to freedom of scientific research should play a more central role in policy-making. This is not only because it is an enumerated constitutional right, but also because it is important in its own right, as it serves purposes that are at the core of our constitutional value-system: promoting individual autonomy, facilitating the search for truth, and supporting democracy. The right to freedom of scientific research is unique in protecting not only the exchange of scientific thoughts and information, but also in particular the physical activities entailed by scientific research, such as performing experiments. The notion that government should somehow seek to regulate every new scientific development is erroneous, as freedom should be the default position in science-related policy, and should only be limited by regulation if, and to the extent that, it is constitutionally justified.

Human rights – right to freedom of scientific research – expression – dignity – limitation

I INTRODUCTION

There are good reasons to believe that the right to freedom of scientific research¹ is the proverbial stepdaughter of the South African Bill of Rights.² First, considering that legislation often mentions the constitutional rights that it intends to promote in its preamble, one might expect that legislation

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¹ Constitution of the Republic of South Africa, 1996 ('the Constitution'), s 16(1)(d).

² Donrich W Jordaan 'Science versus anti-science: The law on pre-embryo experimentation' (2007) 124 SALJ 618. The author has since changed his surname to Thaldar.

that relates to science would mention freedom of scientific research. How many Acts are there that relate to science, one may ask? In fact, there are plenty of them. According to its website, the Department of Science and Innovation administers 22 Acts.³ Besides these Acts, there are also Acts that are administered by other government departments, which contain provisions that relate directly to scientific research. Examples are the Patents Act 57 of 1978,⁴ the National Health Act 61 of 2003,⁵ and the Protection of Personal Information Act 4 of 2013.⁶ Remarkably, however, apart from the Constitution itself, not a single Act of Parliament contains the phrase ‘freedom of scientific research’.⁷

Furthermore, has freedom of scientific research ever been analysed by any of our courts? Remarkably, again, the answer is no.⁸ One can speculate as to the reason. It may be because scientists have not felt that the right has been infringed upon. Or it may be due to a reluctance on behalf of scientists to exert their rights — or even an ignorance of their rights. The legal practitioners who advise scientific bodies and individual scientists may be contributing to keeping freedom of scientific research mentally locked away in obscurity. This situation is possibly self-perpetuating: as long as no-one relies on the right to freedom of scientific research, the right will never be analysed and applied by a court, and no-one will have the confidence to be the first to venture onto terra incognita by relying on the right.

The global COVID-19 pandemic, and in particular the accusations against the Chinese government of exercising censure against its scientists,⁹ vividly illustrates the relevance and importance of freedom of scientific research. Clearly, freedom of scientific research can save lives. But, the relevance of the right to freedom of scientific research is not restricted to the current global healthcare crisis. Whenever science-related policy

³ Department of Science and Technology website available at <https://www.dst.gov.za>, accessed on 13 July 2020.

⁴ Scientific research can constitute infringements on patents (ss 65–71). Accordingly, although patenting is on the one hand an incentive for conducting scientific research, on the other hand it also acts as a constraint on the freedom of scientific research.

⁵ For example, research on human embryos is limited in various ways (s 57(4)); research involving human subjects is made subject to ethics committee approval (ss 71–3).

⁶ The processing of information for the purpose of research provides an exception to certain general prohibitions on the processing of information (e g ss 18(4)(f), 27(1)(d), 32(5)(b)).

⁷ According to a search performed on Jutastat, 27 April 2020.

⁸ According to a search performed on Jutastat and on SAFLII, 27 April 2020.

⁹ King-wa Fu & Yuner Zhu ‘Did the world overlook the media’s early warning of COVID-19?’ 2020 *Journal of Risk Research* 1; Vigilencia Abazi ‘Truth distancing? Whistleblowing as remedy to censorship during COVID-19’ (2020) 11 *European Journal of Risk Regulation* 375; Heidi J Larson ‘A lack of information can become misinformation’ (2020) 580 *Nature* 306.

is developed or revised in South Africa, the right to freedom of scientific research is — as a matter of law — relevant, and should form a core part of the deliberations. In this article, we aim to illuminate the right to freedom of scientific research, and to inspire confidence in the reader to apply the right practically where relevant. This Cinderella right has been waiting in obscurity long enough.

The article is structured as follows. In part II we present a global overview of the recognition of the right to freedom of scientific research. In part III we analyse the ambit of the right, followed in part IV by an analysis of the purposes served by the right, and in part V by an analysis of the limitation of the right. Lastly, in part VI, we conclude the article.

II A GLOBAL OVERVIEW OF THE RECOGNITION OF THE RIGHT TO FREEDOM OF SCIENTIFIC RESEARCH

In this part, we provide an overview of the recognition of the right to freedom of scientific research in national constitutions and international legal instruments. Using South Africa as a point of departure, we show that the particular way in which the right to freedom of scientific research is protected in South Africa is not unique, and is shared by a number of other countries. We also show that the right to freedom of research is explicitly recognised in the constitutions of many countries around the world, and in some important international human-rights instruments. However, such explicit recognition is not ubiquitous. The purpose of this section is not to engage in a detailed comparative analysis, but to provide the reader with a broader context within which the right to freedom of scientific research, as we find it in the South African Constitution, can be understood.

In South Africa, the right to freedom of scientific research is protected as a *dimension* of the more general right to freedom of expression.¹⁰ Section 16 of the Constitution reads as follows:

- (1) Everyone has the right to freedom of expression, which includes –
- (a) freedom of the press and other media;
 - (b) freedom to receive or impart information or ideas;
 - (c) freedom of artistic creativity; and
 - (d) academic freedom and freedom of scientific research.⁷

Apart from South Africa, various other national jurisdictions explicitly protect freedom of scientific research.¹¹ Most similar to the South African Constitution are the constitutions of Kenya,¹² Zimbabwe¹³ and Fiji,¹⁴

¹⁰ Constitution, s 16(1)(d).

¹¹ These jurisdictions include Albania, Austria, Bahrain, Fiji, Jordan, Kenya, Kuwait, Latvia, Morocco, Palestine, Poland, Qatar, Slovakia, Tunisia, Turkey, Yemen, and Zimbabwe.

¹² Constitution of Kenya, 2010, art 33(1)(c).

¹³ Constitution of Zimbabwe Amendment (No 20) Act, 2013, s 61(1)(b).

¹⁴ Constitution of the Republic of Fiji, 2013, s 17(1)(d).

which explicitly protect the right to freedom of scientific research as part of their constitutional freedom of expression clauses. The constitution of each of these countries protects the right to freedom of expression, ‘which includes ... the right to freedom of scientific research’.¹⁵ Several other jurisdictions also explicitly protect freedom of scientific research — not as a dimension of freedom of expression, but rather listed with other related rights. For instance, some group freedom of scientific research together with freedom of opinion¹⁶ and freedom of the press,¹⁷ while other jurisdictions group the right to freedom of scientific research with the freedom of artistic creation.¹⁸ The Constitution of Morocco traverses all of these: it protects the freedoms of opinion, creation, publication, presentation in literary and artistic works, and of scientific and technical research.¹⁹ Others protect the freedom of scientific research under academic freedom clauses,²⁰ within protections for universities²¹ or protections for university staff and students.²²

Some jurisdictions do not have explicit constitutional provisions regarding freedom of scientific research, such as the United States of America²³ and Canada,²⁴ but are likely to protect freedom of scientific research as implicitly part of their respective freedom of speech (First Amendment) and freedom of expression (Section 2: Fundamental Freedoms) clauses.²⁵

The right to freedom of scientific research is also explicitly protected by a number of international human-rights instruments.²⁶ State parties

¹⁵ See the references in notes 12 to 14 above.

¹⁶ The Permanent Constitution of the State of Qatar, 2003, art 47; Constitution of the Kingdom of Bahrain, 2002, art 23; Constitution of Kuwait, 1962 (reinst 1992), art 36; Constitution of Jordan, 1952, art 15(2).

¹⁷ Constitution of the Hashemite Kingdom of Jordan, 1952, art 15(2).

¹⁸ Constitution of Albania, 1998, art 58; Constitution of the Republic of Latvia, 1922 (reinst 1991), art 113; Constitution of the Slovak Republic, 1992, art 43; Constitution of the Republic of Poland, 1997, art 73; Constitution of the Republic of Turkey, 1982, art 130; Constitution of the Republic of Yemen, 1991, art 27.

¹⁹ Constitution of the Kingdom of Morocco, 2011, art 25.

²⁰ Constitution of Tunisia, 2014, art 33.

²¹ Constitution of Austria, 1920 (reinst 1945), art 81C; Constitution of Palestine, 2003, art 24.

²² Constitution of the Republic of Turkey, 1982, art 130.

²³ Constitution of the United States of America, 1789, Amendment 1.

²⁴ Constitution of Canada, 1867, s 2(b).

²⁵ Amedeo Santosuosso, Valentina Sellaroli & Elisabetta Fabio ‘What constitutional protection for freedom of scientific research?’ (2007) 33 *J Med Ethics* 342.

²⁶ International Covenant on Economic, Social and Cultural Rights, 16 December 1966, United Nations, Treaty Series, vol 993, art 15(3), available at <https://www.refworld.org/docid/3ae6b36c0.html>, accessed on 18 July 2020; Arab Charter on Human Rights, 15 September 1994, art 42(2), available at <https://www.refworld.org/docid/3ae6b38540.html>, accessed on 18 July 2020; Charter of Fundamental Rights of the European Union, 26 October 2012, 2012/C 326/02 art 13, available at <https://www.refworld.org/docid/3ae6b3b70.html>, accessed on 18 July 2020.

of the International Covenant on Economic, Social and Cultural Rights ‘undertake to respect the freedom indispensable for scientific research and creative activity’.²⁷ However, the right to freedom of scientific research is not mentioned in the African Charter on Human and Peoples’ Rights.²⁸

Unfortunately, as in South Africa, there seems to be a dearth of case law all over the world on the right to freedom of scientific research. This means that there is a need to consider foundational questions, such as the ambit of the right and the purposes that it serves, in order to start building an understanding of the right and hence assist with its application in practice.

III THE AMBIT OF THE RIGHT TO FREEDOM OF SCIENTIFIC RESEARCH

Considering the ambit of a right is the first step in any human-rights analysis. In the case of the right to freedom of scientific research, it requires first building an understanding of the concepts ‘science’ and ‘scientific research’. In the sub-parts that follow, we explore these concepts, and also traverse important issues related to these concepts to provide the reader with a deeper understanding of the practical application of these concepts, before concluding with suggestions on how to determine the ambit of the right to freedom of scientific research from a legal perspective.

(a) *Science*

Science is one of many sources of knowledge about the world. Other sources of knowledge about the world include, inter alia, philosophical reflection and common-sense experience.²⁹ Science can be described as ‘knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method’.³⁰ The scientific method, in turn, refers to ‘principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of hypotheses’.³¹ Most lawyers might only be familiar with an elementary depiction of the scientific method

²⁷ International Covenant on Economic, Social and Cultural Rights *ibid*.

²⁸ African Charter on Human and Peoples’ Rights 27 June 1981, CAB/LEG/67/3 rev 5, available at <https://www.refworld.org/docid/3ae6b3630.html>, accessed on 18 July 2020.

²⁹ Francisco J Ayala ‘Biology as an autonomous science’ in Marjorie Grene & Everett Mendelsohn (eds) *Topics in the Philosophy of Biology. Boston Studies in the Philosophy of Science* vol 27 (1968) 312; Francisco J Ayala ‘On the scientific method, its practice and pitfalls’ (1994) 16 *History and Philosophy of the Life Sciences* 205.

³⁰ Merriam-Webster dictionary s v ‘science’ available at <https://www.merriam-webster.com/dictionary/science>, accessed on 16 July 2020.

³¹ Merriam-Webster dictionary s v ‘scientific method’ available at <https://www.merriam-webster.com/dictionary/scientific%20method>, accessed on 16 July 2020.

as a fixed sequence of steps. However, such a depiction is over-simplified and in fact inaccurate, as the scientific method is a highly variable and creative process.³² Components of the process, such as characterisation (e.g. observation and measuring of the subject of inquiry), formulation of a hypothesis, and experimentation, need not always all be present, need not always be in a set order, and can be iterative. For instance, in biology a scientific research project may be to sequence the genome of a newly discovered virus which does not need the formulation of a hypothesis. Moreover, the scientific method also entails general principles (or values) that guide the scientific enterprise. These primarily include reliance on evidence, logic, and rigorous critical thinking — certainly values with which lawyers should be familiar.

In a letter to his ten-year-old daughter, renowned biologist Richard Dawkins explains that we understand certain things about the world, such as what stars are, thanks to *evidence*.³³ Evidence is collected through observing or experiencing something that is true, and is thus a ‘good reason for believing something’.³⁴ In science, tradition, authority and revelation are not justifications for beliefs.³⁵ While scientists often rely on the works of others, this is different to believing something just because an authority said it, because the other scientists have had to collect and convey evidence for their claims.³⁶ As a result of its reliance on evidence, science is a reliable source of knowledge. Reliable, however, does not mean infallible. On the contrary, scientific conclusions are always tentative and open to revision.³⁷ Even authoritative theories may be disproven or amended when new evidence provides for such.³⁸

(b) *Scientific research*

The Organisation for Economic Co-operation and Development (‘OECD’) defines research as ‘[a]ny creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications’.³⁹ For clarity, in addition to increasing the stock of knowledge, research may also sometimes aim to revise existing theories. Importantly, *scientific*

³² H G Gauch *Scientific Method in Practice* (2003) 3.

³³ Richard Dawkins *A Devil’s Chaplain: Reflections on Hope, Lies, Science and Love* (2004) 242.

³⁴ *Ibid* at 243.

³⁵ *Ibid*.

³⁶ *Ibid* at 245.

³⁷ Kendrick Frazier ‘What is science’ (1972) 102 *Science News* 131.

³⁸ *Ibid*.

³⁹ OECD *Frascati Manual: Guidelines for Collecting and Reporting Data on Research and Experimental Development* (2015), available at <https://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm>, accessed on 16 July 2020.

research should follow the scientific method. To illuminate this further, we investigate some core features of the scientific method (and of scientific research), such as ‘scientific experimental design’ and ‘repeatability’ and explain it to a legal readership.

First, we focus on experimental design. The design of scientific experiments is crucial, as it affects the validity of the conclusions. At a basic level, an experiment must have an independent variable (a variable controlled by the experimenter) and a dependent variable (a variable that is impacted by the independent variable and that is measured by the experimenter). Suppose a scientist wants to determine whether people’s reading speed will be increased if they drink coffee before reading. Based on a thorough literature review on the effects of coffee, the scientist formulates the following hypothesis: ‘Reading speed increases if a person drinks coffee before reading.’ The independent variable is the consumption of coffee, and the dependent variable is the reading speed. The scientist would need to measure her research subjects’ reading speed a number of times without drinking coffee before reading. This is called the control data. She then needs to do the same after each of her research subjects drinks a cup of coffee. Note that when she does the experiment, the only element to change should be the drinking the coffee. If, for instance, the scientist gives her research subjects not only a cup of coffee, but also a glass of whisky to drink, she will clearly not be able to test her hypothesis — the whisky is a second independent variable that will render the experiment useless. A well-designed experiment can only have one independent variable. When designing an experiment, this also means that a scientist should endeavour to eliminate any uncontrolled variables that can distort the findings. In the reading speed example, a dog barking in the background can be such an uncontrolled variable.

A further crucial aspect of experimental design is *objectivity* — a core value of the scientific method. Scientists may sometimes consciously or subconsciously favour a certain hypothesis. To ensure that subjective biases do not manipulate results, scientific controls that are designed to eliminate bias, such as double-blind testing, randomisation and variable matching, must be employed where relevant.⁴⁰ A well-known example of double-blind testing is clinical trials of new medicines, where neither the research subjects, nor the healthcare professionals who interact with the research subjects, know which research subjects are part of the control group (that receives a placebo) and which research subjects are part of the experimental group (that receives the actual new medicine).

A vital component of the scientific method is the sharing of findings with the scientific community. Scientific research results are published

⁴⁰ Ibid.

in peer-reviewed journals. Although a journal's peer review does not settle the correctness of scientific results and data, it is a quality-control process that aims to ensure that the reporting of scientific experiments and findings meets the standards required for publication.⁴¹ Once a scientist's work has been published, the entire scientific community can review the work. Hardt observes:

[P]eer-review is an on-going process whereby the entire scientific community is able to read, review, and then respond to published work. The majority of the time, the first filter of publication catches most of the errors or inaccuracies. But, sometimes, especially with complex systems, the second filter, comprised of the entire scientific community, will unearth a missing piece of the puzzle. More often than not, this piece does not completely negate the findings (though sometimes, it can); instead, it refines the outcomes.⁴²

Research is not deemed reliable until 'the merit of the idea, clarity of the hypothesis, design and execution of the test, and analysis and interpretation of the results in a broader conceptual framework'⁴³ have been assessed by other scientists. It follows that an essential feature of any scientific experiment is that it must be *replicable* (also often referred to as 'repeatable' or 'reproducible').⁴⁴ This means that a scientist must design and describe her methodology in sufficient detail such that other independent scientists anywhere in the world should be able to replicate the experiment and arrive at the same results, and in so doing verify the findings. If the experiment is not replicable, it means that the original results cannot be generalised, might have been in error, and may have limited, if any, scientific value. Replicability (or 'repeatability' or 'reproducibility') is a 'core requirement of the scientific method',⁴⁵ and at the basis of society's trust in science.⁴⁶

This discussion of some of the core principles of the scientific method was not intended to be exhaustive, but to provide some basic pointers to assess whether an activity, which purports to be scientific research, is in fact so.

⁴¹ Carol Berkenkotter 'The power and the perils of peer review' (1995) 13 *Rhetoric Review* 245.

⁴² Marah Hardt 'Restoring the scientific method to all its glory' (2010), available at <https://www.sciencemag.org/news/2010/02/restoring-scientific-method-all-its-glory>, accessed on 16 July 2020.

⁴³ *Ibid.*

⁴⁴ National Academies of Sciences, Engineering, and Medicine *Reproducibility and Replicability in Science* (2019) ch 3.

⁴⁵ Robert Gerlai 'Reproducibility and replicability in zebrafish behavioral neuroscience research' (2019) 178 *Pharmacology, Biochemistry and Behaviour* 30.

⁴⁶ Felipe Romero 'Philosophy of science and the replicability crisis' (2019) 14 *Philosophy Compass* 1.

(c) *Excursus I: COVID-19 and peer review*

In May 2020, the prestigious journal *The Lancet* published an article by Mehra et al that claimed that the use of chloroquine or hydroxychloroquine in COVID-19 patients increases the risk of certain heart problems and death.⁴⁷ As a result of these findings, certain drug trials were abruptly stopped.⁴⁸ However, in early June 2020, *The Lancet* retracted the article after three of its four co-authors took the position that they could no longer assure that their data was reliable.⁴⁹ This has been described as one of the most consequential retractions in modern history.⁵⁰ Should the peer reviewers not have raised a red flag about the reliability of the data and prevented publication of this article? While one can argue that data congruency is not something that journal peer reviewers would typically investigate, such an answer appears unsatisfactory, especially in the context of COVID-19, where the publication of findings that are compromised because of unreliable data can have far-reaching effects on people's lives. The publication of the Mehra et al article in *The Lancet* undoubtedly impacted negatively on the global scientific project to fight COVID-19.⁵¹ To solve this problem, it has been proposed that data should always be made available and published together with articles, peer reviewers should be expected to analyse the data, and (where needed) specialist reviewers should review data and statistics.⁵² These are certainly sensible suggestions that would strengthen the reliability of published scientific works.

(d) *Excursus II: The replication crisis*

We cannot write about science and the importance of the principle of replication without noting that science is currently in the midst of a replication crisis.⁵³ For instance, a survey by the leading scientific journal, *Nature*, found that '[m]ore than 70% of researchers have tried and failed to reproduce another scientist's experiments, and more than half have failed

⁴⁷ Retracted: Mandeep R Mehra, Sapan S Desai, Frank Ruschitzka et al 'Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: A multinational registry analysis' (2020) 395 *The Lancet*.

⁴⁸ Charles Piller & John Travis 'Authors, elite journals under fire after major retractions' (2020) 368 *Science* 1167.

⁴⁹ Op cit note 47.

⁵⁰ James Heathers 'The Lancet has made one of the biggest retractions in modern history. How could this happen?' *The Guardian* 5 June 2020, available at https://www.theguardian.com/commentisfree/2020/jun/05/lancet-had-to-do-one-of-the-biggest-retractions-in-modern-history-how-could-this-happen?CMP=Share_iOSApp_Other, accessed on 22 June 2020.

⁵¹ Ibid.

⁵² Ibid.

⁵³ M Baker 'Is there a reproducibility crisis?' (2016) 533 *Nature* 452; Gerlai op cit note 45; Romero op cit note 46.

to reproduce their own experiments'.⁵⁴ A number of studies published across different disciplines, from psychology and biomedicine to chemistry and engineering, have proven not to be capable of replication.⁵⁵ The crisis must be seen in the context of the rapidly increasing number of scientific papers that are published every year. In 2016, an astronomical 2.3 million science and engineering research articles were published worldwide.⁵⁶ Given the voluminous nature of the literature in many scientific fields, some scientists are looking into using machine learning and artificial intelligence techniques to track and apprehend the important work in their fields.⁵⁷ Furthermore, incentives for scientists prioritise novelty over replication.⁵⁸ This situation is compounded by the pressure on scientists to publish to advance their careers — especially in high-impact journals.⁵⁹ Also, the number of applicants for science grants increases at a faster rate than the funds that are available, hence increasing the intensity of competition.⁶⁰ Clearly these factors can act as perverse incentives to overstate results to seem more impressive, or otherwise compromise research integrity.

By contrast, some argue that the replication crisis is not a recent development, but has existed in science throughout history.⁶¹ They posit that the crisis has come to the forefront recently due to the increase in effective communication and the generation of more data, which has allowed scientists to improve the debate surrounding these issues.⁶² It follows that although the replication crisis is cause for great concern, it is at least not indicative of diminishing scientific standards.

In our view, research integrity should be strengthened by, inter alia, including philosophy of science and research integrity as prominent modules in the science curricula at universities.

(e) *The ambit of freedom of scientific research*

In the light of the above discussion on science and the scientific method, we now consider the ambit of the right to freedom of scientific research.

⁵⁴ Baker op cit note 53 at 452.

⁵⁵ Romero op cit note 46.

⁵⁶ National Science Foundation 'Science & Engineering Indicators' (2018), available at <https://www.nsf.gov/statistics/2018/nsb20181>, accessed on 16 July 2020.

⁵⁷ National Academies of Sciences op cit note 44.

⁵⁸ Open Science Collaboration 'Estimating the reproducibility of psychological science' (2015) 349 *Science* 943.

⁵⁹ National Academies of Sciences op cit note 44.

⁶⁰ Ibid.

⁶¹ Gerlai op cit note 45; Daniele Fanelli 'Is science really facing a reproducibility crisis, and do we need it to?' (2018) 115 *Proceedings of the National Academy of Sciences of the United States of America* 2628.

⁶² Gerlai *ibid.*

The onus will of course be on a person who intends to rely on the right to freedom of scientific research to show that a certain activity falls within the ambit of this right. To succeed, should it be required that it must be shown that the activity *is* scientific research in the sense that it is fully compliant with the scientific method in every respect? We suggest that the result of such a strict criterion may be that a bona fide science project might be excluded from constitutional protection, simply because of a small deficiency in adhering to all principles of the scientific method. Such an outcome would be contrary to the generous interpretation favoured in South African human-rights jurisprudence.⁶³ On the other side of the spectrum, merely requiring a bona fide attempt at doing scientific research may set the bar too low, as this would allow for unscientific activities to be deemed ‘scientific research’, as long as the people involved are under the bona fide but mistaken impression that they are engaged in actual science. To counter this extreme, the purported scientific activity should substantially comply with the scientific method to qualify as scientific research. In sum, to adhere to a generous approach without sacrificing the essence of the right to freedom of scientific research, we suggest that two criteria must be satisfied: First, the activity must be a *bona fide attempt* to do scientific research — that is, to inquire about or examine a subject according to the scientific method; and secondly, it must *substantially comply* with the scientific method.

How does the ambit of the right to freedom of scientific research differ from the ambits of other rights that also appear relevant to the scientific enterprise, such as freedom of thought⁶⁴ and the freedom of receiving and imparting information and ideas?⁶⁵ We suggest that freedom of scientific research overlaps with freedom of thought (in the sense of freedom of scientific thought), and with the freedom of receiving and imparting information and ideas (in the sense of receiving and imparting scientific information and ideas) — but also entails something unique, given that scientific research often involves an action or series of actions in the physical world. This, we suggest, would typically be the case with the characterisation and experimentation components of the scientific method. Examples where characterisation entails something different from (or more than) thinking or communication would be when a virus is observed under a microscope, or when viral DNA is placed in a high-throughput sequencing machine to produce a genetic sequence of the virus. Examples where experimentation entails something different from (or more than) thinking or communication, would be when a new vaccine

⁶³ *S v Zuma* 1995 (2) SA 642 (CC) para 15; *Bertie Van Zyl (Pty) Ltd v Minister for Safety and Security* 2010 (2) SA 181 (CC) para 21; *S v Makwanyane* 1995 (3) SA 391 (CC) para 9.

⁶⁴ Constitution, s 15(1).

⁶⁵ *Ibid*, s 16(1)(b).

candidate is first tested on human cells *in vitro* and, eventually, when a vaccine candidate is tested on actual humans as part of a clinical trial. Given that freedom of scientific research is a dimension of freedom of expression, doing scientific characterisation and experimentation are therefore forms of expression — more specifically, forms of constitutionally protected expression.

(f) *Postscript: Science and law*

The following is an interesting question: is a lawyer who is engaging in traditional legal research doing scientific research? In order to formulate an answer to this question, consider the following famous quote from the English jurist John Austin:

‘The *existence* of a law is one thing; its *merit* or *demerit* are another thing. Whether a law *be*, is one inquiry: whether it ought to be, or whether it agree with a given or assumed test, is another and a distinct inquiry.’⁶⁶

Legal positivists such as Hans Kelsen describe the study of the law-as-positus (e.g. in common law and statutes) as the ‘science of law’. According to Kelsen, legal science is, alongside ethics and religion, a ‘normative science’, given that the object of study of these scientific disciplines is *norms*. In the same way that one can study human social behaviour from a scientific perspective (social science) or human political behaviour from a scientific perspective (political science), so can one study religions, or ethical systems, or legal systems, from a scientific perspective. This would entail the application of the values of the scientific method — such as reliance on evidence, logic, and rigorous critical thinking — to the object of the research. We suggest that the advent of constitutionalism can be viewed as bridging the is–ought dichotomy in a limited, but important way: by introducing a super-law (the Constitution) to our legal system, constitutionalism brings within the domain of law-as-positus a particular kind of analysis of the merits or demerits of extant law, namely a *constitutional analysis* (an analysis of the constitutionality of a piece of extant law).

In light of the above, we suggest the following answer to the question posed above: if a lawyer who is engaging in legal research does so from a scientific perspective, using the values of the scientific method (rather than an approach that evaluates the law by relying on values external to the law-as-positus, for instance, the natural law approach), we suggest that such research is *scientific* research. This does not mean that non-positivist legal research would be constitutionally unprotected, as such research should fall within the ambit of, *inter alia*, the right to freedom of thought⁶⁷ and the right to freedom of receiving and imparting information and ideas.⁶⁸

⁶⁶ John Austin *The Province of Jurisprudence Determined* (1832) 278.

⁶⁷ Constitution, s 15(1).

⁶⁸ *Ibid*, s 16(1)(b).

IV THE PURPOSES OF THE RIGHT TO FREEDOM OF SCIENTIFIC RESEARCH

It is trite that South Africa follows a purposive approach to interpretation in general, and to the interpretation of constitutional rights in particular. Although there is a scarcity of case law on the right to freedom of scientific research, there is a wealth of case law on the right to freedom of expression — the umbrella right under which the right to freedom of scientific research falls. Accordingly, given the close connection between the right to freedom of expression and the right to freedom of scientific research, we identify the purposes of freedom of expression, and subsequently consider the extent to which each of these purposes can be applicable to the right to freedom of scientific research.

(a) *Identifying the purposes of freedom of expression*

In an early judgment of the Constitutional Court, Mokgoro J identified a number of purposes of freedom of expression in her minority judgment in *Case v Minister of Safety and Security*.⁶⁹ She held as follows:

‘The most commonly cited rationale is that the search for truth is best facilitated in a free “marketplace of ideas.” That obviously presupposes that both the supply and the demand side of the market will be unfettered. But of more relevance here than this “marketplace” conception of the role of free speech is the consideration that freedom of speech is a sine qua non for every person’s right to realise her or his full potential as a human being, free of the imposition of heteronomous power. Viewed in that light, the right to receive others’ expressions has more than merely instrumental utility, as a predicate for the addressee’s meaningful exercise of her or his own rights of free expression. It is also foundational to each individual’s empowerment to autonomous self-development.’⁷⁰

The purposes of freedom of expression that emerge from this minority judgment are first to facilitate the search for the truth, and secondly what can be described as purposes that relate to individual autonomy, such as realizing one’s potential and self-development. In subsequent judgments by the Constitutional Court, a third purpose also took its place as a permanent star in the constellation of purposes of freedom of expression — supporting democracy.⁷¹ Also, as is evident from the cases discussed below, other purposes of freedom of expression that can also be categorised

⁶⁹ 1996 (3) SA 617 (CC).

⁷⁰ *Ibid* para 26.

⁷¹ *South African National Defence Union v Minister of Defence* 1999 (4) SA 469 (CC) para 7 (‘Freedom of expression lies at the heart of a democracy. It is valuable for many reasons, including its instrumental function as a guarantor of democracy ...’); *Phillips v Director of Public Prosecutions* 2003 (3) SA 345 para 23 (‘The right to freedom of expression is integral to democracy ...’).

as relating to individual autonomy have emerged — protecting moral agency, and promoting self-fulfilment.

The most recent judgment by the Constitutional Court that deals with the purposes of freedom of expression is the case of *Democratic Alliance v African National Congress*, in which the majority of the Constitutional Court held as follows:

‘It [freedom of expression] is valuable both for its intrinsic importance and because it is instrumentally useful. It is useful in protecting democracy, by informing citizens, encouraging debate and enabling folly and misgovernance to be exposed. It also helps the search for truth by both individuals and society generally. If society represses views it considers unacceptable, they may never be exposed as wrong. Open debate enhances truth-finding and enables us to scrutinise political argument and deliberate social values.

What is more, being able to speak freely recognises and protects “the moral agency of individuals in our society”. We are entitled to speak out not just to be good citizens, but to fulfil our capacity to be individually human.’⁷²

An even more recent judicial analysis of the purposes of the freedom of expression is found in the judgment by the Supreme Court of Appeal in *Van Breda v Media 24 Ltd.*⁷³ In this case, a unanimous full bench of the Supreme Court of Appeal quoted with approval a speech by Lord Steyn in *R v Secretary of State for the Home Department, Ex parte Simms*⁷⁴ which reads as follows:

‘Freedom of expression is, of course, intrinsically important: it is valued for its own sake. But it is well recognised that it is also instrumentally important. It serves a number of broad objectives. First, it promotes the self-fulfilment of individuals in society. Secondly, in the famous words of Holmes J (echoing John Stuart Mill), “the best test of truth is the power of the thought to get itself accepted in the competition of the market”: *Abrams v United States* [1919] USSC 206; (1919) 250 US 616 at 630 per Holmes J (dissent). Thirdly, freedom of speech is the lifeblood of democracy. The free flow of information and ideas informs political debate. It is a safety valve: people are more ready to accept decisions that go against them if they can in principle seek to influence them. It acts as a brake on the abuse of power by public officials. It facilitates the exposure of errors in the governance and administration of justice of the country.’⁷⁵

Based on these authorities, we suggest that it is now settled law that freedom of expression has both intrinsic and instrumental value, and that its instrumental value is found in three purposes that it serves:

⁷² *Democratic Alliance v African National Congress* 2015 (2) SA 232 (CC) paras 122–3, footnotes omitted.

⁷³ 2017 (2) SACR 491 (SCA).

⁷⁴ [1999] 3 All ER 400 at 408.

⁷⁵ *Van Breda* supra note 73 para 9.

(i) promoting individual autonomy, (ii) facilitating the search for truth, and (iii) supporting democracy.⁷⁶

In the following sub-parts, we analyse each of these three purposes of freedom of expression. In the case of each purpose, we consider the extent to which it is applicable to freedom of scientific research as a dimension of freedom of expression.

(b) Purpose 1: Promoting individual autonomy

We use 'individual autonomy' to denote a collection of concepts that have been held by the courts as purposes of freedom of expression and that are all closely related to individual autonomy — self-development, self-realization, self-fulfilment, and moral agency. While these concepts are related, it is important to note that these concepts are also distinct. Self-development refers to the gradual development of one's abilities and characteristics; self-realization refers to the fulfilment of one's potential; self-fulfilment refers to one's ability to make oneself happy through one's own efforts; and moral agency refers to one's ability to make moral judgements. What all of these concepts have in common is that they are aspects of a person's self-government or individual autonomy. These concepts are also linked to one another in various ways. For instance, making moral judgements in line with one's own moral convictions, despite circumstances that have pressured one in alternative directions, can in itself be deeply self-fulfilling. Also, one's moral judgements may influence how one aims to develop one's personal characteristics, the kind of projects one pursues to make oneself happy, and the way in which one pursues such projects. Yet, it also behoves to point out that the choice of projects and the way in which such projects are pursued to make oneself happy are not necessarily moral choices, but can be purely amoral choices based on one's personal interests, talents and opportunities. (Mr X always wanted to be a gardener, because he enjoys working with his hands and being outdoors.) Similarly, one's moral judgements are not necessarily influenced by one's life projects. (Mr X's vocation as a gardener does not necessarily influence his belief that physical punishment of children is wrong.)

⁷⁶ These three purposes also broadly correspond with those identified by the Canadian Supreme Court in *Irwin Toy Ltd v Quebec (Attorney General)* [1989] 1 SCR 927. In *Irwin Toy*, the Canadian Supreme Court summarised the 'principles and values underlying the vigilant protection of free expression in a society such as ours' as follows: '(1) seeking and attaining the truth is an inherently good activity; (2) participation in social and political decision-making is to be fostered and encouraged; and (3) the diversity in forms of individual self-fulfilment and human flourishing ought to be cultivated in an essentially tolerant, indeed welcoming, environment not only for the sake of those who convey a meaning, but also for the sake of those to whom it is conveyed.'

Individual autonomy being promoted by freedom of expression is premised on the proposition that persons can better develop their own abilities and characteristics, better make themselves happy, and better make moral judgements, if they are free to *express* themselves. Such expression can be in various ways, ranging from the use of the spoken and written word, to art, and to everyday acts. The diverse ways in which persons live their lives — what John Stuart Mill called ‘experiments in living’ — are themselves *expressions* of persons’ attempts to develop their abilities and characteristics, make themselves happy, and expressions of their moral judgements. Clearly, if the idea of individual autonomy is valued and promoted in society, persons must be free to express themselves.

Why is *individual autonomy* important in the South African constitutional dispensation? The answer is that individual autonomy is integral to ‘the fountain of all rights’⁷⁷ — a person’s dignity. In *Barkhuizen v Napier*, the majority of the Constitutional Court held that individual autonomy is ‘a vital part of dignity’.⁷⁸ This is complemented by *Member of the Executive Council for Education: KwaZulu-Natal v Pillay*, where the majority of the Constitutional Court held that an entitlement to respect for the ‘unique set of ends that the individual pursues’, is a ‘necessary element’ of the dignity of the individual.⁷⁹

In *Pillay*, the Constitutional Court also referred to two elements of individual autonomy, personal development and fulfilment, and linked them to human dignity. The court quoted with approval the celebrated phrase from the minority judgment of Ackermann J in *Ferreira v Levin*,⁸⁰ where he held as follows:

‘Human dignity has little value without freedom; for without freedom *personal development and fulfilment* are not possible. Without freedom, human dignity is little more than an abstraction. Freedom and dignity are inseparably linked. To deny people their freedom is to deny them their dignity.’⁸¹

There is also authority for a nexus between another element of individual autonomy — moral agency — and human dignity. In fact, moral agency is even posited as a value that underlies the constitutional rights to human dignity, privacy and freedom. In *British American Tobacco South Africa (Pty) Ltd v Minister of Health*,⁸² a unanimous full bench of the Supreme Court of

⁷⁷ *S v Makwanyane* supra note 63 para 308 (concurring judgment by Mokgoro J).

⁷⁸ *Barkhuizen v Napier* 2007 (5) SA 323 (CC) para 57. The court employed the term ‘self-autonomy’, which is an unnecessary tautology. It does not seem that the court intended self-autonomy to mean anything different from ‘autonomy’.

⁷⁹ *Ibid* para 64.

⁸⁰ 1996 (1) SA 984 (CC) para 49.

⁸¹ *Member of the Executive Council for Education: KwaZulu-Natal v Pillay* 2008 (1) SA 474 (CC) para 63, emphasis supplied.

⁸² [2012] 3 All SA 593 (SCA).

Appeal quoted with approval from the minority judgment of O'Regan J in *NM v Smith*,⁸³ which reads as follows:

'Recognising the role of freedom of expression in asserting the moral autonomy of individuals demonstrates the close links between freedom of expression and other constitutional rights such as human dignity, privacy and freedom. Underlying all these constitutional rights is the constitutional celebration of the possibility of morally autonomous human beings independently able to form opinions and act on them.'⁸⁴

It provides further insight into the status of individual autonomy to read how O'Regan J elaborated on the above quote in her judgment in *NM* (unfortunately not included in *British American Tobacco*), where she effectively posited individual autonomy as a constitutional virtue. She held as follows:

'As Scanlon described in his seminal essay on freedom of expression, an autonomous person "... cannot accept without independent consideration the judgment of others as to what he should believe or what he should do. He may rely on the judgment of others, but when he does so he must be prepared to advance independent reasons for thinking their judgment likely to be correct, and to weigh the evidential value of their opinion against contrary evidence.'" Our Constitution seeks to assert and promote the autonomy of individuals in the sense contemplated by Scanlon.'⁸⁵

To summarise the analysis thus far, individual autonomy and the concepts that are aspects of it, such as self-fulfilment and moral agency, are important in the South African constitutional dispensation, as they are directly linked with an individual's dignity.

Next, we consider the following question: is promoting individual autonomy qua purpose of freedom of expression applicable to the right to freedom of *scientific research* qua dimension of freedom of expression? We suggest yes. As Singh observed, conducting scientific research in a chosen field could be a scientist's 'path to obtaining self-fulfilment from a scientific, academic and intellectual context'.⁸⁶ By freely pursuing their chosen research projects, scientists can better develop their own abilities and characteristics — such as analytical skills, self-criticism, determination and resilience; by freely pursuing their chosen research projects, scientists can better fulfil their own personal ideals about accomplishment. Scientific research also has a distinct ethical dimension that requires moral judgement. This ranges from everyday research-integrity issues such as accurately reporting results and giving credit where it is due, to more

⁸³ 2007 (5) SA 250 (CC) para 145.

⁸⁴ *British American Tobacco* supra note 82 para 13.

⁸⁵ *NM* supra note 83 paras 145–6 (footnote omitted).

⁸⁶ Jerome Amir Singh 'Freedom of expression: The constitutionality of a ban on human cloning in the context of a scientist's guaranteed right to freedom of scientific research' (1999) 62 *THRHR* 577 at 582.

complex ethical questions of the potential impact of certain research on society at large. Accordingly, the freedom to conceptualise and pursue their own chosen research projects confronts scientists with constantly having to make moral judgements. It treats scientists as ‘morally autonomous human beings independently able to form opinions and act on them’⁸⁷ (to quote O’Regan J in *NM*). It should therefore be clear that the right to freedom of scientific research promotes individual autonomy.

In addition to promoting individual autonomy in the direct ways as analysed above — that is, scientists exercising their individual autonomy — freedom of scientific research also promotes everyone’s individual autonomy indirectly. If we accept that freedom of scientific research is a catalyst for scientific progress,⁸⁸ and that scientific progress opens new vistas for the exercising of individual autonomy by individuals in society in general, it follows that freedom of scientific research promotes individual autonomy generally. Corbellini observes that science has ‘freed a significant portion of humanity from ignorance, poverty and disease’.⁸⁹ Living longer, healthier lives, enriched with education about the world around us, and made less tedious by all the modern technologies to which we have become accustomed, clearly expands the opportunities for everyone to exercise individual autonomy in ways that our pre-modern forebears could hardly imagine. Reflecting on anti-scientific attitudes post-World War II, Smith states that before this, scientific discovery was ‘not only of overwhelming benefit to society, but was an essential attribute of human achievement and progress in the brave new world’.⁹⁰

In sum, therefore, the right to freedom of scientific research promotes an important value in the South African constitutional dispensation: individual autonomy. It does so directly, when scientists conduct research, and it can do so indirectly, when the results of scientific research are disseminated and put into practice in society.

⁸⁷ *NM* supra note 83 para 145.

⁸⁸ For instance, John Stuart Mill observed: ‘Persons of genius, it is true, are, and are always likely to be, a small minority; but in order to have them, it is necessary to preserve the soil in which they grow. Genius can only breathe freely in an atmosphere of freedom.’ (John Stuart Mill *On Liberty and the Subjection of Women* (1996) 65).

⁸⁹ Gilberto Corbellini ‘Scientists, bioethics and democracy: The Italian case and its meanings’ (2007) 33 *Journal of Medical Ethics* 349 at 351.

⁹⁰ George P Smith, II ‘Biotechnology and the law: Social responsibility or freedom of scientific inquiry’ (1988) 39 *Mercer LR* 437 at 440; Jordaan op cit note 2 at 631 (‘science is without doubt a principal contributor to the improvement of the human condition and enabler of greater individual autonomy’) and at 632 (‘the right to freedom of scientific research is the lifeblood of scientific progress and the conditio sine qua non for the continued improvement of the human condition’).

(c) *Purpose 2: Facilitating the search for truth*

Freedom of expression is indispensable for the attainment of truth. Mill famously argued that truth would be more attainable if people were able to consider all views, even those with which they were largely in disagreement.⁹¹ This is because the consideration of competing ideas allows one to utilise reason to decide on what is true and false.⁹² It follows that individuals must be given the freedom to listen to the views of others, to air their own views, and to contradict the views of others.⁹³ Censorship, whether imposed by law or through society, is obstructive to the search for truth. This is because humans are fallible, so one can never be certain of the truth of a view or opinion.⁹⁴ Accordingly, even the most controversial views can hold an element of truth.⁹⁵ Instead of censoring opinions, allowing access to the ‘marketplace of ideas’ is the best way to attain the truth — even if just provisionally. ‘Experience, free discussion and argument tend to pry errors loose, to expose them in the light of day.’⁹⁶ If people are barred from expressing a certain opinion, they are not the only ones affected.⁹⁷ The opponents of such opinion, and the current and the future generation, are also robbed.⁹⁸ This is because, if the silenced opinion is correct, opponents are robbed of the occasion for their errors to be corrected; if the silenced opinion is incorrect, the holders lose the opportunity to learn the truth through the opposing arguments.⁹⁹ The restriction of freedom of expression thus disrupts the attainment of truth.

These classic arguments by Mill and his contemporary disciples have been adopted by the South African courts in a number of cases.¹⁰⁰ Implicit in all of these judgments is that truth is important, as it allows society and individuals to thrive. When freedom of expression is limited, the search for truth is compromised and the thriving of society and individuals is

⁹¹ Mill op cit note 88 at 19.

⁹² Richard Moon *The Constitutional Protection of Freedom of Expression* (2000) 12.

⁹³ Ibid.

⁹⁴ Wendy Donner & Richard Fumerton *Mill* (2009) 59.

⁹⁵ Ibid.

⁹⁶ Ibid at 60.

⁹⁷ Mill op cit note 88 at 19.

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ *South African National Defence Union* supra note 71 para 7; *Masuku v South African Human Rights Commission obo South African Jewish Board of Deputies* 2019 (2) SA 194 (SCA) para 17; *Democratic Alliance* supra note 72 para 122; *Van Breda* supra note 73 para 9, quoting *R v Secretary of State for the Home Department, Ex parte Simms* supra note 74 at 408; *South African Broadcasting Corporation Ltd v National Director of Public Prosecutions* 2007 (1) SA 523 (CC) 90 para 119; *Case* supra note 69.

undermined.¹⁰¹ In *Hoho*, the Supreme Court of Appeal reflected on these negative consequences as follows:

‘Suppression of available information and of ideas can only be detrimental to the decision-making process of individuals, corporations and governments. It may lead to the wrong government being elected, the wrong policies being adopted, the wrong people being appointed, corruption, dishonesty and incompetence not being exposed, wrong investments being made and a multitude of other undesirable consequences.’¹⁰²

Similarly, courts in comparative jurisdictions have also recognised the attainment of truth as a purpose of freedom of expression,¹⁰³ often explicitly basing their decisions on the rationale of the marketplace of ideas being the best way to attain the truth.¹⁰⁴

In what follows, we consider freedom of scientific research as a dimension of freedom of expression, and whether freedom of scientific research also has a nexus to truth-finding. We suggest that seeking the truth is indeed a purpose of freedom of scientific research. The very evidence-based nature of science is designed to find the truth about the world in which we humans find ourselves. Science has therefore been described as ‘the search for truths about the natural world’.¹⁰⁵ One should note the delineation of the kind of truth that is pursued by science. In the same way that freedom of scientific research is a dimension of freedom of expression, so the kind of truth pursued by science is a dimension of truth in general, namely truth about the natural or physical world. This includes humans, our bodies and psyches — but not the

¹⁰¹ Apart from its evident instrumental value, we suggest that the truth is also intrinsically valuable to society. Mill argued that truth is intrinsically valuable because the truth of an opinion is part of its usefulness (Mill op cit note 88 at 25). Lynch observes that humans do not only have a mere preference of truth over falsity, but we *care* about truth for its own sake (Michael P Lynch ‘Minimalism and the value of truth’ (2004) 54 *The Philosophical Quarterly* 497 at 504). He argues, as follows (at 499): ‘Nobody likes to be wrong. If anything is a truism, this is. And it suggests that we value believing the truth. Roughly speaking, we think it is good to believe the truth, and not to believe the false.’

¹⁰² *S v Hoho* 2009 (1) SACR 276 (SCA) para 29.

¹⁰³ *Bose Corp v Consumers Union* 466 US 485 (1984) at 503; *Ford v Quebec* [1988] 2 SCR 712 at 765; *Irwin Toy Ltd* supra note 76 at 976; *Indibility Creative Pvt Ltd v Government of West Bengal* 2019 SCC OnLine SC 520 para 13; *Bennet Coleman v Union of India* 1973 SCR (2) 757; *Saxena v Hon’ble The Chief Justice of India* 1996 SCALE (5) 233 at 15; *Okoiti v Attorney General* [2020] eKLR (Petition No 163 of 2019) para 305; *Andare v Attorney General* [2016] eKLR (Petition No 149 of 2015) para 83; *Retrofit (Pvt) Ltd v PTC* 1995 (2) ZLR 199 (S) at 10.

¹⁰⁴ *Abrams v United States* 250 US 616 (1919) 630; *Red Lion Broadcasting Co Inc v FCC* 395 US 367 (1969) 390; *Okoiti* supra note 103 para 305; *Andare* supra note 103 para 83; *Bennet Coleman* supra note 103; *Saxena* supra note 103 at 14; *Retrofit* supra note 103.

¹⁰⁵ Joshua Lederberg ‘The freedoms and the control of science: Notes from the ivory tower’ (1972) 45 *Southern California LR* 596 at 599.

supernatural or metaphysical realm, and not morality or the values that underlie and inform the law. If by ‘truth’ we mean ‘that which is true or in accordance with fact or reality’,¹⁰⁶ science, being evidence-based, occupies an unassailable position of authority concerning truth about the natural or physical world. Yet, one should remember that all scientific conclusions are always provisional and open for revision. This, we suggest, is a strength rather than a weakness. Science’s anti-dogmatic ethos ensures an openness to self-correction and avoids the fossilisation of knowledge. Consequently, science has proven to be a highly reliable source of knowledge, which in turn has provided — and continues to provide — the foundation of all the technological wonders of modernity. Accordingly, the kind of truth pursued by science is important, as it contributes to human flourishing.

The outbreak of COVID-19 demonstrates how crucial freedom of scientific research is to human flourishing, and to human survival. If governments were to suppress COVID-19-related research, the effort to find scientific and public policy solutions to COVID-19 would be undermined, and lives would be lost. The truth clearly has immense value for society, and is therefore an important value. Especially in the context of a health crisis, freedom of scientific research and the search for truth are closely associated with the right to life and the right to physical and psychological integrity.

(d) Purpose 3: Supporting democracy

Our contemporary understanding of democracy is more than just the casting of a vote in an election, but includes values such as transparency, accountability, informed decision-making, and participation in public life. To promote all of these dimensions of democracy — for instance, to keep government officials accountable for their actions, and to allow individuals to participate in public life and influence public opinion and political decisions — freedom of expression is essential. The Constitutional Court has repeatedly recognised the vital role of freedom of expression to all of these various aspects of democracy,¹⁰⁷ and has referred to freedom of

¹⁰⁶ Lexico s v ‘truth’ available at <https://www.lexico.com/definition/truth>, accessed on 16 July 2020.

¹⁰⁷ *South African National Defence Union* supra note 71; *Masuku* supra note 100 para 17; *NM* supra note 83 para 66; *Le Roux v Dey* 2011 (3) SA 274 (CC) para 47; *Print Media South Africa v Minister of Home Affairs* 2012 (6) SA 443 (CC) para 93; *Islamic Unity Convention v Independent Broadcasting Authority* 2002 (4) SA 294 (CC) para 26; *Qwelane v South African Human Rights Commission* 2020 (2) SA 124 (SCA) para 41; *South African Broadcasting Corporation Ltd* supra note 100 para 119; *Mail and Guardian Media Ltd v Chipu* NO 2013 (6) SA 367 (CC) para 50; *De Reuck v Director of Public Prosecutions (Witwatersrand Local Division)* 2004 (1) SA 406 (CC) para 59; *Independent Newspapers (Pty) Ltd v Minister for Intelligence Services In re: Masetlha v President of the Republic of South Africa* 2008 (5) SA 31 (CC) note 34;

expression as the ‘lifeblood of democracy’.¹⁰⁸ This sentiment is echoed by courts in comparative jurisdictions.¹⁰⁹

The kind of expression that is usually associated with supporting democracy is political expression. However, political expression is not the only kind of expression that is vital to democracy. The reliable, evidence-based knowledge about the world produced by science is another kind of expression that is vital to democracy; the need for *informed* decision-making has become integral to our contemporary understanding of democracy.¹¹⁰ As Wilholt has observed, ‘scientific knowledge has become an important input for the democratic process’.¹¹¹ During the COVID-19 crisis, many governments around the world relied on scientific advisory panels to inform decision-making. In South Africa, the Minister of Health established the Ministerial Advisory Committee, consisting of 51 medical scientists. Although the medical bias in the composition of the Ministerial Advisory Committee has been criticised, with calls to include more experts from the humanities and the social and behavioural sciences,¹¹² the existence of the Ministerial Advisory Committee as a body of scientists that is mandated, based on its collective scientific knowledge, to advise government on COVID-19, demonstrates the importance of scientific knowledge as an input in policy-making.

Dikoko v Mokhatla 2006 (6) SA 235 (CC) para 138; *Nova Property Group Holdings Ltd v Cobbett* 2016 (4) SA 317 (SCA) para 43; *The Citizen 1978 (Pty) Ltd v McBride* 2011 (4) SA 191 (CC) para 141; *Phillips* supra note 71 para 23.

¹⁰⁸ *Democratic Alliance* supra note 72 para 122; *Masuku* supra note 100 para 18.

¹⁰⁹ *DeJonge v Oregon* 299 US 353 (1937) 365; *Ford* supra note 103 at 765; *Thomson Newspapers Co v Canada (Attorney General)* [1998] 1 SCR 877 at 28; *Bennet Coleman* supra note 103; *Indibility Creative Pvt Ltd* supra note 103 para 13; *Union of India v Jindal* 2004 SCC 43; *Indian Express Newspapers v Union of India* 1985 SCR (2) 287 para 12; *In Re Ramlila Maidan Incident v Home Secretary* 2012 (2) SCALE 682 para 10; *Saxena* supra note 103 at 15; *Okoiiti* supra note 103 para 305; *Andama v Director of Public Prosecution* [2019] eKLR (Petition no 214 of 2018) para 45; *Andare* supra note 103 para 83; *Alai v The Hon Attorney General* [2017] eKLR (Petition no 174 of 2016 para 31; *Nairobi Law Monthly Company Limited v Kenya Electricity Generating Company* [2013] eKLR (Petition 278 of 2011) para 32; *Kahiu v CEO, Kenya Film Classification Board* [2018] eKLR (Petition no 313 of 2018) para 62; *Okuta v Attorney General* [2017] eKLR (Petition no 397 of 2016) at 5; *Madanhire v Attorney General* (2014) ZWCC 2; *Mutambara v Attorney General* (2015) ZWCC 11; *Association of Independent Journalists v Minister of State for Information and Publicity in the President’s Office* (2004) ZWSC 140; *Capital Radio v Broadcasting Authority of Zimbabwe* (2003) ZWSC 65; *Zimbabwe Lawyers for Human Rights v President of the Republic of Zimbabwe* (2003) ZWSC 12.

¹¹⁰ *South African Broadcasting Corporation Limited* supra note 100 paras 27–8; *Tshabalala-Msimang v Makhanya* 2008 (6) SA 102 (W) paras 38–40.

¹¹¹ Torsten Wilholt ‘Scientific freedom: Its grounds and their limitations’ (2010) 41 *Studies in History and Philosophy of Science* 174 at 177.

¹¹² Jerome Singh ‘How South Africa’s Ministerial Advisory Committee on COVID-19 can be optimized’ (2020) 110 *South African Medical Journal* 439.

A sceptic could note that some of the advisories issued by the Ministerial Advisory Committee were not implemented in their entirety.¹¹³ Yet, we suggest that this does not detract from the importance of scientific knowledge as an input in policy-making. All inputs in policy-making do not necessarily lead mechanistically to policy, because these are not necessarily the sole input or consideration. Hume's classic *is/ought* dichotomy is relevant in this context: the fact that something *is* does not mean it *ought* to be. We humans introduce values to facts about the world. For instance, assume that scientists find that greenhouse emissions are leading to climate change, which in turn is likely to lead to food shortages. This fact on its own does not mean that greenhouse emissions, climate change, or food shortages are morally bad. It is only when we introduce a value, namely that we believe that we have a moral duty to avoid human suffering (and because food shortages are likely to cause human suffering) that we can say that greenhouse emissions are cause for moral concern, and we ought to take action to diminish them. In the context of COVID-19, medical concerns had to be balanced with economic, social, and various other, concerns. Science can yield facts that shed critical light on topical issues that are relevant to public policy, and, in so doing, inform public opinion, perceptions, and political agendas. However, we should remember that humans, as moral agents, are responsible to decide on values and to apply these to facts about our world.

In conclusion, the importance of scientific knowledge as an input in policy-making means that if government can exercise control over the scientific research agenda, it can manipulate the areas in which knowledge is generated and hence shield the factual assumptions underlying certain policies from being exposed as false. If this kind of political manipulation of the democratic process is to be avoided, scientific research should be free.

(e) *Summary*

In our analysis above, we have argued that the three purposes of freedom of expression that have crystallised in case law — promoting individual autonomy, facilitating the search for truth, and supporting democracy — are also purposes of freedom of scientific research. We have also argued that these purposes themselves, and the ways in which they are served by freedom of scientific research in particular, are not trivial, but of significant importance in our society. This highlights the importance of the right to freedom of scientific research as an enumerated right in the South African Bill of Rights.

¹¹³ Department of Health 'Health on availability of Coronavirus Covid-19 MAC advisories being accessible to public' press release, 27 August 2020, available at <https://www.gov.za/speeches/health-availability-coronavirus-covid-19-mac-advisories-being-accessible-public-27-aug-2020>, accessed on 18 October 2020.

V LIMITING THE RIGHT TO FREEDOM OF SCIENTIFIC RESEARCH

Government can attempt to control scientific research in a range of ways, from outright legislative bans¹¹⁴ to allocating public funding to only certain types of research.¹¹⁵ While the former method would clearly constitute an infringement on the right to freedom of scientific research and would have to be justified in terms of the Constitution's limitation clause in order to survive constitutional scrutiny, the latter method might impact the right to freedom of scientific research more indirectly. In practice, government and its public funding agencies, such as the National Research Foundation and the Technology Innovation Agency, will determine priority areas for funding, given limited resources. However, these priority areas should be determined in a rational way and be aligned with the values of the Constitution. For example, only funding research into diseases that affect men, but not funding research into diseases that affect women, would be unconstitutional.

Another way in which government can control scientific research is to regulate it through legislation. Regulation is a less extreme form of infringement on freedom than an outright ban, but an infringement nevertheless, and must be constitutionally justifiable. A prominent danger with the regulation of science is that compliance can be so burdensome that it effectively bans certain kinds of scientific endeavour. Also, when legislation gives discretionary decision-making power to government bureaucrats without specifying objective criteria to guide decision-making, general uncertainty and decisional paralysis may be some of the consequences in practice — all having a chilling effect on freedom of scientific research.¹¹⁶ Such legislation would not only be undesirable from a good governance perspective, but also constitutionally contestable as an arbitrary infringement on freedom of scientific research.

¹¹⁴ An example is human reproductive cloning, which is outlawed by s 57 of the National Health Act.

¹¹⁵ A well-known example is when former US President George W Bush did not outlaw stem-cell research, but restricted federal funding to exclude research on new stem-cell lines. See David Cyranoski 'How human embryonic stem cells sparked a revolution' (2018) 555 *Nature* 428.

¹¹⁶ An example is s 57(4) of the National Health Act, which provides that the Minister of Health 'may permit research on stem cells and zygotes which are not more than 14 days old on a written application and if (a) the applicant undertakes to document the research for record purposes; and (b) prior consent is obtained from the donor of such stem cells or zygotes'. However, there are no objective criteria to guide either an applicant or the Minister. Such criteria were suggested in the academic literature. See: Donrich W Jordaan 'Criteria for pre-embryo research in South Africa: An analysis within the paradigm of respect for the pre-embryo' (2008) 27 *Journal of Medicine and Law* 417.

Because any legal regulation imposes limitations on freedom, such regulation must serve a legitimate government purpose. Also, the severity of the limitation imposed by the regulation must be proportional to the importance of the legitimate government purpose. As such, any proposed regulation of scientific research should be based on rational grounds and not on unsubstantiated fears or concerns. Unfortunately, developments in science are often sensationalised by the media. The public's concerns can be compounded by illegal actions by rogue scientists.¹¹⁷ A prime example is the He Jiankui affair. He Jiankui, a Chinese scientist, used genome editing to modify the DNA of two human in vitro embryos to make the resulting individuals immune to HIV. However, in this process, he flouted established norms for safety protections along the way.¹¹⁸ This precipitated a flurry of global ethical and legal debate and a litany of proposals for the strict regulation, and even the banning of, research on heritable genome editing.¹¹⁹ The fact that He Jiankui's actions were illegal, and that he has since been sentenced to three years' imprisonment and a 3 million Yuan (over R7 million) fine,¹²⁰ received far less attention. It would be authoritarian and ill-informed — and ultimately contrary to the letter and spirit of the Constitution — to view regulation as the default political response to any (real or perceived) public apprehension about a new development in science. Freedom of scientific research should always be the default position in science-related policy; it should be held in high regard given the important purposes that it serves; and it should only be limited by regulation if and to the extent that it is constitutionally justified.

An important example of a legitimate government purpose for regulating the freedom of scientific research would be to protect human research participants. This purpose underlies several pieces of legislation that regulate scientific research — most prominently the system of research ethics committee oversight established by the National Health Act.¹²¹ This system entails that any proposed health research study in South Africa

¹¹⁷ On the subject of rogue scientists, see: Beverley A Townsend 'Human genome editing: How to prevent rogue actors' (2020) 21 *BMC Medical Ethics* 95.

¹¹⁸ David Cyranoski 'The CRISPR-baby scandal: What's next for human gene-editing' (2019) 566 *Nature* 440.

¹¹⁹ See for instance 'WHO expert panel paves way for strong international governance on human genome editing' available at <https://www.who.int/news-room/detail/19-03-2019-who-expert-panel-paves-way-for-strong-international-governance-on-human-genome-editing>, accessed on 21 July 2020; 'Germline editing: Time for discussion' (2015) 21 *Nat Med* 295; Eric Lander, Françoise Baylis, Feng Zhang et al 'Adopt a moratorium on heritable genome editing' (2019) 567 *Nature* 165; Carrie D Wolinetz & Francis S Collins 'NIH supports call for moratorium on clinical uses of germline gene editing' (2019) 567 *Nature* 175.

¹²⁰ David Cyranoski 'What CRISPR-baby prison sentences mean for research' (2020) 577 *Nature* 154.

¹²¹ Sections 71–3.

must be approved by a health research ethics committee ('HREC') that is registered with the National Health Research Ethics Council, a statutory body appointed by the Minister of Health.¹²² Currently, there are 46 HRECs registered with the National Health Research Ethics Council.¹²³ Each HREC can develop its own ethical standards¹²⁴ within the framework of national norms and standards set by the National Health Research Ethics Council.¹²⁵ The most well-known example of national standards produced by the National Health Research Ethics Council is a document entitled *Ethics in Health Research: Principles, Processes and Structures*.¹²⁶ Notably, this document states that the primary role of HRECs is to protect the interests of research participants.¹²⁷

While protecting human research participants in the abstract is certainly a legitimate government purpose that can, in principle, limit the right to freedom of scientific research, any measure of risk of harm to human research participants does not automatically justify an HREC not approving a proposed research project. On the contrary, HRECs are expected to consider both the risks and the benefits entailed by a particular, proposed research project.¹²⁸ For example, a clinical trial of a new medicine will always entail some risk to the clinical trial participants, but measures such as well-designed pre-clinical trials and regular monitoring of the trial participants can be taken to mitigate this risk and, importantly, the benefits of the new medicine may (or may not) outweigh the risks. This links to truth as a purpose of the right to freedom of scientific research, as the clinical trial is conducted to ascertain the truth about the efficacy and safety of the new medicine.

Clearly, HRECs fulfil an important role in our contemporary society to balance the right to freedom of scientific research with other interests in society, most pertinently the interests of human research participants. However, HRECs are fallible, and are not above the law. This means that, *inter alia*, HRECs' decisions must adhere to the principles of

¹²² Note that at the time of finalising this article (October 2020), there is no serving National Health Research Ethics Council. The term of office of the Council that served from 2016 to 2019 expired, and the Minister of Health has not as yet appointed a new Council.

¹²³ National Health Research Ethics Council. List of Human Research Ethics Committees registered with NHREC available at <http://nhrec.health.gov.za/index.php/extras>, accessed on 18 October 2020.

¹²⁴ Section 73(2).

¹²⁵ Section 72(6)(c).

¹²⁶ Department of Health *Ethics in Health Research: Principles, Processes and Structures* 2 ed (2015), available at <http://nhrec.health.gov.za/index.php/grids-preview>, accessed on 18 October 2020.

¹²⁷ *Ibid* at 40.

¹²⁸ *Ibid* at 11, 14, 15, 19.

administrative justice, and are subject to review by the high court in terms of the Promotion of Administrative Justice Act 3 of 2000.

A limitation analysis would of course be informed by prevailing circumstances, such as the current COVID-19 pandemic. Should South Africa's government not require its top biomedical researchers to stop all their other projects and work exclusively on developing a COVID-19 vaccine? This would of course infringe freedom of scientific research, but might be a better strategy (than freedom) to ensure that lives are saved. Can freedom of scientific research — and in particular its purpose of ensuring individual autonomy of the scientists involved — be temporarily sacrificed on the altar of helping society overcome a pandemic? We suggest that such a temporary government intervention would in principle be entirely reasonable and justifiable in the context of a pandemic. However, what happened in practice was that many biomedical research groups all over the world, including in South Africa, jumped at the opportunity to contribute to COVID-19-related research of their own volition.¹²⁹ In this light, it would be difficult for government to justify legal measures that will curtail freedom of scientific research with the ostensible aim of fighting COVID-19.

VI CONCLUSION

As we remarked in the introduction, although the global COVID-19 pandemic may draw attention to the right to freedom of scientific research, the relevance of the right is not limited to this health crisis. As an enumerated right in the South African Bill of Rights, the right to freedom of scientific research should be integral to the thinking about all science-related policy development and revision in South Africa. Moreover, as we have shown in this article, the right to freedom of scientific research is important in its own right, as it serves purposes that are at the core of our constitutional value-system. Yet, a recent report¹³⁰ by the Academy of Science of South Africa ('ASSAf') on the ethical, legal and social implications of genetics and genomics — which includes scientific research in these fields — does not even mention the right to freedom of scientific research.¹³¹ Unsurprisingly, the report proposes the development of a plethora of policies, guidelines, and regulations. The report's point

¹²⁹ A Google Scholar search for the term 'COVID-19' yields around 1 310 000 results, accessed on 25 October 2020.

¹³⁰ Academy of Science of South Africa *Human Genetics and Genomics in South Africa: Ethical, Legal and Social Implications* (2019) 20.

¹³¹ Donrich Thaldar, Julian Kinderlerer & Sheetal Soni 'An optimistic vision for biosciences in South Africa: A response to the ASSAf report on human genetics and genomics' (2019) 115 *South African Journal of Science*; Michael S Pepper, Collet Dandara, Jantina de Vries et al 'An optimistic vision for biosciences in South Africa: Reply to Thaldar et al' (2019) 115 *South African Journal of Science*.

of departure seems to be to identify perceived unregulated spaces and to propose how scientists should be policed.¹³² In a notable rebuke of freedom of scientific freedom, the report recommends that '[r]esearchers should not report their research findings in ways that may be, or may be perceived to be, harmful or offensive'.¹³³ How do scientists speak truth to power if the truth is banned, because it 'may be perceived' as being offensive by the powers that be? Is this the totalitarian future of South Africa?

Just two years later, in the midst of the COVID-19 pandemic, ASSAf apparently changed its stance: Professor Glenda Gray, the CEO of the Medical Research Council ('MRC') made a series of critical public comments on government's handling of the COVID-19 pandemic.¹³⁴ This elicited a sharp rebuttal from the Minister of Health,¹³⁵ followed by the acting Director General of the Department of Health writing to the MRC to investigate Gray.¹³⁶ The acting Director General stated that Gray's statements caused 'harm' to the government's response to COVID-19.¹³⁷ This bears a striking similarity to the report's recommendation discussed above. If something 'may be perceived to be harmful or offensive', the researcher is expected to refrain from saying it. The MRC chairperson swiftly capitulated, apologised for Gray's comments and undertook to institute an investigation into the 'damage' the comments may have caused.¹³⁸ However, the Gray saga received a lot of national media coverage and Gray's cause quickly became a national cause célèbre — several scientists and medical professionals even signed a petition in support

¹³² The report itself uses the word 'policed', as an apparent equivalent for 'regulated'. At 49 of the report it states that '[t]he use of retrospective biobanks or samples could be regulated or policed by community trusted RECs [research ethics committees], for any new relevant questions or utilisation'.

¹³³ Academy of Science of South Africa op cit note 130 at 12.

¹³⁴ Azarrah Karrim & Sarah Evans 'Unscientific and nonsensical: Top scientist slams government's lockdown strategy' *News24* 16 May 2020, available at <https://www.news24.com/news24/SouthAfrica/News/unscientific-and-nonsensical-top-scientific-adviser-slams-governments-lockdown-strategy-20200516>, accessed on 25 October 2020.

¹³⁵ Zwelini Mkhize 'Health Minister's statement on Prof Glenda Gray's public attack of government based on inaccurate information' 20 May 2020, available at <https://sacoronavirus.co.za/2020/05/20/health-ministers-statement-on-the-prof-glenda-grays-public-attack-of-government-based-on-inaccurate-information/>, accessed on 25 October 2020.

¹³⁶ Anban Pillay 'Letter to Prof Mahlangu, chair of the board of the Medical Research Council' 21 May 2020, available at <https://www.groundup.org.za/media/uploads/documents/anbanpillaylettertomrboard.pdf>, accessed on 25 October 2020.

¹³⁷ Ibid.

¹³⁸ Paul Herman 'SAMRC board apologises for Prof Gray's comments, bars staff from speaking to media' *News24* 25 May 2020, available at <https://www.news24.com/news24/southafrica/news/breaking-samrc-board-apologises-for-glenda-grays-comments-bars-staff-from-speaking-to-media-20200525>, accessed on 25 October 2020.

of Gray.¹³⁹ In a welcome volte-face, ASSAf joined her defenders, and published a statement in support of Gray.¹⁴⁰ ASSAf's statement in support of Gray contains the following memorable paragraph on the importance of scientists' freedom of expression:

'As the Academy of Science of South Africa, we believe that freedom of scientific enquiry is fundamental to the health of our constitutional democracy. Academics and researchers need the space to undertake independent research in an environment that is free from fear, intimidation and political interference. To threaten researchers and to muzzle their voice would have a chilling effect on creativity, innovation and experimentation.'¹⁴¹

The notion proposed in the ASSAf report that scientists should refrain from reporting their research findings in ways that 'may be, or may be perceived to be, harmful or offensive', is an unabashed attempt at muzzling their voices, and will indeed have a 'chilling effect on creativity, innovation and experimentation'.¹⁴² Why was a pandemic and a national cause célèbre needed to bring ASSAf back to the constitutional fold? (And how deep and lasting is this commitment to freedom of scientific research?)

Clearly a cultural paradigm change is necessary. Instead of viewing science as an esoteric activity that constantly requires expanded regulation, it should be viewed in a more optimistic light as interwoven with the ideals of human dignity, human flourishing, saving lives, democracy, and good governance. It is time to place the right to freedom of scientific research centre stage. It is time for Cinderella to go to the ball.

¹³⁹ Sharon Dell 'Minister denies threat to academic freedom of medical scientist' *University World News* 27 May 2020, available at <https://www.universityworldnews.com/post.php?story=20200527142324229>, accessed on 25 October 2020.

¹⁴⁰ Academy of Science of South Africa 'Statement: Academic freedom and the values of science' 25 May 2020, available at <https://www.assaf.org.za/files/corona/ASSAf%20Statement%20on%20Academic%20Freedom%20and%20the%20Values%20of%20Science.pdf>, accessed on 25 October 2020.

¹⁴¹ *Ibid.*

¹⁴² *Ibid.*