Gene editing vs. genetic selection

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ABSTRACT: McMahan and Savulescu have put forward a two-tier view that combines person-affecting and impersonal considerations and that is supposed to both favour gene editing over genetic selection and favour saving an existing person over creating a new person. This note shows that a contrastive construal of person-affecting reasons does favour saving over creating, but fails to favour gene editing over genetic selection, whereas a non-contrastive construal does the reverse. Moreover, it shows that both approaches lead to dynamic inconsistencies and to sub-optimal outcomes being chosen.

1 The two-tier view

Genetic selection is generally considered to be a better way of avoiding genetic disorders than gene editing. Since gene editing involves risks, due to the possibility of unforeseen mutations, genetic selection seems to be a safer method of avoiding genetic disorders.

McMahan and Savulescu have recently criticised this position, on the grounds that it ignores person-affecting considerations that speak in favour of gene editing. Gene editing makes someone better off than they would otherwise have been, whereas this is not the case in genetic selection, due to non-identity effects. They put forward a two-tier view that combines person-affecting and impersonal considerations. This view promises to underwrite a number of intuitively plausible verdicts, most notably that saving an existing person is preferred over creating a new person, and favours gene editing over genetic selection. According to this view, there is:

> (1) a reason to do what would be better for a person, (2) a reason not to do what would be worse for a person, (3) a reason to cause a better-off person to exist rather than cause or allow a different, less well-off person to exist, (4) a reason not to cause a miserable person – that is, a person whose life is overall bad for her or below the neutral

level for well-being – to exist, and (5) a reason to cause a well-off person to exist rather than not cause anyone to exist.

Impersonal reasons speak in favour of genetic selection. Genetic selection ensures that the life that will be lived will not suffer from genetic disorders and will be a better life than the life that would otherwise have been lived.

	x	y
A	5	–
B	–	10

Impersonal reasons likewise speak in favour of gene editing. By suitably editing the genes of an embryo, one can ensure that the person will not suffer from genetic disorders and will live a better life than they would otherwise have lived.

	z
C	5
D	10

The impersonal reason to use genetic selection (= choose B over A) is as strong as the impersonal reason to use gene editing (= choose D over C), as long as the risk of unforeseen mutations is set aside. McMahan and Savulescu point out that these two methods differ as regards person-affecting reasons. Gene editing is identity-preserving, such that the person is better off than they would otherwise have been. The person z that lives a good life if gene editing is used is the very same person who would otherwise have lived a not so good life. Genetic selection, by contrast, is not identity-preserving. A different person, namely x, would have existed and would have lived a not so good life, had genetic selection not been used to select y who is not afflicted by the disorder and lives a good life.

The two-tier view takes these person-affecting reasons into consideration and hence favours gene editing. This can be illustrated by the choice between the combined options of either enabling one couple to make use of genetic selection (A○D) or another couple to make use of gene editing (B○C).

	x	y	z
A○D	5	–	10
B○C	–	10	5

Though both outcomes are equally good when considered from an impersonal perspective, the second option is favoured since it involves an identity-preserving intervention that ensures that someone is better off.

This preference is preserved even when there are risks involved, where the risks involved in gene editing mean that the outcome is impersonally worse at the level of expectations.

	x	y	z
A○D^{-}	5	–	9
B○C	–	10	5

Though genetic selection (B○C) is preferable from an impersonal point of view, person-affecting reasons favour gene editing (A○D^{-}), since this method ensures that one does something that is better for a person. This person-affecting reason is taken to be stronger than the corresponding impersonal reason and hence can outweigh the risk of unforeseen mutations.

2 Contrastive or non-contrastive reasons

Difficulties arise when faced with the four options at the same time.

	x	y	z
A	5	–	–
B	–	10	–
C	–	–	5
D	–	–	10

It is unclear how person-affecting considerations are supposed to work in such cases. They can be understood either as contrastive reasons or as non-contrastive reasons.

If they are contrastive, then the reason deriving from the fact that D is better for z only privileges D over C, since this reason depends on the existence of z. This fact, however, does not speak in favour of bringing about D rather than B. Since z does not exist in both of these options, person-affecting reasons relating to z cannot favour D over B. In comparing these two scenarios only considerations of impersonal good apply. Accordingly, one does not have stronger reasons to bring z into existence rather than y. The fact that z could in some other scenario have been worse off, whereas this is not the case for y, is not something that speaks in favour of creating the former rather than the latter.

This, however, means that B is to be preferred over D^{-} when the risk of unforeseen mutations is taken into consideration.

	x	y	z
A	5	–	–
B	–	10	–
C	–	–	5
D^{-}	–	–	9

Impersonal good in this way has a veto on allowing considerations of personal good to come in. As a result, the contrastive version of the two-tier view ends up privileging genetic selection in a wide variety of cases.

By contrast, if person-affecting considerations are non-contrastive, then the fact that z is better off in D^- than in C speaks in favour of this option, even when D^- is compared with B in which z does not exist. The evaluation of options is then dependent on the set of alternatives, insofar as the presence or absence of further options can have an effect on how a given option is to be evaluated and compared. This approach does favour gene editing over genetic selection, since the person-affecting reason favouring D^- is not restricted to the comparison with C but carries over to the comparison with B.

However, the non-contrastive construal can no longer privilege saving over creating, whenever creating a person involves an alternative where the same person is also created but lives a worse life. In such cases the person being created would be benefitted relative to the other option in which they are also created, which would then favour this alternative over another in which they do not exist at all and in which an already existing person is saved.

	x	y	z
S	20	–	60
T	0	80	–
U	0	60	–

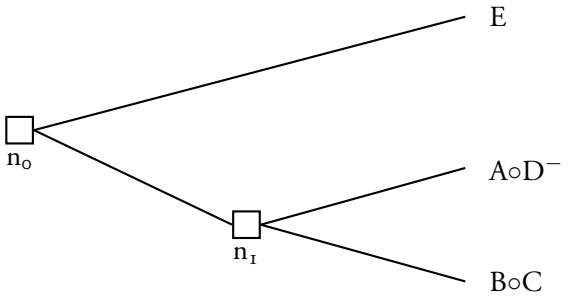
Someone who is only confronted with options S and T should choose the former over the latter, that is save x, enabling him to live another 20 years, rather than cause y, who will live to 80, instead of z, who will only live to 60, to exist, since x is thereby made better off. However, when option U is also available, then choosing T makes y better off, where the resulting non-contrastive reason speaks in favour of T even when compared with S, such that saving an existing person is no longer favoured over creating a new person.

3 Dynamic inconsistency and sub-optimality

In dynamic settings, both approaches lead to dynamic inconsistencies and to sub-optimal outcomes being chosen.

The problem for the contrastive approach can be illustrated by the choice between either creating two lives, one of which suffers from the genetic disorder and the other of which is slightly worse than the good life that can be brought about by means of genetic selection, or alternatively facing the choice between $A \circ D^-$ and $B \circ C$.

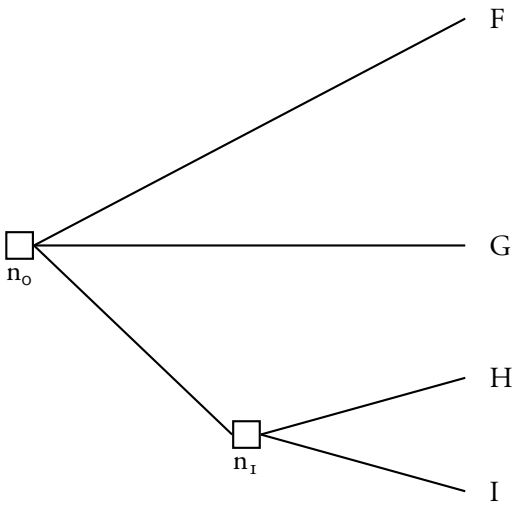
	x	y	z	v	w
$A \circ D^-$	5	–	9	–	–
$B \circ C$	–	10	5	–	–
E	–	–	–	5	9.5



When evaluated from the outset, the strategy resulting in $A \circ D^-$ is impermissible. Yet, once one reaches node n_1, which one can permissibly do as long as reduction of sequential choice is accepted, one will be required to select this option. The person-affecting considerations kick in at this point, leading to an outcome that is deemed to be sub-optimal from the perspective of the original choice node. A sophisticated chooser making use of backward induction will avoid this dynamic inconsistency, but will do so by choosing E which is sub-optimal relative to the alternative $B \circ C$ that could have been reached instead. The possibility of identity-preserving gene editing thus comes with a price at the level of impersonal good that one will have to pay at n_1 and that one can avoid by selecting E at the outset. The theory in this way ensures that one has reasons to prevent future costly situations of gene editing from arising and that one should do so even when this involves bringing about sub-optimal outcomes.

The non-contrastive view faces similar difficulties, since it leads to violations of contraction and expansion consistency conditions α, β and γ.

	x	y	z
F	10	–	–
G	–	2	–
H	–	8	–
I	–	–	9



The non-contrastive view considers H to be the best option when evaluated from the outset. Though F is impersonally better, the fact that y is better off in H than in G constitutes a person-affecting reason that favours H. However, once the agent reaches node n_1 alternative G is no longer available. Choosing H over I, accordingly, does not lead to anyone being better off, which means that H is no longer favoured on the basis of person-affecting reasons. From the perspective of n_1, option I is to be preferred over H. This amounts to a dynamic inconsistency: a strategy that is deemed to be impermissible can be implemented by means of a sequence of permissible choices. Moreover, it results in a sub-optimal outcome since I is inferior to the alternative F that could have been realised at the outset.

4 Conclusion

The two-tier view can either favour gene editing over genetic selection (when construed in terms of non-contrastive reasons) or favour saving over creating (when construed in terms of contrastive reasons) but not both. Both construals give rise to dynamic inconsistencies and to sub-optimality.[1]

[1] Thanks to Jonas Hertel for very helpful comments.