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Polarizing biotechnologies and a polarized public: new challenges for global calls for public engagement in human genome editing

Oliver Feeney[1]

[1] Research Unit 'Ethics of Genome Editing', Institute of Ethics and History of Medicine, University of Tübingen, Tübingen, Germany; oliver.feeney@uni-tuebingen.de

Abstract: The rapid advancements in genome editing, particularly with CRISPR-Cas9, have brought long-promised medical breakthroughs to fruition, but have also accelerated ethically fraught applications. To develop adequate ethical safeguards and effective governance, many endorse public engagement as an essential aspect of this response. This paper tests this confidence by examining the public engagement approach with regard to an emerging existential risk that this rapid development of genome editing poses to liberal democracy, when combined with similarly rapidly growing socio-political polarization,. While this argument has some echoes of Maxwell Mehlman's specter of a genetically enhanced "genobility" destroying the basis of liberal democracy, I outline how this new concern is more plausible, more immediate and, moreover, possibly far more intractable a problem than Mehlman was considering. This is exacerbated by considering how the perception of genome editing's potential—rather than its actual capabilities—may be affected by and, in turn, may worsen this rising socio-political polarization. Given the confidence in the positive role of public engagement with respect to the technology that is involved here, I evaluate its effectiveness, arguing that certain forms of engagement may inadvertently worsen things, whereas stronger deliberative approaches hold promise but face significant, potentially insurmountable, barriers, at least for now.

Keywords: Genome editing, public engagement, socio-political polarization, genobility, liberal democracy.

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1. Introduction

The potential to find cures for incurable diseases, which was prematurely hyped during the course of the Human Genome Project, now seems to be coming to fruition at a rate of development that gives some justification to the phrase the 'CRISPR revolution'. Less than a decade after Jennifer Doudna and Emmanuelle Charpentier's work (Jinek et al. 2012), Victoria Gray became the first person whose sickle cell disease had been successfully treated by a CRISPR-Cas9 based treatment (Stein, 2021). The treatment – Casgevy – also marked milestones in gaining regulatory approval in numerous jurisdictions (Ledford, 2024) and a new generation of genome editing techniques – such as Prime editing and Base editing – are being developed, claiming to be improvements upon the CRISPR-Cas9 technique (Ledford, 2023). This speed of developments toward the, all else being equal, morally justified ends of medicine and in the life sciences, also increases the speed toward something more ethically problematic. It took less than six years for the CRISPR-Cas 9 system to be used in the infamous He Jiankui's embryo editing experiment resulting in three births of children with their germlines altered (Feeney, 2019). In response to the failure of existing systems of expert-driven oversight and

governance, and the insufficient self-regulation by the scientific community itself, an existing drive gained momentum, as Conley et al. (2023, p.9) note, towards near universal endorsement of "public engagement (PE) as a desirable, even essential feature of good governance and policymaking". The phrase 'public engagement' (or equivalent) can be seen far beyond the context of genome editing research, in medicine, planning, environmental decision making, and across various social, economic, and political contexts. However, what is exactly meant by it – on a spectrum from 'minimum', akin to top-down communication to 'maximum', akin to deliberative democracy – can help to explain how there is, at best, a mixed, and perhaps even ambiguous, assessment of its success and effectiveness (Feeney et al. 2018). In this paper, I will explore such questions in the context of a possible existential threat to liberal democracy, that reflects upon the threat of the 'genobility' argument perhaps best outlined by Maxwell Mehlman (2003) long before CRISPR. I outline some crucial shortcomings in Mehlman's response as well as in his focus on one weak variant of equality of opportunity, without the same, or greater, focus on the wider inequalities he appears to accept as a given, and not otherwise challenged and addressed in various (admittedly insufficient) ways in liberal democracies. Nevertheless, this is not to say that there is nothing to worry about in terms of an impact of a 'genobility', even if one were to address the shortcomings in Mehlman's exposition. On the contrary, I outline how, given the right conditions, this may appear increasingly likely to arise from a mix of rapid improvements in genome editing applications and research and, importantly, due to beliefs or perceptions about what it can do. To whatever degree this may be so, I suggest there are more immediate and less containable reasons than the specter of Mehlman's heritable enhancement inequalities which would destroy the basis of liberal democracy. I outline a different specter, where such beliefs interact with increasing socio-political polarization in contemporary, not future, liberal democracies, and which seem to pose a more urgent existential risk. Given the strong endorsement of a role for public engagement in addressing the governance of the technology involved, I evaluate the potential positive impact that this role may have in this case. I argue that some forms of public engagement are susceptible to the same problems of polarization – and may even worsen things – while other stronger forms of public deliberation, offer greater hope but also have significant – perhaps even insurmountable – barriers, at least in terms of addressing the risk directly and without other factors that are not yet in place.

2. The heritable genomic existential threat of enhancement to liberal democracy

In 2003, ten years before the CRISPR Revolution, the Human Genome Project had just been declared complete (effectively, given the technology at the time), and there was much more expectation and speculation than actual interventions that could suggest heritable enhancements were ready to emerge. Despite significant doubts that such genetic possibilities could ever materialize, or if they did, it would be in the distant future, this very possibility of their emergence prompted stark concerns in some academic (and policy advice) circles at the time (Fukuyama, 2002; Kass, 2003). One of the strongest critics was Maxwell Mehlman (2003) in terms of illustrating that it was not just separate issues of unfairness and inauthenticity and the like that may arise from attempts to enhance one's future children: it would create an existential threat to liberal democracy itself. He theorizes that, in a 'neo-liberal' context where enhancements are accessible only to the socio-economically advantaged, their genetic improvements could allow them "to exploit the less talented, devalue the unenhanced, profit at their expense, sell substandard goods, [and] betray professional confidences with cunning." While Mehlman acknowledges that significant inequalities already exist in society, he suggests that belief in equality of opportunity helps people tolerate them—provided the less advantaged still have a chance at upward mobility. However, this belief, Mehlman argues, would be eroded by the positional advantages of heritable genetic enhancements, creating a scenario where the unenhanced would have no real chance of competing successfully with the enhanced.

Simply put, the (enhanced) elite would dominate the (unenhanced) underprivileged. The disparity between the two groups would only widen if, as Mehlman warns, the wealthy are allowed to apply germline enhancements to their offspring. Over successive generations, this would lead to an increasingly unequal society, leaving the disadvantaged further behind. Mehlman describes the offspring of the advantaged as a "genobility," a class that could ultimately undermine the very foundations of democracy. To combat this 'germline' threat, Mehlman proposes a range of measures, including national and international bans on the development and use of such enhancements, restrictions on federal funding, the introduction of restrictive patent laws to discourage private development, DNA monitoring, and, in extreme cases, the use of military force or the sterilization of individuals with enhanced germlines to prevent the transmission of modifications to future generations.

There are, at least, three problems with this response. Firstly, the cure seems as bad as the disease. DNA monitoring, military force and sterilization of enhanced individuals require fascistic elements, which in themselves erode the liberal democracy they purport to save from the 'genobility'. Second, much of the speculation surrounding enhancement lies at the more science-fictional end of ethical evaluation, with the actual prospect of such advancements being remote. While this does not discredit such ethical discussions, it raises caution about their grounding in speculation rather than reality. These scenarios could prove true, but they may also not materialize. For example, many of the arguments rely on genetic essentialist assumptions, which have long been discredited as a reliable framework for understanding the role of genes and the implications of altering them (Feeney 2019). This impacts the level of ethical concerns raised and the type of regulatory measures needed to address them. If such technologies truly posed a threat to liberal democracy by creating inequalities far more pronounced and consequential than those currently tolerated at national and global levels, then there could be grounds for severe restrictions. Third, it also depends on how valuable this liberal democracy is, especially if characterized by significant inequalities tolerated by a belief in equality of opportunity. I have criticized elsewhere (Feeney, 2010) this liberal democratic model that Mehlman seeks to save, noting that the 'belief' at best seems the odds-ratio variant of equality of opportunity. This is a variant limited to the opportunities to exchange spaces with someone experiencing downward mobility and not focusing on reducing the extent of the inequalities in outcomes themselves. This would not be to advocate for equality of outcomes, giving rise to other objections. One could have two different contexts, both with equality of opportunity, and differences in outcomes, but not to the same stark degree – for instance, Mehlman's US context could be exchanged with a Scandinavian one, and in the latter context, we could revisit such concerns from germline enhancements – perhaps with concerns less stark than Mehlman's (Feeney, 2010). It is worth noting, of course, that not agreeing with Mehlman does not mean one accepts such significant inequalities as a given. Since the time of Mehlman's 2003 book, there has been a sizable, ever-growing literature exploring the dangers of inequalities arising from germline enhancements (Feeney, 2012, Sparrow, 2016; Lorenzo et al. 2022 and so on). More recently, Visscher et al (2025) have extended the germline discussion by exploring the potential of polygenic genome editing in human embryos and germ cells that they suggest may become feasible in the next decades. They express the familiar concerns that potential heritable polygenic editing (HPE) technology will "increase inequalities, making the dominant social class the dominant biological class, [in other words] HPE could write these inequalities into our biology" (p643). In some ways, their speculation is more robust than the likes of Mehlman's might have been, by using various mathematical and computer modeling to anticipate the effects of unequal use of HPE on wider society. For instance, if HPE were only available to those in the higher socioeconomic groups, the authors note that this would skew the polygenic disease burden more heavily to those who are already the worst off (Visscher et al., 2025: p.643). Moreover, the authors suggest that the same technology could be used – at some point – to alter non-disease traits such as height and

intelligence, potentially leading to large-scale changes in these traits (Visscher et al, 2025: p641). Even if we did not agree that the result of such changes would be an existential threat to liberal democracy, it could be easier to argue that it would still be a risk to a healthy, just and vibrant liberal democracy. Here, away from existential threats and Orwellian responses, we seem back in the more familiar territory of embracing a role for public participation to help respond to the emergence of a technology (or use of such technology), that would be problematic for ethical, societal, justice and other reasons.

3. Public engagement and human genome editing

When we turn to emerging biomedical technologies, public engagement has been proposed where a particular technology is argued – at least by some – to be controversial or, at least, unprecedented, and where there is the potential for significant (negative) societal impact (Baylis 2019). There are a number of forms that public engagement can take, such as scientific communication to deliberative polling; from sending out leaflets and informational and ethical statements to community meetings or Citizen Juries. Particularly in the aftermath of the He Jiankui case, there have been calls for widespread public deliberation or deliberative engagement on the potential use of heritable human genome editing, before it is ever permitted, if at all (Baylis 2019). Taking the more substantive engagement or empowerment route, justifications can range from the epistemic (wider inputs of reflection, perspectives, value systems can improve policy guidance in such controversial areas) to normative (everyone who may be affected by a technology should have a say – or at least be consulted – in how it is developed and used) (Feeney 2022). This would emphasize the importance of involving wider society in discussions while seeking to promote a well-informed democratic engagement characterized by mutual respect for differing views (Cavaliere, Devolder, and Giubilini 2019). Deliberative engagement is not just a free-flowing conversation, but one with requirements. It is a 'process in which everyone concerned by the decision is considered as a valid moral agent, obliged to give reasons for their own points of view, and to listen to the reasons of others' (Gracia 2003, 227). Mutual justification through informed and comprehensive reason-giving is something that must occur within a context of mutual respect and reciprocity (Gutmann and Thompson 2002). We see that it is not just a deep conversation, probing various issues more than surveys and the like. It is a type of ethos that sets the conditions, such as mutual respect, for such conversations to take place at all.

Conley et al. (2023) highlight that the reality of public engagement does not match the rhetoric in a number of respects, including lack of diversity, issues of power differentials in groups, and so on. As noted by Jason Woolley et al. (2023), some participant-centered research initiatives can be seen to take place according to that minimum 'participation'—where it is merely the case that such research initiatives have increased contact with participants through ICT but are otherwise non-participatory in any important normative sense of the word (Woolley et al. 2016). Despite the gap between the promise and reality of public engagement, the World Health Organisation's 2021 Report emphasizes the importance of fostering public engagement to build trust and legitimacy in any governance process (WHO, 2021). The Committee:

> endorsed a strong commitment to public engagement – a bidirectional activity aimed at facilitating a meaningful exchange of views, values and priorities among all those with an interest in the ethics and governance of human genome editing. Meaningful public engagement that increases the voices of those outside traditional science and policy circles and encourages the circulation of information, views and values is imperative to establish trust and legitimacy in any governance process (WHO 2021: 16).

The more central such public engagement is and the more bi-directional this public engagement is meant to be, the more it must focus not only on the scientific or medical basis underpinning ethical evaluations and legal-regulatory justifications: it must

focus on the question regarding whose views and values are included. For both epistemic and normative reasons outlined above, efforts to increase diversity in public engagement have typically focused on including underrepresented, disadvantaged, or vulnerable groups (Herzog, 2021). Such an approach would seem appropriate as a significant attempt to address our earlier concerns by bringing various perspectives together in a context of mutual respect. Exposure to the diverse and diverging views of others, including those that may be disadvantaged or harmed by the development of some technologies, such as germline enhancements, may elicit new insights, awareness, sensitivity and heightened consideration of the effects, hitherto underappreciated, of one's use or support of the technology in question. The situation may go beyond the focus on genomic enhancements, and the risk of worsening inequalities in society, and move toward a great understanding of, and aversion to, those inequalities in the first place. This deliberation may also yield responses that also move beyond prohibiting the new technology, if it came to pass, but would find innovative ways of capturing it for the benefit of all. There is a range of positive outcomes that seem to be possible with the focus on deliberative engagement – from the increase in understanding, empathy, and innovative insights to new ways of addressing the problems at hand.

On the other hand, the deliberative model is much more expensive, complex, time-consuming and small scale than other forms of participatory engagement. Even if it were accepted as the ideal format of engagement, it may simply not be feasible, especially to roll it out to the wider society. While other, more minimal, forms of participation may not yield the rich insights of deliberation, it may be the most realistic option in some circumstances. It is important to be aware of the different possibilities resulting from a deliberative format and from a more minimal form of engagement, on the same question, and where the same people would be involved. The potential difference between the two models may illustrate a particular point with regard to Mehlman's concerns above, and that is the variable: '*given the right conditions*'.

4. Different realities - the dangerous rise of polarization and mistrust.

In recent years, conditions seem to be changing steadily and sometimes dramatically for once robust and stable liberal democracies. This can perhaps be seen most clearly with the significant rise in polarization and lack of trust, particularly with regard to medicine and science, but also seemingly spreading wider and deeper into western societies. As Francis Collins observed, the politicization of science, compounded by worsening tribalism and polarization, has created a "really bad place" for public trust in science (Nature, Dec 2021). This can be seen in the rise in anti-vaccine and other beliefs (explicitly notable in the US at the moment) connected to an erosion of trust in established sources of science and medical expertise (ALLEA 2018). The rise of anti-vaccine beliefs exemplifies a phenomenon driven, in part, by siloed online information, social media without fact-checking or, worse, when overseen by peddlers in misinformation, and the uncritical acceptance of unverified, incorrect, or malicious content (Germani and Biller-Andorno 2021). Over the past several years, particularly in the USA and UK, significant and highly divisive political events have been shaped by online misinformation campaigns designed to manipulate public opinion (Keller and Klinger, 2019). In response, the prevailing assumption has often been that the public simply needs more accurate and better-quality information to reach sound conclusions, an approach known as the 'deficit model.' While this seems reasonable in many cases, evidence suggests otherwise. As noted by All European Academies (ALLEA) (2018), providing more information does not appear to solve the issue. Trust in the authority of science and medicine depends not solely on facts but on trust itself. Trust involves the ability to wisely place or withhold it, and it includes both epistemic trust in information providers and an emotional dimension influencing judgments about what is trustworthy (ALLEA 2018, 1). This requires not only effective communication but also an awareness of the vulnerabilities of disadvantaged groups, along with humility and self-awareness on the part of individuals, organizations, or

procedures seeking to be trusted. Ultimately, the issue is not merely about trusting information or facts but about determining *who* is trustworthy.

In the context of human genome editing, none of the significant reports – WHO, Nuffield, NASEM – have anticipated this challenge. Public perspectives on human genome editing are likely shaped by the broader social environment, where socialization processes often occur within increasingly polarized information bubbles. These bubbles, amplified by algorithms and social media echo chambers, create distinct realities for different groups, reinforcing divergent views on science and technology. Jürgen Habermas (2023) captures the ongoing erosion of public deliberation and the increasing fragmentation of the public sphere from this new online world of social media where the already imperfect gatekeeping role of the traditional media – for instance, filtering out factual inaccuracies – is challenged and increasingly circumvented by platforms that allow everyone to be author as much as reader. However, there is something stronger and deeper to the socio-political polarization that is currently rising, that may have been fostered by social media and other factors Habermas notes, but may now be far beyond the remedies offered by a new regulation of this online 'free for all' sphere of misinformation. This regulation and gatekeeping will have to be based on some common ground which is increasingly hard to find. It will also have to allow some facts and not 'alternative facts' through the gates. And it will need to be done by someone, or some institution or group, not perceived to be biased.

The Nuffield Report (2018: p.87) briefly – and only once – acknowledges the risks of polarization in debates of genome editing or other genomic interventions, but this mention is limited to the potential of binary choices in bioethics and regulation – for instance, to permit or not to permit. However, none of the aforementioned reports seemed to anticipate the potential effects of broader forms of socio-political polarization, and the broader dynamics of how polarization shapes trust or mistrust in science, medicine, or rather the persons or groups who are involved. Similar to – albeit to a far greater degree – debates in the 1990's around genetically modified organisms (GMOs) or, increasingly in recent years with vaccines, the recent accelerated rise in wider forms of polarization across traditional liberal societies in particular, does not seem to merely reflect disagreement over specific facts, correct information, or misinformation. It also seems to connect to deeper issues of mistrust in traditional scientific, health and academic institutions and the wider social and political contexts that validate or challenge such traditional sources of expertise (Feeney, 2021). While misinformation, such as Wakefield's MMR vaccine scare or conspiracy theories surrounding COVID-19 vaccines, plays a role in distorting public opinion, the deeper issue seems to increasingly lie in the erosion of fundamental trust of 'the other side'.

This dynamic is where people would evaluate information not based on what is said but *who* is saying it. For instance, the demonization of figures like Anthony Fauci during the pandemic reveals how polarization can operate on identity and allegiances to one's group or one's side, rather than on factual or value disagreement alone. This increasingly defines US politics, while also evident in the Brexit debates in the United Kingdom, as well as spreading throughout other countries, particularly in the context of debates about public health, migration, climate change and so on (Kerr et al. 2021; Roblain & Green, 2021; Smith et al, 2024). While there are differences in views regarding the severity of the problem and the potential of responding to it, the mere approach of correcting misinformation would seem insufficient, especially in cases where the root issue is a new form of tribalism, defined not (always) by one's nationality, or ethnicity, but by one's oppositional beliefs in socio-economic, moral, environmental, or public-health matters. In short, in an "us versus them" mentality that rejects opposing views as illegitimate.

Here then one can revisit the notion of the existential threat that motivated Mehlman to seek a strong bulwark against the emergence of germline enhancements because of the potential it would have to destroy the liberal democratic state. Given the current rise of polarization and the separation of significant portions of the population into 'us versus

them' relationships, or non-relationships it may not be too much of a reach to suggest that Mehlman's concerns were slightly misplaced. In the end he was half right. The existential threat for liberal democracy seems genuine, but it did not need germline enhancements to come about. What may be sufficient in a key respect is this socio-political polarization itself. This is not to say that genome editing, or other genomic germline interventions, would not make it much worse. It would seem very likely to do so. However, we would not have to wait for such technical capacity to develop in the first place. It will a highly likely that any such 'heritable genomic enhancement' research will be pursued in a context of ongoing empirical uncertainty of the viability of its effectiveness. This is particularly the case considering complex traits, such as intelligence, and traits that connect to phenotypic outcomes that are also subject to other environmental and social influences. It is also highly likely that this empirical uncertainty will be a context where, to some degree, beliefs in this enhancement project will nevertheless be hyped and accepted as a shared belief among a significant number of persons – including parents and future children. In combination with the polarized fracturing of what is accepted as factual and reasonable, there is an already pervasive idea of self-fulfilling prophecies in self-belief and motivations, essential to educational and other success, attributable to already pervasive effects of parent-child interactions (Madon et al. 2004) and the influence of one's social class (Manstead, 2018). Whatever the chances are that this may come to pass, I would contend they are more plausible and more of an immediate risk than that of Mehlman's original 'genobility' scenario. Moreover, as the causes are not reducible to genomics nor the technical genome-editing interventions themselves, but at least as attributable to genetic essentialist beliefs in a context of empirical (and 'factually unavoidable?') uncertainty, self-fulfilling prophecies and wider polarization processes, it may be a wider, more diffuse and more intractable a problem than Mehlman considered.

5. (Re)discovering common ground and (re)building relationships

The solution may lie in finding common ground where possible, building trust and 'civic friendship' before delving into areas of disagreement. Curato et al. (2017) offer some positive soundings from the perspective of deliberative democracy and on deliberative public engagement models. They note instances where deliberative engagement has reduced group polarization, even where extreme views existed initially (Curato et al. 2017: 33). Moreover, this would seem not only possible in cases of a polarizing topic with a plural, but largely non-polarized population, but also when set in deeply divided societies with mutually exclusive religious, national, racial or ethnic groups (Curato et al. 2017: 33). They report on how enough common ground can be found to promote mutual understanding and even solidarity, even if agreements on substantive issues were not (yet) possible (Curato et al. 2017: 33-34). In the scenario outlined in this paper, this suggests a focus on a longer-term strategy in terms of engagement – first, (re)discover some common ground and (re)build solidarity, while not attempting to proceed yet on dealing with the central polarizing topics, while also avoiding forms of engagement that – as explored above – would entrench false narratives and make the polarization worse.

This approach is perhaps heavily qualified, or complicated, by noting a key phrase that Curato and colleagues use: "*[u]nder the right conditions*, deliberation in divided societies can help to bridge the deep conflicts across religious, racial, and ethnic lines" (Curato et al. 2017: 34 [*italics added*]). In the examples they give – such as Northern Ireland, among others – it seems that 'the right conditions' did not arrive overnight, nor easily, and seemed to benefit from the support of charismatic leaders. Although such a 'catch-all' phrase of being charismatic, is considered by some to be loose and imprecise (Gormley-Heenan, 2007), one could see the various contenders for that characteristic label in key actors in the Northern Ireland peace process of the 1990's. Given the imprecise terminology, such a list is most certainly arbitrary in priority of those named and not named, but not in their inclusion. John Hume of the Social Democratic and Labour Party,

David Ervine of the Progressive Unionist Party (and ex-Ulster Volunteer Force member), Bill Clinton as the US broker, and additional high-profile leaders, would – in the main – qualify as such charismatic leaders too: capable and willing, on both sides, to bring people together.

Currently, in terms of the mature liberal democracies – such as the USA, France, Germany, UK - it seems that a broader and deeper form of polarization is growing at a significant rate. Particularly in the US, it is hard to see that there is goodwill, nor is the charismatic leader seeking to bring people together. The question is whether or when, this will lead to conflict and the fall of liberal democracy that Mehlman feared, with the rise of an illiberal democracy, or a full totalitarian state. As Bryan Caplan (2008) noted, totalitarian regimes arise quickly or over time and can last a relatively short time (due to overreaching ambitions in war), or decades (maybe longer). They can also use modern technology to dig deeper into the population to control dissent to a greater degree. Updating the technology to specify genome editing and social media, these can indeed be seen as key agents in spreading and reinforcing misinformation, and fostering and entrenching deep, polarized groups broadly along liberal versus illiberal lines. As in Mehlman's initial scenario, there is the presence of a particular technology that, under the right conditions, could create an existential risk that can destroy the wider political regime (i.e. liberal democracy). However, it is not as 'clean-cut' as it seemed in that simplifying scenario – as it is not in any hypothetical scenarios perhaps. This also suggests another preparatory role for public-deliberative engagement in better comprehending the multiple technical, societal and political processes that are happening, before finding ways to response to them. In so doing, even if we cannot stop the slide toward the end of liberal democracy as we know it, finding the right mix of technology and wider societal conditions may be something that will, someday, give rise to a new (positive) existential risk to whatever dimmer version of society we may be facing.

6. Conclusions

The existential threat to liberal democracy that Mehlman outlined in the context of a hypothetical 'genobility' offers us a useful point of orientation to reflect upon the current more complex existential threat that may arise from a mix of emerging technical possibilities in genome editing, the combination of genetic essentialist beliefs in a context of empirical uncertainty and the wider socio-political polarization that is currently creating an existential threat – perhaps almost sufficient a focus on its own. However, given the possible impact that the rapid development of genome editing could play in this wider context is a reason that it cannot be ignored. More importantly perhaps, is how this wider socio-political context of polarization can be fueled further by the beliefs that may arise from this technology. This also poses a significant challenge to the centrality given to role of public engagement in the governance of the emerging potential of genome editing technologies in this context. It may seem that I am improperly expanding the scope of genome editing public engagement approaches to cover something more appropriate for a broader debate in deliberative democracy. If the scope were patient engagement, this would indeed be the case. However, for approaches that have highlighted the importance of a genuine engagement with society at large – especially on a global level – regarding a technology's potential disruptive societal impact, the line is less clear. It may be the case that these forms of public engagement will add much insight to the wider discussions, and these wider discussions will be vital for any engagement on the future of genome editing technology. I hope this paper has highlighted how both are interwoven in unavoidable and useful respects, and how the resulting deliberative space can offer some responses to addressing the existential threat that liberal democracy is facing, or the tools for its renewal in the future.

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