

Chapter 29

The Welfarist Account of Disenhancement as Applied to Nonhuman Animals



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Abstract I criticize the current usage of the terms “enhancement” and “disenhancement” in the debate over the genetic modification of animals and propose an alternative definition of these terms based on how modifications affect animals’ welfare in particular contexts. The critique largely follows a similar criticism of the use of the term “enhancements” in the human bioethics literature. I first describe how the term “disenhancement” has been used in debates thus far, and argue that the present lack of a shared definition is problematic. I then consider some potential definitions of “disenhancement” that can be adapted from the human bioethics literature and argue that most of these uses are flawed for the purposes of using the term in current ethical debates. Finally, I elaborate on the welfarist conception of disenhancement and consider some potential objections, using examples from the literature to illustrate key points.

29.1 Introduction

Consider the following scenarios from the ethics literature about genetically modifying animals:

Football Birds: Using gene-editing, chicken DNA is altered so radically that it results in headless (football-shaped) “birds” that are merely fed nutrients through tubes and produce edible eggs. The organisms completely lack anything resembling a brain and are completely insentient (Comstock 2000, 152).

Live Fast, Die Young: In order to avoid the act of killing livestock, certain animals’ genes are altered such that they die painlessly shortly after reaching adulthood (McMahan 2008).

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Polled Cattle: Cows are genetically modified to lack horns. This eliminates the practice of painful dehorning surgery. This could be accomplished via selective breeding over many decades at great expense, but using genetic technology dramatically speeds up the process (McConnachie et al. 2019).

Dino-Chickens: Scientists insert DNA into modern chicken eggs to reproduce their ancient evolutionary ancestors, which happen to resemble dinosaurs because they possess snouts rather than beaks. The lack of beaks results in decreased welfare problems from pecking or debeaking (Shriver and McConnachie 2018).

Painless: Pigs are modified to not feel the unpleasantness of pains by eliminating a particular neurotransmitter in part of their brains. They are still able to reflexively respond to pains (Shriver 2009).

Blind Chickens: Chickens are modified so that they are blind, which results in decreased welfare problems from pecking or debeaking (Sandøe et al. 1999; Ali and Cheng 1985).

Each of these scenarios raises slightly different ethical issues. But all of the animals involved would, in contemporary debates, be described by many authors as “disenhanced” animals. Use of the term “disenhancements” isn’t intended to settle debates definitively about whether particular practices are right or wrong. Rather, disenhancements was introduced into the discussion of animal ethics in order to connect these debates to those in human bioethics about using technologies (genetic, pharmaceutical, bionic) to “enhance” humans by making them smarter, stronger, more loyal, etc. But just as in the human bioethics debate one might claim that enhancement can be impermissible or permissible depending upon circumstances, in the debate about animal ethics, one might believe that a particular modification is a disenhancement but nevertheless hold that it is permissible, or perhaps even obligatory in some circumstances while impermissible in others. Nevertheless, the words we use are important, and the term disenhancements implies that we are taking something away that would otherwise be present. For this reason, applying the term to describe changes to animals carries a strong connotation that such practices ought to be avoided, all else being equal, at least for those who think that animals’ interests ought to be taken into consideration.

In what follows, I criticize the current usage of the terms “enhancement” and “disenhancement” in the debate over the genetic modification of animals and propose an alternative definition of the terms based on how modifications affect animals’ welfare in particular contexts. My critique will largely follow a similar criticism of the use of the term “enhancements” in the human bioethics literature. The strategy will be as follows: I first describe how the term disenhancement has been used in debates thus far, and argue that the present lack of a shared definition is problematic. I then consider some potential definitions of “disenhancement” that can be adapted from the human bioethics literature and argue that most of these uses are flawed for the purposes of using the term in ethical discussions. Finally, I elaborate on the welfarist conception of disenhancement and consider some potential objections, using the scenarios above to illustrate key points.

29.2 The “Opposite of Enhancement”

The term disenhancement has become ubiquitous in discussions of gene editing animals over the past decade, largely popularized by a 2008 article by Paul Thompson entitled “The opposite of human enhancement” and a series of responses published in the journal *Nanoethics*. The term has become a useful shorthand for what seems to be an intuitively graspable concept relating to modifying an animal by “taking something away.” Early examples included the idea of breeding blind chickens to reduce welfare problems that result from cannibalism in confined quarters, or creating the completely insentient “football birds” described above. However, there has not been much of an attempt in the literature to rigorously define the term “disenhancement” as it applies to animals. Perhaps this is due to authors being largely content to rely on what they perceive to be a shared folk understanding of enhancement, or perhaps the assumption is that the term “enhancement” has been sufficiently defined in the human literature such that disenhancement can simply be characterized as the opposite of enhancement. However, I will argue that both of these assumptions are flawed.

Regarding reliance on folk conceptions for key ethical terms, we might surmise that the assumption is that there is sufficient agreement on the reference of the term “enhancement” among the population or some particular fixed group in the population such that the term can be used to refer to uncontroversial cases in the ethics literature. But proceeding without a definition of a key term is generally speaking contrary to contemporary analytic philosophical practices, and for good reason. For one thing, it provides no methodology for deciding on controversial cases. Perhaps technological modifications that simultaneously result in loss of a function, decreased fitness, and decreased welfare can easily be considered disenhancements, but what about mixed cases where different dimensions are varied in opposite directions (e.g. increased fitness but decreased welfare)? Relying on folk intuitions about uncontroversial cases leaves us without a good sorting mechanism for more difficult cases.

Moreover, we should not merely assume widespread agreement even on the cases philosophers believe are uncontroversial. The experimental philosophy movement, despite its flaws, has shown fairly conclusively that philosophers often assume that “the folk” agree on certain concepts or intuitions without sufficient evidence. Philosophers’ assumptions about “the folk conception of X” are often mistaken. Moreover, even if the assumptions are correct for a certain population, there might be cultural, economic, or gender differences in application. As such, it is risky to base arguments or claims on unverified assumptions about the folk conception of enhancement in the absence of empirical research.

And finally, it often turns out that the way the general population uses certain terms is inconsistent and even incoherent and therefore is not well-suited for use in philosophical arguments. The general population might for example believe both that pains are “mental events” *and* that pains are located in body parts, despite the fact that these two beliefs cannot be easily reconciled. Similarly, folk conceptions of something like disenhancement might sometimes link it to evolutionary fitness,

sometimes to what is “species typical,” and sometimes to welfare, shifting their reference point in response to different salient features. But clearly these different conceptions come apart: a given change might result in any combination of increases or decreases along those dimensions, so a definition that lumps them all together will not be able to handle cases that diverge along these dimensions.

The upshot of these problems is that (1) we should not assume, in the absence of empirical evidence, that philosophers can accurately capture the folk definition of disenchantment in a single definition and (2) that it’s extremely unlikely that the folk definition, assumed to represent an approximate agreement across the entire population, will be able to play the role it needs to in a proper philosophical analysis. To say something meaningful about enhancement in the context of ethical debate, we need a term that reliably and meaningfully captures a set of shared properties.

This leaves us with the definitions of enhancement provided in the human bioethics literature. However, the situation in the bioethics literature is anything but settled. Savulescu et al. (2011, 3) write, “Although there is much debate about the ethical implications of new technologies, only a few authors have attempted to provide an explicit definition of enhancement.” Moreover, they have pointed out a number of flaws in the definitions on offer, which led them to propose a welfarist conception of enhancement.

In making their argument, Savulescu et al. (2011) usefully divide definitions of enhancements into two categories which they describe as functional enhancements and human enhancements. Functional enhancements refer to enhancements of particular capacities, capacities such as strength, intelligence, or memory. Thus, for example, taking certain medications such as Adderall might be a functional enhancer of attention, and anabolic steroids might be functional enhancers of strength or endurance. But some changes might enhance certain functional capacities while detracting from more holistic measures of the flourishing of the organism. We can think of cases where increases in particular capacities actually leads to negative consequences for the human or animal (Earp et al. 2014). This is why we need a second category, human enhancement, to capture changes related to the overall performance of the organism. Examples of this type of enhancement could be the person’s health or well-being. Savulescu et al. (2011) use “human enhancement” to describe these changes, but I think differentiating “domain-specific enhancements” from “holistic enhancements” more accurately captures the relevant difference and does so in a way where the terminology can be easily extended to nonhuman animals.

One seemingly straightforward way of connecting domain-specific enhancements to holistic enhancements would be to define the latter as follows: A holistic enhancement is just any instance where an organism has one or more domain-specific enhancements. Similarly, we could say that a holistic disenchantment is just any instance where an organism has one or more domain-specific disenchantments. The problem, however, is that we can imagine cases where the same changes are enhancements in relation to one domain but disenchantments in regards to a different domain. Consider, for example, a change that resulted in greater strength but less fine motor control. Since at the holistic level we presumably don’t want it to be the case that particular changes are both enhancements and disenchantments simultaneously,

the move from domain-specific to holistic enhancements won't serve the purposes ethicists need in having a clear definition of disenhancement.

Among the holistic definitions of enhancement, there are several possible conceptions that can be sussed from the literature. The first is the “not medicine” or “more than treatment” approach. This approach, coming from a specific history in the bioethics literature that was preoccupied with questions about over-prescription of psychiatric medication, defines enhancement as improvements to human form or functioning that go beyond what is necessary to “sustain or restore good health.” Thus, on this usage, taking Adderall to counteract attention deficit hyperactivity disorder is treatment; taking it to study for a test is enhancement. Similarly, using transcranial direct-current stimulation to treat depression would count as a treatment, but tDCS to provide relaxation would be enhancement.

One of the challenges of the “more than treatment” approach is the requirement of coming up with additional definitions for arguably equally contentious ideas such as “good health” and “disease” (Zohny 2014). And this challenge is exacerbated when we try to use the definition of enhancement to create a definition of disenhancement. In the case of defining an enhancement according to performance along one particular domain, it's easy to get “results in a *decrease* in performance along domain X” as a definition of disenhancement if your definition of enhancement is “results in an *increase* in performance along one particular domain.” But if your definition of enhancement is “increases performance beyond what is necessary to sustain or restore good health,” then additional questions arise. Should disenhancement be regarded as anything that impairs health back down to average good health, or anything that drops an organism below good health, both, or something else entirely?

One way of answering this complication would be to utilize the definition provided by Sabin and Daniels (1994), which defines enhancement roughly as follows:

Normal species-functioning definition of enhancement: Any change in the biology or psychology of an organism which increases species typical normal functioning above some statistically defined level.

Correspondingly, we can define the opposite of enhancement as:

Normal species-functioning definition of disenhancement: Any change in the biology or psychology of an organism which decreases species typical normal functioning below some statistically defined level.

Of course, deciding exactly where we set these statistically defined levels raises its own challenges, but hopefully the idea at least is clear enough for present purposes.

Finally, I will consider two other potential definitions of holistic enhancement. These types of measures define enhancement and disenhancement in reference to a single property, but a property that applies to the organism as a whole rather than to a specific capacity. The property Savulescu et al. (2011) propose in regards to humans, and that I will be advocating for in regards to nonhuman animals, is well-being or welfare. They propose the following definition of enhancement:

Welfarist definition of enhancement: Any change in the biology or psychology of an [animal] which increases the chance of leading a good life in the relevant set of circumstances.

And thus we can also propose:

Welfarist definition of disenchantment: Any change in the biology or psychology of an animal which decreases the chance of leading a good life in the relevant set of circumstances.

However, there are other possible candidates which become especially salient when we think about nonhuman animals. In particular, though we generally don't think of evolutionary fitness as a measure for the flourishing of modern humans, this is a term that is more easily applied to nonhuman animals, particularly for animals living in the wild, outside of direct human influence. This would look something like this:

Evolutionary fitness definition of disenchantment: Any change in the biology or psychology of an organism which decreases the organism's evolutionary fitness.

Thus, for example, taking the "Blind Chicken" example from above, it seems relatively straightforward to see how one might intuitively consider this change a disenchantment insofar as it deprives the chickens of a capacity that was important for their survival in the past.

29.3 Normal Species Functioning and Fitness Are Irrelevant for Animals Under Human Supervision

Thus far, I've argued that we can't defer to presumed folk intuitions in place of a definition of disenchantment and also cannot extend the domain-specific definition of enhancement into a makeshift holistic version. That leaves us with the following possible contenders for a definition of holistic disenchantment: the normal species-functioning definition, the welfarist definition, and an evolutionary fitness definition. In this section, I argue that both the normal species functioning and fitness definitions are irrelevant for key areas of discussion in the animal ethics literature.

First, consider evolutionary fitness. There is of course considerable debate as to whether evolutionary fitness has any ultimate intrinsic normative value with, I believe, most ethicists opposing the idea. However, in circumstances where animals are under direct human supervision, the notion of fitness seems especially irrelevant. In cases like the keeping of companion animals, or livestock, or animals put to use for labour, animals' health and opportunities for reproduction are almost entirely controlled by humans. Many traits that would lead to greater ability to survive or reproduce in wilder environments are irrelevant for animals under the direct supervision (and control) of humans.

Consider a trait like aggression in animals such as chickens or pigs. In more naturalistic environments, such a trait obviously would play a role in fighting over resources or protecting territory. However, in many modern confined feeding operations these traits aren't helpful: at least in well-designed systems, the animals are just as likely (or unlikely, as it were) to survive and have their genes passed on whether or not they are aggressive. So it would be bizarre to label hyper-aggressive animals "enhanced" and passive animals "disenchanted" in a confined feeding operation based

on the fact that these traits might benefit the fitness of their wild counterparts in particular circumstances.

We might, alternatively, think that the traits that enhance fitness are now traits that make humans more likely to try to pass on the genes of particular animals. In other words, for livestock, we could describe traits such as passivity, decreased aggression towards humans, cuteness, fast growth, etc., as “fitness enhancements” since people may intentionally select for these traits in animals for their own benefit. But this seems like a distortion of the term; the “Football Chickens,” for example, would count not only as “not disenhanced” but would in fact be “enhanced animals”, since humans would likely be all-too-happy to keep these genes in circulation.

Similarly, “normal species functioning” seems like a challenging idea to apply to the lives of contemporary livestock. First, there’s a question of how “normalcy” is determined; are we using an average based on what the lives of most current animals look like, in which case it would be heavily skewed towards the lives of animals already in confinement for most species used as livestock, or are we using a version of “normality” linked to what some earlier wild version of the animals would have looked like? Using the former seems bizarre: imagine trying to define “normal species functioning” of humans based on averages derived entirely from prison populations. But the lives of “normal” evolutionary predecessors again seem far removed from the modern context. Traits that were presumably helpful in flourishing outside of captivity, such as the ability to detect predators (increased vigilance), fight off rivals (aggression), and reproduce (high sex drive) can all be plausibly imagined to be detrimental for the animals in extreme confinement. Does it make any sense to call an animal modified to have less anxiety in an environment where it will never encounter a predator or non-human threat a “disenhanced” animal?

Unlike these criteria, the welfarist conception of enhancement and disenhancement is relevant in both relatively natural environments and in manmade and highly controlled environments. We can talk plausibly about changes that increase or decrease the welfare of wild animals and of animals in highly artificial environments. And in both cases we have reason to think that these changes matter morally. I’ll consider some possible counterexamples below, but I hope it is clear that welfare continues to matter in artificial environments in a way that the other holistic criteria do not.

29.4 Elaborating the Welfarist Conception of Disenhancement and Responding to Objections

As noted above, the welfarist definition of disenhancement is as follows: Any change in the biology or psychology of an animal which decreases the chance of leading a good life in the relevant set of circumstances. Before discussing the virtues and vices of this definition in more detail, it’s worth highlighting a particularly crucial

component of the definition. Namely, in order to be successful, welfare must be defined *in relation to a particular set of circumstances*.

To see why, consider the Polled Cattle example in two different environments. In both cases, assume that the horns possible role in temperature regulation does not sufficiently influence welfare (we can assume both environments have consistently mild weather). However, in one environment, there exists a particular type of parasite that is completely absent in the other environment. The horns both of the animals themselves and of conspecifics are remarkably effective at limiting the pervasiveness of this parasite, which in turn prevents unpleasant itching sensation and possible infections from wounds. In such cases, would we consider using genetic technology to create a polled variant of cattle to be an example of disenchantment? It seems clear that taking away horns can count as a disenchantment in the parasite environment, since the change would result in decreased welfare, but not in the parasite-free environment, since the change would there be welfare-neutral. It is a virtue of the welfarist conception that it can capture this divergence. As such, the welfarist definition of disenchantment is necessarily tied to particular sorts of circumstances.

Returning to the examples from the beginning can help illustrate some of the features of how the welfarist conception works. The Football Birds, contrary to current usage, would not count as “disenchanted” animals on the welfarist conception. But they also would not be “enchanted.” Since they have no welfare at all, these terms do not apply to them. For almost all of the other cases, the answer as to whether or not they are enchanted or disenchanted is “it depends.” Is the lack of an ability to feel pain an enhancement or disenchantment? It depends on whether the animal is in circumstances where avoiding certain normally pain-inducing features can help prevent further states of negative welfare. If they simply don’t feel pain in some situations but don’t suffer any further negative consequences as a result, this would count as an enhancement on the welfarist view.

Even the Live Fast Die Young example wouldn’t necessarily be considered a disenchantment on this account. If the animals were living lives that were, on balance, full of positive well-being, then causing them to die early would be a disenchantment. However, if their lives were unhappy or even welfare neutral, then dying young would not be a “disenchantment.”

I’m sure there is disagreement about whether it truly makes sense to call a pain-free or short-lived animal “enchanted.” But hopefully it is reasonably close enough to common usage, or at least easy enough to fit to modern usage with some argumentation and clarification. Nevertheless, there are some additionally fairly counterintuitive implications of the welfarist view that need to be acknowledged, and these come out in some of the potential objections to welfarist views. One objection is that welfarist definitions make enhancement and disenchantment too ubiquitous, as they seem to apply to an extremely wide class of changes. Taking antibiotics to treat a disease? That meets the welfarist definition of enhancement. Breaking a leg in a fight? Disenchantment. Even, say, exercising to improve physical fitness could be regarded as a form of enhancement. The terms would no longer pick out only a very small and specific type of proposed changes to animals but would instead refer to a wide class of changes.

But this is a problem only if the original usage was picking out changes that are genuinely qualitatively different from those in the expansive definition and which thereby need to be treated separately. As Zohny 2014 has detailed, many different ideas have been proposed to distinguish enhancements from “natural changes,” such as suggesting that the latter require more work or concentration, but none of the suggestions put forward thus far ultimately hold up against scrutiny. In any event, it remains for proponents of other uses of enhancement to suggest why other types of changes should be regarded as qualitatively different from changes that are brought about through drugs, neurointerventions, or genetic modification, and this would require a more thorough attempt at providing a clear definition.

Another potential criticism considered in the human bioethics literature is that using a welfarist conception of “disenhancement” prematurely settles the moral debate. By linking enhancement with improvement to well-being and disenhancement to decreased well-being, the terminology is such that all enhancements are regarded as permissible and all disenchantments as impermissible.

While it certainly seems true that using the welfarist definition would establish, for many, a presumption in favour of enhancement and against disenhancement, the new terminology in no way should be seen as settling the question of whether a given disenhancement is permissible or not. There might be some enhancements that cause harm to others or to the natural environment, that reflect badly on our character, or that make us complicit in regards to an unjust practice. In all such cases, changes might be deemed “enhancements” but nevertheless considered morally wrong. Similarly, there may be cases where a particular “disenhancement” is dramatically outweighed by other benefits that result, such as a case where a particular change is very good for the environment but results in mild decrease in welfare. The term disenhancement has a negative connotation; however, unlike alternative definitions including current usage, the welfarist definition of disenhancement has connotations that actually track something of (dis)value in a way that provides a useful, though not definitive, assessment.

One final criticism from debates in the human bioethics literature I will consider is that this definition of disenhancement is too dependent upon contested notions of well-being. The philosophy literature has numerous competing accounts of well-being, generally grouped into hedonistic, desire fulfilment, and objective list theories. How can we apply a welfarist definition to enhancement if we haven’t reached agreement among philosophers as to which theory is preferable? As Zohny (2014) says, the differences between these views can be exaggerated...often certain changes count as obvious increases or losses to welfare on any of the types of theories. But, perhaps even more clearly in the case of animals than with humans (where other considerations such as autonomy, rights, or justice are often centred in moral debates), challenges with evaluating welfare in animals will inevitably need to be addressed in a thorough moral debate. Assessing welfare will always be a crucial part of evaluating the morality of policies and practices that involve animals; as such, avoiding questions about characterizing well-being in regards to enhancement simply pushes those questions to a different stage of the debate. In other words, deciding upon the

best conception of welfare is certainly challenging, but the difficulty doesn't allow us to avoid the questions when aiming for the best actions.

29.5 Agency and Disenhancement

My discussion thus far has been largely consequentialist, focusing on particular states of the altered animals as the only relevant possible criteria for definitions of enhancement and disenhancement. However, considering an agency-centred approach raises additional questions.¹ First, one might suggest that particular technological changes can impair or improve the agency of the altered animals and that these changes are relevant to whether the changes count as enhancements or disenhancements. For example: creating “football birds” deprives organisms of any ability to make decisions or to choose to interact with the environment in particular ways, and we may think that in losing those things the chickens have lost something of value.

However, even if one believes this is an important consideration, on many accounts this notion of agency can simply be incorporated into the notion of welfare at stake. One can claim that it is *good for* an organism to have agency, and that decreasing agency thereby lowers welfare and hence can count as a disenhancement, all things being equal. A crude way of making this argument might simply state that having agency *feels good*. Other views hold that agency can contribute to well-being independently of how it makes one feel. But the important thing, for my purposes, is that the value of agency can still be included in a welfarist conception of disenhancement. It is true that some may hold that depriving animals of agency is bad even if doing so is not bad *for the animals*, but these views can be classified as instances of impermissible enhancements without jeopardizing the utility of a welfarist definition of the term.

A very different sort of agent-centred concern has to do not with the agency of the altered animal, but of the individual or group doing the altering. On this type of account, what matters are the intentions behind the changes; if one *intends* to benefit an organism in a particular way, then we call it an enhancement. On the other hand, if the intentions behind a particular change, like the Dino-Chicken, are simply to save expenses and increase the efficiency of an operation, it might seem strange to call it an “enhancement” simply because it happened to improve welfare by accident. Surely we shouldn't reward exploitative practices that have no concern for animals by calling them “enhancements” simply because they had unintended benefits!

Though such an approach has a certain intuitive appeal, there are simply too many complications with relying on presumed motivations to determine whether changes count as enhancements or disenhancements. First, people are notoriously bad at determining the motivations of others, and political allegiances would likely play a large role in determining whether or not the stated intentions of a particular change are believed. But even putting aside the possibility of dishonest statements of

¹The following discussion is based on helpful suggestions from Christopher Preston.

intentions, people are also notoriously bad at identifying even our own motivations for particular actions and have a strong tendency to create self-serving narratives. As such, relying on the intent of technological changes rather than the actual effect would be epistemologically infeasible and could also lend itself to distortion through self-serving motivations. And finally, though we might imagine an intention-focused criteria allowing for cases of enhancement by those trying to improve the lives of animals, it seems extremely unlikely that anything would count as a disenhancement if it were required that the change was made with the intention of depriving an organism of some beneficial capacity. Any negative changes are most likely to be side-effects of attempts to increase profit, or benefit human health, etc. and so relying on the primary intention to determine the definition would mean that almost no proposed changes would count as disenhancements.

29.6 Conclusion: Why a Welfarist Account?

As technology advances, humans are increasingly proposing modifications to nonhuman animals. This is perhaps most prevalent in the realm of agriculture, but proposals have also been made to use genetic technology to stop disease-carrying species from reproducing or to alter the balance of specific ecosystems. And if past behaviour is any guide, humans unfortunately are likely to also attempt to use technology to change companion animals or to design new roles for altered animals in military engagements. Ethical debates about such uses of animals are at an early stage, and have not yet caught up to the technological possibilities. But in order to have a robust debate, it is important that key terms are clearly defined.

The term disenhancement has been increasingly used to describe potential modifications of nonhuman animals across a range of contexts. However, the term has not been clearly defined and the corresponding human bioethics literature has also struggled to come up with a widely accepted definition of enhancement. Given that we need a clear definition in order to properly frame and discuss philosophical debates about human interactions with animals, I have attempted to outline a case for using a welfarist definition of enhancement. This choice of terminology, of course, does not settle any ethical debates, but it does imply that some cases such as creating animals incapable of suffering might be better regarded as enhancement rather than disenhancement.

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