Philos Stud (2017) 174:2845–2869
DOI 10.1007/s11098-016-0813-1

Defeaters to best interests reasoning in genetic enhancement

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Published online: 7 November 2016

Abstract Pre-natal genetic enhancement affords us unprecedented capacity to shape our skills, talents, appearance and perhaps subsequently the quality of our lives in terms of overall happiness, success and wellbeing. Despite its powerful appeal, some have raised important and equally persuasive concerns against genetic enhancement. Sandel has argued that compassion and humility, themselves grounded in the unpredictability of talents and skills, would be lost. Habermas has argued that genetically altered individuals will see their lives as dictated by their parents' design and therefore will not acquire an appropriate self-understanding. How should we view enhancement efforts in light of these concerns? I propose that we begin by adopting a defeasibility stance. That is, I ask whether our belief that genetic enhancements serve in the best interests of the child is reason to genetically enhance, underscoring a sort of epistemic vulnerability. I utilize the epistemological notions of defeasible reasons, undercutting (also called undermining) and overriding (or rebutting) defeaters in order to better understand and systematically evaluate the force of such concerns. I argue that close examination of both objections using this framework shows that we have reason to enhance, a reason that is defeasible but as yet, undefeated.

Keywords Genetic enhancement · Undercutting defeaters · Overriding defeaters · Sandel · Habermas · Savulescu

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Pre-natal genetic enhancement promises unprecedented reproductive capacity to shape the skills, talents, appearance of offspring, even barring erroneous beliefs in genetic determinism. Proponents of the development and widespread use of such technology argue that certain enhancements—such as increases in attention span and memory capacity—will contribute to wellbeing within a relatively wide range of life plans and conceptions of good. Despite its powerful appeal, critics have raised important and equally persuasive concerns against genetic enhancement, which defenders have addressed with varying degrees of success. Against concerns of inequity, proponents have proposed subsidizing enhancements, or at least doing so for poor families (Singer 2009; Bostrom 2003). Others have suggested funding subsidies by taxing those who can afford to pay for it (Mehlman and Botkins 1998). Bostrom (2003) has further argued that such disparities might not be reason enough to stop development of such technologies in light of substantial benefits: "enjoyment of health, a soaring mind and emotional well-being" (503). While supporters of enhancement have effectively addressed, or at least offered starting points for workable solutions to the problem of unequal access, other worries remain.

Sandel (2007) has argued that genetic engineering embodies efforts to acquire complete control over the contingencies of life, thereby eliminating a sense of our shared vulnerability at the hands of nature. Our enhanced sense of authority and control essentially disrupts our ability to feel for, and empathize with, others' misfortune and acknowledge the role of luck in our own achievements. This seems to be a grave price to pay for improving *normal* capacities. Attempts to defend enhancement have been ineffective because of a general failure to correctly situate Sandel's objection within the debate. Sandel narrowly targets a particular *basis* for enhancement—that enhancement will benefit children by improving certain capacities—by arguing that it is this very striving towards improvement through genetic means that destroys certain moral values. The problem is that defenders of enhancement attempt to dislodge Sandel's objection by *assuming* that this is unproblematically reason-giving.

Habermas (2003) argues that enhancement prevents the recipient from viewing her desires, goals and even experiences as her own. Note that unlike Sandel, Habermas does not target a particular justification for genetic enhancement, but rather asserts that there are certain ways in which genetic enhancement might *worsen* the quality of life and therefore outweigh its benefits. Defenses against Habermas's concern have also failed because proponents have not carefully acknowledged how it relates to pro-enhancement arguments. Because Habermas claims that the harms outweigh the benefits of enhancement, a successful defense would need to show either that the benefits are in fact weightier or that genetic enhancement does not impair self-understanding.

What then should we say about enhancement? Does our belief that certain enhancements will improve the child's life provide reason to use pre-natal genetic enhancements? We might not if such efforts erode compassion and solidarity or distort the child's self-conception. I propose that we utilize the epistemological notions of defeasible reasons, undercutting (also called undermining) and overriding (or rebutting) defeaters in order to better understand and systematically evaluate the

force of such concerns. Briefly, a defeasible reason generates pressure to believe a proposition which might be outweighed by other beliefs, or whose justificatory link to the target belief might be undermined. Where S believes that q on the basis of her belief that p, *undercutting* defeaters prevent S's belief q from counting as knowledge or show that S's belief that p cannot sufficiently justify her belief q. *Overriding* defeaters offer direct justification for $\sim q$. My plan is to apply this model to the moral context in order to determine whether or not the belief that genetic enhancements serve in the best interests of the child provides reason to enhance, or, alternatively, fails to do so due to the strength of its defeaters.

Before moving on, I want to say a few things in defense of my method. One might wonder how my approach differs from others', as they too examine and weigh various concerns and eventually defend a particular position. I seem to have done nothing more than introduce technical jargon that obscures what actually matters. Further, it appears that my project could be carried out just as well using Ross's prima facie duties, Beauchamp's and Childress's principles or a similar form of ethical pluralism, all of which allow us to consider competing conditional duties, without the clunkiness of applying epistemological machinery to moral issues. There are two points I want to make. First, although previous writers on the topic have explained and supported enhancement by seriously considering opposing arguments, there is a noticeable lack of precision. More specifically, failing to understand and elucidate precisely how certain objections speak against enhancement has led to an unjustified dismissal of legitimate concerns. Second, I consider the enhancement debate from the standpoint of a possibly mistaken belief: the possibility that our efforts to improve children may lend no justification whatsoever to genetic enhancement. Ethical pluralism, then, appears ill-suited for the task as I make no assumptions about fixed initial or conditional duties. A careful consideration of *undercutting* defeaters might lead us to deny that our efforts to secure the best interests of children count in favor of genetic enhancement. While *prima facie* duties and bio-ethical principles take for granted the existence of certain conditional obligations, *defeasible* reasons do not. In addition, the proposed model allows us to compare competing reasons, and determine whether we have, all-things-considered, reason to enhance. This is carried out by examining *overriding* defeaters.

Following a brief description of the sorts of enhancements that take center stage in this paper, I will expound what I call best-interests reasoning, relying heavily on Savulescu and Kahane's Principle of Procreative Beneficence (2009) and Buchanan et al.'s (2000) general purpose means, which agree that we have reason to enhance because doing so serves in the child's best interests. Given the strength of criticisms and the potential for new findings, I argue that this is best viewed as a *defeasible* reason in favor of enhancement. In the next section, I will offer a detailed explanation of Sandel's objection and argue that it is an undercutting defeater to best-interests reasoning. I suggest here that previous attempts to address Sandel's concern have failed precisely because of their failure to appreciate his argument as an undermining defeater. Nevertheless, I argue that Sandel's argument is ultimately unsuccessful because the types of enhancement justified by best interests reasoning will not generate the moral deterioration he envisions. I contend that best interests

reasoning promotes enhancements in a way that is consistent with appreciating one's vulnerability to forces outside of her control, and thereby retains the virtues of compassion and humility. The final section will examine Habermas's objection, and argue that this, unlike Sandel's, is an overriding defeater. I argue that defenses of enhancement have been unsuccessful in large part due to a failure to appreciate his argument as a competing, overriding reason. I respond to Habermas's concern by incorporating findings in molecular and behavioral genetics that reveal significant variability in gene function. These findings show that genetic enhancement will not prevent self-understanding, given that such variability cannot be determined by genetic engineering or deliberate social interventions. Close examination of both objections will show that we have reason to enhance, a reason that is defeasible but, as yet, undefeated.[1]

1 Best interests

1.1 Positive selection

Genetic intervention may take different forms, including selection against embryos carrying lethal genes in cases of in vitro fertilization through pre-genetic diagnosis (PGD),[2] selection through chorionic villous sampling (CVS), which provides anatomical and genetic information at about 11 weeks of gestation where some parents may choose to abort pregnancies,[3] gene therapy, by which normal or desirable genes are inserted into germline cells (gametes or embryos), and gene surgery, by which abnormal or undesirable genes are deactivated so they do not produce their phenotypic effects.[4] My interest here is primarily positive enhancement, which includes therapy or surgery aimed to improve *normal* capacity and the selection of embryos carrying non-medical desirable traits.[5,6] While the boundary between treatment and enhancement is controversial, I will, taking my cue from Juth (2011), restrict my focus to cases that clearly fall on the enhancement side. I've limited the scope of my project because the sorts of reasons that support treatment do not readily apply to enhancement: while the former may be justified on grounds that the child would be incapacitated or her life intolerable, the same cannot be said

[1] A different application of defeasible reasons, undermining and overriding defeaters can be found in Alvin Plantinga's (2000) *Warranted Christian Belief.*

[2] Gazzinga (2005, 41).

[3] Savulescu and Kahane (2009), 275.

[4] Buchanan et al. (2000), 6.

[5] See Brock (2009) for discussion on positive and negative selection.

[6] The boundary between treatment and enhancement is not uncontroversial. See Parens (1998), particularly contributions by Juengst, Brock and Frankford.

for the latter. For this and other reasons, genetic enhancement is more controversial than therapeutic intervention and involves a distinct set of considerations.[7]

1.2 Best interests reason

The most powerful and straightforward defense of enhancement comes from its potential contribution to the recipient's wellbeing. While this bare formulation captures the basis of pro-enhancement reasoning, it does not do justice to the thoughtfully constrained defense found in the literature. Some of these constraints are intended to protect the family and wider community from harm: Savulescu argues that we have reason to enhance only if we can be reasonably certain that it will not cause "direct or indirect" harm by generating "some unfair competitive edge" (2007, 527); Savulescu and Kahane maintain that the procedure should not place undue burden on existing family members (2009, 278). A different constraint protects the recipient's autonomy by limiting acceptable enhancements to those that are valuable across a wide range of life plans. We see one version of this in Buchanan et al.'s (2000) *general-purpose* means, defined as "enhancements of capacities that are … a benefit from nearly any evaluative perspective" (168). Savulescu and Kahane's Principle of Procreative Beneficence, which demands that parents select children that can be expected to have the best life, also incorporates this constraint by being neutral among reasonable conceptions of wellbeing including desire satisfaction, objective list, and hedonistic (274).[8] Savulescu (2001) lists several enhancements that fall within this range including resistance to chronic pain, increase in memory, the ability to control violent outbursts, which would enable individuals to develop meaningful social relationships and contribute to dignity and independence, increased intelligence, which would promote wellbeing whether it is through being able to imagine various pleasures, or choosing the most effective means to satisfy one's ends.[9]

To further develop this constraint, proponents have adopted Feinberg's (1980) 'rights in trust', which ensure "the child's right to an open future".[10] The idea here is that children have a negative claim against parents that they not foreclose on future opportunities. To be clear, parents do, and are expected to, encourage certain

[7] Treatment-oriented intervention is not without its critics. Some have argued that selection against embryos carrying genetic disease or predispositions to disability sends the wrong message to those living with illness, communicating that life is valued or desirable only in the absence of genetic disease. See Asch and David (2012).

[8] An earlier version of this principle appears in Savulescu (2001).

[9] While Savulescu and Kahane and Buchanan et al. agree on the acceptability of enhancement, the latter support the *permissibility* of enhancement in the absence of competing considerations and the former insist on an *obligation* to enhance in the absence of overriding reasons.

[10] Feinberg's discussion of rights takes place within a legal context, specifically, to determine whether or not the state should prevent parents from foreclosing on children's futures in some way, say, whether families can, due to religious conviction or cultural tradition, prevent their children from attending school or receiving blood transfusions. Feinberg's distinction has, however, also proved useful and relevant to the ethical boundaries between parent involvement and a child's autonomy, and has been utilized by Dena Davis, Michael Sandel, William Buchanan and Norman Daniels.

behaviors and values, but this standard prohibits eliminating the ability to exercise certain rights. For example, rights in trust would not allow a deaf couple to use genetic therapy or selection to produce a deaf child. While this would create a strong bond with family members and the deaf community, the act would foreclose on certain opportunities for the child. In her (2010), Davis explains that the child "will have only very limited options to move outside of that culture…. [confining] her forever to a narrow group of people and a limited choice of careers" (82). Such prohibitive conditions are echoed in Buchanan et al. (2000):

> it would be wrong for parents substantially to close off most opportunities that would otherwise be available to their children in order to impose their own particular conception of a good life or in order to continue their own community that is committed to that conception of a good life. (170)

More needs to be said about the type of rights involved and what, specifically, counts as infringement, but the boundaries of best interests reasoning seem, in principle, clear.

It is important to emphasize that proponents do not claim that acceptable enhancements *will* promote a child's wellbeing. After all, our best efforts might not succeed. But, as many have pointed out, this does not speak against enhancement, as all interventions pose some risk of failure:

> In trying to perfect our children by genetic intervention, just as with other means that parents now typically pursue, our efforts might misfire and the attempt to benefit might result in making them worse off. But this is a possibility for any attempt to improve our children, or to prevent harm to them, and does not argue especially against genetic intervention in order to do so. (Buchanan et al. 2000, 162)

We then have reason to enhance when we justifiably believe that doing so will benefit the recipient in a way that protects her autonomy. Operating on what is epistemically accessible seems to be the best we can do.[11]

1.3 Best interests as a defeasible reason

In light of the constraints outlined above, we can say that we have reason to genetically enhance when the enhancement is justifiably believed to be valuable across a range of life plans, is medically safe, and does not place undue burden on society—either by granting the recipient a competitive edge or by reinforcing suspect social norms[12]—and family members.[13] I'll symbolize using:

[11] See Rothenfluch (2016).

[12] See Little (1998).

[13] I'm assuming that this is a justified belief based on the right sorts of empirical evidence. Some have raised concerns about the permissibility of carrying out such experiments on human subjects (Daniels 2009 and in conversation). I take it, however, that the risks here will be analogous to the risks we undertake in other interventions. That is, we cannot clairvoyantly know that enrolling our children in prestigious institutions and encouraging participation in competitive sports will not cause them to become

$$B(BI) \rightarrow (GE)$$

where B(BI) stands for the belief that genetic enhancements serve in the best interests of the child by enhancing good-neutral abilities safely without taxing family and society, '→' is read as 'a reason for' or 'counts in favor of' and GE for genetic enhancement.

How should we understand this reason? In a practical and simple sense, our belief that a particular act is going to benefit our child seems to speak in favor of doing it. This much seems undeniable. This intuition is further borne out by the fact that parents are both legally required and generally expected to protect the child's wellbeing in certain ways including physical safety, health, intellectual and social development. Thus, that an intervention secures or contributes to a child's wellbeing is generally regarded reason to do it. However, it seems plausible that there might be further considerations that speak against such interventions, either because it detracts from the child's wellbeing in other ways or because, despite appearances, *that* genetic intervention serves a child's interests by improving her normal capacities is not reason to do it. Assuming that we have a permanent or non-negotiable duty to enhance, or that this duty clearly dwarfs other considerations risks oversimplifying arguments on the other side and failing to appreciate their strength. The technology in question is still in its early stages, and the potency and perils will, in all likelihood, become clearer in the future. It seems, then, most reasonable to view this reason as *defeasible,* one that may be undermined or outweighed by additional considerations. One way to carefully and systematically examine such considerations is to utilize the notions of undercutting and overriding defeaters, a framework that allows for the possibility of a presumed reason to altogether lose its status as a reason or, alternatively, to maintain its reason-giving status, but be outweighed by other factors.

Originally introduced as *epistemological* concepts, Sturgeon (2012) offers the following distinction between defeasible and indefeasible reasons:

> [Indefeasible reasons] generate epistemic pressure to believe which cannot be undone or wiped out or overridden simply by the addition of new information consistent with information to hand. [Defeasible reasons] generate epistemic pressure to believe which can be undone or wiped out or overridden simply by the addition of such information. (2)

How does my use of defeasible reason track its epistemological application?[14] Reasons for belief are oriented towards the truth of the belief, whereas reasons clearly do not have this relationship to acts, and as such, might appear inapplicable to my context. I will not attempt to offer a full analysis of practical reason or argue for correlations between epistemic and practical reasoning. My interest in using this

Footnote 13 continued
arrogant, induce an unhealthy competitiveness, or even develop an anxiety disorder. The best we can do is go by the best empirical evidence we have, and when we feel confident, experiment on human subjects.

[14] Thanks to Miriam McCormick for pressing for clarification.

epistemological framework is that it lends some clarity to the ways in which different considerations within the enhancement debate speak to one another.

Following Pollock, I regard both defeaters and reasons as beliefs.[15] Reasons, some have argued, needn't be possessed by the subject. However, such evidence cannot serve as reasons or defeaters in the present context since we cannot step outside of our collective epistemic position to determine what we should do. Therefore, it seems that the only sort of defeaters that matter are the ones to which we have and can have epistemic access.[16]

1.4 Undermining and overriding defeaters: definitions and translations

If ϕ is a defeasible reason to $\psi, (\phi \rightarrow \psi)$, then a defeater d is such that $\sim[(\phi \& \mathrm{d}) \rightarrow \psi]$. That is, it is not that the case that ϕ and d generate reason to ψ. In our context:

$$\sim[(\mathrm{d} \ \& \ \mathrm{B}(\mathrm{BI})) \rightarrow \mathrm{GE}]$$

That is, it is not the case that a defeater conjoined with a belief in best interests is a reason to genetically enhance.

A defeasible reason may be defeated by either undercutting or overriding defeaters. Epistemologists define undercutting defeaters as attacking the basis or grounds for one's belief, by either challenging the truth of the reason or its justification of the target belief. Pollock offers a helpful example. Suppose that you see a number of widgets on an assembly line, all of which look red and you form the belief that they are red. The supervisor later informs you that the widgets are illuminated by a red light that reveals cracks. While you don't have evidence that the widgets are *not* red, you have learned something that undermines your grounds for believing they are red. Melis (2014) offers another example: you form the belief that puffins fly based on Andreas's testimony. But, Filippo tells you that Andreas is not reliable when it comes to natural matters. As before, it is not that you now have evidence that puffins don't fly, but rather the grounds for your belief have been undercut.

While my use of defeaters does not track the likelihood of true belief given your evidence, we can use these analyses and examples to develop a positive and negative characterization of undercutting defeater. Positively: undercutters in a practical context operate by challenging the grounds for our act, by either showing that the grounds are false or that the grounds do not count as a reason for the act. Here I will be examining an undercutter which shows that contributing to a child's wellbeing does not count in favor of genetic manipulation.

[15] Pollock widens the set of defeaters and reasons to include other mental states, but beliefs seem to be most relevant here.

[16] My use of defeaters corresponds perhaps more precisely to *rationality* or *justification* defeaters (Plantinga 2000, 358–359; Steup 1996, 14), rather than warrant or propositional defeaters. The former characterizes defeaters on the basis of the subject's beliefs and experiences, while the latter does not.

$$\sim[\mathrm{B}(\mathrm{BI}) \rightarrow \mathrm{GE}]$$

Negatively: undercutters do *not* provide independent considerations that compete with or outweigh the defeasible reason.

Epistemologists describe overriding defeaters as incompatible or inconsistent with the target belief. Rather than challenging a particular *basis* for a belief *b*, overriding defeaters offer reason to believe $\sim b$. Suppose that while on a field you see an animal in the distance that looks very much like a sheep and form the belief that there is a sheep in the field (Pollock 1970, 62–63). The owner then informs you that there are no sheep in the field. Here, you have acquired a reason for believing something *incompatible* with your original belief (Plantinga 2000, 343–344). Janvid (2008) offers another example: you form the belief that your flight has a layover in Chicago because of a co-passenger's itinerary. But the departure board reveals that the plane stops instead in Philadelphia, which, given landing and take off times, makes a Chicago lay-over impossible. In this case, the board information does not attack your basis directly by showing that the itinerary contains a misprint, or that it is outdated. Rather, it provides independent reason for the belief that the flight does not land in Chicago. Admittedly, if the board is right, this would show that the itinerary did not lead to the truth. But, the defeater itself does not point to any defect or flaw in the reason.

In the practical realm, overriding defeaters do not provide evidence for the *truth* of an incompatible belief (as in the epistemological case) but we can define overriding defeaters in a practical context again by using a negative and a positive characterization. Negatively: overriding defeaters do not show that our reason is false or that the justificatory connection is defective. Positively: overrriding defeaters operate by providing independent reason to not perform the act. Here, I will examine an overriding defeater which shows the harms produced by enhancement are weightier than its benefits. Note that such an argument would be consistent with enhancements improving the child's life in other ways and even allow that such considerations provide *some* justification for the act, but would show that and we have more reason to *not* enhance: $\sim$GE. In the following sections, I will examine whether B(BI), though defeasible, can remain undefeated in the face of Sandel's and Habermas's concerns.

2 Sandel's argument

2.1 The giftedness of life and erosion of sympathy

Sandel argues that genetic enhancement represents a striving towards mastery that in turn diminishes our appreciation of the giftedness of life. To acknowledge the giftedness of life is to realize the limits of our reach, to recognize that parts of our life are not subject to our control and preference. The giftedness of life, insofar as it extends beyond talents and powers (as it seems to in Sandel's discussion), does not appear consonant with what is desirable or valuable as it is conceivable, and probably likely, that some traits will be outside of our control and undesirable. What

then explains Sandel's use of the normatively charged *gifted* rather than a more neutral description such as non-cultivated or innate? Sandel argues that the realization that some of our talents and capacities are *given* founds a sense of humility and compassion:

> To acknowledge the giftedness of life is to recognize that our talents and powers are not wholly our own doing, nor even fully ours….It is also to recognize that not everything in the world is open to any use we may desire or devise. An appreciation of the giftedness of life constrains the Promethean project and conduces to a certain humility. (2007, 27)

That is, accepting that some aspects of our life are not within our reach or malleable according to our preferences forces us to realize that our success is not due entirely to our efforts and others' failures, to a lack thereof. This realization has implications for the way we relate to our own children and wider society. According to Sandel, it grounds unconditional acceptance of children as they are instead of seeking to mold and shape them to meet our desires or expectations. While parenting requires a combination of both unconditional and transformative love (directed towards promoting the child's excellence) genetic engineering entails efforts and attitudes that emphasize transformative over unconditional acceptance, "promoting and demanding all manner of accomplishments from… children" (50). Thus, Sandel argues, attitudes that underlie genetic enhancement disfigure the parent–child relationship. In addition, ties to society suffer as we begin to see ourselves as wholly responsible for our success and failure:

> A lively sense of the contingency of our gifts—an awareness that none of us is wholly responsible for his or her success—saves a meritocratic society from sliding into the smug assumption that success is the crown of virtue, that the rich are rich because they are more deserving than the poor. (91)

According to Sandel, genetic enhancement expresses and reinforces a sense of mastery at odds with the values of acceptance and compassion.

2.2 An undercutting defeater

If Sandel is right that genetic enhancement erodes sympathy, compassion and humility, destroys parent–child relationships and community, then genetic enhancement is significantly problematic. To avoid misinterpreting or oversimplifying Sandel's concern, it is important to parse his claim carefully by examining precisely how his charge affects our reason in favor of enhancement. According to best interests reasoning, we have reason to when we believe that the enhancement will improve the child's lot without imposing difficulties on family and society. We might think that Sandel has shown that while such an enhancement helps the child by improving certain capacities, it generates greater harm by distorting relationship with parents and creating a world void of compassion and solidarity.[17] According to

[17] Thanks to Jennifer Hawkins for highlighting this possibility.

this interpretation, Sandel's concern would be classified as an *overriding* defeater because it leaves intact the justificatory strength of the original reason (that enhancement helps the recipient in certain ways) and offers a competing reason against the act (by detracting from wellbeing). We will call this interpretation S_o:

1. A given enhancement or set of enhancements E benefit the child by improving capacities.
2. But the child will suffer greater harm as a result of E (loss of unconditional acceptance, humility and compassion).
3. Therefore, we should not affix the child with E.

Defenders of enhancement tend to ascribe S_o to Sandel and subsequently respond by denying (2): Singer (2009) claims that concerns about devaluing the giftedness of life or losing a sense of solidarity may be "outweighed by the positive characteristics that genetic selection could bring" (279). Savulescu has listed what these benefits might be:

> Increased empathy with other people, better capacity to understand oneself and the world around, or improved memory. One quality is especially associated with socio-economic success and staying out of prison: impulse control. If it were possible to correct impulse control, we should correct it. (2007, 531)

The authors maintain that the range of benefits afforded by enhancement outweigh the type of harm Sandel anticipates.

I want to suggest that this interpretation and the responses it has motivated are misguided for three reasons. First, Sandel explicitly disassociates his objection from cost-benefit calculations:

> I am suggesting instead that the moral stakes in the enhancement debate are not fully captured by the familiar categories of autonomy and rights, on the one hand, and the calculation of costs and benefits, on the other. My concern with enhancement is not as individual vice but as habit of mind and way of being… The [stakes involve] the norms of unconditional love and an openness to the unbidden, in the case of parenting,; the celebration of natural talents and gifts in athletic and artistic endeavors; humility in the face of privilege, and a willingness to share the fruits of good fortune through institutions of social solidarity. (2007, 95–96)

Rather than impact on the child's wellbeing or interests, Sandel focuses on the undesirable shift in our moral orientation, one which renders us immune to humility and compassion. S_o, however, clearly evaluates the morality of enhancement on the basis of costs and benefits to recipient. One may argue that such a shift may nevertheless indirectly lower the child's quality of life, and therefore is still fundamentally a matter of the child's wellbeing. Although the shift will likely affect the child, this consequence is not the focus of Sandel's argument, as seen by the second point: Sandel's concern would remain even if (2) were false, that is, it turned out that the benefits of enhancement in fact outweighed the harms he anticipates.

Suppose it were found that the sorts of improvements afforded by genetic manipulation would lead to a cure for cancer,[18] and generally make people happier because they were independently high-achieving, less dependent on one another and less susceptible to the contingences of life. Due to their individual strength and independence, the sentiments of compassion, humility and solidarity are no longer valued nor shared. In such a world, it seems that genetic enhancement has significantly improved the child's life, despite the loss of certain moral values. The latter is undesirable, but cannot be translated as harm or cost to the recipient or as a worsening of her wellbeing, particularly in this scenario, where recipients seem to have fared very well due to genetic intervention. Sandel's concern is directed against this form of moral deterioration rather than the child's best interests or the impact on her wellbeing

The third reason to reject S_o stems from a telling link between Sandel's objection to enhancement and what seems to be the strongest reason in its favor, best interests reasoning. According to best interests reasoning, our reason to enhance is founded on its potential to improve the child's good-neutral capacities. But for Sandel, it is the very attempt to improve a child's capacities through genetic means that is objectionable. This is because it entails an amplified sense of control and responsibility, which ultimately displaces humility and compassion.

In light of these reasons, I want to suggest that Sandel has offered an *undercutting* defeater. To see why, consider the epistemological example above: you form a belief *b* that the widgets you see along a conveyer belt are red based on your visual perception. You are later told that the widgets are illuminated by a red infrared light. Note that information about lighting conditions acts as a defeater for *b* by appealing to your basing commitment: your belief *b* was based on visual perception. Such information would make no difference in the absence of this commitment. If instead you formed your belief on the basis of the factory owner's testimony that the widgets in her factory are uniformly red, then information about lighting conditions would not count against your justification. Here is Sturgeon (2012):

> When an agent is committed to a *strong link* between belief in ϕ and source of information S, then, and only then, does belief in ϕ-untrustworthiness of S undercut belief in ϕ (14).

In this case, visual perception of red objects is not an indication of red objects, given lighting conditions. In general, undercutting defeaters are "source sensitive" and may operate by either showing that the source is itself defective or that it cannot confer justification in a particular context because the "source is operating in an environment for which it is not well adapted" (Casullo 2003, 46). While visual perception of a red surface is generally a good reason to believe that the surface is red, it is not so here.

Sandel challenges our basis—B(BI)—for enhancement in an analogous way. Best interests reasoning, as explained above, justifies enhancement on the belief that

[18] A possibility that Sandel himself entertains (95).

some enhancements will benefit a child by improving her general-purpose capacities. While benefitting a child by improving her capacities typically counts in favor of an act—"parents have an obligation to cultivate their children, to help them discover and develop their talents and gifts" (49)—*genetic* enhancements present a context for which this source of justification is not well-suited. This is because improvements sought through genetic means involve the sense that we are in control and can rule out, or come very close to ruling out, the possibility of failure. This is in turn disfigures the parent–child relationship by replacing unconditional acceptance with high expectations and pressure to succeed. More broadly, it engenders the belief that each individual has the capacity to determine the fate of their lives and achieve their goals thereby minimizing, or perhaps erasing vulnerability, humility and compassion.[19] Sandel's argument is then best regarded as an undercutting defeater, which shows that best interests reasoning cannot in fact count in favor of enhancement. Let me explain why: Sandel argues against genetic enhancement on the grounds that it embodies an unhealthy sense of control over life, engendering a sense of invincibility and perhaps even indifference towards others. If this is the case, then we cannot use the improvement of our capacities of as a justification for enhancement, since it is this very drive to improve our lives and render us unsusceptible to the contingencies of nature that fuels our hubris. More carefully, it is replace 'not one' with "not that one" ought not to improve their child and promote their wellbeing, but that these considerations cannot give us reason to genetically enhance, given the unique features of this context. Here is a formalized version of this reading (S_u):

1. Best-interests reasoning justifies enhancements on the grounds that they will safely improve our capacities.
2. But seeking to improve ourselves or our children through genetic manipulation engenders hubris and the loss of compassion and humility.
3. Therefore best-interests reasoning does not count in favor of enhancement.

2.3 Ineffective responses

If S_u is the correct characterization of Sandel's argument (which seems to be supported by closer inspection), then the responses motivated by S_o will undoubtedly fail. Enumerating the benefits of enhancement and insisting that they

[19] In contrast, improvements sought through other means such as teaching a child how to play the piano or inculcating virtues through modeling and explanation do not fuel this sense of control as parents acknowledge that things might not work out as planned. To be clear, it is not that parents have to be committed to genetic determinism. It is sufficient that parents think it highly likely that their involvement will result in the traits and capacities they favor, whereas such a high degree of confidence is not available when it comes to environmental intervention. It is this sentiment that generates a loss of susceptibility, humility and compassion. Thanks to Norman Daniels for pushing me to clarify how genetic interventions are distinct from environmental interventions.

outweigh harms assumes that such improvements are uncontestably reason-giving.[20] This is the very thing that Sandel denies. That is, even if enhancement procures such benefits, this does not give us reason to enhance because improvement sought through genetic manipulation entails an undesirable shift in our moral values. While improving a child's wellbeing gives us reason to act under ordinary circumstances, in this context, such considerations do not generate reason to act because wellbeing sought through genetic means takes away humility, compassion and solidarity. Thus, merely listing the benefits will not address Sandel's undermining concern because Sandel has denied that these benefits count as reasons at all in this context.

Other responses have oversimplified Sandel's argument by interpreting it as criticizing *all* efforts to improve. Brock (2009) argues

> Parents now typically exert great efforts to shape and mold their children's development during their childhood in myriad ways. While some parents overdo this and can even become tyrannical in the control sought over children, some attempt to shape their children's development is part of every parental experience; its presence is not incompatible with parents' unconditional love and acceptance of their children…these efforts are typically a reflection of…their unconditional love and acceptance (270).[21]

The idea here is that parental efforts to rear children in particular ways manifest, rather than conflict, with their love. For this reason interventions do not, as Sandel fears, distort the parent–child relationship, but in fact sustain and contribute to it. However, as stated above, Sandel, does not argue that intervening is itself problematic and instead specifically takes aim at improvements sought through genetic interventions. He argues that *these,* unlike other interventions, generate an increased sense of responsibility and control, which in turn does away with the compassion, humility and solidarity. Hence, Brock's argument that efforts to improve a child's wellbeing is consistent with unconditional love does little to address Sandel's particular concern.

A similar line of reasoning can be observed in Savulescu (2007):

[20] To be clear, these proponents allow that certain circumstances might outweigh a parent's permission or obligation to enhance, such as the compromised wellbeing of their other children, but even in this situation there remains at least initial reason to enhance.

[21] Brock also maintains that positive selection occurs at an embryonic-stage or pre-implantation stage, which then allows the normal processes of pregnancy, infancy and early childhood to build strong relationships between parent and child. Given the biological foundations of intimacy, loss of sympathy and unconditional love and acceptance do not seem to be likely consequences of genetic intervention (2009, 269). However, these claims are unsustainable. While a biological basis for parent–child relationships seems plausible and supportable, this does not seem to constitute a necessary or sufficient condition for the development of such a relationship, as evidenced by the vast number of unhappy, unhealthy relationships parents and their biological children, and the successful relationships between parents and adopted children. Thus the presences of these processes, post-intervention, do not secure unconditional love and acceptance between parents and child. Furthermore, these claims do not speak to Sandel's more general worry that such technology might generate a degree of indifference towards others' misfortune.

> Some people in society believe that children are a gift, of God or of nature, and that we should not interfere in human nature….We screen embryos and fetuses for diseases, even mild correctable disease. We interfere in nature or God's will when we vaccinate, provide pain relief to women labor…and treat cancer…Why, then, not treat the embryo with genetic therapy if that intervention is safe (531).[22]

One might think that Savulescu is speaking directly to Sandel's notion of the giftedness of life, arguing that we interfere with what is gifted to us routinely, and believe that it is acceptable to do so. For this reason, interfering through genetic intervention is equally acceptable. However, here again, we see that Sandel's argument is presented in broad strokes that overlook key features that give the argument its force. Unlike other forms of 'interference', Sandel argues that genetic enhancement distinctively involves an expansion of our power and control at the cost of sympathy and compassion. While therapeutic interventions aid the child, they still leave open the capacities and future the child will have. In contrast, enhancement and positive selection reflect an effort to tightly control these factors and thereby eliminates our "openness to the unbidden". Sandel's criticism, then, is not levelled against *all* attempts to improve ourselves or re-route the course of nature, but doing so in particular ways.

Sandel's emphasis on control have led some to reject his argument on the basis of an unwarranted commitment to genetic determinism. Geneticists agree that genes do not have a direct and invariable impact on most cognitive and emotional traits. Studies show childhood smoking and criminal tendencies are influenced far more by peer groups than by parents. Cognitive neuroscientist Michael Gazzinga (2005) describes genes as nothing more than "scaffolding, but the fine detail is tuned by interaction with the environment" (48). Resnick and Vorhous (2006) apply these findings to Sandel's argument:

> Genetics can be used to control traits only if those traits are strongly determined by genetics in the first instance. But with the knowledge that most traits are not strongly determined by genetics the vision of hordes of parents shaping their children and, in the process, remaking nature loses its cogency. Parents may be able to influence nature but they are surely unable to *master* it. Even if there is, as Sandel suggests, a 'drive to mastery', a wide array of limitations…strongly suggests that our ability to exert control via genetic modification will *necessarily* fall far short of anything that could be construed as mastery.

Sandel's concern, however, is not sidelined by the denial of genetic determinism, as his argument does not hinge on the *actual* outcome of genetic intervention. Rather, it is the *pursuit* of control that Sandel finds problematic. While genetic manipulation might not yield the traits or lifestyle specifically preferred by parents, the relentless quest for domination and the belief that this is achievable persists, which is in turn,

[22] While Savulescu uses "treat", he is defending genetic intervention (including enhancement) more broadly in this piece.

what extinguishes unconditional acceptance and sympathy. This is why Sandel objects more generally to what he calls 'hyper-parenting' which includes hectoring from the sidelines at sports competitions, enrolling children in highly selective preschools, writing their college essays, etc. These traditional forms of intervention are not deterministic, but are nevertheless criticized by Sandel on the grounds that they represent "an anxious excess of mastery and dominion that misses the sense of life as gift" (62). Now, actually achieving expected results might fuel these efforts and compound the subsequent weakening of relationships, but this is not essential to Sandel's argument. Rejecting Sandel's argument by highlighting the myth of genetic determinism, then, is ineffective as his target is not the determinism of genetic manipulation, but rather *aiming* to "remake nature including human nature, to serve our purposes and satisfy our desires" (26).

2.4 A defense of best interests reasoning

The responses above fail because they erroneously assume that Sandel's argument requires a commitment to genetic determinism, misperceive the argument as an *overriding* defeater that accepts the reason-giving status of B(BI), or they take him to be rejecting all efforts directed at helping one's child improve. An adequate defense will have to reinstate the justificatory link between best interests and genetic enhancement. That is, it will show that our belief that certain enhancements will serve in the child's best interests by improving good-neutral capacities does generate reason to enhance: B((BI) → GE).

Best interests reasoning does not count in favor of *all* genetic enhancements, but specifically those which better equip children to achieve their own goals, whatever they might be. Whether the child ultimately decides to become a virtuoso pianist or a teacher, genetic enhancement is intended to help her achieve her objectives without imposing specific expectations. The child's life and choices are not determined by, but are rather aided by, these interventions. Rather than erode compassion, sympathy and humility, such reasoning forces the parent to be open to and accept the child's aspirations. Further, given that the enhancements selected may not be particularly advantageous to the line of work or life-plan the child has chosen, parents and children will have to face the possibility of failure, and accept a degree of unpredictability and vulnerability. Therefore, contra Sandel, genetic interventions justified by B(BI) do not erase the appreciation of giftedness or erode acceptance and sympathy. For this reason, best interests reason is not undermined, and can remain an undefeated reason in favor of enhancement. Note that in my defense, I have not *assumed* that contributing to a child's wellbeing by improving her capacities is itself a consideration in favor of enhancement. In contrast, Singer and Savulescu take for granted that this is a non-negotiable reason-giving feature of enhancement. I have defended its reason-giving status from Sandel's charge by showing that genetic enhancement does *not* erode our moral sentiments. Further I have not defended enhancement by arguing that parental interventions are generally reflective of love or that therapeutic intervention are permissible. Recall that what Sandel claims is not that interventions are themselves problematic, but that these considerations fail to justify *genetic* enhancements. I've instead shown that seeking

improvement of capacities require a degree of openness to the child's decisions and preferences as well as the possibility of failure. My defense, then, dislodges Sandel's worry that genetic enhancement will erase our appreciation of the giftedness of life and ultimately erase humility and compassion.

Sandel, seeming to anticipate this line of argument, denies that he is assuming that all those who enhance do so out of a desire to control and determine a child's life:

> Nor do I claim that people who bioengineer their children or themselves are necessarily motivated by a desire for mastery, and that this motive is a sin no good result could possibly outweigh. (96)

This passage seems to suggest that while we might not explicitly or knowingly pursue control, the practice will inevitably, but unintentionally weaken solidarity and humility. The charge, however, seems improbable in light of BI constraints. Deliberately focusing our efforts on ways that *help* the child follow her own aspirations rather than indiscriminately affixing her with all manner of enhancements or narrowly engineering her to conform to our own idiosyncratic conceptions of goodness will prevent this very thing from happening. The goal is not to create a super-human or a *perfect* human, but someone who is well-equipped to pursue a life of her choosing.

3 Habermas's argument

3.1 Genetic enhancement impairs self-understanding

Habermas (2003) maintains that recipients of genetic enhancement cannot develop an appropriate self-understanding in which they see themselves as "authors of [their] own lives".[23] Habermas's concern is not the importance of *actual* autonomy—that is, the freedom to choose how one lives—but a perception of oneself as exercising this autonomy, where one is able to "*perceive* [herself] as the initiator of [her] actions and aspirations."[24] According to Habermas, genetic

[23] Habermas's worry is distinct from concerns of autonomy found in biomedical ethics more generally, and enhancement in particular. Habermas argues that if one's dispositions are, from the very start, molded according to parents' desires and societal values, it will be difficult, if not impossible, for the child to distinguish herself as separate from, and independent of, third-party intentions. She might, in a sense, be able to carry out what she wants to do, but the problem for Habermas is that she will not regard her desires as truly her own.

[24] Habermas motivates the worry by discussing the role of self-understanding in the context of membership to a moral community, one which "requires all its members to show equal respect of every other member and to be responsible in their solidarity with all of them" (73). Habermas connects at times to Kant's principles of humanity and universalizability and even draws support from diverse religious and metaphysical doctrines which too seem to agree that "a minimal ethical self-understanding of the species [sustains]…this kind of morality" (40). While Habarmas situates self-understanding within a picture of moral agency and human dignity, it will go beyond the aim of this paper to present and examine these connections. I will, instead, take it for granted (I think uncontroversially) that perceiving one's authenticity is in itself valuable. My discussion, then, will center on whether or not genetic enhancement

enhancement impedes self-understanding because the child is treated as "an object which is manufactured or repaired or channeled into a desired direction" (52). These charges, may, *prima facie,* appear unwarranted since enhancements, as emphasized above, are intended to help and benefit the child. Habermas argues that parents are uniquely situated in the case of genetic enhancements, in that the entire process is dictated by parents and the aid of doctors:

> The programming intentions of parents who are ambitious and given to experimentation have the peculiar status of a one-sided and unchallengeable expectation….In their role as programmers, the parents are barred from entering the dimension of the life history where they might confront their child as authors of demands they address to him (51).

The problem, as Habermas sees it, is that parents are unable to obtain the child's consent during the time of intervention, and, worse, the child cannot later reject, reverse or re-assimilate these interventions later in life. Unlike music lessons and rules of etiquette that "children have the opportunity to respond to and break away from" (62), the child is not given the opportunity to "engage in a revisionary learning process" of her genetically programmed traits. In a word, genetic programming cannot be undone. Though we might try to equip the child in ways that are compatible with, and beneficial to, a wide range of life plans, we cannot rule out the possibility of "dissonant" cases. We "cannot be sure that this harmony between one's own intentions and those of a third party will inevitably be produced" (61).[25] Because the child does not have a say at the time of intervention and cannot subsequently re-evaluate the effects of intervention later in life, she is barred from developing the right sort of *self*- understanding as "undivided author of [her] own life" (63).

The charge might, at first glance, appear naïve. Surely the disconfirmation of genetic determinism ensures that genotype does not typically produce irreversible behavioral dispositions or talents. In addition, Bostrom (2003) has argued that genetic interventions might be reversed using somatic gene therapy or medical nanotechnology. Such considerations do not allow us to sidestep Habermas's worry as they focus on the symptom of irreversibility without attending to what Habermas sees as its cause. Habermas is not merely arguing that a particular trait cannot be undone or skill unlearned, but rather that the child cannot distinguish her *self* from what her parents have created, and for *this* reason is not afforded the opportunity to

Footnote 24 continued
deprives us of such understanding, and remain neutral about the impact of such understanding on moral reasoning, or being members of the relevant type of moral community.

[25] Habermas distinguishes here between positive enhancement and therapeutic intervention. He writes that as long as "intervention is guided by the clinical goal of healing a disease or of making provisions for a healthy life, the person carrying out the treatment may assume that he has the consent of the patient preventively treated" (52). The idea here seems to be that we can unproblematically assume patient consent for preventative or therapeutic measures, whereas the same sort of confidence cannot be garnered for positive enhancements. Habermas further points out that even in cases of therapeutic intervention, a sort of "instrumentalization" of human nature is possible in cases where the patient's virtual consent is not considered. (52).

independently critically examine her parents' choices. That is, in opting to reverse an intervention (using genetic or behavioral therapy), the child sees herself as "choosing" from within her parents' mold. Thus, the sheer potential for reversibility isn't enough.[26] To protect against threats to the child's self-conception as sole author, it must be shown that such decisions come from her.[27]

There is an important criticism here often levelled against autonomy objections to enhancement, which will draw out a key feature of Habermas's argument. Some have argued that no one is exclusively responsible for their own lives; the non-enhanced, after all, do not choose their genetic inheritance. Sandel (2007), while not himself a proponent of enhancement, contends that "the alternative to a…genetically enhanced child is not one whose future is unbiased and unbound by particular talents, but a child at the mercy of genetic lottery" (7).[28] Savulescu and Kahane (2009) echo the same worry: "It makes little sense to think that we limit a future child's autonomy by selecting its genetic endowment (especially increasing talents and capabilities), but respect it by leaving the formation of that endowment to natural processes" (282). Such criticisms suggest that sole authorship is, in itself, implausible, and therefore cannot count against genetic enhancement.

Habermas maintains, however, that self-understanding is not impaired in ordinary, non-enhanced births, because the individual is able to see herself as continuous with a body that emerged independent of a third party's design and intentions. Habermas explains that seeing ourselves as authors or initiators of our lives—"that it is our own voice speaking and no other" (2003, 57)—requires identifying with one's own body. It is the body that "[denotes] center and periphery…enables us to distinguish between actions we ascribe to ourselves and actions we ascribe to others" (58). In order to *be* and not merely *have* one's body, it must be experienced as "something natural as a continuation of the organic, self-regenerative life from which the person was born" (58). Habermas maintains that one recognizes her authenticity (that her desires, beliefs, experiences are truly her own) when she can identify herself as a body that emerged from a wholly natural and organic birth. Habermas writes, "for a person to be himself, a point of reference is required which goes back beyond the lines of tradition and the contexts of

[26] A similar line of reasoning can be found in Parens (2004), where he argues that acknowledging genetic influence on behavior, far from minimizing or erasing a sense of authorship and responsibility for one's behavior, it "could give individuals an increased sense that they are responsible to alter those imperfections, to change their temperaments by whatever means possible (exercise, drugs, cognitive therapy, and so on)" (S24). Again, the worry is that for the recipient, it is unclear whether the drive for change stems from authentic desires or is again rooted in her parents' intervention.

[27] It is important to note that Habermas, like Sandel, does not assume genetic determinism. He explicitly maintains that "irrespective of how far genetic programming could actually go in fixing properties, dispositions and skills, as well as in determining the behavior of the future person, post factum knowledge of this circumstance may intervene in the self-relation of the person….The change would take place in the mind" (53).

[28] Sandel is here refuting the view that genetic engineering would impair the child's autonomy by infringing on her right to choose her own life. This is related to, but not the same as, Habermas's concern that genetic engineering will distort self-understanding. However, Sandel's claims here are relevant because it points to a potentially mistaken assumption on Habermas's part that absent genetic engineering, we can justifiably view ourselves as full authors of our lives.

interaction" (59).[29] Alternatively, "a person who would be the sole product of a suffered socialization fate would see his 'self' slip away in the stream of constellations, relations and relevancies imposed upon the formation process" (59–60). Thus, even though the non-enhanced child has not herself chosen her genes, she can view them as independent of third-party designs. In fact, the genetic lottery *contributes* to self-understanding insofar as it allows the individual to define herself as continuous with a body constructed apart from the desires, intentions and influences of her parents and society.[30] This entirely detached beginning allows her to critically appraise later social influences from her own perspective. Pre-natal genetic manipulation, on the other hand, reduces the child to *nothing more than* a product of third parties' goals, efforts and control.

3.2 An overriding defeater

Again, to avoid oversimplifying or illegitimately dismissing Habermas's argument, we should ask how Habermas's argument speaks to our reasons in favor of enhancement, namely, that we have reason to enhance when doing so will serve in the child's best interests by improving good-neutral capacities safely and without adversely affecting family and society. We might interpret Habermas in one of two ways. First, we might think that Habermas is arguing that we have *no* reason to enhance because doing so harms the child in significant ways and therefore does not contribute to, but detracts from, her best interests. Note this this would, in effect, deny that B(BI) offers any justification at all in favor of enhancement. Even if it is true that enhancement serves to improve good-neutral capacities, this does not count in favor of enhancement because of the severity of harm, perhaps in the same way that the recreational fun of bullying does not in any way justify bullying. I think, however, that this is a mischaracterization of Habermas's view. He does not argue that improving capacities through genetic means is itself morally defective in the way that deriving fun from someone else's pain and humiliation would be. Rather, Habermas argues that genetic enhancement is objectionable for *other* reasons. An analogy might be helpful: The opportunities afforded by a competitive school speak in favor of attending that school, whereas its cost might be an overwhelmingly bad-making feature. The second consideration does not affect the truth or the reason-giving status of the first, but instead presents independent reason to perform an incompatible act. In the same way, Habermas offers a *competing* consideration, one which seems to outweigh the reasons in favor of enhancement, rendering his argument an *overriding* defeater that leaves intact our original justification. That is, the belief that genetic enhancement generates non-self-understanding provides

[29] He relies here on Hannah Arendt's notion of *natality,* which views birth as an entirely new beginning, detached from existing persons and societies.

[30] It might be argued that children are never entirely detached from parental intentions since parents have deliberately selected one another. I take it that the unenhanced child can still be viewed as a new and independent beginning in that mate selection does not establish or control *which* genes or traits will be transmitted to offspring.

reason to not enhance: B(NSU) → ∼GE.[31] While Habermas has offered a strong reason against enhancement, his argument is *compatible* with the belief that genetic enhancements will benefit the child by improving intellectual capacities, and that such improvements generate reason to enhance.[32]

3.3 Failed responses

Understanding Habermas's objection as an overriding defeater helps distinguish some effective responses. One way to defend enhancement is to show that the benefits yielded by enhancement outweigh concerns about self understanding. We see this approach in Savulescu (2007), where he attempts to bolster the advantages of enhancement by arguing that they are comparable to the treatment of disease. According to Savulescu, treatment is valued for the goodness of health, which is not valued as a good in and of itself but rather for enabling us to live well: "health is instrumentally valuable– valuable as a resource that allows us to do what really matters, that is, lead a good life" (521). Genetic enhancement directed toward increasing intelligence, controlling impulsivity, overcoming shyness, etc., will also make life better. Because improvements afforded by genetic enhancement contribute to well-being in the same manner and to the same extent as therapeutic intervention, its benefits outweigh any impact on self-understanding. The problem with this line of argument is that while such considerations give us some reason to enhance, they do not overpower Habermas's concern. This is because self-understanding also seems to play a crucial role in wellbeing and it is conceivable that it plays as significant a role as the treatment or prevention of disease. Indeed, if one has a successful career and meaningful relationships, but considers herself a complete fraud or as nothing more than a properly-functioning automaton that has satisfied her programmers' intentions, the individual's success, while good in itself, might mean little to her. We cannot a priori conclude that increased intelligence and attention span will contribute more to wellbeing than an appropriate self-conception

We might, instead, defend enhancement by denying Habermas's charge, that is, by arguing that genetic interventions do not in fact prevent self-understanding. Brock, for example, argues that identity is not determined exclusively by genetic factors, but also depends on environmental influences:

[31] We may also view the tension between best interests and Habermas's self-understanding argument as a tension between competing biomedical principles (Childress and Beauchamp 2013). According to their principled approach, we are to weigh and balance different moral norms relevant to the situation. While this method parallels and helpfully illuminates the *rebutting* nature of Habermas's argument against best-interests reasoning, the framework isn't appropriate for the paper as I make no assumptions about fixed values, and it is unclear that Habermas's argument conforms to the demands of any of the principles.

[32] Melis (2014) explains that an overriding defeater to one's belief is "perfectly compatible with the justificatory process having been executed impeccably, and having being delivered by a reliable source working in good circumstances" (437). Epistemological overriding defeaters operate by preventing reasons from leading to truth, whereas underminers suggest a mistake in the process. The situation is of course slightly different in the practical case: as suggested above an overriding defeater leaves intact the reason-giving force of the original reason (best interests in our case) to perform the act.

> It is a mistake to believe that interventions that change a person's genome must change his or her identity in a deep way, whereas environmental interventions only bring out what is already fixed. There is no fixed phenotype given a particular genotype. Instead, there is a range of phenotypes associated with the genotype and determined by the environment with which the individual interacts. (2009, 255)

If a child's identity is not fixed by parental intervention, then the child need not feel that she is nothing more than a product of her parents' design. Brock's argument, however, does not address Habermas's contention that the child is ultimately a product of broader social factors. Recall that according to Habermas, self-understanding can develop only if the child has a new beginning, outside the reach of *all* social and environmental influences. It is this detached and separate birth that allows the individual to see herself as authentic rather than the "sole product of a suffered socialization fate".

Brock's and Savulescu's defenses, then, are ultimately powerless in the face of Habermas's argument. They have neither shown that improving good-neutral capacities outweighs concerns about self-understanding, nor that genetic enhancements do not impede self-understanding. Below, I argue that Habermas's claim is incompatible with current findings in genetics, and therefore, is unsustainable.

3.4 Complex traits present opportunities for newness

The worry, as Habermas sees it, is that genetic interventions make the child, from the very start of her life, subject to the desires of her parents, the influence of social pressures and the operations of a 'technician'. Instead of an adolescent who matures, finds her own voice and takes a critical and revisionary stance to the social influences that have helped shape her, the recipient of enhancement does not feel 'at home' in her body and sees herself, her experiences and desires as products of third-party intentions. I want to suggest that Habermas's argument is at odds with our current understanding of genetic function. There are three ways in which newness is introduced at the level of function. First, geneticists agree that most traits are not produced by simple additive interactions between alleles, where each gene functions independently of other genes. Rather genes exhibit *hierarchical* or *epistatic* interactions, where some genes might exert an effect that is realized only if certain other genetic effects had occurred earlier, making genetic effect "not *additive* to earlier events, but conditional on them" (Hyman 2006, 117–118). In the early twentieth century, it was found, in part because of Bateson's (1909) pea plant study that two different genes contribute to the flower color of a pea plant is a two-step chemical reaction. Miko (2008) explains that "if either step is nonfunctional, then no purple pigment is produced, and the affected pea plant bears only white flowers" (197). More recently, studies have shown that whereas early onset Alzheimer's Disease (AD) is caused by large-effect genetic mutations, late-onset AD appears to be affected by many different alleles of small effect (Schaffner 2006). Given their epistatic interaction, it is clear that the manipulation of genes at a particular locus or even a set of loci will not ultimately fix the child's complex emotional or cognitive

traits, due to the variability of interaction between the genes in question and background genes. This leaves room for an element of newness that emerges independent of deliberate genetic modification.

A second source of functional variability emerges at the level of environment. That is, environmental factors do not invariably impact each person in a predictable and specifiable manner. Rather the influence of environment varies according to features of the subject's genotype and the ways in which this is expressed. Schaffner (2006) cites a study (Caspi et al. 2002, 2003) in which the metabolizing effects of two alleles (the long and short form) of the monoamine oxidase A, or the MAOA gene was studied. It was found that the short variant less effectively metabolized neurotransmitters, and as a result, increased the likelihood of developing severe antisocial behavior. However, this was a qualified finding:

> Individuals who had the short allele were much more likely to develop antisocial behaviors, including a record of criminal convictions, but only if they had been abused in childhood. Those with the long allele did not display these increased antisocial behaviors, even though they also likely suffered childhood abuse. (2007, 44)

Anti-social behaviors, then, were not a direct, inevitable product of environment, but rather stemmed from certain alleles operating within specific contexts. In addition, genes may alter the environment itself, which then subsequently affects gene expression. A child's genetically dependent impulsive or disruptive temperament may invoke certain behaviors and responses from those with whom she interacts, including parents, teachers and peers. The resulting environment will then influence gene expression and shape neural synapses and circuits that influence behavior (Hyman 2006, 118). What this means is that social influences do not fix or determine the child's identity. Rather, because of the variability and complexity of interactions, the child retains an element of newness.[33]

A final source of functional variability comes from epigenetic factors that affect allelic expression over time. Dennis (2003) discusses two forms of epigenetic signals including methylation and chromatin modeling, both of which control gene activity, turning genes 'off' and 'on', respectively. Methylation tags cytosine, one of the four chemical bases that make up the genetic code with a methyl group and results in silencing gene expression. Chromatin remodeling occurs through chemical modification of histone tails (which are proteins around which strands of DNA are wrapped), and switches the relevant genes on. Researchers have found that cancer cells exhibit unusual patters of DNA methylation, and more work is currently being done to identify the role of epigenetics in diseases such as diabetes, obesity and heart disease. What these findings suggest is that phenotype cannot be reduced to a matter of allelic composition, but will vary according to the variable epigenetic profile of the person. While there is evidence to suggest that it might be possible for parents to manipulate the child's genome in a way that affects epigenetic factors,

[33] While Brock discusses the role of environment in shaping the child's identity, he does not show that environmental impact may be variable and will allow the child to retain the newness Habermas thinks essential for self-understanding.

such influences might emerge through non-genetic factors later in life. Again we see that newness may arise at the level of genetic function. While parents may select allelic composition, the child will be a complex network of new interactions that are not controlled or determined by parents.

Factors that determine complex cognitive and emotional traits are not restricted to genetic *structure* but hinge significantly on the interactions between genes, environment and other non-genetic factors. What this suggests is that an entirely new and individual beginning is not lost through genetic manipulation, but rather emerges from unique interactions. The recipient of enhancement, then, can maintain her independence from the design and desire of parents as well as social influence and develop an appropriate self-understanding as a product of new interactions. She may subsequently see herself as author of her own desires, experiences, etc. I want to suggest, then, that our belief that certain genetic enhancements benefit the child by improving her general purpose capacities is not outweighed by loss of self-undersanding.

Our justified belief that genetic enhancements significantly benefit the child without harming others or placing the child herself at risk seems to be a very strong reason in favor of enhancement. However, assuming that this belief is a fixed reason or a reason that cannot be trumped by other considerations leads to an unwarranted dismissal of legitimate concerns. Classifying best interests reasoning as a *defeasible* reason and dividing concerns about enhancement in terms of undercutting and overriding defeaters generates a more perspicuous and thorough understanding of the way in which the latter relate to the former, thereby avoiding the pitfalls of previous approaches. Using this framework, I have attempted to show that at least some of these defeaters do not undermine best interests reasoning. More precisely, the rational bias created by such a belief is neither undone by Sandel's undermining defeater, nor outweighed by Habermas's overriding defeater.

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