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An evaluation of genetic editing in terms of its impact on free will, genetic determinism and reason-responsiveness

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Masters in Philosophy Research Paper 2024.

“An evaluation of genetic editing in terms of its impact on free will, genetic determinism and reason-responsiveness.”

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Contents

Acknowledgements. 3
Plagiarism Declaration 4
Abstract 5
Introduction 7
Structure 10
Chapter 1 13
Genetic influence on behaviour. 13
Chapter 2 17
Choice and Reasons Responsiveness. 17
Reason responsiveness. 20
Moderate Reasons Responsiveness. 29
Chapter 3 33
Scope of choice. 33
Reason responsiveness and gene editing. 34
Genetic editing as a neutral and necessary component for the expansion of individual freedoms. 39
What might genetic editing mean for free will? 40
Chapter 4 45
The concrete case. 45
The hypothetical case. 46
Hannibal Lecter's Dinner Party. 50
Hannibal. 50
Lecter. 52
The Dinner Party. 52
Twin World's Diverge. 54
Chapter 5 57
Facing an impossibalist argument. 57
Discussing Ultimate Responsibility as presented by Kane. 59
What do we mean by 'the way we are'? 61
Directly addressing the requirement of Ultimate Responsibility. 64
Chapter 6 66
Conclusion. 66
Bibliography 68

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Abstract

Genetic editing has advanced at an ever-increasing speed over the past five decades and has sparked curiosity from all corners of academia. This paper discusses genetic editing in terms of its interaction with philosophical topics relating to the freedom of will.

A vast collection of literature has already been published regarding the ethical considerations of genetic editing, however, in this paper I put those concerns to the side and seriously analyse the impact a complete practice of genetic engineering would have on our free will in the context of a moderately reasons responsive framework.

Theoretically, the discussion occurs under the theoretical position of compatibilism. The main claim of the argument which develops in this paper is that genetic editing is uniquely positioned to expand our scope of free will in line with a moderately reasons responsive understanding of free will.

Key words: Genetic Engineering, Compatibalism, Free Will, Reasons Responsiveness, SMA, Gene editing, Gene by environment interaction.

Introduction

This paper aims to explore the relationship between the deterministic nature of a mind understood through the lens of the physicalist, and genetic editing and how this interaction might affect our understanding of free will and freedoms to choose "the way we are" so to speak.

This paper will explore this question in two main ways: firstly, it will examine the notion of "the way we are" and the amount of control we might have over his fact. This points us to the realm of free will and more specifically determinism. This paper considers both the positions of the compatibilist and the incompatibilist in how free to control "the way we are" we could be in a deterministic world. Secondly, the discussion will shift towards the factors that might constitute the deterministic nature of the mind, and in taking a physicalist approach, an argument is made that there is a physical basis for determining "the way we are". From this juncture we can begin exploration on the key topic of this paper, that being: how genetic editing, the manipulation of the physical substrata that come to constitute the mind, might provide us with a way to alter "the way we are" for the first time in our human existence.

The intersection between free will and genetic editing may at first seem rather esoteric. This fact is not lost on me, however, I do not believe that this should act as a deterrent for philosophical discussion to be had on the topic. The possibility of genetic editing coming to influence psychological characteristics, intelligence and cognition are rather sci-fi at present, but with the immense speed of progression being seen in the field, discussions such as the one had in this paper may well come to be important topics in the future. Curiosity is a natural and key component to what it means to be human, and that curiosity extends to our own inner workings, it seems intuitive to self reflexively ask: "why do I do the things I do, why do I make certain choices and why are my preferences aligned in the ways that they are?".

Psychology as a field of study is by and large fixated on these kinds of questions. The answers it has attempted to provide thus far range from experiences in upbringing, attachment styles, conditioning, predisposition, environmental influences, sexual drives, life and death instincts, parental relationships, peer modelling and so on and so forth. There is a litany of possible explanations given for our actions and choices. However, the main take away from current psychological research and the work that is most useful for the discussion at hand is the balance between nature and nurture and how this comes to influence and shape the way we are.

The manipulation of environment is something firmly within our grasp at current, that being the nurture aspect of the debate. The very ways in which we try to raise our children is an indication of this. The right school, the right friends, hobbies, and exposure to positive influences are all right at the top of a parents' list of important factors related to child rearing. We influence the environments of others and of ourselves all the time. In a discussion on the psychology of the Republic, Jonathan Lear hits on a similar notion, the environment we grow up in becomes internalised and as we grow, we process this internalisation and later in life come to externalise this environmental influence, and as such, come to create our world in a way that fits best with our understanding of the world we internalised when we were young (Lear, 1992). On this reading, he sheds light on how Socrates intended to study the soul by examining first the city, this seems to rely on the idea that the mind creates its environment as the environment comes to create the mind.

The central point at which we have always lost control, however, is when we journey into the mind itself. Environment, we can control, the mind however remains mysterious and aloof. In a rather ironic way, it seems that the mind hides its true nature away from itself as it attempts to study its own image. Descartes was of the opinion that the mind was indeed incorporeal, something other and non-physical and that in some mysterious way, it came to interact with the body, a definitionally corporeal thing (Descartes, 1993). Thus, substance dualism was born and subsequently discredited in the hundreds of years of philosophy that followed. In today's age of modern physics, we come to understand that physical entities may only be influenced by physical things. Modern medicine, imaging, genetic analysis, and scientific breakthroughs tell us that whilst thought itself as a concept may not be tangible in the traditional sense, there is nonetheless a physical basis for how this phenomenon occurs. The notion of a non-physical substance somehow interacting with a physical substance holds very little sway in today's discussion of the mind. As such we might turn towards a physicalist view.

The hard-liner physicalist holds that the mind is purely physical, the mind is nothing short of a complex series of neuronal pathways, sensitive to stimulus and reactive in such a way that behaviour is born out of its operations (Stoljar, 2022). As such, physical systems are constrained by physical laws. Matter may not be created nor destroyed, it may only be altered in form, for example. This is the first law of thermodynamics, and this law would hold in any corner of our physical universe. The above is of course a very strict and inflexible depiction of the mind, one which seems to leave out the undeniable intuition that we all have that the mind is something more, something beyond the grasp of a purely physical depiction. This intuition

is embodied best in the arguments of Nagel and his question: *what is it like to be a bat?* The subjective, *what it is like-ness* to live and think and choose causes us to acknowledge the physical and the mental as two concepts rather than being mere synonyms of one another (Nagel, 1987).

The way in which I propose reconciling the physical nature of the mind with its undeniably ethereal character of subjective experience is by making an appeal to supervenience. In short, the ethereal mind comes to supervene upon the physical brain, the physical then gives rise to a non-physical entity in virtue of these properties emerging from the complex collection of physical structures that are embodied by the brain (Stoljar, 2023). The explanation above becomes clearer with an example provided by David Lewis.

> If one is to think about an image printed on a dot matrix printer, we find that the image is made up of many uniform and identical dots, these dots, when arranged in a particular way give rise to an image. This image supervenes on the dots and their structure, the image then emerges from the dots in a way in which the global properties of the image are nothing but a series of dots. If two pictures were printed, they could not differ except for the case in which there is a dot in one and not the other (Lewis, 1986). [1]

The mind then comes to be born of and supervenes upon the physical world and as such, it stands to reason that it would be constrained by physical law. The place where we might find the most traction in understanding and shaping the mind then lies in how able we are to manipulate and influence the physical substrata that give rise to the mental. One such sub-stratum would be genetically determined structures that influence the mind and cognition. This will be the primary point of discussion for this paper.

The fundamental question for this discussion is whether the manipulation of genetic structures might give rise to the manipulation of the psychic structures of mind and might giving this control to individuals afford them increased personal freedoms?

The answer which I aim to argue towards in this paper is that genetic editing is able to expand the scope of individual freedom and thereby increase the amount of personal freedom of will experienced by the individual in a way hitherto never experienced in human history. Genetic editing can, in short, increase our individual capacities for acting freely, when that action is

[1] Lewis here is directly quoted within (Stoljar, 2023).

undertaken in a moderately reasons responsive framework, and those actions taken are done so in accordance with our best or most valued reasons.

Structure

The way in which this paper will achieve its intended goal is by structuring its focus around three main pillars.

The first, is a discussion on choice. This discussion aims to describe in as much detail as is necessary for the argument at hand, the nature of choice and some of its key components. The components most relevant to this paper will be the role individual disposition plays in choice, the predetermination of choice and the extent to which an individual's choice can be said to be free.

The second, is a discussion and summary of scientific advances in the field of genetic editing and the hypothetical, but not impossible, extension of the field into the realm of psychological genetic manipulation. This discussion will tie into the previous section of the paper in that it will be proposed that genetic editing, be that in some future or hypothetical state, stands to meaningfully influence the way in which we come to understand our individual wills and the freedom with which we go about our willing.

The third and final pillar is a hypothetical and abstract discussion of what free will might come to be in a world where psychological genetic editing is possible and practiced. The driving point of the argument being that genetic editing stands to expand the scope of human freedom in ways hitherto impossible, and that this kind of genetic editing is not as impossible as it seemed in years passed and becomes more plausible as the field matures from its infancy. The goal of this pillar is to substantiate the claim I make that genetic editing can extend the scope of our individual freedoms and our capacity for acting freely.

These three pillars will come to form the three component parts of the paper, however, the structure of the argument will unfold as follows:

As a jumping off point, some preliminaries will need to be developed. Firstly, the scientific basis for genetic editing will be discussed in sufficient detail for the argument. This paper is not primarily focused on the feasibility of genetic editing and its effects on psychological constructs, nor is it focused on providing a rigorous review of the scientific literature presently available on the topic. Rather this section will be used to stage the argument going forward.

Secondly, an overview of choice and free will as it is currently understood in academia will be provided.

With these preliminaries in place, the argument can run its course. A discussion of choice begins the core argument of the paper, and this then feeds into exposition and arguments made in favour of reasons responsiveness. Moderate reasons responsiveness in particular will be the theoretical perspective from which the argument will set its foundations. Moderate reasons responsiveness provides a theory of choice which can accommodate a deterministic world as well as freedom of will, it does so by promoting decisions made on the basis of *good enough* reasons.

The term *good enough* simply put, means a reason that is sufficient to satisfy the reasons responsive mechanism found in the agent. When choices are made on the basis of reasons that are *good enough*, even within a deterministic framework, we find the conditions for freely willed action to have been met. This will be the position I argue for and from in subsequent chapters.

Following the foundation of moderate reasons responsiveness, the argument will then turn towards the *scope of choice,* this refers to the number of choices possible for selection by the individual at the moment of choice. A link can be drawn to the Principle of Alternate Possibilities (PAP) here, however, I will not be utilizing the concept in the same way as incompatibilist arguments have done in the past. Rather, I will argue that the scope of choice, whether that be a narrow or broad scope, is a necessary but not sufficient condition for freely willed action.

This point is argued for by first establishing: 1) What is meant by *scope of choice* in this context, 2) Genetic editing's ability to expand, and by extension, narrow an agent's scope of choice, 3) By arguing a concrete case in which genetic editing can be shown to expand the scope of choice available to an individual and lastly, 4) By arguing a hypothetical case in which genetic editing may, in some possible future reality, come to alter human psychological characteristics and impact the agent's scope of choice in this way.

Following this argument, it would be remiss of me to ignore the impossibilist position imposed on free will and choice by Galen Strawson. The Strawsonian position, which calls for responsibility *'all the way back'* must be addressed if my argument is to hold any more weight than a narrowly applicable and niche thought experiment. For this reason, I will outline and argue against the Strawsonian position on the grounds that total self-determination is an

unnecessary requirement for choice to be considered free and for individuals to take on moral responsibility for their actions. I will argue instead that, moderate reasons responsiveness provides us a more than adequate system with which to accommodate freely willed choice in a deterministic world and that despite our choosing the way we do because of the way we are, we are still able to choose freely if we make choices that are aligned with our best reasons which are dictated by the way we are.

My argument will then take the position that genetic editing can firstly: expand our scope of choice, which is a necessary component of free will. And secondly: I will argue that genetic editing can change our responsiveness to reasons from the moment of administration of a gene therapy.

These two combined points provide grounds for the possibility of agential manipulation of the scope of choice, which in turn allows an agent to factor more reasons into their reasons responsive mechanism and also acts to manipulate the sensitivity of the agent's responsiveness to certain reasons. This argument culminates in a hypothetical in which an agent has *more* choices than before and the possibility of the agent directly manipulating their sensitivity to reasons in the future.

This creates an expansion (or shrinking on a more cynical reading) of human choice and free will which has never before been feasible, in virtue of genetic engineering.

Chapter 1

Genetic influence on behaviour.

It seems all discussion had as to the effects of genetic editing on free will come to naught unless there is reason to believe that genetics are capable of affecting behaviour in an important way. The research done on the genetic influence on behaviour has predominantly been concerned with its effect on intelligence and verbal and spatial abilities. In a rather comprehensive review published in 1997, the results cited point toward a rather reliable correlation between verbal and spatial abilities and genetic heritability (Plomin and Craig, 1997). The review considered information from a study that included more than 1500 pairs of twins, across seven different studies, in four different countries and across the ages of childhood to old age (Plomin and Craig, 1997).

Viewed from multiple perspectives, the results discuss correlations between parents and their children, siblings, and identical twins. In the case of twins, correlations on verbal and spatial abilities greatly exceed those correlations drawn between fraternal twins, with identical twin correlations on verbal ability being 0.76, whilst fraternal twin correlation is 0.43 (Plomin and Craig, 1997). On spatial ability tests the identical twin correlation was 0.62, whilst in fraternal twins it was 0.34 (Plomin and Craig, 1997). This high correlation, particularly when compared to fraternal twins, indicates that genetic identicalness plays a role in ability when environment is shared. This points towards important information in support of the hypothesis that genetic editing may powerfully influence cognitive abilities, even when environment is considered. If the genetic code in question is that which is possessed by individuals who perform incredibly well in various tests of intelligence, that code may be then copied into the genome of a child before birth or after to give them an advantage in terms of these measures of intelligence.

It seems reasonable to conclude that intelligence effects behaviour, at the very least, varying levels of intelligence will influence the decisions different individuals make in terms of their reason responsive reactions to environmental factors. This is not to say that they will ever move away from a reason responsive mode of decision making, but rather that intelligence will affect the various kinds of responses an individual might have to certain stimuli. These responses are also shown to be heritable. In the Swedish Twin Registry, it was shown that responder behaviour in a game-theoretical experiment was 42% heritable (Johnson, Penke and Spinath, 2011). This demonstrates that a particular kind of behaviour is strongly correlated with

heritability, thereby providing support for the notion that certain behaviours are very much determined by genetic predisposition and mediated upon by environment. In a similar way, environment is also shaped by certain genetic factors. It has been shown that individual differences in socioeconomic status are substantially genetic in their origin according to twin and adoption studies (Kaili *et al.*, 2018). Certain estimates from twin studies cited in Kaili et al (2018), suggest heritability estimates of around 50%, this means that about half of the individual differences in socioeconomic status can be explained by an individual's inherited genetic sequence.

Certain behaviours then are shown to be, at least partially determined by genetic predispositions and, socioeconomic status can also be explained by genetics at least half of the time. Intelligence and genetics are also closely inter-connected, where we find a higher correlation of intelligence between identical twins than we do in fraternal twins. We find genetics to have a powerful role to play in both socio-economic status as well as in intelligence, however, these two factors are not isolated from one another. Socioeconomic status to a large degree determines an individual's environment, from the nutrition they have available to them, to the education that might be able to receive. Intelligence also acts to predict socioeconomic status to a large degree.

So how might these statistics lend themselves to the discussion at hand within this paper? Put simply, individuals who possess similar genetic makeups are predisposed to respond to stimuli in similar ways, this points towards the decisions they make and the way they exercise their free will. If we wish to genetically edit an individual before conception, we might pair the genetic codes of two individuals who demonstrate the kind of decision-making processes we wish to pass on. This child will then be genetically predisposed to make decisions in just such a way. This is in no way a guarantee of behaviour, genetics and genetic predisposition are still nonetheless mediated upon by environment, the converse also being true. If this discussion was had many years prior, dating back to the days of the likes of B.F. Skinner or Ivan Pavlov, our recommendations for creating a super-moral human being would have lain firmly in the region of environment and environmental manipulation. We have always been able to manipulate the environment surrounding development and do so with conscious intent. If this was not the case, we would not have waiting lists for so called 'good schools', nor would parents wish to exercise control over what their children see and are exposed to on social media. Environmental manipulation then is no new idea, however, what makes this discussion unique is that for the

first time we are now able to manipulate the factors lying in the other half of our developmental influences, that being genetics.

The flip side to the coin of genetic engineering in humans, turns away from providing otherwise healthy individuals with enhanced intellectual, behavioural, or psychological traits, rather we might consider the effect genetic engineering could have as a preventative medicine. Phenylketonuria (PKU) has been identified as a single gene recessive disorder that occurs in around 1 in 10 000 births, furthermore, the gene responsible for PKU was located on chromosome 12, from this we have been able to identify the gene for fragile X, which is the second most prevalent cause of cognitive disorders (Plomin and Craig, 1997).

The predictive power of genomic mapping discussed thus far does not operate as the singular influence on predicting an individual's cognitive capacity or scholastic performance, rather, genetics and environment come together to create the individual in this respect. From contemporary research using twin studies we may conclude that just over half of the variance in school achievement can be accounted for by genetic influences (Holden, Haughbrook and Hart, 2022). That being that for half of all the variance seen in school achievement in children studied, more than 50% of that variance comes as a direct result of genetics, and the other 50% however, is accounted for by the environment in which these children find themselves. As simple as this picture appears, that being that what genetics fails to account for is captured by environment and what environment fails to account for is captured by genetics, fails to capture the entire picture. What seems to be left out are the experiences of the individuals that make up these samples, context influences the role genetic variation has in relation to environment and vice versa, this consideration of context within the gene environment interaction is termed a gene-by-environment interaction (Holden, Haughbrook and Hart, 2022).

What this means is that a gene-by-environment interaction demonstrates the effect of context on phenotype and how this differs depending on the individual's genetic predispositions, or, when the effect of an individual's genetic predisposition on a phenotype differs dependant on the context in which the individual finds themselves (Holden, Haughbrook and Hart, 2022). We see this interaction most clearly when we consider the varying contexts of different classrooms. Classroom quality varies immensely across schools, cities, provinces, and countries. The variation between schools in developing nations is substantially greater than in developed countries. If one is to consider the variation between classroom settings in South Africa, we find some elite boarding schools, with fees in the hundreds of thousands of Rand a

year compared to underserviced government schools where the schooling is free. This inequality not only indicates a substantial difference in access to resources but also points towards a substantial difference in scholastic context as well. This context makes a substantial difference when considering the gene-by-environment interaction amongst the students. Where we find high classroom quality, we also find higher genetic influences on reading skills, and likewise the genetic influence on reading skills becomes weaker when classroom quality is low (Holden, Haughbrook and Hart, 2022). In essence, what this information points to is an alignment with the bio-ecological model, whereby, supportive environments allow for the expression of genetic potential, whereas environments that are not supportive inhibit the expression of genetic potential (Holden, Haughbrook and Hart, 2022).

Genetic heritability is not fixed however, it fluctuates over time, in this way its predictive power is limited and yet, this is not to say that its usefulness is negated (Harden, 2021). One might liken genetic heritability to the Gini coefficient which indicates wealth inequality amongst a population, a Gini coefficient of 1 indicates that all the wealth is held by a single household, a score of 0 indicates that the wealth is perfectly shared across the entire population, and much like heritability this coefficient is also prone to fluctuation (Harden, 2021). Despite the propensity to fluctuate it remains a useful tool, genetic heritability is much the same, we should not overestimate its power, but we should not fall prey to the notion that it is useless.

Chapter 2

Choice and Reasons Responsiveness.

Choice is a funny concept. It is simultaneously the most freeing thing in the world and the most restrictive and stifling. As technology advances, we become more and more connected to more and more people, services, products, and activities. This means that presently, humanity arguably has more choices to make in more fields and at more times than ever before in history. For example, cell phones did not exist one hundred years ago, there were no multinational cellular communications companies, no data plans, no cell phone contracts and no devices to choose from. Now, however, not only are there cell phones, but one must choose from hundreds of devices, pair that device with one of a dozen plans from a variety of service providers. Even in this small area of choice, the capacity for choice has expanded immensely within one hundred years, cell phones being one small example that put thousands of possible options to choose from before us that our grandparents never had.

The question that emerges from this idea is this: are we more free now than our ancestors were, or less free? It is undeniable that the range of possibilities to choose from in our everyday lives has expanded immensely and continues to do so year on year. With more alternatives, we are given the possibility for more choices, more choice means we can choose with greater specificity and that specificity allows us to choose the alternative that is best tailored to our specific 'need set'. When presented with three hundred different cell phones for example, the likelihood that we will find the cell phone best suited to our needs is much greater than if we were presented with only three options. As wonderful as this increased scope of alternatives sounds, it does come with drawbacks. Firstly, sifting through all three hundred options in search of the correct one is no small task. It is gruelling and time consuming and frankly quite irritating. The process would feel far more pleasant if we were only presented with three options. Secondly, when we are presented with so many alternatives to choose from, we stop looking for the most suitable choice and begin searching for the perfect choice (Schwartz, 2003). Surely amidst the three hundred possible devices to choose from, one of them would be the perfect fit. Our expectations skyrocket in the face of greater alternatives, we become fixated on making the best choice and paradoxically, this fixation on perfection often causes us to freeze up and experience choice paralysis (Iyengar, 2011).

I often find myself settling down for the evening with the desire to watch something good on TV. I am then presented with my first choice, which of the three streaming platforms that I am subscribed to do I use? Choosing from three alternatives isn't the most daunting decision and so I make it. I am then presented with thousands upon thousands of on demand viewing options and after scrolling through these options for half an hour, I decide that they are all terrible and I change my streaming platform. Again, on the new streaming platform I am presented with even more on demand viewing options and yet again, I find nothing and change platform. I repeat the process on the third viewing platform and give up on my desire to watch TV and resort to reading a book instead. Surely, being presented with thousands of possible on demand viewing options would give me the best likelihood of finding a show that I want to watch, having all these alternatives to choose from should in some way make me more free than someone who does not have these thousands of viewing options and yet, at the end of the night the person who only has one channel to watch is watching the Sunday night movie, and rather enjoying it, whilst I sit in silence cursing the amount of money I spend on all my streaming subscriptions whilst finding nothing to watch.

Despite the fact that I have many more alternatives to choose from than the person who only has one channel, I am enjoying myself significantly less. My multiplicity of possible choices seems to make me more miserable than someone who only has one option, and no real freedom to choose what movie to watch at all (Schwartz, 2003).

So why then do we value a multitude of choices so much? Well, the main reason is that if we are devoid of alternatives to our choices, we can't be said to be making any choices at all, in that sense we aren't in fact acting of our own free will (Taylor, 1992). Suppose fifty years from now we have a viewing algorithm that is so advanced that it can perfectly predict and choose what you want to watch most. Each night it chooses what you watch for you, and each night you thoroughly enjoy your viewing. You never once choose what you watch and frankly, not once have you wished you were watching something else. Your options for what to watch have been removed and your happiness increases as a result of the simplicity of the process. You have been relieved of a rather tedious choice. However, what you don't know is that part of the subscription package that this wonderful algorithm comes as a part of, is that it saves money by only making available the single show or movie it selects for you. There are in fact, no other options. You of course remain blissfully unaware of this fact as you continue to enjoy your show each night, never wanting to watch anything else, the issue is that you couldn't watch something else, even if you wanted to.

This is not to say that should your past choices have been different; you would not have other options available to you. The algorithm examines your past choices and preferences and tailors its programming to suit those choices. If you had possessed a different set of preferences or patterns of choice, the algorithm would have selected other programming for you. In this way, the program selects your viewing on the basis of your best reasons under the assumption that your choices should align to those best reasons.

We now ask if you are free or not in terms of your nightly TV viewing. Some philosophers will say that you are indeed free, that despite your viewing being pre-selected and beyond your control, you still enjoy what you watch and would not choose to watch anything else anyway. According to your best reasons, this is the show you want to watch and so you watch it, the presence of alternative viewing options does not factor into your freedom, this school of thought falls roughly into the category of compatibilism (O'Connor and Franklin, 2022). Other philosophers will look upon the conclusions drawn by the compatibilists with disgust, shocked at how one could consider themselves free when they could not choose any other option than the one they do. Any happiness the person feels in this state is not due to their freedom but rather a result of their ignorance. For this group of philosophers, what matters is that there are options and that an individual is able to choose from any of these alternatives, this school of thought falls roughly into the category of incompatibilism (Vihvelin, 2022).

Broadly speaking, an incompatibilist argument can occur most commonly in two main forms: 1. Arguments that claim that determinism would prevent us from making choices in the *right sort of way,* and 2. Arguments that determinism deprives us of the ability to do otherwise (Vihvelin, 2022).

A third form, the one which this paper will focus on in earnest, is that determinism deprives us of the ability to exercise *ultimate responsibility* which in turn excludes the possibility of an agent being held accountable for their choices and by extension, not being able to choose freely at all (Strawson, 1982).

Compatibilism by comparison makes the argument that an agent can be said to have free will in a deterministic world. This line of argument takes many forms and has seen considerable evolution over its lifespan. Authors such as Harry Frankfurt, Susan Wolf, John Martin Fischer, and Mark Ravizza to name a few have provided substantial counter arguments to the incompatibilist argument in its various forms. A key point in understanding the compatibilist position is that it factors into a broader question of whether an agent can be held morally

responsible for their choices if those choices occur in a deterministic world, whereby they could not choose other than the way they do (McKenna and Coates, 2021).[2]

The compatibilist argues that an agent can and should be held morally responsible for their actions in a deterministic world. A line of argumentation that I find particularly appealing is that the agent's responsiveness to reasons for their choices should be taken into account when attributing moral responsibility. This line of argumentation is attributed to Johan Martin Fischer and Mark Ravizza, and the collaborative account of this argument is termed moderate reasons responsiveness (McKenna and Coates, 2021).

Moderate reasons responsiveness aims to address the concerns Fischer faced previously in his accounts of reasons responsiveness. This refers to a mechanism-based theory of reasons responsiveness that was too responsive to reasons and results in the bar being set far too high for an individual to be held morally responsible for their choices. By establishing a mechanism that is too insensitive to reasons limits only individuals with highly limited or insane sensitivities to reason would satisfy the conditions for freedom (McKenna and Coates, 2021).

A moderate mechanism-based to reasons responsiveness slips between these two extremes and provides a strong theoretical basis for the discussions which will follow in this paper.

Reason responsiveness.

This section will provide a description of the reason responsive account and will apply it to some cases where dysfunction is present. The purpose of this exercise is to create an understanding of the reasons responsive account, demonstrate how examples of dysfunction operate in this model and lastly how genetic editing might be used to rectify these dysfunctions in a reasons responsive model.

A reasons responsive compatibilism turns on the notion that agents do what they do because they have reasons for doing it. For example, I am now writing a philosophy paper, I have

[2] This is not to say that all compatibilists hold that alternate possibilities cannot be accommodated in a deterministic world, in fact, Frankfurt argues that *if* determinism threatens our freedom to choose, it is not because it obstructs our ability to do otherwise and even *if* it did, the freedom to do otherwise is not the right kind of freedom required for moral responsibility (Frankfurt, 1969; McKenna and Coates, 2021). In this sense, the freedom to do otherwise can be included or excluded on different readings of the compatibilist argument, however, at its base it should not come to influence the question of one's freedom to choose.

reasons to engage in this activity, such as a desire to pass the course, to get my ideas across, to test my own assumptions against knowledge held in the field of philosophy and so on. At present, I have no reasons to stop writing and so I continue to write. If, however, I developed a migraine I would then have a reason to stop writing, and so I would.

This indicates that an agent has the ability to select from alternatives the option that most closely aligns with their best reasons (McKenna and Coates, 2021). The agent will always select the option that best aligns with their best reasons, and as these best reasons are formed prior to the moment of choice, they can be said to be determined as the individual will choose according to reasons already formed long before the choice at hand. (McKenna and Coates, 2021).

The reasons for action and indeed the reasons for choice are not arbitrary, they take into account a variety of factors ranging from environmental possibility, agential genetic composition, past life experiences and personal preferences. The reason for an action is in many ways formulaic. If a supreme being or highly advanced computer were able to take every aspect of reality into account and measures this against the laws of nature, it would be certain that they would be able to predict the reasons an individual has for the actions they undertake using this formula. This is of course referring to "Laplace's Demon" (Laplace, 1995). And yet, despite the individual's choices being entirely predictable and determined by the laws of nature and matters of fact, it remains true that they choose the way they do in accordance with their best reasons. If they were to choose in a manner that goes against their best reasons for the sake of demonstrating that their choices are radically free, they would find themselves choosing alternatives that they don't actually want. This seems hardly free at all, in fact it seems stifling and counterintuitive (Pereboom, 2001).

On a reasons responsive account, an agent's moral responsibility for an action is not decided by whether they could have done otherwise, but rather it is decided by the fact that the agent's action has the kind of causal history necessary for that agent to have been the source of their action in an important way (Pereboom, 2006). This view of agential responsibility can be termed a *source* view, that being that an agent's reasons for acting originate from within themselves. Understanding why this is an important component of a compatibilist, reasons responsive account of free will is rather simple. If I am sat at my desk writing this paper, not because writing this paper is the action that best aligns with my reasons, but rather because there is a crazed, philosophically inclined gunman standing behind me with a pistol to my head,

then I am carrying out my action for all the wrong reasons. If I stop writing then I will most likely die and so I write, the reason for my writing however does not come from within myself, it originates externally to me and therefore, I am being manipulated and not acting freely at all. This is a case of coercion. However, say this gunman was good-natured, albeit crazed and dangerous, and he knows that I desperately want to finish writing my philosophy paper and choose to keep writing. I choose to write; it just so happens that I have the additional pressure of the gunman standing behind me to ensure that I do it. In this instance I am acting in accordance with my will to keep writing, I act freely in that I choose to write, gunman or not, however, I could not choose to do otherwise if my will suddenly changed. This amounts to an analogy of many deterministic arguments in that we most often, unless coerced by external factors, act in accordance with our best reasons, however, if determinism is true, which I believe it is, we could not do other than what that reason dictates. The argument then centres around whether acting on our best reasons alone, devoid of alternatives is sufficient for acting freely. My position on the matter is that our best reasons are indeed sufficient for acting freely, and that these reasons could be manipulated by certain genetic means.

Standing in opposition to the *source* view, stands the *leeway* view, that being that an individual should be held morally responsible for their actions if it is the case that they could have acted other than the way they did (Pereboom, 2006). This view centres on the Principle of Alternate Possibilities (PAP), that being if alternative actions are possible and available to the agent, they can and should be held morally responsible for the action that they took (Frankfurt, 1969).

Agents of course, do not always respond to their reasons in a completely rational way. Take for example the gambling man, who has lost nearly his entire fortune at the blackjack table. Instead of taking his last few thousand rand and leaving the casino before he becomes absolutely penniless, he instead takes his remaining money and bets it all on a single hand. This action is not rational at all, but the decision to bet all his remaining money utilises similar reasons to the decision to leave the casino. The man desires more money, or desires money in general. He could take his remaining money home with him; he could limit his losses and keep what he has and make do. This action would result in the cementing of his loss, and this is an undesirable result for the gambler. Or he could gamble his remaining money and possibly gain more, leaving open the chance that his fortunes could increase, he would then have achieved his desire for having more money. The options in front of him point towards either accepting a certain loss or leaving open to the possibility of making a profit or losing everything. The gambler opts to leave the possibility open.

He is more responsive to the reasoning that he could in fact become wealthier, this outweighs the more rational reason that he should stop so that he does not become completely broke. He is more responsive to the former reason than the latter reason (Pereboom, 2006). The issue at play in this example is that the gambler did not react to the rational reason to act otherwise because he could not have been reactive to this reason. His reasons responsive processes have been clouded by a faulty psychology, that being that he is addicted to the possibility of money and not the money itself and so he gambles (Elster, 1979). If he was responsive to reasons in the correct sort of way, he would see that the only guaranteed action for having money is to keep what he has. This reason should be the one that he is most sensitive to and yet, his reactivity is heightened for the chance of gaining more money and is decreased to holding onto what he has as a sure thing (Elster, 1979).

The question that arises from the gamblers story is whether we might consider him to be acting freely at all. He is clearly making a decision to act according to reasons. It is clear that he is more reactive to certain reasons than others, and yet his reactivity to the reasons he chooses is so strong, that his reactivity to rational reasons has become entirely diminished. In many ways, he could not have done other than what he did because of how highly reactive he is to reasons that align with his faulty mechanism of choice and in that sense, he could not have done other than what he did and could not be held morally responsible for his actions.

As we learn more about the gambler, we come to discover that he is a long-time gambling addict. This is not the first time he has lost big and unless intervention comes his way, it won't be the last. The gambler is acting on the impulses presented to him by his addiction, his normal reason responsive mechanism has been hijacked by the overly gambling sensitive reactivity imbued within him by his addiction. It can be said that he is being manipulated to act in the way that he does (Heyman, 2009).

This raises the necessitation of a discussion on the differences between addiction, coercion, and manipulation. All three of these concepts share a common trait in terms of the way we intuitively identify them as being *non-free* depictions of the will, or faulty reasons responsive mechanisms in action.

Take the following for example.

1. John orders a cheeseburger instead of a salad, despite knowing that a salad is better for his health. Here we do not bat an eye as cheeseburgers, most often, taste far better than

salads and so John's choice is not problematic to us. We can see that he is more responsive to reasons aligned to taste and enjoyment than he is to his health.

2. Suzy opts to buy a designer handbag instead of the no-name brand one, despite the no-name brand one being a quarter of the price and fulfilling largely the same function. Again, we do not feel uncomfortable with this decision as Suzy may simply have an affinity to the brand, seek out the level of quality the brand provides or enjoys the image afforded by luxury brands.
3. Steve, however, spends the last of his money on a bottle of whiskey instead of food, despite being convinced that buying food was the better choice to make. Here we find ourselves becoming uncomfortable with the freedom of his choice (Svirsky, 2021).

The above examples point to the moment in which we notice that an individual's reasons responsive mechanism is not functioning as it should. Steve, knowing that he has better reasons to buy food than whiskey, chooses the option for which the reasons are not as compelling as the alternative. He is not acting in accordance with his best reasons, our question now turns to why this is the case.

In cases like Steve's, we might attribute this dysfunction in his responsiveness to reasons in three ways: Steve may be coerced into choosing the less-good option, that being that an external party is interfering in his responsiveness to reasons by *forcing* him to choose the worse option. This may be achieved by offering significant reward for going against his best reasons or threatening punishment if he does not comply with the external parties will (Anderson, 2023).

Steve may also be manipulated into going against his best reasons, manipulation implies that an external party is interfering in the way an agent thinks about their reasons, thereby altering their response to them (Noggle, 2022). In Steve's case, a malicious bottle store owner may convince Steve that this particular bottle of whiskey is the last one to be sold in the country due to a trade embargo being enforced the next day. If he doesn't buy it now, he will never have the opportunity to buy it again. This is not true, however, he is attempting to manipulate Steve to make a decision that is not aligned to his best reasons.

The last possibility for Steve's faulty responsiveness to reasons is that he is an addict. This case differs from the previous two in that the interference in the agent's responsiveness to reasons comes from an internal source as opposed to an external source. The agent in the case of addiction experiences a weakness of will in that they are physically and or psychologically, incapable of choosing the option that they *know* they should (Svirsky, 2021). Steve is an

alcoholic; his body has developed a physical reliance on alcohol and his psyche has become dependent on intoxication for its functioning. Steve knows that buying whiskey instead of food is a poor choice and yet he cannot choose otherwise due to his addiction which interferes with his responsiveness to reasons from an internal source (Svirsky, 2021).

Whilst in some sense it can be said that the gambler is being manipulated by his addiction, it does not necessarily follow the same pattern that most *straight manipulation* arguments do. In a straight manipulation argument an agent is manipulated in to A-ing against their will and so they do not freely A, for example: a voter arrives at the voting booth with the intention to vote for the democratic party and as they are about to cast their vote, a secretly implanted mind control device is set off and forces him to vote for the republican party (Mele, 2008). The example of the gambler is different because the manipulation does not come from an external source but rather occurs at an internal source, much like in the case of Steve.

The addiction originates and resides within the gambler's own mind, being reinforced by repeated exposure to gambling and being affirmed as a valid way of thinking on the few occasions that he wins. In the *straight manipulation* case, the voter is manipulated by a force external to them, in the gambler case, that force is internal. The action in this case comes from an addictive reason, this addiction warps and alters the reasoning of the individual and whilst within their addiction their best reasons serve the addiction as opposed to the individual themselves. The agent's best reason or the reason they value most strongly, will be to quit and seek help so as to preserve their own lives. This best reason, however, becomes secondary to the reasons dictated to the individual by the addiction which serves the purpose of prolonging the addiction (*Addiction and Responsibility*, 2011 & Frank and Nagel, 2017). A common theme within rehabilitation programs is that the freedoms of the individual are often restricted so as to starve the addictive reasons of the resources they require to be satisfied. In these cases, a restriction of freedoms in the short term may lead to an expansion of freedom in the long term.

Plain *manipulation* arguments may provide a better point of reference for the gamblers case. These arguments also contain the premise that an agent is manipulated into A-ing against their will and so do not freely A. The additional premise included with this case is that an agent is not morally responsible for their actions because their reasons for acting are brought about by a deterministic causal process that can be traced all the way back to their birth, the agent themselves have no control over this process and had no say in how it would come to inform the way they are and therefore the way they choose (Mele, 2008).

In the case of addiction, we find the locus of control in the individual has been externalised. The desire to satiate the addiction overwhelms the desire to act in accordance with one's best reasons. What I mean by externalization is that the driving force for action is not dictated by the agent's best interests, rather it is driven by more primitive emotions such as the desire for pleasure and the avoidance of pain (Heyman, 2009). An addict seeks to satisfy their addiction as a means of avoiding the pain of withdrawal and this avoidance of pain is an action driven by reasons. The reason an addict continues to use the substance they do is because they do not wish to feel the pain of withdrawal and that their reasons for continuing their addiction are more potent than their reasons for entering recovery. An addict's reasons responsive mechanism operates in a faulty manner, the definition of a *good enough* reason changes. Whereas in non-addictive cases, the reason to prolong one's life or be financially stable are good enough reasons to drive aligned actions, an addict may view the continuation of pleasure and the avoidance of pain as the best reason of all due to the potent addictive effect of their chosen substance. It is akin to examples of coerced confessions, whereby an individual being held by an interrogator is deprived of sleep, food, comfort and so on and is continuously presented with the threat of punishment and pain. A confession is made, not because the individual has decided to own up to something they did, but rather because they wish the pain would stop and that the punishment they have been promised will be reduced if a confession is made. Here the definition of a *good enough* reason has been shifted and an appeal is made to base human instincts, that being the preservation of life and the avoidance of suffering (Gudjonsson, 2003).

The confession comes because of reasons, but it comes for the wrong sort of reasons. The reason most prevalent in the decision-making process is the avoidance of pain and the prevention of suffering. This reason drowns out other reasons we might consider more sensible, such as pleading innocence when they have committed no crime (Gudjonsson, 2003).

The falsely imprisoned man and the addict share a common aspect in their decision-making process, that being that they are coerced into choosing an option based on reasons one would not traditionally consider the most sensible, that being, these reasons are not the best reasons.

However, in the moment of choice, the reason to choose the option that will bring about the alleviation or prevention of pain is a good reason. The issue lies in the fact that this reason is inserted into the individual's decision-making process by factors and agents external to the decision maker.

But even in the case of coerced confessions we find that the circumstances surrounding the free will of the individual to be rather dubious. It is clear that they are coerced into confessing to a crime that they did not commit through the actions of an external party, in this way they did not choose freely and know that they are choosing an option which they believe is not the correct one. It is also clear that they are still acting in accordance with their best reasons as they choose to act in a way that will result in the alleviation of pain, which is a sensible thing to do. The scope of the choice made in this instance is multi-levelled. At a high level, the individual makes the irrational choice to implicate themselves in a crime they did not commit by means of a confession. But at a baser level, they make the rational choice of avoiding and alleviating pain. In the case of coercion, the reasons for action are present, but do not arise in the individual in the right sort of way as they are externally sourced by others which seek to control and manipulate the actions of the agent. This becomes apparent when we consider two different mugging victims. The first, takes place in the typical way, an individual is held up at knife point by a thief who demands the victim's money. The victim hands over their money because they do not wish to be harmed and act according to their reasons to preserve their own safety. These reasons arise in the wrong sort of way. Victim two however, is also held up at knife point and the thief demands their money, however, upon looking at the mugger they come to realise that the mugger needs their money more than they do and so, with an air of good will, hand over their money. These reasons are not coerced, and they arise in the right kind of way, this victim is then not a victim at all, but rather acts freely and not due to coercion. As we can see from this example, the genesis of reasons plays an important role in the freedom of choice and our reasons responsive mechanism (Watson, 2004).

The challenging part of this discussion is that a microscopic narrowly scoped choice of pain avoidance, in which the agent acts freely, may have the effect of or give rise to the coerced and unfree choice of confessing to a crime which they did not commit.

The agent wants to avoid pain, but also wants to maintain their innocence. These two wants are at odds with one another, and the agent finds themselves in the midst of a dilemma. If they maintain their innocence, they will not be able to avoid pain and if they avoid pain, they will not be able to maintain their innocence. As it is impossible for the agent to satisfy both of their wants in this instance, they must choose the want that they want most, or are willing to sacrifice their other want in order to obtain it. This admits of a want hierarchy in which some wants must be better aligned to the agent's reasons than others. The agent desires the avoidance of pain, this is a first order desire, one wherein he wishes to act in order to alleviate or avoid pain. This

desire does not indicate the agent's will however. The agent desires to avoid pain, however, his will is that he maintains his innocence, this maintenance of innocence is a conflicting first order desire (Frankfurt, 1971). For that reason, the agents will assess which of the two first order desires best align with their best reasons and select that option accordingly. The agent may have reasons which dictate that the maintenance of innocence is far more important than the avoidance of pain, this may be mediated upon by second order desires about the first order desire to maintain one's innocence (Frankfurt, 1971). The maintenance of innocence as a first order desire may give rise to second order desires such as desiring to maintain one's innocence as a display of religious purity, or to achieve a sense of martyrdom or even to protect one's image amongst others.

In this sense, whether the agent holds out against the pain or gives in and falsely admits to the crime, they have acted in accordance with their will to either avoid pain or to maintain their innocence which has been satisfied in terms of the agent choosing between the two available options in accordance with their best reasons. Satisfying both desires simultaneously is not possible in this scenario.

What remains is that the individual is forced to choose between only two alternatives, the avoidance of pain and a false admission of guilt or the experience of pain and the maintenance of innocence. One of these options will align more closely than the other to the agent's best reasons, however neither option is entirely preferable.

If the agent were to be given a third choice, if their scope of choice were to be expanded, might they now possess the opportunity to choose an option that aligns more closely still to either of the before mentioned alternatives, an option which may be most preferable in this instance. I argue that the scope of choice an agent is presented with stands to impact the freedom of choice that individual has access to.

By using a moderate reasons responsive account, we find an opportunity for genetic editing to expand the scope of individual choice in such a way that dysfunctional agents might be presented with an additional option that aligns more closely with their good enough reasons than their dysfunctional response to reasons would. Through gene therapy, the gambling addict might be changed in such a way that their response to reasons that fall in line with keeping their money becomes stronger and as such an additional option is presented. They may now be able to walk away. The notion of an expanded scope of freedom will be discussed in the section that follows.

Moderate Reasons Responsiveness.

A moderate mechanism-based reasons responsive approach would dictate that an individual would responds to reasons that are good enough, that being that the agent would be responsive to reasons but not *all* reasons (McKenna and Coates, 2021). This is best illustrated by an example: Say I am on my way to work, my job pays well, I find it satisfying and challenging and I would not want to lose this job at any cost. Now I have reasons, good reasons at that, to remain at my job and do my level best. Suppose then that I was approached by an employee of a competitor's company. This person offers me one hundred Rand to skip work for the day. I of course would respond "no" and continue to work. One hundred Rand is not a *good enough* reason for me to skip work and risk losing my job. Now suppose that this individual had offered me more money than I make in a year to skip work for the day, this is also a good reason, but is clearly a better reason than the hundred Rand and good enough a reason to warrant the risk of being fired for skipping work.

We feel this sense of "good enough" intuitively, we often hear phrases such as "no sane person would pass that up" or "they must be mad for not taking the deal" and indeed if I had taken the hundred Rand to skip work the majority of people would most likely consider me a dullard and likewise they would think the same of me if I had turned down more money than I make in a year. This comes down to an internalised value judgement system that we all exercise, and as Fischer and Ravizza have proposed, this system is mechanism-based and moderately sensitive (McKenna and Coates, 2021).

By choosing to take the large sum of money and skip work, I must also accept responsibility for the consequences of my actions, including being fired. With this reason and my mechanism-based response to accept reasons that are of a *good enough* nature, I could not have done other than accept the offer and likewise I could have done nothing other than turn down the one hundred Rand. A reason-responsive account dictates that I respond to reasons in such a way that I respond to reasons that are deemed *best reasons* (or in a moderate reasons responsive context; *good enough*) so that, should I be presented with *good enough* reasons I should choose from the possibilities presented to me by context, the option that best aligns with these reasons. My choice is determined then by the reasons available and my responsiveness to them, however, I am still acting in accordance with my internal reasons responsive mechanism and on this basis, I would be considered morally responsible for my actions. I accept these risks

based on my response to *good enough* reasons and I have deemed the risk worthwhile and therefore act in a manner that is deemed free.

Returning to the example of the TV show-selecting algorithm, which chooses what you watch and unknown to you, prohibits you from watching any alternatives, the idea of an algorithm choosing what you watch based on certain facts it has learned about you and your viewing tendencies sounds rather advanced, but not all that farfetched. We tend to make choices that can at times seem rather predictable, various patterns of preference become the underlying data set for any algorithm that aims to suggest to us things that we might like. We find these suggestions being offered to us every day, I listen to Black Sabbath, Metallica, and Pantera, so it is likely that my music app's suggestion for me to listen to Iron Maiden will be fairly well accepted (Anderson, 2008).

In our attempts to program software and algorithms for predicting human behaviour and preference, we bake into these systems our own understanding of what a *good enough* reason might be for selecting the option presented to the user. Given the music I have listened to in the past, it is statistically more likely for me to listen to music of that same genre than to try a genre I have never listened to before for the first time (Anderson, 2008). This is indicative of a deterministic system, whereby an understanding of the past events, states of affairs and rules of the phenomena are sufficient to create predictive models on how future events will occur (Hoefer, 2023).

These algorithms attempt to gain an understanding of the way we are. It is the way we are that comes to dictate the way we choose and so, suggesting Iron Maiden to me, given the way I already am in terms of my music taste, is simply offering me an option that is already aligned to the way I am and the way I have chosen in the past. This kind of prediction is not unique to machines, we often use this same predictive mechanism with one another. I know that my wife enjoys chocolate ice cream. It is a preference she has held in the past, and it is the option she chooses over other types of ice cream most often. When I buy her an ice cream, I am going to buy her a chocolate ice cream because it is the most logical choice. It is a *good enough* reason to select chocolate over the other flavours on offer. Intuitively we can sense that this is the best option, knowing now what you do, that my wife's favourite ice cream is chocolate and that she consistently chooses this flavour over all the others, you would consider me a bit silly for buying her vanilla ice cream instead. My reasons for buying vanilla ice cream, that it is my

favourite flavour, are good, but not good enough given the knowledge I have about my wife's preferences.

I could buy an assortment of seven different kinds of ice cream and present them all to her in an unbiased manner so as to preserve her sense of free will and being able to choose an alternative option to the one I predicted she would choose. And without doubt, she would look at me as if I had gone mad and express her annoyance with me wasting money on seven times more ice cream than she needed. And yet she will still most likely choose chocolate. In fact, if I had bought her only one chocolate ice cream, she would have displayed a happier response to my actions than if I had bought her the assortment of ice creams in order to preserve her sense of free will (Schwartz, 2003). Despite my best attempts to act in a metaphysically sensitive manner and respect her free will's requirement for the possibility of alternative options, I would have received a better response from her if I had simply resorted to utilising my own predictive capacities and bought her an ice cream on the basis of the way she is and reasons that are *good enough.*

A multiplicity of options does not lead to the satisfaction we might think it would when it comes to freedom of choice, and an elimination of alternatives leaves us wondering if there was ever any choice to be made in the first place. The overwhelming concern then is whether our choices are made for us, by external factors and whether we can do anything to influence these choices (Elster, 1983).

The idea that our choices have already been made for us relies on determinism. This view holds that, given that we are physical beings and that our brains operate as physical entities, using bio-electrical signals, neurotransmitters and utilise conductivity to transfer information throughout the body, our brains then are also required to abide by the physical laws of the universe. Essentially, these physical laws dictate, in every possible case, the ways in which physical entities may and may not behave. Our brains, being physical entities, guided by physical laws, are then subject to prediction (Churchland, 1984).

If one were to have a complete understanding of all the physical facts of the universe, as well as a complete understanding of all physical laws, then that individual could in fact predict any possible event utilising these facts and laws, and seeing as the brain is in fact a physical entity, this individual would be able to predict the choices and actions a brain would take (Laplace, 1995). An entity capable of such immense predictive power is discussed by Laplace in terms of his hypothesis on the now famous "Laplace's Demon". In this way, our choices are all

predetermined by physical facts outside of our awareness, guided by laws which may be beyond our understanding and that the combination of these factors come together to cause this particular keystroke being made at this particular time by me. It could not have been any other way.

Determinism then comes to play a pivotal role in our discussion. It has an important impact on the question of this paper. We as human beings, who are physical entities which live, breathe, and think in virtue of physical systems are also bound by physical laws. An assumption prevalent throughout this paper will be that choice, is to a meaningful degree, calculated by our bioelectrical machinery and can be determined by our physical make-up. In this sense, the way we choose is determined by the ways in which our physical being is comprised, this is no more relevant than in the brain itself. This view includes, synaptic connections, the presence of neurotransmitters and ingrained neural pathways that come about as a result of our past experience. Our responsiveness to good enough reasons comes to be determined by our physical make up and as such, the alteration of this responsiveness needs to come from a mechanism that is similarly physical. Genetic editing is the tool with which we may edit and alter the physical make up of individuals, both in the body and in the brain, this is the mechanism through which we may create change in the individual's responsiveness to reasons. With regards to the above claim, my position in this paper is that choice and the freedom of will is bound by physical laws and if we are to alter this responsiveness in any meaningful way, we are required to do so in line with the physical laws that govern the neurological mechanisms of choice.

Chapter 3

Scope of choice.

All discussion to be had with regards to the topic of free will comes to mean very little if we do not first address the notion of choice. Free will differs from what I have termed the 'scope of choice' in that free will is the ability to choose freely from an array of options, or to take a reasons responsive approach, to choose in accordance with one's better reasons. Free will concerns the action of choosing, the actual moment of selecting an option or enacting one's will or preference (Haji and Cuypers, 2005).

The scope of choice, however, does not concern the action of choosing at all, rather it concerns those things which could be chosen. Regardless of how determined or undetermined we are, our ability to choose is reliant on the avenues of action we could possibly take. An individual who is completely paralyzed, unable to move any muscles other than his eyes would most likely not care very much about how free he may be to choose his actions. This is precisely because, he does not have many options to choose from. He could not stand up and close the window because he felt a draft, nor could he choose the chicken over the beef on the canteen menu. All he *can* do is lie in his bed.

The freedom of will this man has, in this instance matters less than the scope of choice he has. His scope of choice relates to the actions that he might possibly be able to do. As I sit in front of my computer, my scope of choice is rather broad. I could continue to write, or I could get up and make myself coffee, or I could go for a run, or I could procrastinate and watch TV instead. These options are all in the realm of possibility concerning my action, the collection of these options comes to form my scope of choice.

Returning to the example of the addict and the coerced confession, I will argue that the reason for their actions being considered irrational or constrained, comes about as a result of a considerably decreased scope of choice rather than the fact that they are not free to choose other than they do. The addict may appear to have a broad scope of choice available to them, much the same scope as those possessed by the majority of people of earth, however, this is the wrong way to approach the choices available to him. It may seem as though the addict could stand up from the blackjack table and play the slots instead, or he could leave the casino and

enrol in gamblers anonymous, or he could go watch the latest movie at the cinema and so on and so forth (Mele, 2015).

This understanding of the options he has available to him is mistaken. Rather than the addict being able to choose from an array of options, he is in fact reduced to choosing between just two. He could experience pleasure by continuing to indulge his addiction, or he could experience pain by starving his addiction.

When faced with a choice between pleasure and pain, the most reasonable action is to elect pleasure and forgo pain. It is an evolutionarily hard-wired response within our minds. We seek to experience pleasure and avoid pain. As children we learn not to touch hot stove plates because when we do, we get burned and this pain enforces the notion in our minds that this action is to be avoided at all costs. Likewise, we learn that praise is pleasurable and when we act in ways that cause our loved ones to give us praise, we learn to repeat these actions in future so as to receive more instances of this pleasurable experience (Austad, 2020).

With our coerced prisoner, we find that they too are faced with a dichotomy of choice as opposed to a branching series of options. They can choose the continuation of pain or the cessation of that pain. The prisoner's best reasons dictate to them that they should seek the cessation of pain and so they often do. Internally, this choice is made according to the individual's best reasons, from an external perspective however, this choice may be regarded as being irrational, because we understand the continuation of harmful activities to be a *worse* option, however, as an addict their responsiveness to reasons is faulty because of the interference of the addiction which is a type of coercion but of an internal origin (Svirsky, 2021).

Reason responsiveness and gene editing.

The discussion had so far has focussed on freedom with regards to an agent being able to choose in accordance with their better reasons. It has also been considered that an agent who is coerced, manipulated, or influenced by addiction so that they choose an option that they normally would not choose could not be considered free. However, they may be selecting the option that aligns best with their base desire such as the avoidance of pain or the experience of pleasure, this then indicates a manipulation of their will. The agent may desire food as a first order desire but will have competing second order desires about their first order desire in that they want to eat more

healthily and so eat a salad, or they have a desire for tasty food and eat a cheeseburger (Frankfurt, 1971). The two desires are at odds and yet, the individual forsakes their desire to eat a cheeseburger and chooses instead the desire to be healthier, their *will* in this instance is that they eat healthier, and it is these reasons that win out in their decision making.

They choose freely to not satisfy a desire that they hold because they hold other reasons more important than the ones in place for eating the burger. The question this paper is concerned with however, is what the manipulation of the very mechanics of reason would mean for the freedom of choice and reasons responsiveness.

This section aims to argue that genetic editing holds a unique, and never before considered place in the free will discussion. That unique role being its ability to manipulate and alter the biological components that constitute our reason responsive mechanism. This manipulation and alteration are by design, this design may come in two forms, the first being design by the individual and the second being by the design of an external party.

A short example will clarify what is meant by the statements above.

Mahatma Ghandi demonstrated immense bravery in the face of pain and persecution and demonstrated significant mastery over his response to pain so that he could achieve his greater goals. In the case of a hunger strike, an individual possesses the first order desire to eat (this is a base desire), however, they also hold two competing second order desires about their first order desire. These competing desires are to prolong hunger so they may send a message about a cause they are passionate about, but on the other hand they also hold the competing second order desire to eat and alleviate the discomfort of hunger. The desire to send a message, to stand for what one believes in and through their actions to inspire others to do the same, is also indicative of a first order desire, however it's aims are considerably more abstract and less basic than the desire to eat or avoid pain (Nussbaum, 2004). To eat is a physiological desire, one which we all experience daily. The neglect of this desire will often lead to physical harm over prolonged periods of time. The neglect of the desire to stand for what one believes in or to engage in protest against an injustice will not result in physical harm, it is not physiological but psychological and any harm that it causes will be of that nature. The distinction here lies in physical desire and psychological desire, in the case of a hunger strike, the primary (and physical desire) to eat, is being overlooked in favour of the second order desire (about the first order desire to eat) whereby the individual wishes to prolong hunger to send a message, which is fuelled by the desire to stand for what one believes in, which may be a more base

psychological desire (Nussbaum, 2004). This forgoing of a competing second order desire so that it's opposing desire may be realised is indicative of an individual's *will*. Likewise, if the agent lacks the constitution to withstand starvation in order to convey their message and decides to forego their desire to send a message so that they may satisfy their desire to eat, this too is indicative of their *will.*

Ghandi possessed a unique constitution, one which allowed him to inspire and move millions. This constitution is undoubtedly due to his unique reason responsive make up. This make up can be found in many other great individuals throughout history: Harriet Tubman, Steve Biko, Martin Luther King, Malcom X and others. All these individuals were able to withstand persecution, discomfort, pain, and threat of death in order to satisfy their desire to influence the minds of the people of the world in important ways.

This characteristic of fortitude in the face of immense threat is something that at a general level, can be said to be shared amongst all these individuals. Now imagine for a moment that we had exact and highly detailed information on each of these individuals' genetic and neurological makeups and were able to identify a common gene amongst them. Let us call this gene the "fortitude gene". As farfetched as this may sound, consider recent discussion had on the *warrior gene*[3] and how the presence of this gene has come to influence discussions had in court rooms in the United States[4]

Now, our hypothetical *fortitude gene* has been identified and synthesised and is ready to be administered to live or soon to be born individuals through a gene therapy. This treatment will fundamentally manipulate and alter the reason responsive processes of the recipient and may

[3] The monoamine oxidase (MOA) gene has been the subject of many studies focussing on its role in the reuptake of certain neurotransmitters, the likes of which have certain behavioural effects. One of these effects is the likelihood of increased aggression and risk taking in those individuals who possess this genetic variation. One controversial study cites that this variation is more present in Māori men. This is discussed and disputed in the following paper.

Lea, R. and Chambers, G. (2007) 'Monoamine Oxidase, Addiction, and the "Warrior" Gene Hypothesis', *The New Zealand medical journal*, 120, p. U2441.

[4] The use of a genetic MOA criminal defence in United States has gained a great deal of media attention, but very little sway in the court of law.

(*Defendant's MAOA Gene Evidence Deemed Inadmissible in Murder Case*, 2020; *Convicted Murderer Claims 'Warrior Gene' Caused Him to Kill*, no date; *State v. Yepez: Admissibility and Relevance of Behavioural Genetic Evidence in a Criminal Trial | Psychiatric Services*, no date)

be administered by request of the individual or be administered before the individual is even born.

Here we see how design by individual and design by an external party comes to influence the discussion and how this will shape the direction of the paper moving forward.

We have patient X, an individual who has always desired to change the world and take a stand for what they believe in. Patient X, however, has a remarkably low tolerance of pain and discomfort and in previous attempts at taking radical action towards achieving their goals of inspiring change in the world, they have found themselves giving up on hunger strikes at lunch time and giving up on protests as soon as the weather turns cold.

Patient X has the strong desire to avoid discomfort and so too do they have the competing desire to inspire change in the world. These two competing first order desires are of two different kinds. Pain elicits a physiological and in-built response within in us to avoid pain, or make it stop. Anyone who has accidently placed their hand on a hot stove plate knows how automatic our response to withdraw is. The desire to inspire change in the world is of a distinctly psychological nature. Failing to strive towards this desire will not cause us bodily harm but may well cause us psychological harm. The basis of these desires are different, so too are the consequences of failing to satisfy them.

And so, upon hearing about the *fortitude gene* therapy available, they sign themselves up and begin receiving treatment. The treatment is successful, Patient X is now able to withstand considerably more discomfort than they ever had been able to before and are able to make it a few days into a hunger strike before giving in and now attend weekly demonstrations in front of parliament. If you would suspend your disbelief with regards to the possibility of such a scenario coming to pass in the near or distant future, consider the philosophical ramifications of the choice Patient X makes.

Patient X has willingly chosen a therapy that alters their reason responsiveness in a fundamental way. They chose to take this action so that they may be able to satisfy their desire to make a lasting and meaningful impact on the world and in order to make this a reality, they needed to be less responsive to reasons relating to the alleviation of discomfort. The ethical reasons to endure a hunger strike are now *good enough* to warrant the physical discomfort that comes as its price. Patient X now responds to reasons differently to the way they did before, and this has allowed them to satisfy the competing desire to effect change in the world through demonstrations of this nature. In this example, Patient X has utilised gene editing to expand

their scope of freedom, allowing themselves to select from an expanded set of options that more closely align to their higher order desires and will. The gene therapy has expanded their scope of freedom as they are now able to engage in the activities that were usually neglected in favour of the satiation of their desire for the avoidance of discomfort.

By contrast, let us now consider an example of an individual whose genetic alteration comes from without. Consider Patient Y, a newly minted conscript of a nefarious military regime. Patient Y will be deployed to a highly volatile territory where soldiers are often captured and tortured in brutal ways so that the enemy may extract intelligence from them.

The leadership of the military Patient Y now serves, deem the risk of information falling into enemy hands too great to risk and so, upon hearing word of the newly developed *fortitude gene* therapy begin to administer this therapy to their new conscripts. As part of basic training, Patient Y receives daily injections carrying the *fortitude gene* therapy for a duration of months and upon completion of their training they are far more resilient to torture than the average person. Patient Y is aware of the gene therapy and what it aims to achieve, however, Patient Y has no choice in receiving this therapy as it constitutes a mandatory component of basic training.

Patient Y now responds to reasons related to the avoidance of discomfort and pain significantly less than they did before and possesses a far stronger constitution. However, by contrast with Patient X, Patient Y did not elect to receive this therapy and whilst they have experienced an expansion in terms of their scope of choice, now that an aversion to discomfort factors into their decision-making process less, they have experienced this expansion of the scope of options available to them in the service of the military and not in service of themselves. This marks a reduction in Patient Y's personal freedom, whilst simultaneously eliciting an expansion in their scope of choice.

The interaction between the freedom of an individuals will and the scope of their choice is an important one. An expansion in the scope of choice an individual has is a necessary condition for their expansion of free will, however it is not a sufficient condition. As we have seen from the discussion just had about patients X and Y, an individual's scope of freedom may act in favour of their freedom or in favour of their servitude.

Genetic editing as a neutral and necessary component for the expansion of individual freedoms.

An individual will choose the way they do because of the way they are. That being that each person has a set of reasons responsive sensitivities that make them more likely to act in certain ways than others and those choices align with a deterministic and predictive model of choice. This is not to preclude their freedom of will, all this tells us is that an individual's choices may be predicted and known beforehand, the freedom of those choices is dependent on whether or not the choice made aligns to their best reasons (Frankfurt, 1971; O'Connor and Franklin, 2022).

Genetic editing as a practice has been shown to alter the human body, whether that be phenotypically or in terms of rectifying genetic abnormalities and disease. The scope is broad, one may alter their eye colour with this technology or reverse blindness that comes about as a result of a genetic abnormality[5].

This paper is not primarily interested in genetic editing's ability to alter the human body phenotypically, but rather, this paper is concerned with the possibility of altering the human mind and the scope of individual choice. A genetic basis for behavioural traits is a topic of immense interest and attracts a great deal of research, however its results are as of yet inconclusive. For this reason, I do not wish to pin the strength of my argument on an inconclusive and hypothetical possibility, rather, I wish to first consider a more concrete case for the expansion of human freedom with the use of genetic editing in which and individual's scope of choice may be expanded by means of reversing genetic illnesses and then entertain the hypothetical of genetically altered minds afterwards. This approach aims to establish a base for future discussions surrounding freedoms and the scope of choice as they come to be affected by genetic editing and alteration, discussion which may take years to occur in earnest.

[5] Ahmad, I. (2022) 'CRISPR/Cas9—A Promising Therapeutic Tool to Cure Blindness: Current Scenario and Future Prospects', *International Journal of Molecular Sciences*, 23(19), p. 11482. Available at: https://doi.org/10.3390/ijms231911482.

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Sahel, J.-A., Bennett, J. and Roska, B. (2019) 'Depicting brighter possibilities for treating blindness', *Science Translational Medicine*, 11(494), p. eaax2324. Available at: https://doi.org/10.1126/scitranslmed.aax2324.

What might genetic editing mean for free will?

We act the way we do because of the way we are. This statement seems uncontroversial, I choose based on preferences that I hold, favouring some things over others. Furthermore, my range of choices are dictated to me by my context, I may want to choose to buy a Ferrari instead of a McLaren, but given my context, both of those options are out of reach. The scope of available options is limited by my context, the way I select amongst those options is determined by the way I am, and the inescapable fact is that I could not hope to have chosen the way I am, at least, not all the way back so to speak.

As discussed already in this paper, genetics plays a role in making us the way we are, it provides the blueprint for our being which first comes into contact with our environments. As we achieve ever longer periods of exposure to the environment, our blueprints undergo multiple revisions. These revisions occur not only at the level of genetics but at the level of personality as well.

Furthermore, our genetic code may in fact act to limit our capacity for choice. Take for example genetic Spinal Muscular Atrophy (SMA). Those born with SMA display a deficiency in ubiquitous protein survival of motor neurons, which is encoded for by the *SMN* genes, *SMN1* and *SMN2* (Ogino and Wilson, 2004). What results from this deficiency is a marked and severe atrophy of spinal motor function and control. Patients with SMA can be sub-divided into three types with regards to the severity of the condition as well as age of onset, these factors are then linked to a probable prognostic outcome. In SMA type I, children are born with severe muscle weakness and hypotonia, they lack the ability to walk or sit, and in many cases this muscle weakness can spread to the respiratory system, resulting in death before the age of two years old (Ogino and Wilson, 2004). In SMA type II, individuals display proximal muscle weakness, the onset of which occurring before the age of eighteen months, these individuals may be able to sit, but will not be able to walk unaided (Ogino and Wilson, 2004). Lastly, in individuals diagnosed with SMA III, we have an onset which occurs after the age of two, individuals will develop proximal muscle weakness across their lives, they will be able to walk until the disease progresses further and are likely to survive into adulthood (Ogino and Wilson, 2004).

In the case of SMA, we have described three subtypes of people, each of which have had their scope of choice narrowed by degrees in relation with the severity of their disease. Individuals of the SMA I group are likely to pass away before being able to make any significant life

choices. Even as infants, their scope of choice is so limited that they cannot choose to sit or lie down, crawl or roll, stand or walk. Beyond their ability to choose, this group of individuals are presented with markedly fewer options to choose from than an individual born without SMA would, their freedom to choose has been severely constrained. Members of the SMA II group also experience a much narrower scope of choice than individuals born without SMA would, however, members of the SMA II group experience a markedly *broader* scope of choice than individuals born with SMA I. Members of the SMA II group are able to sit on their own, experience proximal muscle weakness as opposed to complete spinal muscular degeneration and are likely to live longer lives, they have more options to select from than individuals born with SMA I (Wirth, Brichta and Hahnen, 2006). However, they will never walk unaided, run, climb mountains, or play their favourite sport. These are options not afforded to these individuals and this scope of choice is fixed by their condition from birth.

By contrast, individuals born with SMA III are born with the disease but will grow and develop in a similar way to children without the disease. The negative effects of SMA III become apparent as they grow older and as the disease progresses, they begin to lose certain abilities that they had before, they may lose the ability to walk, control limbs and will experience significant proximal weakness (Wirth, Brichta and Hahnen, 2006).

From these three types of SMA, we see three different scopes of choice. SMA I individuals have a narrower scope of choice than individuals with SMA II, and individuals born with SMA II have a significantly narrower scope of choice than individuals born without SMA, and yet they also have a much broader scope of choice than individuals born with SMA I. Individuals born with SMA III are born with a similar scope of choice to people born without SMA, but that scope of freedom becomes narrower and narrower throughout their lives.

It is evident that the scope of choice an individual has is variable and comparative, furthermore, that scope of choice is also amenable to change over an individual's lifetime. In this case, the scope of choice is genetically determined, that being that an individual with SMA will most likely never have the option to run the comrades or climb mount Everest, this is not to say that many people ever actually exercise that choice in their lives without SMA.

If we were able to remove the limitations imposed on the individual by SMA, it seems undeniable that their scope of choice would increase, new options would become available to them, they would be able choose options that were never remotely possible before. Removing these limitations requires no philosophical thought experiment machinery or alien technology,

a gene therapy[6] is readily available in the commercial market right now that, if administered in early childhood, can reverse the genetic abnormality that causes SMA[7]. Through genetic engineering, we are able to treat SMA effectively and thereby, using genetic editing tools, are able to expand the scope of freedom possessed by these individuals.

Now, whilst genetic editing may open up the range of choice available to an individual, it is still unclear as to whether or not it is capable of effecting the *way* they choose. An individual with SMA that receives the gene therapy may now have the option of becoming a runner available to them, however, this does not mean that they will choose to run over choosing to watch TV from the couch. From the discussion had thus far, the individual sitting on the couch watching TV who cannot use their legs, is less free than the individual sitting on the couch watching TV with fully functional legs. Both individuals are engaged in the same action, both chose this activity and selected this action using their best reasons, and yet, it seems that, intuitively that we would accord the individual who can run but chooses not to as being more free than the individual who can only sit.

The availability of options plays a pivotal role in our judgement on who is free and when their actions are deemed to be made using free will. The person who sits, because they can only sit, is devoid of options, there is no possible alternative to the choice they made. The fact that I choose vanilla ice cream over chocolate ice cream because of the way I am seems to place me in the same situation. I do what I do because I could do nothing other than what I do. However, if there was me and an exact twin world replica of me, standing in two identical ice cream parlours, each of us orders the vanilla and we both receive the vanilla ice cream, we have both chosen the way we do because of the way we are. However, in my world, the ice cream parlour is fully stocked, under the counter there are many tubs of ice cream, all different flavours and kinds. For my twin however, his ice cream parlour is out of stock on every flavour except

[6] Onasemnogene abeparvovec is a targeted gene therapy for SMN1 approved for use in patients with SMA younger than 2 years old.

[7] Ogbonmide, T. *et al.* (2023) 'Gene Therapy for Spinal Muscular Atrophy (SMA): A Review of Current Challenges and Safety Considerations for Onasemnogene Abeparvovec (Zolgensma)', *Cureus*, 15(3), p. e36197. Available at: https://doi.org/10.7759/cureus.36197.

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vanilla. We both get the flavour we want, we both choose the way we do because of the way we are and would not have chosen differently, and yet, my twin could not, in any possible sense have gotten any other kind of ice cream, whereas I could have, or at least I had the option to. It seems that my scope of choice was in some sense greater than my twins. However, neither of us were aware of the scope of our freedom at the time of making the choice. We both believed fully that we had many options to choose from, this was true for me, but false for my twin. If my twin was made aware of this fact, that he could have only possibly chosen one kind of ice cream and that the range of choice presented to him was an illusion, he would feel rather claustrophobic and caged in. This kind of reaction to arguments along the lines of free will being a mere illusion is common in most people. Often, we only pay attention to our ability to choose when attention is drawn to the fact that all the options we thought we had were non-existent.

Even taking into account a compatibilist position, one which states that we can be said to choose freely, if the choice we make is in accordance with our best reasons, the presence of options makes the scope of choice feel more free in some experiential manner. To make the assertion that in order to choose freely is to be able to choose other than the way I do is counter intuitive, in this sense, I would be free if I chose at odds with my best reasons, in some way then I would be choosing the less-than-ideal option for myself in that moment. This seems markedly less free than making a choice that aligns with my best reasons, even if I could not have, in fact, chosen otherwise. In the example above I attribute the limitation to the scope of choice to the conditions found in the world in which the agent chooses, this does not identify a limitation to mechanics of choice however in so far as the limitation on the choice made comes from an external source, that being context. However, context, the mechanics of choice and the way we are invariably interact in such a way that we could not remove one component from the others and still be discussing the same thing, that being choice. Our scope of choice acts as a preliminary to our freedom of will, the scope of being able to choose any ice cream flavour or just one matters in the moment of choice, even if in the example above it does not come to affect the choice made.

Free will and the scope of choice seem to be two separate entities then. Our freedom to choose, for all intents and purposes, cannot exist when understood as radical free will. The reason for this is twofold. Firstly, I cannot choose freely in a radical sense because my environment and circumstance place limitations on the scope of choice presented to me. As much as I would like to step out of my house right now and run a sub-two-hour marathon, it is not an option I could

ever select as I am physically unable to run a marathon in that time. There are constraints placed on our scope of choice and this in turn limits our ability to select these options, even in a reasons responsive manner.[8] This is not intuitively apparent in our daily lives as for us to be aware of these limitations, we would also need knowledge of all the alternatives possible and which of those we are prevented from choosing. This level of awareness or fore-knowledge is beyond our common usage or understanding. Secondly, my choices are determined by the way I am. This is certainly an important problem to address, I will argue that for our choices to be made freely we need not be responsible for ourselves all the way back (Strawson, 1982). I believe this criterion for freedom to be unnecessarily strict. Simply put, it sets the bar too high. We are not responsible for the way we are, not all the way back at least, and our choices are often dictated by the way we are at the time of making that choice. This point will be discussed at greater length in a subsequent section of this paper.[9] The way I choose then is fixed by the way I am and the options available to me are fixed by the scope of choice I am presented with. This scope however, is variable, it differs from person to person and expands and contracts across our lifetime. We are never in control of that scope, as we cannot choose (radically) to expand that scope or minimize it.

However, this may not be true, at least not anymore. Given the discussion had already with regards to SMA and its available gene therapy, for the first time in history, humanity is able to adjust the scope of choice in a controlled manner. Simply put, an individual who would never walk and therefore lacks all those options in their scope of choice, is now given the ability to walk and as such, their scope of choice expands to include all those options made available by the ability to walk.

[8] We are often none-the-wiser when it comes to the scope of options we have available. In the ice-cream case, my twin and I hold the same belief, that being that the ice-cream parlour has stock of all the options they have listed on the menu. The difference between us is that in my case, my belief is true and in my twins case it is false. However, as neither of us know the truth of falsity of our beliefs, we choose in accordance with our best reasons and encounter no resistance in acting accordingly. If, however, our inclination were to buy chocolate ice-cream, I would be able to do so as my scope of choice is sufficiently broad so that it may align with my best reasons, my twin however, would butt up against the limitations of his scope of choice and be prevented from acting in accordance with his better reasons and in this sense his free will is diminished.

[9] See Chapter 3.

Chapter 4

The concrete case.

The goal of this paper is to demonstrate that genetic editing can expand the scope of freedom available to the individual. As genetically altering minds and psychic processes enjoys little in the way of concrete proof, I aim to achieve this end by demonstrating that an expansion of the scope of choice acts as a necessary condition for the expansion of the scope of freedom.

An individual at any one time is presented with a multitude of options for action. Whilst they are presented with an array of options, the option which they will select is predictable as the agent acts within a deterministic system (O'Connor and Franklin, 2022). The agent will choose the action which aligns most strongly with their reasons responsive sensitivities, this action will then be chosen in accordance with the agent's best reasons and can therefore be considered an action undertaken freely (Sekhar Sripada, 2010).

The prerequisite to this description of freely willed action is that the action must be selected from a range of possible alternatives. This array of actions is subject to certain limitations, those being physical laws, matters of fact, economic feasibility, resource constrictions and so on to name a few (Mele, 2015). If for example I wish to eat a chocolate ice cream, but I do not have any money, I will then not have the option of eating a chocolate ice cream available to me and it will not be an option included in my scope of choice. I will then choose to eat whatever I have in the fridge because that is the option that aligns most closely to my best reasons, and I will have done so freely.

However, if I were to suddenly be given the money for the ice cream, my scope of choice would have expanded, and I would choose the ice cream as it aligns more closely to my best reasons than the alternative. Genetic editing, in my view, may act to concretely expand the scope of choice an individual is exposed to in virtue of its ability to fundamentally alter the limiting factors surrounding choice. An individual who gains back the use of their legs has an expanded scope of choice greater than they did before regaining use of their legs and therefore are able to choose options that align most closely with their reasons, these options being unavailable to the individual before this point.

In this sense, concrete changes in human physiology enable the individual to select from a wider range of options and this expanded scope allows for the selection of options that align more closely to the reasons responsive sensitivities possessed by the individual.

This expansion to the scope of freedom is something that can be demonstrated in a concrete manner, as is discussed earlier in this paper with examples relating to SMA.[10]

The hypothetical case.

If one is to work under the hypothetical assumption that cognition comes about as a result of genetically determined factors which construct the physical structure of the brain and this in turn gives rise to cognition as a physical process, it stands to reason that any alteration of this genetic base would result in a significant alteration to cognition of the individual. From what has been discussed so far in this paper, the likelihood of this hypothetical becoming reality may not be as far-fetched as one would first believe. However, with the research in its present state, there is no way forward in which the idea of genetically altered cognition does not take on the form of a hypothetical. Despite the hypothetical nature of the case at hand, it is still philosophically worthwhile to investigate the ramifications this case might have on the topic of free will. It is this hypothetical which forms the second part of this discussion.

Genetic alteration of the base components for cognition would alter the sensitivities an individual has to various reasons and this in turn would elicit a marked change in behaviour. Unlike the concrete case, the focus here is not on the expansion of the scope of freedom, but rather in this section the focus is on an alteration to reasons responsive processes themselves.

Imagine for a moment that introversion and extroversion are characteristics that are genetically encoded. I, as an introvert, am unlikely to freely choose a vocation in which I am required to perform on stage in front of others or find myself bathed in the spotlight. An extrovert, by contrast, would be unlikely to choose a vocation in which they spend extended amounts of time in isolation from others. The characteristics of introversion and extroversion, albeit in their overly simplified states, are likely to directly impact the sensitivity an individual has with regard to reasons related to interactions with other people.

[10] See page 35.

Working under the assumption that these traits are genetically encoded and given the further hypothetical of gene editing reaching a point where such genetically based traits can be altered and manipulated, we find ourselves in the realm of an interesting question.

What would it mean for an individual to alter their own genetic structure in such a way that they no longer respond to reason in the same way they did before? And indeed, what would it mean if they altered their genetically encoded sensitivities in such a way that they now run opposite to the ways in which the sensitivities that lead them to the decision to make the change ran?

Research in the field of optogenetics posits the possibility of manipulating, inhibiting or implanting memories in a live subject (Canli, 2015). If our exemplar trait of introversion or extroversion came about as a result of learned behaviour during childhood, it may be possible to manipulate the memories associated with the reward and or punishment of these traits in childhood and thereby alter the behaviour of the adult subject.[11]

The question of in vivo genetic alteration provides room for interesting questions on the origin and nature of choice and indeed predisposition. At present, the technology relating to in vivo genetic editing is promising, particularly in the fields of treating genetic disorders such as SMA. The application of a gene therapy which induces noticeable change in the individual, is at present, available. However, the technology relating to altering cognition by such means is many decades away from becoming remotely feasible, if possible at all.

The area of interest regarding this topic lies in an individual choosing to alter the way they choose in future by making significant changes to their reasons responsive processes. For example, an introvert who struggles to put themselves out there and consequently feels like their life is stagnating as a result. They are overlooked at work, with friends and so on. They have good reasons to want to be more extroverted, it would, at least according to their best reasons at that moment, be an improvement to their quality of life. Being extroverted, however, runs contrary to their existing mechanism of choice which favours the side of introversion.

[11] The mechanism through which this memory manipulation works is highly complex and still in the early stages of research. The essence of the research is best explained by Canli (2015) in the following extract: *"The basic idea behind the optogenetics approach is to insert light-sensitive molecules called opsins into genetically defined cells of the central nervous system (Boyden et al., 2005). By using different kinds of opsins and wavelengths, and different viral delivery vectors, investigators can select specific types of cells to be excited or inhibited with millisecond resolution. Optogenetics studies have begun to demonstrate how memories can be activated, implanted, or inhibited" (Canli, 2015).*

Similar to discussions had by Frankfurt regarding his willing and unwilling addict, here we may find a case of the willing and unwilling introvert. The introvert desires to be free of the perceived constraints placed on them by their introversion and so they see extroversion to be the most suitable remedy to their problem. Choosing to be extroverted does not align to the individual's best reasons, it is a desire that they possess, but a desire for which they lack the relevant ability to make reality. The introvert in question is plagued by conflicting desires. They desire to be more extroverted because their best reasons dictate that this change would make their lives easier, but they simultaneously desire the comfort that they experience in virtue of their introverted behaviour. They desire to attend the company month end drinks function, but also desire to spend that night on their couch watching television.

Our reasons often originate from very different sources in our mental make-up. The logical faculties of our unwilling introvert tell them that the best way to achieve the changes they so desire from becoming more extroverted is to participate in more social events. However, perhaps from a more emotional origin, they simultaneously desire the comfort afforded to them by their introverted behaviour. Being more sociable will feel uncomfortable to them but will achieve their desire to be more extroverted. Staying home will be comfortable but will not achieve their desire to be more extroverted. The conflicting desires are then subject, ultimately, to a cost rewards analysis (Kunda, 1990). Is the discomfort a suitable price to pay for the benefits that come with being more extroverted? This discomfort for the purposes of perceived self-improvement can be termed growth.

The effort required to act against characteristics possessed by the individual so that they may experience growth feels uncomfortable and runs contrary to lower order reasons which respond strongly to sensations such as comfort and the familiar. The desire to act in a manner more conducive to extroversion comes at a cost, but, should the individual be sufficiently sensitive to their reason for changing, they will be able to overcome the reasons which respond to lower order stimuli and prioritise those which respond most strongly to higher order desires such as personal growth (Kunda, 1990). It is important to note here the way in which I use the terms higher and lower order desires. I view the distinction here as being predicated on the desires level of abstraction from a base or primal desire. A desire for food would be a lower order desire as it is a base desire, lacking in abstraction. A desire for healthy food is a higher order desire as it operates at a higher level of abstraction, building on the base desire for food but also incorporating the more abstract concept of 'healthy' food and by extension the comparative of 'unhealthy' food (Watson, 1975). Often, our higher and lower order desires run contrary to

one another, and it is also often the case that our higher order desires win out as we tend to place more value upon our abstract higher order desires about our lower more base desires than we do our lower order desires themselves. Our desire to eat is a basic lower order desire, it seeks out food in a primal manner, however, our more abstract and often more valued higher order desires about our desire to eat determine our course of action.

Personal change is uncomfortable and challenging, it is for that reason only a small proportion of individuals who plan out a marathon training plan ever make it past their first five kilometre. The option genetic editing presents in this hypothetical case is that an individual may be able to bypass the unpleasantness associated with such change and simply change devoid of the lengthy process.

This creates a certain complexity for choice. An individual may choose to be responsive to reasons that are different from the reasons that lead them to choose the change. Higher order desires are more accessible and therefore may take preference over lower order desires in such a way that the unwilling addict, introvert, lazy person and so on may cease to exist entirely, there only being willing individuals. By accessible I mean that these higher order desires are more open to alteration. Our base desires exist at an almost primal level and tampering with them would serve little purpose. If one is to manipulate the desire to eat, we may find that starvation is the end result. However, if one is to alter the higher order desires held about the desire to eat, we find a change in behaviour with regards to how the individual approaches and responds to their lower order desires.

Our introvert for example may receive a gene therapy that acts to lower their experience of anxiety by altering the rates of production for neurotransmitters such as serotonin and GABA (Gamma-aminobutyric acid). This decrease in anxiety would allow them to feel significantly less discomfort when being social, the cost benefits analysis then changes. Being more sociable comes at a lower cost and therefore, our introvert would be more responsive to reasons regarding socialisation and practicing the extroversion they so desire.

This example illustrates one possible way in which genetic editing can be leveraged to alter our responsiveness to reasons. We have already been exposed to various medications that perform the same role as the hypothetical gene therapy mentioned here, SSRI's (Selective Serotonin Reuptake Inhibitors) and Benzodiazepines perform the function of decreasing anxiety, this has the effect of reducing the agent's aversion to social interaction (assuming their aversion originates from an anxious state). What I have presented here is a more permanent

alternative to achieving the same end. The difference being a genetic mode of delivery as opposed to the introduction of synthetic neurotransmitters.

Hannibal Lecter's Dinner Party.

Hannibal Lecter, a well-known literary psychopath and cannibal, is synonymous with our cultural imagery of serial killers and murderers. As a character he is completely enslaved to his desire to murder and eat his victims, although he does not come across as a man out of control. He is in fact singularly focused on his desires and expertly manipulates those around him to achieve his ends. He displays no remorse or hesitation and acts with a certain clinical cruelty very seldom replicated in other books of the same genre.

Now, my mention of him here serves a philosophical purpose. At the beginning of the *Silence of the Lambs* we find Hannibal Lecter imprisoned in a maximum-security psychiatric prison. He is held behind bullet proof glass, in a room with no windows to the outside world. All communication is heavily monitored, and the prison has gone to painstaking lengths to eliminate all human contact.

Imagine for a moment that this Hannibal has a twin world counterpart. Everything in this twin world is exactly the same, Hannibal has had all the same life experiences and is physically and psychologically identical with his twin world doppelganger.

It is within this thought experiment that the first differences in these two worlds will become apparent. For the purposes of differentiating Hannibal Lecter from his twin world doppelganger, I shall refer to the former as Hannibal and the latter as Lecter.

Hannibal.

Hannibal finds himself incarcerated in a maximum-security psychiatric prison, much like he does in the books. His environment is carefully controlled, and his every movement is scrutinized by a litany of psychiatrists, criminologists, and guards. Hannibal is an exemplary prisoner, he does not fight with guards, traffic contraband or cause any significant disruption. Why might this be?

Well, considering his heavily controlled environment and significant lack of choice in his own activities, Hannibal is experiencing an incredibly narrowed scope of choice. The reasons to

which he might be responsive to is so narrow that he can, despite his own desires, do nothing other than be an exemplary prisoner.

We have here an example of an external influence of Hannibal's freedom of will whereby the prison has so carefully controlled the environment that he finds himself presented only with options the prison finds acceptable.

His rehabilitation program to this point has included a strict series of punishments and rewards. If he is to receive his food in an orderly and polite manner, he will be rewarded with increased portions or perhaps a helping of dessert. If he does not obey this request, he will be punished by having his portion cut in half or removed entirely, leaving him hungry until he decides to rectify his behaviour.

This pattern of rehabilitation is common across prisons the world over, behaviour that is deemed to be desirable is met with reward and privileges whilst behaviour that is seen to be undesirable is met with harsh punishment. This is the basic premise on which incarceration operates, harking back to the now archaic notions of classical and operant conditioning. Skinner draws a parallel to the Socratic notion of *midwifery* whereby an individual is guided along the path towards a desired outcome, the midwife themselves taking no credit for the individual's growth, but rather helping the individual uncover what is already inside themselves (Skinner, 1977; Tomin, 1987).

Skinner states that this, in a practical sense, requires revision and for the midwife to play their role effectively, they must exert control. Control in this sense refers to the positive options made available for the individual to choose, allowing them to select the options that will be beneficial to their growth. Control also occurs in the negative sense whereby certain paths are blocked off from the individual so that they may not travel down that path (Skinner, 1977).

In Skinner's words, "We build 'belief' when we increase the probability of action by reinforcing behaviour." (Skinner, 1977).

In Hannibal's case, paths leading to undesirable growth are blocked by the prison system and paths leading to desirable growth are offered to him with his "belief" being built by the provision of rewards for his acceptable action.

The "growth" in question may be understood as responsiveness to reasons in the context of this paper. By controlling Hannibal's environment, the prison aims to increase his responsiveness

to reasons that align with the pro-social norm, it does this by altogether eliminating the alternative reasons Hannibal may be more responsive to.

Lecter.

Lecter, Hannibal's twin world doppelganger, finds himself in a very similar prison. He is there for all the same reasons as Hannibal and the prison has the same goals for Lecter during his incarceration, those goals being rehabilitation.

Where these worlds differ is that in Lecter's world, genetic editing has been perfected. Geneticists have a perfect map of the human genome, a robust understanding of how genes influence behaviour and are able to administer gene therapies that fundamentally alter the psychological character of the recipient.

In this world, Lecter receives a tailored gene therapy once a week that aims to fundamentally alter his responsiveness to reasons. This gene therapy diminishes his responsiveness to reasons aligned with the killing and eating of other human beings and strengthens the responsiveness to reasons that align more closely to the pro-social norm.

Of course, all the same restrictions on environment remain identical for both Hannibal and Lecter, Lecter is not allowed to engage in activities we would deem dangerous or morally impermissible. However, Lecter is not exposed to the punishment and reward system Hannibal is. Whether Lecter assaults a guard or not, he will still receive his full dinner and a dessert, none of his books will be removed for lack of cooperation and no reward will be given for desirable behaviour. All environmental limitations exist purely to keep both the public and Lecter from harm, they serve no purpose in his rehabilitation.

The mechanism of change lies solely in the editing of Lecter's genetic makeup and his psychological traits, those being, his responsiveness to reasons both aligned to the pro-social norm and those aligned with anti-social behaviour.

The Dinner Party.

Both Hannibal and Lecter serve their time and are deemed to be reformed according to the parole board. Hannibal has demonstrated exemplary behaviour whilst incarcerated and responded well to the environmental conditioning that aided in actualizing this change.

Lecter on the other hand has merely completed his course of gene-therapy treatments. His responsiveness to reasons which promote pro-social behaviour has been heightened whilst his responsiveness to reasons which align with his cannibalistic tendencies have been dulled immensely.

In celebration of his release, Hannibal and Lecter decide to host a dinner party in both of their respective worlds and you are invited. You, somehow exist as a singular you and do not have a doppelganger in either world, therefore you must choose to accept either Hannibal's invite or Lecter's.

This decision should not be made lightly as entering the home of a convicted murderer and cannibal for dinner is no small thing. The Hannibal Lecter you choose will illustrate which form of rehabilitation you found more convincing. The classical method of altering the environment of the individual, eliminating all choices which might result in undesirable consequence and rewarding the individual when they follow the only path that they have available to them whilst incarcerated or an individual who has had no punishment or reward administered to them but has instead undergone a genetic therapy which aims to alter their responsiveness to reasons.

Upon their respective releases, each of them was presented with an increased scope of choice in terms of their environment expanding and becoming less controlled. Each of them now gained the ability to move freely, to be free from constant surveillance and to determine the content of their own daily activities.

It becomes clear that in Lecter's case, the very machinery underlying choice has been fundamentally altered, whereas in Hannibal's case, there has been an attempt to alter this machinery through environmental manipulation which provides no guarantee of change.

I believe the safest choice is to accept the invitation sent to you by Lecter. The root of the problematic decision-making matrix within Lecter has been fundamentally altered, this points towards the most stable alteration. I believe that you, the reader, will have chosen similarly to me. If not, I commend your faith in the prison system and classical conditioning, however, you will have to indulge me in the assumption that you chose Lecter over Hannibal.

This illustrates that genetic engineering holds some legitimacy in our minds, albeit in a hypothetical sense. The reason it holds that legitimacy is because we acknowledge that alterations made to our responsiveness to certain reasons, thereby alter the way we choose

going forward (Wolf, 1980). It is safe to say that our twin world Hannibal Lecters are now no longer doppelgängers at all, at least not in a conception that goes beyond appearance.

Twin World's Diverge.

We have established in the previous section that our twin world Hannibal Lecters have left their respective prisons sufficiently different to one another that we would be able to choose to have dinner with the genetically modified doppelganger instead of the doppelganger who was released for good behaviour.

This demonstrates two things:

1. That there has been substantial change in both Hannibal Lecters from the time they were incarcerated to when they were released and,
2. That the two doppelgangers have left prison being sufficiently different to one another that we are able to demonstrate a preference as to which one we would share a dinner with.

Our twin worlds have now diverged from one another on the basis that we have two remarkably different Hannibal Lecters. The question I would like to pose now is whether either of them are still identifiable with Hannibal Lecter at all, and if not, why?

I contend that Hannibal, the twin who underwent incarceration without genetic intervention, is still very much the same Hannibal we knew prior to incarceration. His will in prison was forcefully mediated upon by the environment he found himself in. He could not choose in accordance with the way he is because the environment had narrowed his scope of freedom to such a degree that he could not choose the option that aligns most closely with his good enough reasons. Upon release, the scope of choice will expand once more, and he will have a selection of reasons available to him that he did not have before, and these will likely have a high level of responsiveness associated with them. We find then that whilst his environment has been manipulated to impact his freedom of will, the individual who is responsive to reasons within that environment has not fundamentally changed.

Lecter on the other hand, our genetically modified subject, has been changed from the inside out. Whilst he too experienced a narrowed scope of choice during his incarceration, this

environmental manipulation was not put in place to effect change in Lecter, rather it was a safety measure for the protection of those who worked with him.

The change occurred on a genetic level, within the bioelectric machinery that underly our responsiveness to stimulus and at a higher level, our responsiveness to reason. This version of Hannibal Lecter now has a decreased responsiveness to reasons for action that align with nefarious acts. Simply put, murder is just not as appealing to him as it once was.

A question about identity arises and is perhaps too broad a topic to broach with any rigor in the context of this paper, however I will address it briefly to illustrate my point.

If Hannibal Lecter, who his whole life has been driven solely by the desire to kill, has been changed to no longer hold these desires, are we still talking about the same person? I would think not. In a deterministic understanding, all decisions and events could be understood and predicted if we were presented with all of the matters of fact and rules that apply to that given reality. This reality includes a Hannibal Lecter who was determined to undertake terrible actions because they aligned with his good enough reasons for acting. A Hannibal Lecter who no longer responds to these reasons is no longer the same individual as there is a fundamental change in the characteristics that formulate the identity of this person.[12]

This change in identity has come about as a result of the interference of others, not as a choice made by Hannibal Lecter himself. A choice imposed on an agent by an external actor must be seen as a violation of that agent's freedom of will, and when that imposition results in a change that permanently alters the agent's reasons for choosing going forwards, it must be said that the freedom of will experienced by that individual has decreased substantially.

What if Hannibal Lecter had chosen to undergo gene therapy voluntarily? My argument is that the individual has increased their personal capacity for freedom in an important way. They have willingly elected to undergo this change, what this indicates is that even prior to the intervention, the individual possessed a certain responsiveness to reasons aligning with the desire to change. A desire to change and actioning change itself are very different things, I desire to run a marathon, but putting a training plan into action requires a very strong and consistent responsiveness to reasons aligning with running goals. Hannibal Lecter may have a

[12] Parfit has far more to say on this topic, particularly with regards to his conception of Relation mattering more that personal identity. Continuity on his reading is far more complex than the representation I have provided here, principally the notions of psychological continuity (Parfit, 1984). However, I believe my description of a fundamental change in responsiveness to reasons derived from a source external to the individual is sufficient to indicate a change in personal identity.

desire for changing his ways yet is not sufficiently responsive to reasons that promote his abstinence from evil action. Gene therapy may represent a jump start for turning desires to reality in terms of the expansion of the freedom of will. Hannibal Lecter does not need to be responsive to reasons that would ensure he remains murder free for the rest of his life, he only needs to be sufficiently responsive to reasons that align with his choice to undergo a gene therapy that will begin the process.

In this sense, there exists within Hannibal a desire for change, gene therapy is a tool with which to make that change reality. If the application of gene therapy aligns in some small way with the reasons responsiveness of the individual, and the individual undergoes this therapy willingly, we may say that the freedom of will experienced by this individual has expanded and they have been able to maintain their identity across the change.

An individual who is forcefully subjected to gene therapy of this kind, and who does not possess within them any responsiveness to the reasons the gene therapy aims to align with, then this person will see a large decrease in their personal freedom of will and in some sense may no longer maintain their identity across this change.

The origin of the manipulation of will in the form of genetic editing matters immensely. It is the deciding factor as to whether the change increases or decreases the subject's freedom of will as well as how this change will impact the maintenance or destruction of personal identity.

Chapter 5

Facing an impossibilist argument.

Galen Strawson puts forward an argument detailing the impossibility of moral responsibility, building from a rather simple idea. Essentially, nothing can be *causa Sui,* that being that nothing can be the cause of itself (Strawson, 1994). It seems to be a rather uncontentious claim, it could not be the case that I somehow played some causal role in my own birth, these factors were of course beyond my control, and I highly doubt many people would be willing to attack this claim. Strawson goes on, saying that for us to be morally responsible, we would have to be the cause of ourselves in certain crucial mental respects, however, because we cannot be the cause of ourselves, we cannot possibly be said to be morally responsible for any of our actions (Strawson, 1994).

The above argument is incredibly simplified, and it will be expanded on in order to fully present Strawson's position in the strongest sense possible, however, at face value, even this simplified argument seems to carry a great deal of weight.

When we consider free will and actions performed freely, we prize those actions and choices for a reason, this reason, flows from the way we are, that being our constitution, predetermined intuitions, and beliefs (Strawson, 1994). A great deal of factors contribute to the way we are, be that mentally and/or physically. Genetics may determine our height, weight strength and so on. Combined with environmental and historical factors such as socioeconomic status, resource availability and stressors, genetics may come to impact our personality as well. The mental follows much the same path - genetics, environment, past experience and exposure to ideas forms our mental reality and determine the way we are mentally speaking, to a large degree.

Returning to the initial argument, if one can be said to be responsible for their actions and choices, one must also be responsible for the way one is, in this sense one must be responsible for the way one is mentally, the determining factor related to how we choose (Strawson, 1994). To be responsible for our choices and actions then, it is required that we be responsible for explicitly and consciously choosing the way we are mentally, if we do not consciously choose the way we are then we cannot be responsible for our choices, which are made in accordance with the way we are mentally speaking (Hurley, 2000).

So, we may then ask: what is required for one to explicitly and consciously choose the way one is mentally? To make that choice it seems that one must already have certain dispositional qualities, preferences and by extension must already be a certain way mentally. Furthermore, for one to have these already existing dispositional mental qualities required for explicitly and consciously choosing the way one is mentally, one must have chosen those pre-existing dispositional mental qualities, again having a set of pre-pre-exiting dispositional mental qualities (Strawson, 1994).

We seem to be standing on the ledge of an infinite regress, requiring ever deeper lying dispositional mental qualities, at no point reaching a first choice (Strawson, 2000). The conclusion of this line of reasoning then is that it is impossible for us to ever be held responsible for our choices, precisely because it is impossible for us to be *causa sui* (Istvan, 2011).

In light of the impossibility to be the cause of oneself, both physically and mentally, it seems then that we are bound by factors beyond our control, these factors determining the way we choose and the way we act. This argument rather eloquently escapes the troubles of determinism, not falling within either the compatibilist or incompatibilist camps (Istvan, 2011). Whether the world is determined or not, in either case we cannot be the cause of ourselves mentally, thus posing a rather intractable problem, that being, that we never had and never will truly have free will, at least not in the sense we commonly come to understand it.

For the sake of simplicity for the remainder of this paper I will present Strawson's argument in the following simplified manner.

1. We choose the way we do because of the way we are, mentally speaking.
2. If we are to be held responsible for the way we choose we must also be held responsible for the way we are mentally speaking.[13]
3. We cannot be held responsible for the way we are mentally speaking because we cannot be the cause of ourselves.
4. Therefore, we cannot be held responsible for any of our choices or actions because we cannot choose the way we are, and by extension cannot choose freely.

[13] This particular premise will be the one I attack in this paper. I do not fundamentally disagree with any of the other premises here, however I believe premise 2 to be particularly unforgiving and unnecessary.

As robust as this argument appears, and many wiser philosophers than me have tried to defeat it, I believe that the requirement for being responsible for oneself *all the way back* is an impossible requirement, not necessary for freedom of the will to obtain. My argument from the perspective of genetic editing and moderate reasons responsiveness aims to illustrate that freedom of will can be achieved in a deterministic and not self-causally responsible world. If my argument is successful, this conclusion should, at the very least, be intuitively plausible for the reader.

A refutation of the Strawsonian position will occur, however, I first intend to expand further on this impossibalist position by discussing Kane and his presentation of a weaker form of self-determination. I will then make my counterargument referring to both in kind.

Discussing Ultimate Responsibility as presented by Kane.

Kane discusses two requirements needed for the incompatibilist position to hold. If free will can be said to be incompatible with determinism, we first need the requirement of alternate possibilities (AP), that being we have multiple choices available to us like forks in a road where we choose the path we wish to take. Secondly, we have the requirement of Ultimate Responsibility (UR) that being that the reasons, motivations and causes of an action taking place must come from within us and not from some external source such as the foreordained will of God, luck, or deterministic mechanisms (Kane, 2005). In saying this, what Kane aims to present to us is that for an agent to be ultimately responsible for an action, that agent must be responsible for some crucial aspect of the sufficient reason for that action occurring (Istvan, 2011). And as Strawson contends through his argumentation, our reasons *are* causes, therefore, following from Kane, one would need to be responsible for some crucial aspect of their reasons, which in turn acts as the cause of an action. It is important to note here that for Kane, the origin of cause comes to dictate the freedom of will, a reason should originate from within the agent, not an external source which ensures that the agent could not have acted in any other way. If external sources come to dictate choice in such a way as determinism would describe, then the only truly free agent is the one which acts in and indeterministic world (Kane, 2005).

Luther makes the claim “Here I stand, I cannot do other”. Proponents of the incompatibilist school of thought have argued that, despite being the way Luther is at that moment, his past

choices have undoubtedly led him to be the way he is, thereby he has chosen to stand where he does in the way that he does (Kane, 2005).

It is hard to deny that we often act from a will already formed, in the moment of my action I act the way I do because of the will that I have, a will formed before I reached my present action. However, it is argued that we do in fact determine the will that is already formed in virtue of the long list of choices we had made prior to having that will. UR then is predicated on the notion that we are responsible for our actions if we are ultimately responsible for the formation of our will, even if that already formed will limits our scope of choice and freedom of will in the moment (McKenna, 1998).

The requirement for ultimate responsibility runs aground when it reaches the inevitable threat of regress. How could we possibly know at which point we make decisions on the basis of an already formed will or when we are making decisions that will form our eventual will?

This seems to be an incredibly high hurdle for the notion of ultimate moral responsibility to leap over. The requirement put forward by Kane does little to place any more control in the hands of agents regarding their freedom of will than would be present without his account. Kane fails to satisfy the Strawsonian requirement as well as the compatibilist requirement.

When one attempts to trace back the origin of reason for a choice, we find that no set of first choices becomes apparent whereby it is clear that these decisions will determine the kind of choices we make throughout the rest of our lives. Secondly, if individuals at young ages, before the age of neurological maturation, are being held morally responsible for the formation of the way an individual is in later life, it seems that the character formed from these decisions is hardly up to the task of making mature moral decisions.

So, it seems then for ultimate responsibility to hold we must concede that the will which we deem to be responsible for our actions was formed by choices made by an individual we would most likely not hold morally responsible for their actions, at least not to the fullest extent. The determined choices made by an adult were formed by the will of a child whose disposition would set the trajectory of the adult's choices across their entire lives. Furthermore, the notion of having to be responsible for one's reasons all the way back and therefore having to address the ensuing infinite regress is not a mandatory position, we are still left with the question of whether UR is a necessary requirement for freely willed action (Hurley, 2000).

This paper poses the question: If we cannot choose the way we are *all the way back* what would changing the way we are *midstream* achieve in our argument for freely willed action? I contend that:

1. UR is not a hard requirement for freely willed action because it is too high a hurdle for any practical model of free will to leap.
2. That genetic editing can:
    a. Increase an individual's scope of choice in the immediate sense by altering physiological limitations placed on the individual by genetic circumstance and,
    b. In a future state, be able to fundamentally alter the genetic structure of psychological character through live gene editing to *change the way one is* midstream so to speak.

What do we mean by 'the way we are'?

When we focus on discussions about free will, the notion of an individual being *'the way they are*' is a regular statement. I am the way I am, the way I am impacts what I choose to write and how I go about doing this. Likewise, my friend has no disposition to write about what I do and so does not do it, this is because of the way they are. So, the question that seems to be of importance here is what makes us the way we are?

Life is one long learning process, it comes about as a series of complex decisions, automatic reactions, and considerations, relying on our logical and rational thought patterns as well as our emotional and empathetic reflexes. I may enjoy vanilla ice cream more than I enjoy chocolate because of experiences I have had with ice cream throughout my life. Vanilla has been more often enjoyed by me than chocolate and so I develop a preference. Perhaps I associate vanilla with a good memory, or I find myself associating chocolate with a less pleasant memory. Our preferences often come about as a result of experience.

Experience is a complex topic in its own right and is far too broad to receive the full attention it deserves in the context of this paper, however, I would be remiss if I did not discuss it in a minimally satisfactory way. Our experiences are derived from our senses, our sight, hearing, taste, touch, and smell. These senses pick up stimuli from the outside world and translate it into complex bio-electrical signals which are then sent to the brain to be processed.

If we take sight as an example, light reaches our eye and passes through the cornea where it travels through the pupil and is focused by the lens which correctly focusses light onto the retina. The retina then uses specialized cells which take that light and translate it as bioelectrical signals. These signals then travel along the optic nerve, across the optic chiasm and eventually arrive at the occipital lobe (National Eye Institute, 2022). The brain then interprets these signals and creates an image which we call sight. However, a key component to sight is that we do not in fact see actual objects, rather we see a mental picture produced by the brains interpretations of electrical signals it receives[14]. These signals are arbitrary, they in no way resemble the actual object of perception, rather, much like a computer, they are a kind of code which tells us which colours are being perceived, in which areas of the visual field, where certain lines are present and the approximate distance away from the eyes the object is located, among many other metrics used (Rock, 1981).

The interpretation of these signals relies on the brain being able to order them into a meaningful image and to do this, it relies upon experience to form predictions. The brain predicts, as accurately as it can, what is being seen. It adds its own input to construct the image, therefore, sight is as much an internally constructed perceptual experience as it is an external stimulus (Crane and French, 2021).

Our brain is in a similar situation to the man in the Chinese room in Searle's famous thought experiment (Searle, 1982). According to Searle, he finds himself in a sealed off room with no windows or doors or way of contacting the outside world except for a letter box. In the room he finds himself surrounded by a series of baskets containing a variety of Chinese symbols and to his right he finds a bookshelf lined with manuals. These manuals contain within them sets of rules, where each Chinese symbol is matched with a corresponding Chinese symbol found in the indicated basket. As Searle acquaints himself with the room, a letter passes through the letter box, it is in Chinese and Searle understands none of it, as he understands absolutely no Chinese. And so, he refers to his manuals and painstakingly matches each symbol in the letter with its corresponding symbol in the basket and assembles these symbols in response to the letter. He passes his own letter back out the letterbox, having no idea what he has said or even

[14] The brain and the sensory organs work together to form mental images of the things being perceived. The process is collaborative as opposed to linear, for example, an object perceived through a narrow slit may still be perceived in its entirety through the phenomenon of *painting* (Rock, 1981). This phenomenon is when the brain takes in limited sensory information and completes the image from memory and past experience, thereby contributing to the perception of images as opposed to being a mere recipient and processor of information.

Rock, I. (1981) 'Anorthoscopic Perception', *Scientific American*, 244(3), pp. 145–153.

what the letter he had previously received was talking about and yet, to the person on the outside of the room, the response is in perfect Chinese and completely sensible. To the native Chinese speaker, they are under the impression that they are communicating with another, human Chinese speaker and yet Searle understands no Chinese at all (Searle, 1982).

The brain is in a similar situation, it is in its own sealed off box, it cannot see, touch, smell, taste or feel the outside world at all. It receives all its information about the outside world through electrical signals, which come along nerve tracts, its own letterbox if you will. It matches these signals up with past experiences of these signals and generates predictions about what it is most likely perceiving and when satisfied, sends its own electrical signal back out the letterbox in response, which moves the body in a manner conducive to an appropriate response to the stimulus (Friston, 2009). The brain perceives the world as electrical signal, not as concrete and physical and so to provide meaning it must create a predictive image of what it is perceiving. Our experiences then are in many ways, incredibly accurate and predictive hallucinations (Clark, 2013). The computer I see in front of me in my mind is not the actual computer but rather a very impressive prediction of what this computer looks like. Our brain builds up its predictive bank throughout life in order to finely tune our hallucinations to create the most accurate images of the world it can.

Our experience is as much a product of the internal mind as it is a product of the outside world, and it is experience and perception that allow us to make decisions. I choose vanilla ice cream over chocolate ice cream because of the way it tastes, but the way it tastes is a product of my own inner mental predictive processes in response to electrical signals caused by eating ice cream. These inner processes are the physical workings of the bioelectrical brain at work and must be in some way determined by physical laws. My preference of vanilla then may be entirely determined, my choice then is not only a forgone conclusion but my preference and reasoning for choosing vanilla over chocolate is determined as well.

So, the way we are could be said to be a combination of past experience, the way the brain constructs these experiences in a hallucinatory kind of way and the manner in which the brain responds to this stimulus through the messages it sends through its letterbox. A great deal of choice then comes to rely on the workings of our biological machinery, in fact all choice can be said to be the way our brain predicts our world to be and the value it assigns to these predicted objects.

What would we achieve if we were in some way, able to manipulate and engineer this biological machinery?

Directly addressing the requirement of Ultimate Responsibility.

The remarks of Kane stipulate that for an individual to be held morally responsible for their actions, and by extension, to have willed those actions freely, the individual must meet the requirement of Ultimate Responsibility (UR). This has already been described, however, I now intend to directly address this requirement and argue against it.

The requirement for UR leads to an infinite regress, at no point can we find the "first will" so to speak, and for this reason we cannot trace responsibility back to a concrete source within the context of individual actions (Strawson, 2000). The dispositions on which we rely when making decisions were formed long before we could conceive of them or influence them. The factors which contribute to the formation of these dispositions are many and varied, ranging from genetic predisposition, physiological make-up, life experiences, upbringing and environmental context to name a few.

The requirement that we must in some way have been the cause of these dispositional qualities is an extreme and unnecessarily strict requirement to impose on an individual's will. Strawson agrees with this, however it is our take aways that differ. He holds that UR is impossible and that we therefore cannot be truly free, I hold that it is an unnecessary requirement for freely willed action. If we consider cases in nature where some entity is *causa sui,* we would be hard pressed to find any entity that fits this description. It would be a safe assumption to make that most readers would concede that a self-causing entity is impossible.

There is no doubt that the requirement of UR is incredibly difficult, if possible, at all, to meet, where there is room for doubt however is whether we are required to impose this standard on our conception of free will when other simpler explanations will serve our purpose just fine.

My position is that in a moderate reasons responsive compatibilist understanding of free will, we are not required to live up to the standard of UR. We are able to choose freely if the following conditions are met.

1. Our decisions originate from within ourselves and are not coerced, manipulated, or forced.

2. Our decisions are made in accordance with our "good enough" reasons.
3. We are presented with a scope of choice. [15]

When these conditions meet, we have a model which allows us to explain and understand freely willed action in a deterministic world. We can acknowledge that we are the way we are and can do nothing other than what we do, and yet we are also able to carve out the intricacies of voluntary or forced action and assign responsibility to these actions accordingly.

Simply put, this model of free will works and it has no room or need for the requirement of UR. The universe itself leaves very little room for *causa sui* entities, relegating these possibilities to the hypotheticals. There are arguments to be made in favour of retro-causation, however these discussions are beyond the scope of this paper and in any case, I do not believe these cases would add much more value to the present discussion than a moderate reasons responsive compatibilism does regarding the nature of free will. [16]

At risk of oversimplifying the task, I address the requirement of UR by simply showing that it is not a necessary condition for free will and that a moderate reasons responsive compatibilism operates as a better mechanism for understanding freely willed action and moral responsibility.

[15] This scope is variable and may change, but the absence of which would indicate a choice not made freely as the choice would necessarily need to be made from forces external to the agent. An example might be the totally paralyzed and mute individual with no means of communication. Their carer may decide that they need a haircut, they of course lack the requisite scope of choice to be able to refuse or accept this action and therefore lack a scope of choice. The decision is made from without because the agent has no scope of choice from which to act. This links back to earlier discussion surrounding scope of choice being a necessary condition for freely willed action.

[16] See Faye, 2021 for further discussion on this topic.

Faye, J. (2021) 'Backward Causation', in E.N. Zalta (ed.) The Stanford Encyclopedia of Philosophy. Spring 2021. Metaphysics Research Lab, Stanford University. Available at: https://plato.stanford.edu/archives/spr2021/entries/causation-backwards/ (Accessed: 14 October 2023).

Chapter 6

Conclusion.

This paper has centred around four main components: the way we are and the way we choose, the reasons which inform our choices, the basis for genetic editing and the ways in which genetic editing might change the way we respond to reasons and indeed which reasons we respond to.

Genetic editing intersects with free will in two interesting ways, the first being its ability to expand an individual's scope of choice and thereby widening the number of options available when a choice is made. This expansion of scope allows for more fine-tuned responses to reasons and for the consideration of more reasons more generally. Secondly, genetic editing, particularly in terms of in vivo genetic editing, may hypothetically enable an individual to manipulate their reasons responsive processes in such a way that they will respond to reasons that they may have previously been insensitive to.

This argument has made a case in favour of a moderate reasons responsive account, it has then leveraged this account so that the field of genetic editing may be applied to its operation. The result of this application is that, in a concrete and current case, genetic editing can expand the scope of freedom in terms of reversing and altering genetic illness and or abnormality. This case places the discussion firmly in the realm of possibility for a contemporary application[17].

This argument also poses the more abstract and by extension philosophically impactful case of genetically engineered psychological structures, which would, hypothetically, change our responsiveness to reasons. This is a step into unventured territory, whereby as a species we are for the first time tinkering with the machinery of our will.

I have made these cases on the back of a concept I term the "scope of choice". This concept is a necessary but not sufficient condition for freely willed action. What this implies is that for an individual to choose freely in accordance with their good enough reasons, the agent must have available to them a scope of reasons for which they may be responsive to. As this scope expands, we are able to respond to options that more closely align with our good enough

[17] In particular cases such as that of SMA and colour blindness mentioned previously in this paper.

reasons. Likewise, as this scope narrows, we are responsive to reasons that will align with our desires less specifically.

Genetic editing then does not make us radically free by blowing the doors off Strawson's argument, on the contrary, it is a means by which we may manipulate the machinery of free will in a moderate reasons responsive framework. With regards to Strawson, I have not committed the paper to an assault of Ultimate Responsibility, rather I have deemed it to be unnecessary for a working conception of free will. I pick out the specific premise that for an agent to will freely they must be responsible for the way they are all the way back and deem it to be an impossible and unhelpful criterion for establishing a satisfactory model of free will. And so, I discard this requirement and with it Strawson's argument.

The argument I have made is that genetic editing is a means through which we can expand our scope of choice, be that in my concrete or hypothetical case, and in so doing, genetic editing then comes to expand our freedom of will in ways never before possible.

This work is by no means final or exhaustive, rather, I hope that it will act as a primer for the consideration of this topic moving forward and I have aimed to achieve this by establishing an argument for genetic editing being a tool for the expansion of human freedom of will.

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