

Protecting women by moderating men? Gene line editing in the case of the MAOA gene and social markers.

Dissertation for the MSt Practical Ethics
University of Oxford

September 2024

Candidate Number: 128648

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Dissertation for the MSt in Practical Ethics, Michaelmas Term 2024

Word count (excl. reference list): 14,997 words

Abstract

In this thesis, it is argued that there are serious reasons to consider gene editing to prevent unusually violent males from existing. Violence disproportionately impacts women, girls and sexual minorities perpetrated largely by cisgender non intersex heterosexual males. I address the premise that there is a good reason to consider gene editing to prevent (unusually) violent males from coming into existence. I draw on the example of the MAOA-L genetic variant specific to males and found to be a key factor in certain cases of male aggression. I first consider that violence against women and vulnerable groups (WVG) is a very serious problem and most methods to solve it have failed. Furthermore, there is reason to think that the usual approaches will continue to fail and cannot be reformed because of entrenched patriarchal societies, poor investment and late intervention. They will also likely continue to fail because male aggression is on the increase across global populations. One alternative approach that might be considered is investigating the biological dimensions of violence. Using biomarkers to predict violence has been proposed but as I will show, this faces serious problems, both scientifically and ethically. Another approach, that plausibly would not be subject to the same objections would be to try to intervene in biology earlier, through gene editing in embryo. By extending arguments set out by McMahan and Savulescu on embryo selection versus gene editing I consider the permissibility around MAOA-L gene editing. Objections still

exist in the space of regulation and democratisation. I will show however that gene editing does not fall prey to scientific or ethical objections sufficient to show it should not be seriously entertained. Research into this approach must be invested in and I conclude that gene editing to address male violence against WVG should be considered more significantly.

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Introduction

Targeted gene editing is entering an exciting new era in addressing disease.

Sequencing of the human genome and understanding the role of genes in health and disease is underway¹. Technologies hailed as revolutionary in being able to edit DNA are continuously developing. To date there has been a disproportionate focus on leveraging such technologies to mitigate physical disease. My focus will be to extend the question of permissibility of such technologies to the issue of unjustified, genetically driven male cisgender violence. Unjustified violence is for the purposes of this research defined as rape and sexual harassment, rape as a weapon of war and domestic violence (Lindemann, H, 2019). In 2024, the World Health Organisation estimates indicate that globally 1 in 3 or 30% of women worldwide have experienced physical and / or sexual violence in their lifetime (WHO, 2024)². Such violence is damaging to the survivors, to the people around them, to society at large and as we consider here, to the perpetrators.

Monoamine oxidase A-L (MAOA-L) genetic code (otherwise known as ‘the warrior gene’) found on the X-chromosome has been proposed as a significant neurobiological factor in driving propensity to commit various forms of aggression (Caspi, 2002). The MAOA-L gene has been correlated with antisocial behaviour, aggression, and violence (including sexual violence). The MAOA-L gene is reported to be rare, but population studies remain limited (Caspi, 2002, p851). Nevertheless MAOA-L serves as an interesting precedent for the question of whether it would be permissible to address male tendencies for violence against WVG with biological

¹ See also the Human Genome Project <https://www.genome.gov/human-genome-project>

² <https://www.who.int/news-room/fact-sheets/detail/violence-against-women>

means. There have been specific cases of MAOA-L carriers being found guilty of committing unjust violence in the form of sexually violent acts against WVG.

Abnormal behaviour such as impulsive aggression in the form of arson, attempted rape and exhibition were cited in the case of Brunner et al. 1993. MAOA-L therefore provides an example of how biological indicators of propensity to commit violence can be helpful in prevention of said aggression.

I consider whether it is ethical to edit the MAOA-L gene as a precedent for addressing male perpetrated sexual or gender-based violence against women and other vulnerable groups (WVG)³. To address this, I will consider various premises. First, I consider the problem of violence and sexual violence against WVG; Second, I address why societies efforts to address it have been intractable; Thirdly, I consider ongoing barriers to addressing violence against WVG using the same approaches before; Fourthly, I consider alternative approaches in the form of biomarkers and their limitations. Finally, I consider the role of gene editing and application to MAOA-L carriers in embryo. I draw on the argument structure proposed by McMahan and Savulescu (2023) that (1) it would be better for the MAOA-L holder, (2) not doing gene editing would be worse for the MAOA-L holder, (3) better-off people should exist rather than a MAOA-L carrier, (4) we have a duty not to cause a less well-off person to exist, (5) gene editing is better because it allows the MAOA-L carrier to exist rather than disallow their existence. The ethical questions around addressing sexual violence against WVG are not new. The application of gene editing as a recourse for survivors, perpetrators and wider society provides additional opportunity for

³ Such as those identifying as female. Male perpetrated violence against sexual minorities is of concern however there were gaps in the literature about this form of violence in relation to MAOA-L carriers.

discussion.

1. An overview of MAOA and the problem of male violence

The presence of the MAOA-L genetic code (otherwise known as ‘the warrior gene’) found on the X-chromosome (Caspi 2002) has been identified as a neurobiological factor in driving propensity to aggression when coupled with high provocation (McDermott R et al, 2009). MAOA is an enzyme that breaks down neurotransmitters in the synapse. Some humans have a low expression variant of the gene MAOA which can affect neurotransmitter levels (including serotonin and dopamine) and related activity in the amygdala and the prefrontal cortex (Shih et al., 1999)⁴. The rates of this low-activity MAOA in the population are debated but some researchers suggest they could be one third of the male population (Mcdermott R, Tingley D, Cowden J, Frazzetto G, Johnson DD, 2009). Whilst it is not possible to attribute all cases of MAOA-L violence to violence targeting VWG or that all violence against VWG can be attributed to a genetic factor alone, it is an example of how genetic predisposition to violence (including sexual violence) can replicate (Zhang-James, 2019). In a mapping of genetic predisposition to violence 40 interrelated genes were mapped in mice to also demonstrate functional pathways for aggression in human models (ibid). Gene interaction and neural pathways were found to play significant roles in expression of violence (Buckholtz, JW and Meyer-Lindenberg A, 2008).

⁴ MAOA-L is only one contributing disease to overall violence alongside schizophrenia and other forms of psychosis. I do not intend to claim that all violence and specifically violence against women and PCC is due to disease alone with harmful patriarchal norms, harmful social and religious practices and autocratic political systems significant factors amongst others.

In 1993 a series of often sexually violent attacks by male members of a Dutch family prompted a woman to seek support from clinical geneticists⁵. Han Brunner and colleagues at the Nijmegen hospital worked with the family to uncover a genetic code for an enzyme called monoamine oxidase A (or MAOA) (Brunner et al, 1993). Brunner syndrome as the condition became known was then revisited in Caspi's 2002 longitudinal study which followed young males over thirty years. The findings were then validated in Fergusson's 2011 replication study. Findings indicated that a mutation in MAOA hindered boys brains in finding ways to cope with maltreatment. Neurotransmitters in the brain key to emotional control such as dopamine (DA), norepinephrine (NE) and serotonin (5-HT) were seen to morph. Over time this manifested as violent behaviour when environmental triggers were in place. Both studies (2002 and 2011) reinforced the connection between both genetic and environmental causes (GxE) of male perpetrated violence. Caspi's 2002 study found 44% of children carrying MAOA-L went on to commit violent crime when also subjected to environmental triggers in the form of maltreatment⁶. This rate was at the time equivalent to the rates of "major risk factors associated with cardiovascular disease" (Caspi et al., 2002, 854). A more recent study saw male college students issue hot sauce to individuals assumed to have stolen money from them. It found when environmental triggers were low (20%) there were marginal differences in how MAOA-L and MAOA-H individuals reacted however when the triggers rose to 80% the rates reflected what Caspi had previously found in terms of

⁵ Attempted rape of a sister and forcing other female family members to undress at knifepoint were two incidents shared in the original Science article in 1993.

⁶ IQ was also a factor that was considered however the Caspi 2002 study did not find that IQ was as relevant a factor as exposure to maltreatment.

propensity to commit aggression and more specifically, enact spite in MAOA-L carriers. (McDermott, 2009).

Despite the replication work some researchers remain concerned that MAOA genotypes alone are insufficient to identify aggression⁷. One of the primary gaps in data originates from how MAOA-L presents in ethnic minority groups and how MAOA-L rates differ across population demographics. Also in 2002, another team of researchers suggested that MAOA high- and low-level differentiation between global populations may have been accentuated by positive selection, finding that ‘The H test and the low diversity levels suggest that the underlying population structure may have been accentuated by positive selection, potentially acting on MAOA-related phenotypes’ (Gilad Y et al, 2002). The team advocated for further studies but suggested that in practice in some populations, MAOA-L prevalence is not just higher but is a sign of positive genetic evolution. Such findings were received with scepticism made worse by the perceived over-elevated interest in the original findings⁸. If in certain populations male aggression is replicating and triggers for violence are increased by the presence of digital media, then we should consider what this means for violence against WVG (Hahn et al, 2014)⁹. The original scepticism around these studies should be balanced against what they could mean for those on the receiving end of such aggression and for society as a whole, and I now consider this.

⁷ Criticism from some in psychiatry such as Duncan L and Keller M in 2011 suggested these results suggested a publication bias, originated from low statistical power resulting in a high false discovery rate.

⁸ Google scholar suggests these papers had, in 2014, been cited over 7,000 times not far off paper on the structure of DNA. I contend that public interest should not undermine the relevance of such findings.

<https://www.thehastingscenter.org/a-decades-worth-of-gene-environment-interaction-studies-in-hindsight/>

⁹ See also <https://www.propublica.org/article/social-media-violence-young-americans#:~:text=As%20shooting%20rates%20among%20the,prompting%20people%20to%20take%20action>

2. Violence against WVG is a serious problem *and* there are reasons to think that methods to solve it have failed and will continue to.

Violence against WVG is not rare and harmful masculine behaviours and attitudes are cited as the primary drivers of violence against women (WHO, 2024). This is increased amongst the lesbian, gay, bisexual, transgender, queer, intersex, asexual and other (LGBTQIA+) gender and sexual minority communities (Meyer, Doug, 2016). One in three cisgender women or 736 million cisgender women globally are subject to physical or sexual violence by a partner or stranger (WHO, 2024). Violence against many men and individuals in the LGBTQIA+ population is likely to be as harmful to individuals and society¹⁰. However, whilst boys, men and LGBTQIA+ communities are also impacted, the inequities that women and girls suffer positions them as specifically exposed (WHO, 2021). Society has not managed to rectify issues of inequality to alleviate the differing lived experience of men and women and vulnerable groups¹¹.

Across the world but particularly in Oceania, Southern Asia and Sub-Saharan Africa ('high-risk continents') girls and women aged 15-24 are most likely to experience violence¹². Evidence suggests that "Violence – in all its forms – can have an impact

¹⁰ Philosophical doctrine also has diverging views on the definition of violence that are out of scope. Jason Wyckoff defends that violence is neither right or wrong, Matthias Lser debates whether it is right or wrong to have respect for the victim. All these views have been well captured in Vittoria Buffachi's Introduction: Philosophy and Violence, 2013.

¹¹ Such inequalities narrow in emergency or humanitarian situations where all groups become exposed to violence and abuse (migrant hubs for example where human traffickers operate).

¹² In these most high-risk areas violence against women and girls is experienced at 33-51% (WHO, 2021). From research undertaken it is the structural inequalities which highlight why it remains important to study violence against boys and girls and LGBTQIA+ as distinct but complementary. For instance, certain intersections across geographies and societies are more exposed than others – populations living with disabilities for example may be

on a woman's health and well-being throughout the rest of her life – even long after the violence may have ended. It is associated with increased risk of injuries, depression, anxiety disorders, unplanned pregnancies, sexually transmitted infections including HIV and many other health problems” (WHO, 2020). It remains unclear then why addressing such violence is limited to social solutions. It could be argued using the WHO figures on sexual violence that if one third of the female population will experience sexual violence and there are 3.95 billion women globally (Statistica, 2022)¹³ the scale of the problem dwarves for example heart disease, the most prevalent physical disease, which effects around 250 million people¹⁴. This suggests it warrants attention and innovation to address it.

Sexual violence perpetrated by males has impacts on society as a whole and comes with tremendous costs, impacting national budgets and overall development. In July of this year (2024) the UK National Police Chiefs' Council (NPCC) updated a report on violence against women and girls which identified the issue of male-perpetrated violence as a national emergency¹⁵. Intimate partner violence (IPV) remains the most significant form of violence experienced by women and girls (WHO, 2020). It is also the most significant type of domestic violence in the private space. Usually, IPV is experienced and perpetrated by individuals in blood or

more exposed than other groups and racial minority populations living with disabilities even more so (See also Bagwell-Grey, Jen, Schmitz, 2020).

¹³ <https://www.statista.com/statistics/1328107/global-population-gender/#:~:text=Of%20the%207.95%20billion%20people,2022%20were%20below%2015%20years.>

¹⁴ <https://www.bhf.org.uk/-/media/files/for-professionals/research/heart-statistics/bhf-cvd-statistics-global-factsheet.pdf?rev=e61c05db17e9439a8c2e4720f6ca0a19&hash=6350DE1B2A19D939431D876311077C7B#:~:text=lt%27s%20estimated%20over%20250%20million%20people%20are%20living%20with%20coronary%20heart%20disease.&text=Globally%20around%20145%20million%20men,women%20have%20coronary%20heart%20disease.&text=Coronary%20heart%20disease%20kills%20an,the%20world%27s%20single%20biggest%20killer>

¹⁵ <https://news.npcc.police.uk/releases/call-to-action-as-violence-against-women-and-girls-epidemic-deepens-1>

intimate relationships. Domestic violence includes child abuse and elderly abuse in the home. IPV covers ‘physical, sexual or psychological harm, including physical aggression, sexual coercion, psychological abuse and controlling behaviours’ (UN Women, 2024)¹⁶. As an example, the UK NPCC reported that 242 domestic abuse deaths where partners or former partners are responsible for death were recorded in police reports between April 2022 to March 2023¹⁷. The real scale of violence goes beyond police reports for a multitude of reasons such as underreporting, problematic legal frameworks and police complicity amongst others (Mulvahill, N & Sweeting, F, 2024). Barriers to addressing sexual violence and violence against WVG have not been sufficiently addressed across the world due to entrenched institutional patriarchy, corruption and backlash against gender equality¹⁸. to overcome what amounts to a global pandemic (it is transmissible and severe comparable to a physical infection (Jung et al, 2019)) (Morens D et al, 2009).

3. Methods to solve violence against women and girls will likely continue to fail

Rawls’ *1971 Theory of Justice* gives us guidance in how a society should function to rectify inequalities through our institutions and policies by suggesting we consider others through a veil of ignorance. Others argue that reform of public policy and political institutions are not sufficient, because male-perpetrated violence against

¹⁶ <https://www.unwomen.org/en/what-we-do/ending-violence-against-women/faqs/types-of-violence>

¹⁷ Domestic violence crimes or IPV should be seen as distinct to other forms of VAWG such as female genital mutilation (FGM); online or technology facilitated violence; child, early and forced marriage; human trafficking; femicide; sexual harassment; rape; corrective rape and sexual violence in conflict.

¹⁸ The US for example is alongside Iraq, Sudan and a wide range of other countries in refusing to ratify the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW). See also Alvarez, J and Bauder, J, 2024).

WVG widely occurs in the ostensibly ‘private’ institution of the family. Friedman, Stoll and other feminist critics have therefore suggested a failure to include family-based violence in our theorizing or calls for reform facilitates injustice against WVG. An example of this is the limited investment in engaging men and boys to address the problem of violence against women and children¹⁹.

Evidence suggests that across the globe approaches to identify the causes of and prevent violent males from acting violently have failed. UNODC reports from 2021 suggest global prisons are overflowing with male inmates and that males consist of 94% of the overall prison population²⁰. Sexual offenders however largely escape incarceration (there are varying perspectives as to whether prison is a solution to sexual violence or a temporary preventative measure). A study by the US organisation Rape, Abuse and Incest National Network (RAINN) found that “out of 1,000 rapes, 993 will go unpunished. Only about a third — 344 — are reported to police, 63 of those reports lead to arrest, 13 of those cases are referred to prosecutors, seven of those cases lead to a felony conviction, and just six of those rapists will be incarcerated”²¹. In addition to this pattern of impunity there remains doubt by some that incarceration is the best deterrent to prevention of violent crime with limited evidence that harsh sentences stop crime prevalence (Von Hirsch, A et al. 1999). Rehabilitation and psycho-social mechanisms to prevent recidivism or violent crime are not well invested in nor universally available (Gibney D, Jones A, 2014). The digital society, access to pornography and digitalised violence is

¹⁹ The Global Database on violence against women found only one in ten initiatives to prevent / mitigate violence against WVG across 193 countries target men and boys.

²⁰ https://www.unodc.org/documents/data-and-analysis/briefs/DataMatters_NM_Day_2023.pdf

²¹ <http://rainn.org/statistics/scope-problem>

considered to have contributed to younger predators and younger victims²².

Given the evidence that suggests the failure of existing approaches I argue that a wider approach needs to be considered that factors in not just political or institutional causes of male violence but also biological and genetic causes. In the next section I look at the role of biomarkers. This will be necessary to understand gene modification of MAOA-L, in accordance with the argument structure I laid out previously.

4. Responding to the biological dimensions of violence –bio-prediction and continued problems

Accepting the connections between genetic predisposition to violence (discussed under section 1) and the scale of the problem of violence against WVG (2) and that society has and will continue to struggle to address such violence (3), I now consider non-social predictors for violence against WVG in the form of bio-prediction.

A. Biomarkers and the relevance to MAOA-L identification

Bio-prediction would be based on identifying carriers of the MAOA-L gene and then providing social prescriptions or isolating them before they commit acts of violence.

Biomarkers or biological markers in genes provide a reference point for cause of disease or susceptibility²³. These are considered helpful in diagnosing, treating and managing physical illnesses and contribute to better decision-making for societies.

Nevertheless, there are limitations to their application for behavioural or

psychological conditions²⁴. Challenges related to bio-prediction include a)

²² <https://library.open.org/handle/20.500.12657/51536>

²³ Biomarkers Definition Working Group (2001) *Clinical Pharmacology & Therapeutics*, 69, 89–95.

²⁴ Zohny et al (2018) have suggested that the focus on biomarkers in relation to violent crime is disproportionate given the cost involved in white-collar crimes. I dispute this claim—violence against women is underestimated

treatment for positive outcomes for the individual and society can be coercive and could amount to eugenics, b) supporting an individual to handle the stigma associated with bio-prediction could be as costly as incarceration and c) bio-prediction is reliant on identification of adults or self-referral.

B. The slippery slope from consenting preventative treatment to eugenics
As efforts to drive gender equality have manifested thinking on violence has become polarised between two schools of thought. One, newer set of perspectives originates from a school of thought identifying that the causes of male-perpetrated violence originate from deep rooted institutional failures to address gender inequality and remove harmful patriarchal norms. Another set of older views contends that natural selection / physical advantage and biological determinism is the cause of male-perpetrated violence. This conclusion, that violence against WVG should be reduced to biological terms (such that the violence is not meaningfully within a person's control) has the unsettling result of undermining the basis for holding people responsible for their behaviour (since logically, this requires that they have meaningful control over it). Nevertheless, in understanding how to address male violence and stop resulting violence to wider society it is important to understand both the social drivers of male violence and any biological predisposition through bio-prediction (Brunner H et al, 1993).

Historically the use of bio-prediction has unfortunately resulted in either multigenerational stigmatisation or the development of harmful eugenics programmes seeking to push certain differently abled, ethically or religiously diverse

and under analysed and impacts on a wide range of other issues including having devastating effects for the global economy, for future generations and for democratic values and rule of law. Failure to address violence against women can enable an environment of impunity that increases the space for white-collar crime (Langton and Truman, 2014).

groups out of populations.²⁵ The US 1917 policy of forced sterilisation of individuals including ‘persons guilty of a particular offence, like rape’ is a testament to the risks of bio-prediction based on criminality (Savulescu, 2001). In the Czech Republic sterilisation or medication is still used to address the propensity for sexual violence (Lišková, K and Bělehradová, A, 2019). Consent, ‘fully informed when a capacitated (or “competent”) patient or research participant to whom full disclosures have been made and who understands fully all that has been disclosed consents voluntarily to treatment or participation on this basis’ (Eyal, 2019) is fundamental for bio-ethical treatment to be issued. What remains in question is whether the individuals in the US 1917 case or in the Czech Republic can consent to the procedure in question. It is not possible within the scope of this research to cover all arguments around biomarkers and consent, but they serve to articulate one of the primary challenges with implementation beyond identification of individuals²⁶.

C. Biomarkers and Stigma: The Macbeth dilemma - the challenge of risky definitions
Let us now consider the question of stigma. Mathew Baum (2016) highlights the key trade-offs between helpful uses of biomarker application and the unintended consequences of applying them. Baum first highlights the challenges in biomarker application: *risky definitions* being applied deterministically when many individuals will not go on to ‘develop the thing they are at risk for’ (Baum, 2016). It is unlikely that Macbeth would have committed the acts that made him king had he never been told that he was going to become king. The stigmatisation of knowing your risk to a certain illness could ‘needlessly cause(s) fear and stigma’ and performing actions

²⁵ See also Lombrosco, Gibson and Rafter (2006) and the eugenics programmes promoted by the Nazi party.

²⁶ There are specific arguments around the use of sterilisation that are also relevant to this discussion which cannot be addressed in the space available. For further reading see Douglas et al, 2013.

that inadvertently lead to increased risk (Baum's example of *risky driving* where knowledge of one's biology results in enhanced moral responsibility to those around us (Baum, 2016)).

D. The cost of Biomarkers: risky punishment

The third consequence of biomarker challenges comes from a case like a MAOA-L carrier who, because of genetic behavioural markers related to his reactionary violence, could be owed different obligations in terms of resource allocation or in this case *risky punishment*. Controversially genetic carriers of MAOA-L who have been accused of committing acts of criminal violence have tried to use their biomarkers as a defence (State v Yopez, 2018). However, there is evidence that courts are rejecting genetic evidence because of the lack of knowledge about how the MAOA gene and antisocial behaviour work to result in the crime (Appelbaum P et al, 2015 and Shurich P et al, 2021)²⁷.

E. Risky assessment and limitations of science

Finally, Baum refers to *risky assessment* where decision making results in prioritising resource investment in individuals with high-risk markers. This is demonstrated in the 2024 case of Carys Holmes, a teenage army recruit, disallowed from entering the army based on her family history of breast cancer. Whether Carys goes on to develop breast cancer is unknown and preventing her from accessing a career which could improve her overall wealth, and security might increase her risk²⁸. Baum suggests many of the challenges against biomarker use fall out of how society distributes resources between 'sick vs. well' rather than addressing

²⁷ The gaps in understanding environmental triggers of violence remain key to the problem around being able to identify perpetrators before they commit grievous crimes (see GxE as previously discussed, Caspi 2002).

²⁸ <https://www.bbc.com/news/articles/cl40ex5rrnko>

propensity of risk of disorder development. Furthermore, there are limitations in our understanding of how genetic codes work as a whole (outside of the coding of the disorder) which impedes our knowledge of risk. Whilst the full biomarkers debate is not the focus on this research, Baum helpfully guides us to rethink these challenges through consideration of the nature of the disorder and the risk caused by the disorder to see how biomarkers can work holistically with legal, social and medical systems. Nevertheless, one of the primary challenges to prevention and treatment of male violence against WVG stems from identification of risky male perpetrators early enough in infancy (Frazetto G et al, 2007). The solution for this would be to identify biological information about individuals before they become aggressive, and I will now consider how this could be addressed through genetic modification.²⁹

5. Gene-editing - An alternative approach

One way to address these problems with the bio prediction approach that would still involve seeing what we can learn from a biology-based approach would be to consider gene editing of embryos. As previously discussed, advances in gene technology mean that genetic modification technology may allow for us to take out heritable genetic codes -both those that cause physical illness and those that cause psychological illness with far more limited side effects than ever before. I will consider whether it is ethical to modify the genetic code of these men to address the scale of violence against WVG and consider the ethical implication of in-vitro gene

²⁹ We will not consider arguments for sterilisation or tailored pharmacological moderators for example as they depend on the biomarker being obvious and are considered too late for prevention.

editing drawing on the principles of bioethics beneficence, autonomy, justice and non-maleficence (Beauchamp and Childress, 1979).

Technology and definitions

Gene editing therapies and technology are fast developing. In 2023 the approval was granted for CRISPR to be rolled out to treat sickle-cell disease and Thalassaemia in the UK³⁰. There is good evidence to suggest that the earlier candidates receive genetic treatment to treat physical diseases, the more promising the improvements³¹. Therefore, we should consider how this could apply to behavioural disorders. CRISPR can carry out both ex-vivo genetic correction of patient cells and in utero modification³². Somatic gene therapies involve modifying a patient's DNA to treat or cure a disease caused by a genetic mutation. Somatic interventions may involve taking blood stem cells from a patient, correcting them (with CRISPR) and reinserting them to correct the genetic mutation. Somatic treatments change blood patterns but do not change sperm or eggs. Germline human genome editing, or germline gene editing (GGE) conversely alters the genome of a human embryo at its earliest stages to affect every cell and cells that are then inherited. Given the limitations in somatic and germline studies for psychological conditions, I will consider gene editing more generally unless otherwise specified. When referring to the 'future person' I indicate the person that they embryo will become.

³⁰ <https://news.vrtx.com/news-releases/news-release-details/vertex-and-crispr-therapeutics-announce-authorization-first>

³¹ <https://www.reuters.com/business/healthcare-pharmaceuticals/what-happens-when-2-million-gene-therapy-is-not-enough-2023-08-12/>

³² <https://www.frontiersin.org/journals/genome-editing/articles/10.3389/fgeed.2024.1342193/full>

6. Gene editing in embryo to address violent genes

I will consider the application to in utero gene editing or prenatal genetic editing which envisages the potential for a fetus to be diagnosed with a genetic disease before birth. This is important as there remain empirical and ethical risks around both ex vivo or embryo selection. Certain types of cancer, allergic reactions and damage to organs or tissues have been cited as ex vivo risks. Sex selection, an alternative to addressing genetic risk factors ex vivo, is controversial given the cultural and social background to such decision-making. Parental autonomy and reproductive liberty are key arguments in favour of sex selection (albeit limited in scope to the global minority who can realise autonomy / reproductive liberty) however this debate is not the focus of this research (Liao M, 2005). Instead, let us consider gene editing as an alternative. This proposal too has both scientific and ethical challenges. Nevertheless, I argue that these can plausibly be addressed by investing in studies addressing the biological presence of male cisgender aggression, and that if they are addressed, this has a good chance of meaningfully reducing violence against WVG.

Framing the debate, drawing on arguments from embryo selection In *Reasons and Reproduction: Gene Editing and Genetic Selection (2024)*, McMahan and Savulescu discuss why embryo selection is not necessarily morally better to address genetic disorders than gene editing. They propose three categorisations which help us consider relevant ethical issues surrounding gene editing to edit MAOA-L in an embryo. These arguments include '*The comparative view*' (where benefiting and harming are irrelevant to the existence of future persons), '*The impersonal view*' (distribution and maximisation of wellbeing as priority regardless of

a particular person) and ‘*The two-tier view*’ (which encapsulates person-affecting and impersonal reasons) (McMahan, Savulescu, 2024, 12). I will now consider the *two-tier view* given gene editing of MAOA-L may have both person-affecting and impersonal dimensions. The following arguments will be considered: (1) it would be better for *that* MAOA-L carrier, (2) *not doing gene editing* would be worse for that MAOA-L carrier, (3) better-off people should exist rather than a MAOA-L carrier (4) we have a duty not to cause a less well-off MAOA-L carrier to exist (5) gene editing is better because it allows the MAOA-L carrier to exist rather than disallow their existence (McMahon and Savulescu, 2024, 11). We now address the application of in-utero gene editing to cases of MAOA-L and consider the ethical repercussions associated with somatic (person-affecting) and germline (impersonal) edits; that is, edits which would be passed on in a heritable way.

7. The argument that it would be better for *that* MAOA-L carrier to have gene editing to edit MAOA-L (1).

The principle of procreative beneficence holds that in cases of embryo selection in the context of IVF, parents are morally obligated to choose the embryo which they have most reason to believe would have the best chances of a good life. The principle can be used to also apply to gene editing or not gene editing, however what the best life is in practice is contested.

A. Applying a criterion of what is a better life

Liao provides a rights-based criteria of beneficence which can help ensure that selected individuals should be ones where ‘genetic improvement affects the fundamental rights (including future identity, dignity, and good lifetime) of individuals

which are especially vulnerable and without autonomy, such as embryos or a newborn' (Liao, 2019, 103). It can be suggested that using Liao's criteria an MAOA-L carrier has the right to be born without irrational, reactionary violence which could undermine the future human's ability to live an autonomous life³³. Autonomy refers to the rational self-governance of an individual to realise self-affecting decisions regardless of external objections (Christman J, 2020). One aspect of autonomy is being able to govern one's behaviour according to one's values or ideals. The MAOA-L code reduces this ability on average (because it makes a person more inclined to uncontrolled fits of violence) and therefore it can be seen as reducing, on average, the future autonomy of the individual in this respect³⁴. This implies that if the gene were modified to eliminate this autonomy-reducing factor, then, all else being equal, the autonomy of the future individual could be enhanced by the editing. For the purposes of this research, we assume that the future person rather than the embryo can possess autonomy³⁵. There are scientific distinctions around the degree to which GGE can and will change the future human (see previous definition of somatic versus germline editing processes). Regardless of whether the eventual change to the future human (which is to a degree expected), by carrying out gene editing we are manipulating the future individual (Malmqvist E, 2007). Whether this manipulation of cells impacts self-governance of the future human or whether it would impede a

³³ Many researchers suggest that therapies are accepted in those who cannot give informed consent if the benefit is the survival or integrity of the newborn or child (Macpherson I et al, 2019). Due to space limitations, we cannot consider questions around consent and child age (see also Spriggs M, 2023).

³⁴ Liao suggests that GGE is impermissible when a fundamental capacity is taken away - 'Sunbathing is an activity, but is not a basic activity, because a human being qua human being's life as a whole is not affected if a human being does not go sunbathing'. Liao goes on to suggest that there are positive duties to ensure human beings have their fundamental conditions met if the duty is not demanding and that 'there would be a duty to correct the defects in this offspring' (Liao 2019,100).

³⁵ There are views that suggest the embryo demonstrates characteristics of self-governance amounting to having moral value equivalent to fetal personhood however these form part of a wider debate on the moral status of embryos which are not within the scope of this research (see Pennings et al, 2024).

better life for the MAOA-L carrier will now be considered.

Challenge 1: Could gene editing of MAOA-L take away the freedom to determine one's path argument?

One of the main issues with gene editing is that it might interfere with the moral agency of the resulting human or the ability to realise one's path in life. If by editing the MAOA-L gene we also remove the individual's aptitude for fighting for justice or creativity it might have a longer-term detriment to society (Liao, 2019). For example, Sam, an MAOA-L carrier mistreated in childhood, goes on to witness an attack on a woman in the street. Sam defends the woman and this goes on to drive his reactionary violence. Sam has taken the opportunity to autonomously manage his violence. MAOA-L however is not fundamental for realising a path in life and Sam could realise his autonomy in given situations without the presence of MAOA-L. Take the example of Joe Fallon, a University of California neuroscientist. Joe is a carrier of MAOA-L and could be a posterchild for why we should allow for environment to rectify behavioural diseases³⁶. Fallon married and never having 'killed, or raped anyone' identified his pathology whilst working on psychopathy and undergoing a series of genetic tests. Fallon calls himself a 'pro-social psychopath' that controls his tendency to rage in non-violent manners but does cite his loving childhood as instrumental in how his condition manifests. Using Fallon's case, we might contend that every MAOA-L carrier (even those in his situation coming from a long line of murderers) should be allowed the freedoms associated with humanity without due interference. However, many MAOA-L carriers will not however have the luxury of a

³⁶ <https://www.smithsonianmag.com/science-nature/the-neuroscientist-who-discovered-he-was-a-psychopath-180947814/>

life where they can mitigate their aggressive tendencies. Unlike Joe, they may experience mistreatment, they may grow up and live in economically or socially difficult environments. Calculating whether the future person could use their autonomy in a rational, positive manner is difficult given the uncertainty of environmental correction. Furthermore, as evidenced by the challenges to use of biomarkers, social correction is likely to be insufficient. In summary, the future human is unlikely to be negatively affected by having MAOA-L edited out. This implies that GGE should be considered in some if not all circumstances.

Challenge 2: Gene editing would harm the embryo, the future person and the mother

If we assume that the individual will be benefitted by the gene editing, we should also consider that it might cause harm (Ranisch A et al, 2022). Specifically, the individual and the mother could be harmed by the gene editing process. This would be bad because of the risk of physical harm, the impact on the future human and the resulting loss of confidence in gene editing for medical conditions. I will state how physical risks, with greater investment in technology and data, can be mitigated to such an extent that the overall benefits would likely outweigh the risks.

A. Harm to the MAOA-L carrier

The physical harm risk could come in the form of the unintended consequences of gene editing. In gene editing, rewriting small segments of genomes requires breaking the DNA base and relying on DNA reparation in the cell to generate positive reactivity. Off-target changes to personality and psychological integrity are a major concern of gene editing. Off-target genome editing refers to nonspecific and unintended genetic modifications. Examples include toxicity, inflammation and

cancer³⁷. We do not yet know the unintended off target consequences of gene editing because of gaps in science and empirical data³⁸. Such data would give us insight into whether the descendants of a modified MAOA-L carrier will be more / less harmed than had they not undergone gene editing³⁹. Further concerns are raised around whether gene editing will impact the psychological integrity of an individual - 'If gene editing alters brain development in a way that causes a significantly different psychological trajectory, it would be identity-altering' (Alonso N, Savulescu J, 2021). MAOA-L is already identity altering⁴⁰. Instead of viewing the editing as identity-determining, we should perhaps consider that it is identity-correcting or rehabilitating (McMahan, 1998).

B. Harm to the mother

Gene editing technology is improving all the time and is demonstrating that physical harm can be increasingly mitigated. There does remain gaps in our knowledge about longer term effects to the future human and to the mother which should be given more investment as for physical disease⁴¹. Questions over the potential health risk to the mother are however not well-understood yet. Limitations include a lack of

³⁷ In 2018 He Jiunki modified embryos with germline therapy before implanting them into women. The aim of this process was to disable the CRR5 gene which can trigger vulnerability to HIV. Whilst this is distinct from in-utero gene editing, this research provides a background to concerns around germline editing. Issues raised include concerns around immunity, with dominant mutations being un-editable and the potential for undue influence on the host cell gene expression. Whether these changes can be deemed as harms are unclear.

³⁸ A counter position could be considered in that regardless of GGE the population experiences epigenetic changes in descendants of those who have experienced extremely traumatic events. There is constant adaptation and evolution in the population – not all is positive for society (Yehuda et al, 2016)

³⁹ Lavazza also warns against how GGE might impede variety in the population – 'evolution makes the species prosper, as the more polymorphisms are found in the population, the more easily there may be some individual capable of withstanding new environmental challenges, be it a bacterial or viral threat, harsh climatic conditions, and so forth' (Lavazza A, 2019).

⁴⁰ The MAOA-L variant might be associated with a specific dysregulation of an emotional brain centre (Buckholtz et a., 2008).

⁴¹ Delivering gene editing on the in-utero fetus is suggested to have many benefits such as dose control per weight, to deliver multipotent cells (hematopoietic progenitor cells) that can develop into all types of blood cells, including myeloid-lineage and lymphoid-lineage cells and are found in peripheral blood, bone marrow, and the umbilical cord blood) (Parenteau and Flake, 2020).

genome studies and a lack of clinical data (Godar S, et al., 2016)⁴². Invasive procedures for mothers and embryos are already addressed through blood transfusions (such as for RH) via umbilical vein injections at 18 weeks' gestation (Peranteau W, Flake A, 2020). Furthermore, there is already success in addressing severe immunodeficiency diseases in this way by injecting the mother with paternal blood stem cells. Studies largely focus on the immune response / rejection of treatment by the mother however research suggests that the earlier the GGE intervention the safer it is for both mother and embryo (Peranteau W, Flake A, 2020). This indicates that there are strong reasons to consider studies in this area to better understand the benefits and unintended consequences to the mother and the MAOA-L carrier over their lifetime.

8. The argument that not doing gene editing would be worse for *that* MAOA-L carrier (2)

Since genes that predispose an individual to behave in unjustified violent ways (e.g., commit criminal assault) are likely to significantly decrease their chances of living a good life, the procreative beneficence principle suggests that parents are morally obligated, all else being equal, to, if possible, select embryos or protect their children from harmful genes.

Environmental luck and parental limitations

Take the example of Bob and Barb. They have found out they are expecting a child. After undergoing in utero pre-natal testing, the MAOA-L gene has been identified in their future son (Barb's great uncle was a convicted murderer). Having received

⁴² Such studies could assess the risk to the mother from the procedure alongside the risk should the mother experience filial harm by the MAOA-L carrier. See also (Hemptinne M and Posthuman D, 2023).

information about MAOA-L and the potential for environmental triggers, they contemplate gene editing. The MAOA-L may / may not manifest because Barb and Bob are happy, middle class and emotionally stable with a strong support network. But what if they send their son to day nursery and he is molested or hit. Will it trigger the MAOA-L, and would they know? If it does, they can rely on various options such as social service support, tailored pharmaceutical programmes, mindfulness coaching and access to specific diets (Baum and Savulescu, 2014). However, there is the possibility the child will still be worse off because of the stigma associated with the treatment and having to manage the condition. Knowledge of violent tendency might be considered leaving the individual worse off than if the tendency was removed totally.

Furthermore, MAOA-L has been associated with poor intellect and impulse control (Baum & Savulescu, 2016). If the carrier is from a sexual or racial minority, intellect and impulse control are compounded by the inequalities and injustices of society - 'No matter how committed they are to achieving a just world, parents won't be able to change the fact that their child will grow up in a sexist, racist, and homophobic environment' (Sparrow, 2021, 16). Whether parents bear the responsibility to create children who are not disposed to immorality for the benefit of the child and wider society will be revisited in Chapter 10. Parents originating from deprived or deprived backgrounds could be unable on numerous accounts to protect children from harm that in this case could manifest the violence associated with MAOA-L.⁴³ Options to criminalise parents for deliberately maltreating a child known to have the MAOA-L

⁴³ Vice President Kamala Harris, during her time as San Francisco district attorney from 2004 to 2011, oversaw a controversial truancy programme that carried misdemeanour penalties for parents whose children regularly missed school. It was widely criticised for disproportionately affecting low-income and minority residents.

variant have been challenged by the moral hazard that a parent would simply deny knowledge. The cases of babies such as Ella Vitalis or Finley Bowden left in the care of violent offending parents and eventually tortured to death are testimony to the fact that capacity to safeguard is overwhelmed. Women are at the frontline of protecting children from harmful abusers (themselves also vulnerable to abuse).⁴⁴ The use of gene editing could go some way to rectifying the opportunity for socially disadvantaged children living with the condition if coupled with societal investment.⁴⁵

Theoretical application of Quality-of-life adjusted years (QALYs) in relation to MAOA-L carriers and sexual violence offenders

A quality-of-life adjusted year (QALY) is the academic standard for measuring how well all different kinds of medical treatments lengthen and/or improve patients' lives. QALYs help by giving a generic measure of quality and the quantity of life liveable with a given disease. Furthermore, QALYs help in economic terms to evaluate the value of medical interventions. The argument that Gyngell C, Bowman-Smart H & Savulescu J make about this is that QALYs can be used beyond understanding disease burden of physical disease to intelligence (2019). The implications of this argument for the permissibility of gene editing are that if we can

⁴⁴ In April 2023, the UK courts ruled that parental rights can be stripped if a parent is found to be guilty of serious sexual offences including paedophilia and rape (crimes committed at a far statistically higher rate by male parents. See <https://www.nytimes.com/2023/10/03/nyregion/dead-baby-brooklyn-abuse.html> and https://www.bbc.com/news/uk-68830796?fbclid=PAZXh0bgNhZW0CMTEAAaanjZQO2E3ONPIBQ3b9CuySqC0Lmiq7fjYdrU5-Y42eza8-grZDJRjzxBs_aem_ASnl-0VxN1vSB3sEKQfYPdYdquOblkjD9mRxoEn9NmW0ZjxMV5c0P3GiFuO6jbToPSlwjEv6ndWJLVXA6YFPikl and <https://www.independent.co.uk/news/ap-england-english-london-mary-b2346769.html> As well as the campaign ran by <https://supportnotseparation.blog/2021/02/28/children-killed-rises-to-69/>

⁴⁵ Gyngell C et al. suggest 'As with complex disease, using the polygenic scores it is possible to stratify the population into three board groups 'high predisposition to high intelligence'; 'medium predisposition to high intelligence' and 'low predisposition to high intelligence'. It will become theoretically possible to use GGE to shift individuals from the low or medium predisposition groups, into the high predisposition group (2019).

understand a life is likely to be poorer because of lower intelligence identified in polygenic scoring, we could potentially use gene editing to improve their intelligence outlook. The slippery slope to enhancement will be discussed shortly.

Nevertheless, it is relevant to consider whether perpetrators and victims of sexual violence could have their life opportunities scored and, whether based on such scoring preventative programmes could be explored. There is already some empirical data available about the disease burden of abuse. Children that experience maltreatment have losses in quality of life seen as 'significant' amounting to 11 days a year lost in QALYs and 'the bad effects of sexual violence are quite significant' (Corso et al, 2008). In addition to evidence on how violence and sexual violence impacts on the life of survivors, an MAOA-L carrier's life could be below the neutral level for well-being- (they may be incarcerated and cause serious harm to themselves and others) resulting in poor QALYs scores for the perpetrator. In conclusion, it is likely that QALYS could be used to assess whether a MAOA-L carrier would be worse off and, all other things equal, it is likely this would be the case for most MAOA-L carriers.

Challenge: we do not know what a better or worse life would be?

Procreative beneficence has been criticised as a principle because it suggests moral obligations on parents that extend to anti-selection of different abilities which are not necessarily universally considered of harm to the child such as deafness. As to the question of who should decide what a good life is, the worry is that across liberal societies there are gaps in agreement around what can be conceived to be a good life. If survival is the primary goal of a good life and the MAOA-L carrier lives in a context which demands aggression as a tool to realise this good life (children of drug

dealers for example), there are challenges to whether the principle holds. Some critics might suggest that positive examples of 'warrior-ism' exist and are necessary in the population and that instead of modifying the genes of an individual we should rely on therapeutic medicines previously dismissed because of the social stigma (Van Vugt, M, 2012). However regardless of context, intuitively it seems flawed that aggression and violence could be attributes a parent would want to see in a child. MAOA-L after all is not a deafness and has severe implications beyond the individual. Irrational violence might bring hedonistic satisfaction to the carrier the inverse could be said to their mother, to their siblings or to others who cross their paths (Douglas and Devolder, 2021). Although there are valid disagreements about many aspects of what it means to live a good life, there are also areas of broad agreement. One such area is that, all else being equal, being disposed to engage in unjustified/criminalised violent behaviour is likely to count against such a life on any conception, not only for the carrier of MAOA-L but for those around them. I have discussed that the resulting violence and sexual violence has public health consequences. Therefore, we can assume that a good life would be one where an individual does not have to carry MAOA-L genes if, all other things being equal, there was a way to edit out the gene. Arguments for gene editing of an MAOA-L carrier to address violence against WVG need to be balanced in terms of what the violence and the gene editing means for the wider society.

9. The argument that better-off people should exist rather than a MAOA-L carrier (3)

In the original Savulescu -McMahon research the ethical issue was embryo selection versus gene editing. Here I apply the argument that better-off people should exist

rather than the MAOA-L carrier to a discussion of whether decreasing the number of MAOA-L carriers could serve to promote better off people overall.

Better – off victims and future victims

If we were able to identify vulnerability in future victims, would we gene edit the future victim or gene edit the MAOA-L carrier? Intuitively it seems we would still seek to curtail the aggressor. Therefore, it follows that we cannot consider the future person's autonomy as more important than say the autonomy of potential victims, some of whom may already be ex-vivo people or indeed children or embryos created because of future rape. Male strength might need to be collateral damage in curbing aggression 'If male dominance is based on greater biological sources of strength and aggression, then so long as human biological nature remains the same, curbing male dominance will require unending social constraints on male strength and aggressiveness. Women would need extra social protection against male strength and aggression, since men are typically stronger and more aggressive than women (Friedman, 2004, 164). This suggests that gene editing is likely to be acceptable for some cases of individuals likely to carry out violence because more better off people should exist (in this case women and vulnerable groups that would otherwise be subject to violence). We go on to discuss whether editing MAOA-L will ensure that better-off people exist.

Impersonal and personal issues of restorative justice

The presence of violence and aggression is a harm to individuals and society with origins and root causes that often manifest over multiple generations. Restorative justice is a means of facilitating repair after harm, often bringing partners together as a form of restitution (Boonin, D, 2008). Boonin suggests that it is morally permissible

for the state to treat those who break the law in ways that would be wrong to treat those who do not (Boonin D, 2008). Whether this can be extended to the embryo who has not yet broken the law but who carries genetic markers that indicate propensities has been discussed. Boonin's main point is that instead of punishing perpetrators the state should focus on victim restitution, and this is what we will consider. Mothers of MAOA-L holders have been named 'carriers' (Baum and Savulescu, p.16, 2013).⁴⁶ It is feasible that access to gene editing for the most disadvantaged women who themselves may have experienced abuse, be a matter of restorative justice – 'In the face of threats from those we fear, we may have to devote ourselves to self-defence and, perhaps, even to simple self-preservation. Not only do a person's particular choices and actions change because of her fear of others; her entire character may become distorted by the need for heightened vigilance and frequent self-defence (Friedman, 2004: 150).

Parental justice

An additional form of justice could manifest for the parents with regards to the caring burden they might have in handling a child with physical or psychological abuse tendencies should also be considered. There remains a reality that parents have limited ability to determine the positive trajectory of their children. We have previously discussed the limited support available in economically constrained social support systems. In the case of Jennifer and James Crumley, parents convicted for involuntary manslaughter accused of 'failing to take reasonable care' to prevent their child's mass shooting in Michigan in 2021. Ethan, their son, was

⁴⁶ Each female takes an X chromosome from each parent (one normal X chromosome from the parent but still pass this variant to children).

experiencing mental health issues and was hearing voices around the time of the attack⁴⁷. Parents that have done everything to rectify their child's disposition to violence could still be held accountable for potential crimes resulting from their children. Parents could be owed justice to be rid of harmful genetic polymorphisms that could stigmatise procreation and the dignity in parent-child relationships (Palacios-González C., 2015). This becomes more significant in the face of technological manipulations to children that are outside of parental capacities to control⁴⁸. Intervening at the embryonic stage offers parents a path to an alternative child-raising life and could serve as restorative in correcting genetic tendencies to irrational violence. Specifically, it could do so by being transformative in addressing bias and harm in society that has left women, vulnerable and poorer groups exposed to disproportionate violence. If we were to consider the sexual violence originating from genetic violence as a public health issue (as well as a social / criminal issue) we could better balance duties owed to those vulnerable and, to living individuals and future victims (Trickett P, Noll J, Putnam F, 2011).

Better off societies

A 37 year longitudinal study identified sexual offending as prevalent in families (Långström N, Babchishin K, Fazel S, Lichtenstein P, Frisell T, 2015). As previously discussed in Chapter 3, the scale of sexual violence against women is disproportionate to the justice and prevention mechanisms and investment

⁴⁷ Baum and Savulescu suggest reasonable but foreseeable events may occur because of parental negligence (such as not getting help for hallucinations) (Baum and Savulescu, 2013: 22).

⁴⁸ Genetic untying meaning raising designer individuals without kinship would be better than gene editing individuals born from MAOA-L carrying parentage could be considered. I suggest that the concept of biological parentage should be debated but that what is important is the nature of the caregiver (Liao, 2019).

available. Professor Michael Salter, director of Childlight UNSW in School of Social Sciences at the University of New South Wales and an expert in child sexual exploitation and gendered violence wrote in the Guardian in April 2024, 'If men's violence is not prevented or treated, it tends to spread like an infectious disease'⁴⁹. In 2024 a social media debate posing the question of whether women would rather be left in the woods with a man, or a bear highlighted that most women fear men and would choose the bear.⁵⁰ Whilst was not a representative survey, this debate seeks to demonstrate that most women in society feel at risk of harm. One of the arguments for gene editing (beyond benefit to the future person) is social solidarity to 'remedy harms that have already been set in motion for future generations' (Gyngell C, et al, 2019). If an MAOA-L carrier in society may go on to harm a woman (knowing the vulnerabilities that exist to sexual violence) and by society failing to meaningfully ensure protections, society then becomes complicit in the knowledge of the potential harm.

During the COVID-19 pandemic trade-offs around autonomy, privacy, equity, trust and proportionality were made to ensure people were better off than they might have otherwise been (Biller-Andorno et al, 2022). Given the far-reaching impact of violence against WVG similar approaches should be considered in the application of gene editing - 'The harm that people can do to each other are of special relevance to autonomy. These two aspects of embodiment, capacity and vulnerability, are interrelated in that vulnerability to a particular harm diminishes as one's capacity to

⁴⁹ <https://www.theguardian.com/commentisfree/2024/apr/30/in-a-society-where-male-violence-seems-inevitable-we-need-much-more-than-education-and-awareness>

⁵⁰ <https://theconversation.com/why-women-would-prefer-to-be-alone-in-the-woods-with-a-bear-than-a-man-229140>

defend oneself against that type of harm increases. Women, for example, are particularly vulnerable to rape and domestic violence.’ (Friedman, 2004, 156). Examples demonstrating the scale of global violence against WVG include the following cases. In 2024 a Milwaukee woman was sentenced to eleven years in prison for killing the man that sex trafficked her to numerous other males and raped her. The perpetrator was a white male who had been filming and disseminating his abuse of her since she was a minor.⁵¹ A case of a French woman drugged and raped by 71 men including her husband over a nine-year period also came to light in 2024.⁵² In 2024, it was reported that in India a woman reports (noting most do not or cannot) a rape every fifteen minutes.⁵³ Additionally, the technology facilitated abuse of women is now on the increase with many more men able to stream violence against WVG with impunity. The role of MAOA-L is not stated in many of these cases, nor may it be present however the cases serve to demonstrate that investment in gene editing to identify violent perpetrators before they commit such acts should be considered.

Sexual violence being a particular type of violent crime of a scale similar in reach to a gender-specific pandemic which involves loss of bodily integrity, and which has public health consequences and as such it is relevant to try to seek better lives overall even if the path to this is gene editing of an MAOA-L embryo.

⁵¹<https://www.washingtonpost.com/nation/2024/08/19/chrystul-kizer-sentence-wisconsin-sex-trafficking/>

⁵² See Pelicot case details <https://www.vox.com/world-politics/370736/france-rape-case-gisele-dominique-pelicot-metoo>

⁵³ <https://www.reuters.com/world/india/indias-struggles-with-high-rape-cases-low-conviction-rates-2024-08-15/>

Challenge 1: family desire for the best child

As previously discussed, some actions are 'person affecting' in that they will affect specific individuals in the future, while others are 'impersonal' since they change which individuals will exist in the future (Parfit D, 1984). The benefits awarded by gene editing MAOA-L will be a) person-affecting – the future human resulting from the edited embryo and living victims the fetus might go on to harm and b) impersonal given the future human will likely then go on to procreate different person(s) than they would otherwise and harm / not harm those around them not yet born (Sparrow, 2021). Therefore, editing the MAOA-L gene (if undertaken by germline editing) could have impersonal benefits beyond the individual. Sparrow (2021) has been highly critical of the impersonal reasons (to future persons not yet born) for gene editing 'The idea that parents are obligated to genome edit their children to suit existing social norms is offensive enough. However, should the benefits made available by genome editing become sufficiently large, there will be a compelling argument that parents should be required by law to enhance their children'.

One barrier to gene editing being used to address genetically originating sexual violence is poverty, social exclusion and race (Kuppermann, 2014). Conversely these are also the reasons why eugenics programmes have been highly controversial in the past-because they were seen as facilitating 'richer social groups [who] would genetically modify their children to create a superhuman race with enhanced cognitive abilities, resistance to disease, and quasi-immortality, dividing humanity into genetic "haves" and "have-nots."' (Lavazza, 2019). There is concern that in identifying individuals for gene editing society will 'go back to considering individuals affected by [mental illness / neurodiversity] as marked by "lesser genetic quality."'

(Lavazza, 2019). This is also a critique of procreative beneficence seen as having the potential for families to choose to ‘enhance their children rather than avoid a genetic disorder’ (Sparrow, 2021, 12-14). Sparrow suggests that instead of thinking of the wider society parents in the Western world will seek to abuse gene editing practices to reinforce the injustice already in society - ‘the “best” baby turns out to one who will grow up to be white, male, and straight... and blonde-haired and blue-eyed’ suggesting that ‘procreative beneficence [would] require parents to become complicit with injustice.’ (Sparrow 2021, 16). However, these concerns can be addressed by public policy debates which consider ‘the safety of the techniques, but also a democratic process that takes into account such differing views and values’ (Cavaliere, 2019, 221)⁵⁴. Whilst there are considerable debates around enhancement versus correction, it is hard to believe that MAOA-L gene editing can be seen as enhancement as the gene is acting abnormally and causes harm to the individual and others around them. MAOA-L is an off target change away from the MAOA-H version which, when working properly is seen to promote serotonin (Boardman et al, 2022).⁵⁵ This is not a polygenic editing case of eye colour or height nor a case of parental intolerance of future imperfections (Sandel, 2007). Therefore, it is important to address the difference between concerns around editing in / out for enhancement purposes and edited out to address disorders with off-target genetic harms as integral⁵⁶.

⁵⁴ Cavaliere’s requirement for a democratic process is important. Skewed legal, social, economic and personal security advantages for men across the world could impede global access for women to GGE to address MAOA-L and other violent genes. It could be envisaged that doing the right thing for women in the democratised societies could result in a population of homogenous less aggressive males. This could leave women in the rest of the world exposed to greater harm because gene editing certain males would potentially result in a less diverse population overall. Such limited diversity in Western populations could polarise global populations further along democratic vs autocratic lines.

⁵⁵ Expressivist objection suggests that human identity and disease are integral. I refute this specifically to the case of MAOA-L where both MAOA-L and the resulting sexual violence could both be perceived as *diseases*. To address one, you must address the other and consider bioethical implications that are impersonal in nature as relevant as person-affecting.

⁵⁶ It is important to distinguish between ‘those affected by levels of violent crime’ compared to ‘the cost of accommodating ‘immutable’ traits of others’ (Polcz S, Lewis A, 2016).

Challenge 2: the parental bias

An additional concern Cavaliere (2019) flags is the bias that comes with parenting.

Parents are simply not going to be able to rationalise the wider benefit to society and themselves. Cavaliere's argument is 'that the welfare of future children and the reproductive autonomy of the prospective parents are usually considered of greater moral importance than the aggregate interests of society in having healthy members' (Cavaliere, 2019). In other words, whilst no parent wishes for their child to go on to cause harm to themselves and others, they will focus what is within their control, raising an otherwise healthy child. Parents may also be so desperate to procreate that they may ignore the realities of the future life trajectory of the child even with information to the opposite. Gene editing may therefore be seen to undermine procreative rights to produce a child regardless of the conditions that child will live with. Principles of egalitarian justice which express equal concern with societal benefits could trump parental autonomy to procreate. With MAOA-L we are concerned with both justice for the offspring and for women and wider society should the MAOA-L embryo go on to become a serial rapist. The implications of this are that parental autonomy could trump any obligations of procreative beneficence. We consider this further in discussions of benefit to society.

10. The argument that we have a duty not to cause a less well-off person to exist, where we realise that an MAOA-L carrier's life is below the neutral level for well-being (4)

We have previously discussed that all other things considered, it is likely an MAOA-L carrier's life would be worse off and likely below the neutral level for well-being (under 2). For example, they may be incarcerated and cause serious harm to themselves and others. Now let us consider who has a duty to cause an MAOA-L

carrier not to exist. First, we must consider what powers and capacities those with a duty might have to the MAOA-L holder (in embryo form). Continuing from previous discussions we will address the role of the parents, and any duties owed the MAOA-L carrier by wider society.

Duty of parents

Most parents want to ensure that their future child has the greatest chance to live a good life. Parents do have obligations not to beget children who have a likelihood of a poor quality of life or who might be harmed for both the child and society. Parents are expected to uphold non-maleficence to their offspring by ensuring they provide their basic needs. Furthermore, there is an additional expectation that parents take opportunities to maximise their well-being (see, 1) and maximise future autonomy. This amounts to a moral responsibility as distinguished from causal responsibility. Parents have moral responsibility rather than causal responsibility because of their specific former powers and capacities that extend from procreation to upbringing of a child (Xu, 2021). One way of doing this starts in embryo by taking care of the future human. Non-invasive prenatal tests (NIPT) are a tool to expand the choice of a parent to maximise the chances to give a good future life to their child. This has been helped by the introduction of optional testing for untreatable foreseeable diseases such as Asperger syndrome, down syndrome, cancer, cystic fibrosis, and spina bifida. Statistical information could be at the disposal for women who seek to decide whether gene editing would be right to address MAOA-L both in terms of the rates of individuals that end up incarcerated but also in terms of the rates of individuals harmed by sexual violence from this genetic identity. Let us now consider who owes who the duty to provide this information.

Duty of society to the mother

Returning to arguments that better-off people should exist over the MAOA-L carrier we should also consider what duties are owed to those around the embryo. Perhaps most important to consider is the mother, who carries the MAOA-L on the x chromosome and who could bare the physical burden of an irrationally aggressive child / adolescent and the psychological burden of having to make the decision to undertake gene editing⁵⁷. The right of the mother to information about the specific risks not just to carrying the baby or to the future well-being or health of the baby but also to her gendered risk to exposure as a potential victim are relevant to enable the full autonomy of the mother (Långström et al, 2015)⁵⁸. This would be especially important where the fetus has been born to women who have not necessarily practiced their freedom in sexual reproductive rights (SRHR) and who might be the first to suffer from the sexual violence perpetrated by close male relatives. Women have traditionally held the burden for protecting themselves from violence in society and efforts to empower typically misconstrued as autonomy (such as birthing the child of a rapist where there is no other choice available) (Långström et al, 2015). Friedman states ‘Male dominance is bolstered by men’s statistically greater degree of aggressiveness and fighting strength as compared to women. Women are thus, on average, denied the most useful traits by which people defend themselves against physical threats from other persons’ (Friedman, 2004, 152). Gene editing of MAOA-L may in fact offer women a tool to defend themselves in some way from future male

⁵⁷ As previously discussed, the mother may not have full access to her procreative autonomy. The woman’s right to protect herself in her life, that of her other children and that of others from violence should be integral to her procreative liberty.

⁵⁸ Given the coercive nature in institutions and in relationships when it comes to sexual reproductive health rights and use of contraception and abortion (SRHR) (Strong, J, 2022).

aggression. Whilst we know that MAOA-L is likely low in presentation across the population other genetic markers related to violence might be more obvious and therefore warrant further investigation and identification.

Societal duty to address harm versus the problem of male violence: what is proportionate?

Statistically, it has been hard to prove how many male rapists go on to commit multiple rapes and the degree to which responses should be proportionate and robust enough to address the scale of the problem⁵⁹. There are also gaps in knowledge around the nature of MAOA-L perpetrated violence and other forms of violence against VWG that could have biological origins. There are also gaps in how violence manifests with new technologies giving additional platforms for irrational and premeditated behaviour⁶⁰. Take the example detailed in *Lisak and Millers' 2002* contested paper on *Repeat Rape and Multiple Offending Among Undetected Rapists* where 1882 men on a university campus completed questionnaires about their childhood and adult expressions.⁶¹ 34 perpetrators from the sample claimed to rape twice whilst 42 repeat offenders committed a total of 375 acts. Using this example, one MAOA-L carrying embryo could go on to become a future person which could commit rape against an average of nine individuals and significant harm against many more. Whether society has a duty to address 'Male dominance be found in all,

⁵⁹ The reasons for recidivism cannot be captured within the scope of this research.

⁶⁰ See United Nations Children's Fund, *When Numbers Demand Action: Confronting the global scale of sexual violence against children*, UNICEF, New York, 2024. The report finds that 'Globally, 650 million (or 1 in 5) girls and women alive today have been subjected to sexual violence as children. This includes more than 370 million (or 1 in 8) who have experienced rape or sexual assault in childhood' and refers to both contact (rape and sexual assault) and non-contact (verbal or online abuse).

⁶¹ https://time.com/wp-content/uploads/2014/09/repeat_rape.pdf Contested after Joe Biden used statistics from the report that repeat rapists reach 6 victims rather than 2 suggested elsewhere <https://www.heatherflowe.com/post/are-most-rapists-committing-one-offs-or-are-most-rapes-committed-by-a-felonious-few>

or nearly all, spheres of life' and whether gene editing is a means of doing so should be explored because 'Wherever male dominance appears, women's autonomy is threatened.' (Friedman, 2004, 151).⁶² Given harm as well as duty is different depending on the power individuals are likely to go onto possess in society and aggregated harm is greater if applied to potential victims, addressing violence in the form of MAOA-L and other related genetic causes of male perpetrated violence would most probably, based on empirical evidence, with all else being equal result in better off people.

Regulation and democratisation of access to gene editing

There remain significant questions over who should decide on gene editing embryos (women, society, parents) and on the value attributed to editing over selection. With increased genome wide association studies (GWAS) there are renewed opportunities for DNA data to be shared, commercialised and used for harm but also for potential good. These remain significant issues that are not fundamentally within the scope of this thesis. Perhaps international cooperation over CRISPR-Cas9 and new RNA technologies could drive non-maleficence rather than being seen as a dystopian tool⁶³. The problem in rolling this out comes in how to balance the consequentialist harms associated with the potential acts of MAOA-L carriers and balancing the freedoms of parents as a) individualistic, b) voluntary and c) without State coercion. Perhaps we simply need to be aware of these issues to avoid falling into a slippery slope rather than dismiss the functionality of gene editing

⁶² Friedman has written that such control involves 'men's greater control than women's of resources and power and men's control of women's sexuality and reproduction' and states that 'autonomy is more valuable for dominated people than for dominators' (Friedman, 2004, 151 & 161).

⁶³ See also <https://www.liebertpub.com/doi/full/10.1089/crispr.2020.0082>

completely on moral basis (Evans, 2021). International cooperation around the development of CRISPR Cas9 is testament to this. Regulation remains the most controversial area for consideration – ‘Despite these worries, the regulation of new reproductive technologies will be influenced by governments’ policies, which in turn will reflect the interests of society and societal views on emerging reproductive technologies’ (Cavaliere, 2019: 223). If technologies exist to correct an addressable disease they will likely develop with / without regulation. An ‘enlightened approach’ to inclusive, democratic regulation of gene editing could be transformative for populations suffering most from the eventual consequences of mental illness, crime and sexual violence (Cavaliere J, Devolder K, Giubilini A, 2018)⁶⁴. Public views in favour of gene editing are already positive when done early in embryo development – ‘86% of Americans with high scientific knowledge approved of the use of HGE to prevent diseases that would be apparent at birth. This drops to 56% of people with low knowledge of science’⁶⁵. Awareness and myth busting would have to be addressed to ensure that women carriers of MAOA-L were well positioned to use their autonomy to protect their offspring and in doing so contribute to curbing the sexual violence within society⁶⁶. However, I will now address challenges that too much information can undermine the autonomy of mothers and parents.

⁶⁴ One of the most intuitive concerns about technologies like germline engineering is the effect on equality. It is feared that germline engineering would only be available to the rich, and that it could widen the gap between rich and poor, adding biological advantages to already existing social ones. This is an important and complex issue, faced not just by genome editing but other goods like education. Ethically, we must take steps to ensure that the benefits and costs of HGE are evenly or shared [idem]

⁶⁵ *Public Views of gene editing for babies depend on how it would be used*, Pew research, 2018

⁶⁶ A similar trajectory has taken place on bioethical issues such as euthanasia.

Challenge 1: too much knowledge on the part of the duty bearer can undermine procreative autonomy

The complexity of the information and uncertainty associated with NIPTs can also be seen to undermine the procreative autonomy (the power to make and act on decisions about reproduction) of the parents (Horn et al, 2024). One example of how this is seen to work in practice is in Australia where estimates suggest 90% of prospective parents accepted selective abortion where NIPT was positive for Down syndrome⁶⁷. There is evidence women are choosing to have fewer prenatal tests because of the risks involved to the pregnancy coming to term and this could imply that even if offered gene editing, women would opt out of knowing their child could be a MAOA-L carrier⁶⁸. Additionally, women could hide this information for fear of coercion by partners to go ahead or abort the pregnancy. Psychological coercion already pervades the NIPT space and would likely increase in the case of testing for MAOA-L or other behaviour related disorders (DeGrazia, 2015 and Bennett, R, 2001). Therefore, for testing for MAOA-L it would be fundamental to deliver the NIPT with robust practices to ensure consent for NIPT and right to clear information. Gene editing *with* NIPT could therefore provide the potential for resolving many challenges around procreative liberty⁶⁹. Therefore, gene editing could prevent against future sexual violence perpetration and safeguard the integrity of the fetus by allowing for changes to be made to cells without parents having to abort or to sex select⁷⁰. This has benefits for parents who feel

⁶⁷ Families report feeling disempowered to assess the potential impact of a disease of their child and lack information. <https://www.downsyndrome.org.au/about-down-syndrome/statistics/prenatal-statistics/>

⁶⁸ <https://jamanetwork.com/journals/jama/fullarticle/1906614>

⁶⁹ ‘Procreative liberty—like all liberties—can be viewed either as a negative right that protects parties from governmental prohibitions or as a positive right that obligates government to facilitate choices or provide services’ (DeGrazia, 2015). Dworkin has contested whether choice increases overall freedom because of the increase in responsibilities and knowledge of uncertainties (Dworkin 1982) as captured by (Cavaliere, 2019, 221).

⁷⁰ Other more harmful methods such as forced sterilisation would also be unnecessary.

religion or culture prohibit abortion but also for potential adoptive parents and stepparents who would have the undue burden as part of their moral duty to protect the child from the MAOA-L triggers (Tabery, 2009). I now consider further arguments upholding that existence rather than non-existence is better for the MAOA-L carrier.

11. The argument that gene editing is better because it allows the MAOA-L carrier to exist rather than disallow their existence (5) According to Derek Parfit's 1987 non-identity account it is impossible to *harm* a being when an action causes a different being to come into existence (such as delaying conception due to an outbreak of a virus) or selecting different embryos. This has been used as an argument for embryo selection over gene editing however there remain questions around this premise that are beyond the scope of this research but that are relevant. The account relies on value judgements around existence as being better and non-existence as being worse which cannot be fully addressed within the scope of this research (McMahan, Savulescu, 2024, 10).

The question of all other things being equal

The entry for consideration around existence being better or worse can be found in consideration of what parents would do instead of gene editing all other things equal. Douglas and Devolder suggest that whether the editing can be seen to benefit the child will depend on what the parents *would* have done if they chose not to pursue gene editing (2021: 320). If we assume that the worst outcome is for the child to have a heightened risk in terms of likelihood to become a criminal and potentially sexually abuse others (with implications for future populations) then the options available to the responsible parent are to use donor gametes or abort and select another embryo or adopt (Douglas T, Devolder K, 2021: 314). If we do not allow gene editing and we

hold that parents would not want to cause harm to their child by allowing them to hold the MAOA-L gene and on balance the harm of gene editing is less harmful than the harm of the sexual violence and criminality and that many parents would not want to stop a child from coming into being then we can assume that gene editing is permissible. Gene editing will help avoid serious person-affecting harms and can avoid the abortion of a fetus and the resulting harms of having an MAOA-L carrier in society.

Selection as an alternative

Another argument suggests that instead of concerning ourselves with the impact of modified phenotypes (edited individuals) we would be better to diagnose embryos and select a different embryo based on not having mutations (of the MAOA gene in this case) (Sparrow 2021, 5). Darnovsky's "popular position" highlights that sex selection or embryo selection will bring into the world an entirely different human and so that human cannot be harmed and should be preferred to gene editing (McMahon and Savulescu, 2024, 13 and Douglas and Devolver, 2022, 305). This results in a different embryo being selected and therefore mitigates against issues of harm to the individual. However there remains significant challenges around this. A different child would be born to the embryo that was originally to be edited and this could resurface some of the enhancement challenges discussed earlier. Instead of addressing harms caused because of genetic material parents could be inclined to create totally different children. This could result in a child of a different gender 'if every family only wanted male children, based on the view that life for males is usually easier in society, this would result—contrary to individual expectations—in a worse condition for all, with a lack of women and a very strong competition between

men' (Lavazza A, 2019). This seems additionally flawed if for instance we are trying to address male violence against WVG. Sparrow has also suggested that a key issue with procreative beneficence is that 'if, some for reason, we insist that parents are obligated to ignore the implications of social injustice for the welfare of their children, an obligation to maximise expected welfare seems likely to require that parents select girl children' (Sparrow, 2010). If girl children were selected because they did better in school, were less likely to become violent or hold the MAOA-L gene (because of heeding warnings over gene editing) then there would also be repercussions for society in terms of diversity. Gene editing would remove the risk of sex selection, arguments for enhanced babies and address the fact that many parents do not and will not have access to embryo selection technologies (outside those with Western Educated Industrialised Rich and Democratic (WEIRD) values). In many of the cases where they do, financial, religious or cultural barriers exist to their being able to do so (Gyngell C, Savulescu J, 2017: 33). Bringing different children into the world other than those already conceived is problematic and not practical for most people. Gene editing on an individual will not change the individual existence but rather change the quality of that existence. Therefore, on the balance that the quality of the existence will likely not be worse than a life lived with MAOA-L for that individual and for those around them (person-affecting). Let us consider however the risk for future people (impersonal) on consequentialist reasoning, the last question we will consider before concluding whether gene editing should be considered as a means for tackling MAOA-L carrier's propensity for violence against WVG.

Challenge 1: Risk to future generations

Gene editing remains controversial as it involves making substantive changes in the human gene pool (Polcz S and Lewis A, 2016)⁷¹. As previously discussed, germline amendments carry consequences for future generations because they are “identity affecting” (Parfit 1984, 256). This means that they could have off target effects and could be inherited through the human gene pool, causing mutations from generation to generation. Gene editing will have moral implications for person-affecting harm (the harm to the fetus and resulting person) and impersonal or identity affecting harm (harm to future generations). Concerns around eugenic programmes and population enhancement based on cognitive capacities are based on concerns that enhancement of physical capacities will breed humans that are stronger and more psychologically weaponised (Liao, 2008). Countries across the world are becoming increasingly militarised and it would be naïve to assume that bio-enhancement is not part of the toolkit of these states. Sparrow argues that mitochondrial replacement and cloning are likely ‘technologies to be developed in the not-too-distant future’ and we should not be surprised if they seek to maximise harms to women and girls (Sparrow, 2021, 12-14)⁷². If society grasps addressing the biological drivers of violence, then instead of being exploited for eugenics purposes, gene editing could be a force of good and change the extent to which their children are

⁷¹ In 1988 (updated in 1996) the American Medical Association said it was appropriate to limit modification to somatic cited the conditions for non-therapeutic interventions (1) clear and meaningful benefit to the person, (2) no trade-off with other characteristics or traits, and (3) citizens must have equal access to the genetic technology, irrespective of income or other socioeconomic characteristics. There have been concerns around the reasonableness of application and the narrow scope.

⁷² Mitochondrial Replacement Therapy (MRT) is an in vitro fertilization (IVF) technique that involves removing an intended mother's nDNA from her oocyte or zygote, which contains mutated mtDNA, and transferring it into a female provider's oocyte or zygote, which contains nonpathogenic mtDNA and from which the nDNA has been removed. It has been found to have resulted in off-target effects such as the transfer of mutant DNA from the mother.

impacted by unjust social norms [Sparrow, 2021, 16]⁷³. If women are globally living in fear of sexual violence and we are unable to effectively address this through societal correction gene editing might be the answer.

Conclusion

In this thesis, I have argued that there are serious reasons to consider gene editing to prevent unusually violent males from existing for justice and public health reasons. I have drawn upon the example of the MAOA-L genetic predisposition to highlight the need for greater biological investigation in male perpetrated unjust aggression.

Given the scale and unpredictability of violence against WVG and the limitations in realistically how society can respond, I have concluded there is reason to think that the usual approaches will continue to fail. Another approach that was considered was to address the biological dimensions of violence. Using biomarkers to predict violence in advance has been proposed but also fails scientifically and ethically.

This is because of the potential for eugenic misuse, the cost of implementing case by case social rehabilitation (likely to face the same challenges as social prevention of violence against WVG) and support for addressing stigma will likely impede their rollout and the reliance on self-reporting or referral for identification of potential perpetrators. Therefore, it has led to a discussion of the alternative approach in the form of gene editing in embryo, a means to intervene in biology earlier. The framework established by McMahnnon and Savulescu around the embryo selection versus gene editing debate validates the permissibility around MAOA-L gene editing.

⁷³ <https://biology.stanford.edu/events/eugenics-and-scientific-racism-stanford-and-beyond/nathaniel-comfort-medicine-dysgenic#:~:text=Abstract%3A%20Dysgenics%20is%20the%20opposite,forces%20that%20encourage%20their%20production>

Whilst gene editing will not necessarily improve the overall life conditions of the human it will address the tendency for violence when triggered by MAOA-L and therefore contribute to a better life for *that* person and for *other* people that they will meet. Not doing MAOA-L gene editing will leave the future human, the parents and society in a worse off state. Therefore, carrying out gene editing in embryo on MAOA-L carriers will ultimately deliver greater utility not only for person affecting reasons but for *persons* affecting reasons. McMahan and Savulescu suggest that the person-affecting reason is stronger and trumps the impersonal reason however perhaps on balance in this case one cannot uphold without another⁷⁴.

Objections still exist in the space of regulation and democratisation however if we accept that women are globally living in fear of sexual violence, and we are unable to effectively address this through societal correction and the use of biomarkers remains problematic then gene editing might be the answer. Avoidance of sexual violence should be a global health and political priority for society. There is good reason to think that investing in research into in-vitro gene editing to remove the MAOA-L gene would substantially contribute to avoidance of sexual violence.

Significant opportunities are possible to do this through the ongoing work on genome sequencing⁷⁵. There are no ethical or practical defeaters to doing this.

Therefore, significant investment and resources should be put into clarifying whether this would really help, since it could possibly be of benefit to carriers of MAOA-L, to potential victims, to institutions and to society at large. I have argued

⁷⁴ See also conclusions on the limited importance of the non-identity problem for the public in making decisions Doolabh, K., Caviola, L., Savulescu, J. *et al.* 2019

⁷⁵ <https://www.oxfordharrington.org/events-news/news/research-uncovers-link-between-mutations-in-rnu4-2-gene-and-neurodevelopmental-disorders>

that any ethical and moral challenges one might have about investing in this type of research are outweighed by the potential benefits.

Bibliography

- Cavaliere, Giulia. "The Problem with Reproductive Freedom. Procreation beyond Procreators' Interests." *Medicine, Health Care and Philosophy* 23, no. 1 (August 14, 2019): 131–40. <https://doi.org/10.1007/s11019-019-09917-3>.
- CAVALIERE, GIULIA, KATRIEN DEVOLDER, and ALBERTO GIUBILINI. "Regulating Genome Editing: For an Enlightened Democratic Governance." *Cambridge Quarterly of Healthcare Ethics* 28, no. 1 (December 20, 2018): 76–88. <https://doi.org/10.1017/s0963180118000403>.
- Author(s) Jennifer L. Truman; Lynn Langton, and
Corporate Author Bureau of Justice Statistics
(BJS) Address 810 Seventh Street NW. "NCJRS Virtual
Library." Criminal Victimization, 2014 | Office of Justice Programs. Accessed
October 16, 2024. <https://www.ojp.gov/ncjrs/virtual-library/abstracts/criminal-victimization-2014>.
- Douglas, Thomas, Pieter Bonte, Farah Focquaert, Katrien Devolder, and Sigrid Sterckx. "Coercion, Incarceration, and Chemical Castration: An Argument from Autonomy." *Journal of Bioethical Inquiry* 10, no. 3 (June 29, 2013): 393–405. <https://doi.org/10.1007/s11673-013-9465-4>.
- Zohny, Hazem, Thomas Douglas, and Julian Savulescu. "Biomarkers for the Rich and Dangerous: Why We Ought to Extend Bioprediction and Bioprevention to White-Collar Crime." *Criminal Law and Philosophy* 13, no. 3 (August 10, 2018): 479–97. <https://doi.org/10.1007/s11572-018-9477-6>.
- Author(s) Jennifer L. Truman; Lynn Langton, and
Corporate Author Bureau of Justice Statistics
(BJS) Address 810 Seventh Street NW. "NCJRS Virtual
Library." Criminal Victimization, 2014 | Office of Justice Programs. Accessed
October 16, 2024. <https://www.ojp.gov/ncjrs/virtual-library/abstracts/criminal-victimization-2014>.
- Godar, Sean C, Paula J Fite, Kenneth M McFarlin, and Marco Bortolato. "The Role of Monoamine Oxidase a in Aggression: Current Translational Developments and Future Challenges." *Progress in neuro-psychopharmacology & biological psychiatry*, August 1, 2016. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4865459/>.
- Godar, Sean C., Paula J. Fite, Kenneth M. McFarlin, and Marco Bortolato. "The Role of Monoamine Oxidase a in Aggression: Current Translational Developments and Future Challenges." *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 69 (August 2016): 90–100. <https://doi.org/10.1016/j.pnpbp.2016.01.001>.
- Doolabh, Keyur, Lucius Caviola, Julian Savulescu, Michael J Selgelid, and Dominic Wilkinson. "Is the Non-Identity Problem Relevant to Public Health and Policy? An Online Survey." *BMC medical ethics*, July 5, 2019. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6612186/>.
- Douglas, Thomas, and Katrien Devolder. "Gene Editing, Identity and Benefit." OUP Academic, June 5, 2021. <https://academic.oup.com/pq/article/72/2/305/6294062>.

- “Nathaniel Comfort - ‘Is Medicine Dysgenic?’” Department of Biology. Accessed October 16, 2024. <https://biology.stanford.edu/events/eugenics-and-scientific-racism-stanford-and-beyond/nathaniel-comfort-medicine-dysgenic#:~:text=Abstract%3A%20Dysgenics%20is%20the%20opposite,forces%20that%20encourage%20their%20production.>
- Dworkin, Gerald. “Is More Choice Better than Less?” *Midwest Studies in Philosophy* 7 (1982): 47–61. <https://doi.org/10.1111/j.1475-4975.1982.tb00083.x>.
- Bennett, Rebecca. *Theoretical Medicine and Bioethics* 22, no. 5 (2001): 461–71. <https://doi.org/10.1023/a:1013015019369>.
- DeGrazia, David. “Ethical Reflections on Genetic Enhancement with the Aim of Enlarging Altruism.” *Health Care Analysis* 24, no. 3 (August 6, 2015): 180–95. <https://doi.org/10.1007/s10728-015-0303-1>.
- DeGrazia, David. “Ethical Reflections on Genetic Enhancement with the Aim of Enlarging Altruism.” *Health Care Analysis* 24, no. 3 (August 6, 2015): 180–95. <https://doi.org/10.1007/s10728-015-0303-1>.
- Contributor(s): National Academy of Sciences; National Academy of Medicine; National Academies of Sciences. “Human Genome Editing: Science, Ethics, and Governance.” Science, Ethics, and Governance | The National Academies Press, February 14, 2017. <https://nap.nationalacademies.org/catalog/24623/human-genome-editing-science-ethics-and-governance>.
- Miriam Kuppermann, PhD. “Prenatal Testing and Informed Choice.” *JAMA*, September 24, 2014. <https://jamanetwork.com/journals/jama/fullarticle/1906614>.
- “Prenatal Statistics.” Down Syndrome Australia. Accessed October 16, 2024. <https://www.downsyndrome.org.au/about-down-syndrome/statistics/prenatal-statistics/>.
- Funk, Cary. “Public Views of Gene Editing for Babies Depend on How It Would Be Used.” Pew Research Center, July 26, 2018. <https://www.pewresearch.org/science/2018/07/26/public-views-of-gene-editing-for-babies-depend-on-how-it-would-be-used/>.
- “Over 370 Million Girls and Women Globally Subjected to Rape or Sexual Assault as Children – UNICEF.” UNICEF USA. Accessed October 16, 2024. <https://www.unicefusa.org/press/over-370-million-girls-and-women-globally-subjected-rape-or-sexual-assault-children-unicef>.
- Strong, Joe. “Men’s Involvement in Women’s Abortion-Related Care: A Scoping Review of Evidence from Low- and Middle-Income Countries.” *Sexual and Reproductive Health Matters* 30, no. 1 (March 24, 2022). <https://doi.org/10.1080/26410397.2022.2040774>.
- Xu, Hanhui. “What Should Parents Do for Their Children &—a Philosophical View of Parental Obligation.” *Open Journal of Philosophy* 11, no. 04 (2021): 427–43. <https://doi.org/10.4236/ojpp.2021.114029>.
- Polcz, Sarah, and Anna Lewis. “CRISPR-Cas9 and the Non-Germline Non-Controversy.” *SSRN Electronic Journal*, 2016. <https://doi.org/10.2139/ssrn.2697333>.

- Ilklic, Ilhan, and Rainer Brömer. "Michael J. Sandel: The Case against Perfection: Ethics in the Age of Genetic Engineering." *Medicine Studies* 1, no. 2 (June 2009): 183–85. <https://doi.org/10.1007/s12376-009-0018-4>.
- Boardman, Felicity, and Gareth Thomas. "Expressivist Objections to Prenatal Screening and Testing: Perceptions of People Living with Disability." *Sociology of Health & Illness* 45, no. 6 (October 2022): 1223–41. <https://doi.org/10.1111/1467-9566.13559>.
- Kuppermann, Miriam, Sherri Pena, Judith T. Bishop, Sanae Nakagawa, Steven E. Gregorich, Anita Sit, Juan Vargas, et al. "Effect of Enhanced Information, Values Clarification, and Removal of Financial Barriers on Use of Prenatal Genetic Testing." *JAMA* 312, no. 12 (September 24, 2014): 1210. <https://doi.org/10.1001/jama.2014.11479>.
- Sparrow, Robert. "Human Germline Genome Editing: On the Nature of Our Reasons to Genome Edit." *The American Journal of Bioethics* 22, no. 9 (April 19, 2021): 4–15. <https://doi.org/10.1080/15265161.2021.1907480>.
- Parfit, Derek. *Reasons and persons*, January 23, 1986. <https://doi.org/10.1093/019824908x.001.0001>.
- India struggles with high rape cases, low conviction rates | Reuters. Accessed October 16, 2024. <https://www.reuters.com/world/india/indias-struggles-with-high-rape-cases-low-conviction-rates-2024-08-15/>.
- Zhou, Li. "The Horrifying Rape Case Roiling France, Explained." *Vox*, September 9, 2024. <https://www.vox.com/world-politics/370736/france-rape-case-gisele-dominique-pelicot-metoo>.
- Sex-trafficking victim Chrystul Kizer gets 11 years for killing abuser - the washington post. Accessed October 16, 2024. <https://www.washingtonpost.com/nation/2024/08/19/chrystul-kizer-sentence-wisconsin-sex-trafficking/>.
- Addressing volatile ethical issues of covid-19 with the core five enduring values list for health care professionals | catalyst non-issue content. Accessed October 16, 2024. <https://catalyst.nejm.org/doi/full/10.1056/CAT.22.0108>.
- Gyngell, Christopher, Hilary Bowman-Smart, and Julian Savulescu. "Moral Reasons to Edit the Human Genome: Picking up from the Nuffield Report." *Journal of Medical Ethics* 45, no. 8 (January 24, 2019): 514–23. <https://doi.org/10.1136/medethics-2018-105084>.
- Lisa Sugiura Associate Professor in Cybercrime and Gender. "Why Women Would Prefer to Be Alone in the Woods with a Bear than a Man." *The Conversation*, August 27, 2024. <https://theconversation.com/why-women-would-prefer-to-be-alone-in-the-woods-with-a-bear-than-a-man-229140>.
- "In a Society Where Male Violence Seems Inevitable We Need Much More than Education and Awareness | Michael Salter." *The Guardian*, April 29, 2024. <https://www.theguardian.com/commentisfree/2024/apr/30/in-a-society-where-male-violence-seems-inevitable-we-need-much-more-than-education-and-awareness>.
- Trickett, Penelope K., Jennie G. Noll, and Frank W. Putnam. "The Impact of Sexual Abuse on Female Development: Lessons from a Multigenerational, Longitudinal Research Study." *Development and Psychopathology* 23, no. 2 (April 18, 2011): 453–76. <https://doi.org/10.1017/s0954579411000174>.

- Långström, Niklas, Kelly M Babchishin, Seena Fazel, Paul Lichtenstein, and Thomas Frisell. "Sexual Offending Runs in Families: A 37-Year Nationwide Study." *International Journal of Epidemiology* 44, no. 2 (April 2015): 713–20. <https://doi.org/10.1093/ije/dyv029>.
- Palacios-González, César. "Ethical Aspects of Creating Human–Nonhuman Chimeras Capable of Human Gamete Production and Human Pregnancy." *Monash Bioethics Review* 33, no. 2–3 (June 2015): 181–202. <https://doi.org/10.1007/s40592-015-0031-1>.
- Boonin, David. *The problem of punishment*, April 14, 2008. <https://doi.org/10.1017/cbo9780511819254>.
- Douglas, Thomas, and Katrien Devolder. "Gene Editing, Identity and Benefit." *The Philosophical Quarterly* 72, no. 2 (June 5, 2021): 305–25. <https://doi.org/10.1093/pq/pqab029>.
- Grabo, Allen, and Mark van Vugt. "Voting for a Male Warrior or Female Peacekeeper? Testing the Evolutionary Contingency Hypothesis in the 2016 U.S. Presidential Elections." *Evolutionary Psychology* 16, no. 2 (April 1, 2018). <https://doi.org/10.1177/1474704918773267>.
- Van Vugt, Mark. "The Male Warrior Hypothesis: The Evolutionary Psychology of Intergroup Conflict, Tribal Aggression, and Warfare." *The Oxford Handbook of Evolutionary Perspectives on Violence, Homicide, and War*, November 21, 2012, 291–300. <https://doi.org/10.1093/oxfordhb/9780199738403.013.0017>.
- Corso, Phaedra S., Valerie J. Edwards, Xiangming Fang, and James A. Mercy. "Health-Related Quality of Life among Adults Who Experienced Maltreatment during Childhood." *American Journal of Public Health* 98, no. 6 (June 2008): 1094–1100. <https://doi.org/10.2105/ajph.2007.119826>.
- Support Not Separation. "Children Killed Rises to 69." Support Not Separation, March 10, 2021. <https://supportnotseparation.blog/2021/02/28/children-killed-rises-to-69/>.
- Berg, Sanchia. "Paedophiles Could Be Stripped of Parental Rights under New Law." BBC News, April 17, 2024. https://www.bbc.com/news/uk-68830796?fbclid=PAZXh0bgNhZW0CMTEAAanJZQO2E3ONPLBQ3b9CuySqC0Lmiq7fjYdrU5-Y42eza8-grZDJRjzxBs_aem_ASnl-0VxN1vSB3sEKQfYPdYdquObIkjdD9mRxoEn9NmW0ZjxMV5c0P3GiFuO6jbToPSlwjEv6ndWJLVXA6YFPikl%2B%2Band%2Bhttps%3A%2F%2Fwww.independent.co.uk%2Fnews%2Fap-england-english-london-mary-b2346769.html.
- Fahy, Claire, and Andy Newman. "Judge Let Abusive Parents Keep Daughter. Days Later, She Was Dead." *The New York Times*, October 3, 2023. <https://www.nytimes.com/2023/10/03/nyregion/dead-baby-brooklyn-abuse.html>.
- Hempton, Matthieu C. de, and Danielle Posthuma. "Addressing the Ethical and Societal Challenges Posed by Genome-Wide Association Studies of Behavioral and Brain-Related Traits." *Nature Neuroscience* 26, no. 6 (May 22, 2023): 932–41. <https://doi.org/10.1038/s41593-023-01333-4>.
- Peranteau, William H., and Alan W. Flake. "The Future of in Utero Gene Therapy." *Molecular Diagnosis & Therapy* 24, no. 2 (February 4, 2020): 135–42. <https://doi.org/10.1007/s40291-020-00445-y>.

- McMahan, Jeff. "Wrongful Life: Paradoxes in the Morality of Causing People to Exist." *Rational Commitment and Social Justice*, November 13, 1998, 208–48. <https://doi.org/10.1017/cbo9780511527364.013>.
- Yehuda, Rachel, Nikolaos P. Daskalakis, Linda M. Bierer, Heather N. Bader, Torsten Klengel, Florian Holsboer, and Elisabeth B. Binder. "Holocaust Exposure Induced Intergenerational Effects on FKBP5 Methylation." *Biological Psychiatry* 80, no. 5 (September 2016): 372–80. <https://doi.org/10.1016/j.biopsych.2015.08.005>.
- Almeida, Mara, and Robert Ranisch. "Beyond Safety: Mapping the Ethical Debate on Heritable Genome Editing Interventions." *Humanities and Social Sciences Communications* 9, no. 1 (April 20, 2022). <https://doi.org/10.1057/s41599-022-01147-y>.
- Magazine, Smithsonian. "The Neuroscientist Who Discovered He Was a Psychopath." *Smithsonian.com*, November 22, 2013. <https://www.smithsonianmag.com/science-nature/the-neuroscientist-who-discovered-he-was-a-psychopath-180947814/>.
- Pennings, Guido, Wybo Dondorp, Mina Popovic, Susana Chuva de Sousa Lopes, and Heidi Mertes. "Ethical Considerations on the Moral Status of the Embryo and Embryo-like Structures." *Human Reproduction*, September 30, 2024. <https://doi.org/10.1093/humrep/deae228>.
- Spriggs, Merle. "Children and Bioethics: Clarifying Consent and Assent in Medical and Research Settings." *British Medical Bulletin* 145, no. 1 (February 1, 2023): 110–19. <https://doi.org/10.1093/bmb/ldac038>.
- Malmqvist, Erik. "Analysing Our Qualms about 'Designing' Future Persons: Autonomy, Freedom of Choice, and Interfering with Nature." *Medicine, Health Care and Philosophy* 10, no. 4 (February 20, 2007): 407–16. <https://doi.org/10.1007/s11019-007-9052-8>.
- Zalta, Edward N. "Edward N. Zalta (Ed.), *Stanford Encyclopedia of Philosophy*." *PhilPapers*, 1995. <https://philpapers.org/rec/ZALSEO>.
- Macpherson, Ignacio, María Victoria Roqué, and Ignacio Segarra. "Ethical Challenges of Germline Genetic Enhancement." *Frontiers in Genetics* 10 (September 3, 2019). <https://doi.org/10.3389/fgene.2019.00767>.
- Liao, S. Matthew. "Designing Humans: A Human Rights Approach." *Bioethics* 33, no. 1 (October 12, 2018): 98–104. <https://doi.org/10.1111/bioe.12519>.
- Macarrón Palacios, Arturo, Patrick Korus, Bodo G. C. Wilkens, Najmeh Heshmatpour, and Sarita R. Patnaik. "Revolutionizing in Vivo Therapy with CRISPR/Cas Genome Editing: Breakthroughs, Opportunities and Challenges." *Frontiers*, 2024. <https://www.frontiersin.org/journals/genome-editing/articles/10.3389/fged.2024.1342193/full>.
- "Vertex and CRISPR Therapeutics Announce Authorization of the First CRISPR/Cas9 Gene-Edited Therapy, CASGEVYTM (Exagamglogene Autotemcel), by the United Kingdom MHRA for the Treatment of Sickle Cell Disease and Transfusion-Dependent Beta Thalassemia." *Vertex Pharmaceuticals Newsroom*, November 16, 2023. <https://news.vrtx.com/news-releases/news-release-details/vertex-and-crispr-therapeutics-announce-authorization-first>.

- Liao, S Matthew. "The Ethics of Using Genetic Engineering for Sex Selection." *Journal of Medical Ethics* 31, no. 2 (January 28, 2005): 116–18. <https://doi.org/10.1136/jme.2003.005983>.
- Macarrón Palacios, Arturo, Patrick Korus, Bodo G. C. Wilkens, Najmeh Heshmatpour, and Sarita R. Patnaik. "Revolutionizing in Vivo Therapy with CRISPR/Cas Genome Editing: Breakthroughs, Opportunities and Challenges." *Frontiers*, 2024. <https://www.frontiersin.org/journals/genome-editing/articles/10.3389/fgeed.2024.1342193/full>.
- Insight: What happens when a \$2 million gene therapy is not enough | Reuters. Accessed October 16, 2024. <https://www.reuters.com/business/healthcare-pharmaceuticals/what-happens-when-2-million-gene-therapy-is-not-enough-2023-08-12/>.
- "Vertex and CRISPR Therapeutics Announce Authorization of the First CRISPR/Cas9 Gene-Edited Therapy, CASGEVYTM (Exagamglogene Autotemcel), by the United Kingdom MHRA for the Treatment of Sickle Cell Disease and Transfusion-Dependent Beta Thalassemia." Vertex Pharmaceuticals Newsroom, November 16, 2023. <https://news.vrtx.com/news-releases/news-release-details/vertex-and-crispr-therapeutics-announce-authorization-first>.
- Fletcher, Joseph. "Principles of Biomedical Ethics. by Tom L. Beauchamp and James F. Childress. New York, Oxford University Press, 1979. 314 Pp. \$13.95. \$7.95 (Paper)." *Theology Today* 36, no. 4 (January 1980): 595–96. <https://doi.org/10.1177/004057368003600423>.
- Holm, S. "Principles of Biomedical Ethics, 5th Edn." *Journal of Medical Ethics* 28, no. 5 (October 2002). <https://doi.org/10.1136/jme.28.5.332-a>.
- Frazzetto, Giovanni, Giorgio Di Lorenzo, Valeria Carola, Luca Proietti, Ewa Sokolowska, Alberto Siracusano, Cornelius Gross, and Alfonso Troisi. "Early Trauma and Increased Risk for Physical Aggression during Adulthood: The Moderating Role of Maa Genotype." *PLoS ONE* 2, no. 5 (May 30, 2007). <https://doi.org/10.1371/journal.pone.0000486>.
- "Army Backtracks on Teen Rejected over Breast-Cancer Gene." BBC News, May 24, 2024. <https://www.bbc.com/news/articles/cl40ex5rrnko>.
- Scurich, Nicholas, and Paul S. Appelbaum. "State v. Yepez: Admissibility and Relevance of Behavioral Genetic Evidence in a Criminal Trial." *Psychiatric Services* 72, no. 7 (July 1, 2021): 853–55. <https://doi.org/10.1176/appi.ps.202100226>.
- Appelbaum, Paul S., Nicholas Scurich, and Raymond Raad. "Effects of Behavioral Genetic Evidence on Perceptions of Criminal Responsibility and Appropriate Punishment." *Psychology, Public Policy, and Law* 21, no. 2 (May 2015): 134–44. <https://doi.org/10.1037/law0000039>.
- State v. Yepez, 428 p.3d 301 | casetext search + citator. Accessed October 16, 2024. <https://casetext.com/case/state-v-yepez-3>.
- Lombroso, Cesare, Cesare Lombroso, Mary Gibson, and Nicole Hahn Rafter. *Criminal man*, July 6, 2006. <https://doi.org/10.1515/9780822387800>.
- Baum, Matthew L. *The neuroethics of biomarkers*, March 1, 2016. <https://doi.org/10.1093/acprof:oso/9780190236267.001.0001>.

- Strimbu, Kyle, and Jorge A Tavel. "What Are Biomarkers?" Current opinion in HIV and AIDS. Accessed October 16, 2024.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3078627/>.
- Savulescu, Julian. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics* 15, no. 5–6 (October 2001): 413–26.
<https://doi.org/10.1111/1467-8519.00251>.
- Eyal, Nir. "Informed Consent." *The Routledge Handbook of the Ethics of Consent*, June 14, 2018, 272–84. <https://doi.org/10.4324/9781351028264-25>.
- Lišková, Kateřina, and Andrea Bělehradová. "'We Won't Ban Castrating Pervs despite What Europe Might Think!': Czech Medical Sexology and the Practice of Therapeutic Castration." *Medical History* 63, no. 3 (June 18, 2019): 330–51.
<https://doi.org/10.1017/mdh.2019.30>.
- Gibney, Daniel R., and Alyson Jones. "A Crisis Worker's Observations on the Psychosocial Support for Victims and Families Following Child Sexual Abuse; a Case Study." *Journal of Forensic and Legal Medicine* 27 (October 2014): 25–28. <https://doi.org/10.1016/j.jflm.2014.07.001>.
- Sousa, Marta, Joana Andrade, Andreia de Castro-Rodrigues, and Rui Abrunhosa Gonçalves. "The Effectiveness of Psychological Treatment in Adult Male Convicted for Sexual Offenses against Children: A Systematic Review." *Trauma, Violence, & Abuse* 24, no. 3 (April 12, 2022): 1867–81.
<https://doi.org/10.1177/15248380221082080>.
- Bottoms, Anthony, and Andrew Von Hirsch. "The Crime-Preventive Impact of Penal Sanctions." *Oxford Handbooks Online*, November 11, 2010.
<https://doi.org/10.1093/oxfordhb/9780199542475.013.0005>.
- Jung, Janis, Robert Busching, and Barbara Krahe. "Catching Aggression from One's Peers: A Longitudinal and Multilevel Analysis." *Social and Personality Psychology Compass* 13, no. 2 (February 2019).
<https://doi.org/10.1111/spc3.12433>.
- "Global Database on Violence against Women." UN Women Data Hub. Accessed October 16, 2024. <https://evaw-global-database.unwomen.org/en>.
- A theory of justice: Original edition on JSTOR. Accessed October 16, 2024.
<https://www.jstor.org/stable/j.ctvjf9z6v>.
- Friedman, Marilyn. "Autonomy and Male Dominance." *Autonomy and the Challenges to Liberalism*, February 7, 2005, 150–74.
<https://doi.org/10.1017/cbo9780511610325.009>.
- "Call to Action as VAWG Epidemic Deepens." National Police Chiefs' Council (NPCC). Accessed October 15, 2024.
<https://news.npcc.police.uk/releases/call-to-action-as-violence-against-women-and-girls-epidemic-deepens-1>.
- Alvarez, José E., and Judith Bauder. "Critiques of the CEDAW Regime, International Law, and International Human Rights." *Women's Property Rights Under CEDAW*, May 1, 2024, 163–86.
<https://doi.org/10.1093/oso/9780197751879.003.0003>.
- Morens, David M., Gregory K. Folkers, and Anthony S. Fauci. "What Is a Pandemic?" *The Journal of Infectious Diseases* 200, no. 7 (October 2009): 1018–21.
<https://doi.org/10.1086/644537>.

- “Violence against Women and Girls Is One of the World’s Most Prevalent Human Rights Violations, Taking Place Every Day, Many Times over, in Every Corner of the Globe. It Has Serious Short- and Long-Term Physical, Economic and Psychological Consequences on Women and Girls, Preventing Their Full and Equal Participation in Society.” UN Women – Headquarters. Accessed October 15, 2024. <https://www.unwomen.org/en/what-we-do/ending-violence-against-women/faqs/types-of-violence>.
- Gilbert, Susan. “A Decade’s Worth of Gene-Environment Interaction Studies, in Hindsight.” The Hastings Center, August 1, 2023. <https://www.thehastingscenter.org/a-decades-worth-of-gene-environment-interaction-studies-in-hindsight/>.
- Gilbert, Susan. “A Decade’s Worth of Gene-Environment Interaction Studies, in Hindsight.” The Hastings Center, August 1, 2023. <https://www.thehastingscenter.org/a-decades-worth-of-gene-environment-interaction-studies-in-hindsight/>.
- Laramie E. Duncan, Ph.D., Ph.D. Matthew C. Keller, Ph.D. From Harvard School of Public Health Laramie E. Duncan, and Ph.D. From Harvard School of Public Health Matthew C. Keller. “A Critical Review of the First 10 Years of Candidate Gene-by-Environment Interaction Research in Psychiatry.” *American Journal of Psychiatry*, October 1, 2011. <https://doi.org/10.1176/appi.ajp.2011.11020191>.
- “Discover Magazine.” Discover Magazine. Accessed October 16, 2024. <https://www.discovermagazine.com/>.
- Bagwell-Gray, Meredith E, Sarah Jen, and Nikolaus Schuetz. “How Intimate Partner Violence and Intersectional Identities Converge to Influence Women’s Sexual Health across Environmental Contexts.” *Social Work* 65, no. 4 (October 1, 2020): 349–57. <https://doi.org/10.1093/sw/swaa031>.
- “Global Database on Violence against Women.” UN Women Data Hub. Accessed October 15, 2024. <https://data.unwomen.org/global-database-on-violence-against-women>.
- Mulvihill, Natasha, and Fay Sweeting. “Sexual and Violent Police Perpetrators: The Institutional Response to Reporting Victims.” *Policing and Society*, July 2024, 1–16. <https://doi.org/10.1080/10439463.2024.2369332>.
- “Devastatingly Pervasive: 1 in 3 Women Globally Experience Violence.” World Health Organization. Accessed October 15, 2024. <https://www.who.int/news/item/09-03-2021-devastatingly-pervasive-1-in-3-women-globally-experience-violence>.
- McMahan, Jeff, and Julian Savulescu. “Reasons and Reproduction: Gene Editing and Genetic Selection.” *The American Journal of Bioethics* 24, no. 8 (September 11, 2023): 9–19. <https://doi.org/10.1080/15265161.2023.2250288>.
- Bufacchi, Vittorio. “Introduction: Philosophy and Violence.” *Revue internationale de philosophie* n° 265, no. 3 (September 1, 2013): 233–35. <https://doi.org/10.3917/rip.265.0233>.
- Carbone, Agostino. “Book Review: *Violence against Queer People: Race, Class, Gender and the Persistence of Anti-LGBT Discrimination* by Doug Meyer.” *Gender & Society* 31, no. 3 (August 5, 2016): 409–11. <https://doi.org/10.1177/0891243216663195>.

Meyer, Dan. "Incest: The Most Personal Violence." *Violence and the Prevention of Violence*, 1995, 85–100. <https://doi.org/10.5040/9798216032403.ch-006>.