

Towards A Multispecies Population Ethics: A Sufficientarian Approach

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Current ecological threats, such as the sixth mass extinction or climate change, highlight the need to evaluate the moral implications of changing populations, both human and non-human. The paper sketches a non-anthropocentric and multispecies sufficientarian account of population ethics. After discussing several other options for multispecies population ethics, the paper proposes a *two-level account of multispecies sufficientarianism*, according to which the value of populations depend on two kinds of sufficientarian thresholds. First, there is a *species-relativized individual-level* threshold for what species-specific flourishing is for an organism. Second, there is a *population-level* threshold for a sufficiently viable population enough to support the species-specific flourishing of the current and future members of that population. The paper concludes by discussing some of the practical implications and concerns raised by the two-level account suggested.

Introduction

Current ecological threats, such as the sixth mass extinction or climate change, are having a huge impact on both human and non-human populations. Threats like these highlight the need to evaluate the moral implications of changing populations, both human and non-human. Yet the focus of population ethics, i.e., ethical research on moral issues regarding variable populations, has mostly remained anthropocentric. Ethical discussions that are more applied in nature mostly have sought to justify policies to reduce human population growth (Cafaro 2012, 2021; Cripps 2016a, 2016b). The more theoretically oriented population ethics aims to find an appropriate value theory of human populations that would avoid the infamous problems formulated by Derek Parfit in his seminal book *Reasons and Persons* (1984) (Arrhenius 2000, Arrhenius, Ryberg, and Tännsjö 2017).

Non-anthropocentric population ethics has received more attention recently, however. Specific questions related to animal population ethics are discussed in Gosseries and Meijers (2022) and Sebo (2022). This paper contributes to this emerging discussion and puts forward a

non-anthropocentric sufficientarian account of population ethics. The central characteristic of sufficientarianism is that there is a threshold for morally satisfiable or flourishing life, and our main moral concern should be about those who are below the threshold, or at risk of falling short of it. In this way sufficientarianism focuses our population ethical efforts on those whose “moral need”, in terms of suffering, misery, or non-satisfiable life, is the greatest.

While there are several attempts to apply sufficientarianism as a multispecies theory of justice—by extending the capability approach, for instance (Nussbaum 2006; Schlosberg 2007; Fulfer 2013)—population ethical treatments of sufficientarian axiology remain sparse. In this paper, I aim to take the first steps towards such a treatment. I start by discussing the theoretical, “Parfitian” population ethical problems in the multispecies context and focus mainly on questions related to sufficientarian population axiology, i.e., questions concerned with what makes one population better than another in sufficientarianism. As Gosseries and Meijers (2022) remind, this axiological ranking does not directly tell us what our population ethics should be, as there might be other considerations that matter when we decide “how we ought to act to affect a population’s size or composition”. Still, as the discussion of the paper shows, the plausibility of population axiologies depends partly on what normative implications they have. For instance, does the great negative value of some wild animal populations, because they include so many suffering animals, require acts from us to minimize the number of suffering animals even if the suffering results from “natural fight for survival”? Thus, the axiological rankings of populations cannot be totally insensitive to their normative implications, even if all-things-considered answers to the population *ethical* questions about right action will hang on what other values are in play and on our normative ethical theory.

The central aim of this paper is to investigate what the morally relevant sufficientarian thresholds for multispecies population ethics would be. After discussing several other options, I propose a *two-level account of multispecies sufficientarianism*, according to which the value of populations depends on two kinds of sufficientarian thresholds. First, there is a *species-relativized*

individual-level threshold for what species-specific flourishing is for an organism. Second, there is a *population-level* threshold for a sufficiently viable population enough to support the species-specific flourishing of the individual members of that population. I conclude by discussing some of the practical implications and concerns raised by the two-level account suggested.

The challenge of Multispecies Repugnant Conclusion

Population ethics became a part of normative theorizing at the same time as increasing concerns about human population growth and its negative environmental impacts. Yet the main interest of theoretical population ethics is not to assess the morality of human population growth as such, but rather to theorize on the value of changing population, i.e., when the number of individuals, their level of welfare (or any other morally relevant good for them), and their identities vary. In the face of changes like these, our considered beliefs and intuitions seem to lead to inconsistent and unacceptable results (e.g., Arrhenius 2000: Arrhenius, Ryberg, and Tännsjö 2017).

Population ethics is thus an attempt to understand the nature of those inconsistencies and to develop ethical theories and population axiologies on ways of avoiding them.

A specific set of inconsistencies and unacceptable results has been presented by Parfit (1984). The infamous problems, such as the Repugnant Conclusion and the Non-Identity Problem, as formulated by Parfit, have since dominated theoretical discussions of population ethics and axiology. Although these discussions have focused almost entirely on human populations, these problems also appear between human and non-human populations, as Parfit himself noted. In the one his later papers, he presents a *multispecies version of the Repugnant Conclusion*:

Compared with the existence of many human beings who would live the best lives that humans could live, it would be better if there existed instead some much larger numbers of the earliest sentient animals who had lives that were just worth living, because these

animals had enough slight pleasures like those of cows munching grass or lizards basking in the sun. That is a repugnant conclusion. (Parfit 2016: 118)

The (multispecies) Repugnant Conclusion results from the “additive total” population axiology, such as total utilitarianism, which holds that the value of a population is the straightforward sum of individual wellbeings in that population.¹ As long as the population C of cows or population Z of lizards are much larger than the population A of humans “living best lives that human could live”, the total value of C and Z can become greater than A, even if cows and lizards in those populations would have much lower level of wellbeing (“slight pleasures like those of cows munching grass or lizards basking in the sun”) (Fig. 1).

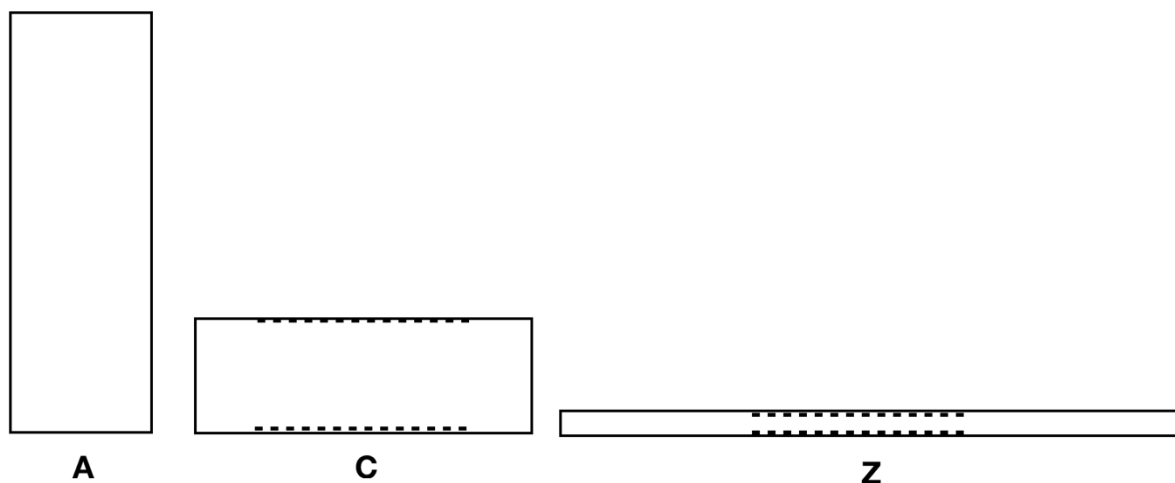


Figure 1. The Multispecies Repugnant Conclusion. The width of each block represents the number of individuals in the corresponding population, the height represents individuals’ level of

¹ The Non-Identity Problem, in contrast, is a special obstacle to “narrow person-affecting” axiologies, according to which a change in a population cannot be worse for that population if it is worse for no one in that population (see, e.g., Parfit 2017). Purves and Hale (2016) and Sebo (2022) discuss some implications of the Non-Identity Problem in multispecies context. A detailed analysis of multispecies sufficientarian “narrow person-affecting” axiology is out of scope of this paper. But generally, to avoid the Non-Identity Problem, sufficientarians can appeal to a threshold notion of harm, according to which an action harms someone if the agent thereby causes the harmed person to be in a subthreshold state. As the identification of the threshold harm does not require us to be able to compare the state of an individual to her better-off state in a situation that would have been obtained in the absence of the harmful action, it allows us to avoid the Non-Identity Problem. For a detailed discussion of the threshold notion of harm and the Non-identity Problem, see Meyer and Roser (2009) and Kyllönen (2021).

wellbeing in those populations. Population A consists of human beings, population C of cows, and population Z of lizards. Dashes indicate the block in question should be much wider than shown, i.e., the population size is much larger than shown.

The Multispecies Repugnant Conclusion raises questions regarding multispecies evaluations of populations to the fore, even if it may be disputed whether that really is a repugnant conclusion, and if so, to what extent (see, e.g., Sebo 2022). The questions concerning the value of different (human and non-human) populations will necessarily become acute as the human impact on populations, especially through climate change, increases massively. While the consequences of current ecological threats to populations are generally taken to be destructive, as testified by the literature on the sixth mass extinction (e.g., Ceballos, Ehrlich and Dirzo 2017), it is also clear some populations will benefit from global warming and other environmental changes. To evaluate the moral implications of changing populations, both human and non-human, we need to have a non-anthropocentric account of population ethics.

In this non-anthropocentric and multispecies context, the relevant populations will be understood in a very generic way “as groups of individual organisms of the same species in time and space” (Jax 2006: 240). This generic definition leaves open more specific questions in ecology regarding how, for instance, the boundaries of populations are defined or what kind of relationships are required for a population. These internal relationships among the members of populations have not been part of traditional anthropocentric population ethics. However, in non-anthropocentric population ethics, these relationships may play a central role in understanding the value of the population.

Attempts to avoid the Multispecies Repugnant Conclusion

The population ethical literature presents several attempts to avoid The (Multispecies) Repugnant Conclusion. The first class of solutions provides alternative ways to aggregate wellbeing into the total value of population. For instance, according to a critical level view, individuals' wellbeing has a positive value only when it is above the critical threshold that is located much higher than the neutral level below which the lives of individuals cease to be worth living. Lives below this critical threshold, for instance the lives barely above the neutral level in Z, would have a negative value, and the critical level view can thus claim to avoid the Repugnant Conclusion (e.g., Broome 2004, 2010). The major problem of the critical level view is that to avoid the Repugnant Conclusion the critical threshold needs to be set at a relatively high level of wellbeing, which opens the view to another counterintuitive implication that Arrhenius (2000) has called the Sadistic Conclusion: it would be better to cause extreme agony to a few than reduce the wellbeing of a large enough population by a minuscule amount below the critical level.

The second class of solutions rejects the additive total axiology that seems to lead to the Repugnant Conclusion and the Sadistic Conclusion; i.e., the very low numbers, if added to themselves often enough, must become larger than any initial larger number. One way to perform this rejection is to value populations based on their average wellbeing. As the average wellbeing in A is much higher than in Z (or for that matter in C), the average view can avoid the (Multispecies) Repugnant Conclusion. But the average view also has highly implausible implications. It implies, for instance, that a population of a single individual at a high level of wellbeing would be better than a very much larger population that has the average wellbeing only slightly below that high level (Sebo 2022). More dramatically, as Arrhenius, Ryberg, and Tännsjö (2017) note, the average view also implies if that single individual population leads a life at a very negative level of well-being, a life of constant torture, for instance, there is another population that is better even though it contains millions of lives at just a slightly less negative level of well-

being. Many hold these implications highly implausible (see Adler and Treich 2015; Broome 2004; Parfit 1984).

Another way to reject the additive total axiology is to follow John Stuart Mill's view about qualitative differences in wellbeing. Along this line of thought, Parfit (2016) himself has defended a strong form of lexical superiority, according to which the lives at the beginning of the sequence (population A) involve goods that are lexically superior to the goods involved in the lives at the end of the sequence (population Z). The idea is that the goods involved in the lives of population A can be superior to the goods involved in the lives of population Z, in the sense that any amount of the former is better than any amount of the latter. And as we move down the alphabet from the high-quality population A to the low-quality population Z, those superior things in life are gradually lost. For instance, as Parfit has suggested,

the first step from *A* to *B* involves the loss of Mozart's music; in the move from *B* to *C* Haydn's music is lost; in the move to *D* Venice is destroyed; and so on down the alphabet. All that is left in the final move to *Z* is "muzak and potatoes". The loss of the most worthwhile things in life cannot be compensated for by any gain in the quantity of muzak and potatoes. Consequently, whatever the number of people in population *Z*, there will be less welfare, or less valuable welfare, in this world as compared to population *A* and thus the Repugnant Conclusion is blocked (Arrhenius, Ryberg, and Tännsjö 2017).

For Parfit (2016) the lexical superiority view also allows a way to block the Multispecies Repugnant Conclusion. If certain goods involved in human wellbeing were considered qualitatively superior to those of some other sentient animals (e.g., munching grass for cows or basking in the sun for lizards), we could avoid the Multispecies Repugnant Conclusion.

However, critics of the lexical superiority argument have questioned whether the idea of lexical superiority is justified at all, or whether the view can avoid the Repugnant Conclusion (e.g., Arrhenius 2005). In particular, many defenders of non-anthropocentric ethics would deny the straightforward lexical superiority of the goods involved in human wellbeing. Similarly, upholding the lexical superiority of the wellbeing of any complex and psychologically sophisticated organism easily would face the concern raised by Clare Palmer (2011: 286):

After all, it's easy enough for humans to breed relatively complex and psychologically sophisticated organisms to make up for wild ones that are going extinct. Indeed, we could even breed more ourselves. [... ...] In fact, in expanding animal farming, we're likely already increasing the numbers of psychologically complex organisms in the world.

To avoid the multispecies Repugnant Conclusion, on the one hand, and Palmer's concern about a *More Sophisticated World* in which we would make up for non-human extinctions by breeding more humans or expanding animal farming, on the other, we need still another way to understand the value of populations of different species.

Multispecies population ethics and a sufficientarian axiology

Sufficientarianism provides a third alternative way to reject the additive total axiology. According to sufficientarianism, there is a lexical sufficiency threshold for a morally satisfiable (decent) life. In sufficientarianism a life above the sufficiency threshold has no positive value but a life below it has a negative value, and this negative value is greater the farther the life is from the sufficiency level. Thus, the sufficientarian account is able to avoid Palmer's concern about the *More Sophisticated World*, because the greater number of psychologically complex organisms do not by itself increase the value of populations. Here sufficientarianism also differs from critical level views, which apply a straightforward additive scale to measure (positive and negative) value on

both sides of the threshold. Sufficientarian axiology, in contrast, focuses on the disvalue of those badly off individuals who do not have enough for a morally satisfactory life. Thus, in the sufficientarian axiology the value of a population depends strongly on whether the members of the population have lives that are *not* below the sufficiency threshold.²

As the sufficiency threshold is usually thought to locate much higher than the neutral level above which life becomes worth living (and below which it ceases to be worth living), sufficientarianism can avoid the Repugnant Conclusion, both anthropocentric and multispecies versions. If individuals' lives (either human or non-human) in *Z* are only barely worth living, they also would fall well below the sufficiency threshold, and sufficientarianism would strongly disvalue this shortfall (see Huseby 2012; Kyllönen and Basso 2017; Thomas 2018).³

The avoidance of the Repugnant Conclusion does not come without a cost, however. Consider, for instance, a human population *B* “in which billions lead lives filled to the brink with pure joy” (Huseby 2012: 195) and a population *Z*₂ of two lizards basking happily in the sun. Because in sufficientarianism lives above the threshold have no specific positive value, a sufficientarian axiology would remain indifferent between these two populations in which all individuals are above the threshold. For many would find the indifference between *B* and *Z*₂ implausible, Huseby (2012) calls this the *Indifference Objection* against sufficientarianism. But things turn to even worse for sufficientarians if the human population *B* would include a single individual below the threshold—perhaps only minimally. In that case, sufficientarians would

² Here the sufficiency threshold is understood as “minimum enough” for what is morally required. The “maximum enough”, a threshold above which something would be morally bad, is discussed later in the paper. For two types of sufficiency threshold, see Spengler (2016).

³ And since the disvalue of a population is greater the farther below the threshold the people are, sufficientarian axiology also is able to mitigate the threat of the Sadistic Conclusion. Moreover, a sufficientarian account could allow there to be a second threshold at the point in which a life worth living turns miserable (the neutral level in utilitarianism) and at which a miserable life is lexically worse than a life worth living but not sufficiently so. If this double threshold account is allowed, sufficientarianism would avoid the Sadistic Conclusion (see, e.g., Huseby 2012).

rank Z_2 with two lizards above B of billions of blissful people because of the one insufficiently well-off person in B. Huseby calls this the *Lexicality Objection*.

In his response, Huseby reminds us the plausibility of these *Objections* should be weighed against the implausibility of the Repugnant Conclusion and other outcomes of additive total axiologies. For instance, consider we have a large population A of very well-off humans and an even larger population E of elephants with lives barely worth living. Like in the Multispecies Repugnant Conclusion, the number of elephants in E is large enough to outweigh the total human welfare of A. But let us further assume there is another elephant population E^* that is twice as large as E and has thus over twice as much welfare as A. Yet E^* also includes a notable number of elephants in misery which, however, is outweighed by the welfare of the large number of elephants leading barely worthwhile lives. Because the total value of E^* , regardless of the significant amount of misery it contains, is greater than the total value of A, an additive total axiology, like utilitarianism, ranks E^* higher than A. For many, this, what Arrhenius (2011) calls The Very Repugnant Conclusion, is even more implausible than the outcomes in the *Indifference* and *Lexicality Objections*. How could we rank a population with lives only barely worthwhile and with notable amount of misery above a population in which all are leading a very well-off life? For Huseby (2012), sufficientarians' ability to avoid The Very Repugnant Conclusion is a strong reason in its favor despite the *Objections*. Instead of the additive total axiology leading to the original and The Very Repugnant Conclusion (both anthropocentric and multispecies), the sufficientarian ranking is based on the moral relevance of lives that are *not* sufficiently well-off. In the world in which insufficient subthreshold misery is so common, focus on this specific moral aspect of populations could have a great practical value. It helps us to focus our population ethical efforts on populations in which the "moral need", in terms of suffering, misery, or non-satisfiable life, is the greatest. Admittedly, population Z_2 of two lizards would be better, at least in this respect, than billions of blissful people plus one insufficiently well-off person, as Z_2 does not include any individuals leading life that is below the morally sufficient level. However, a plausible

way to understand the practical population ethical demand resulting from this ranking, is to say we should try to improve the situation of the insufficiently well-off person in B rather than praise the “betterness” of Z_2 . In the multispecies context this focus entails some further complexities, however, which I discuss in the following sections.

Finally, the implausibility of the outcomes in the *Indifference* and *Lexicality Objections* can be mitigated by other morally relevant aspects that a sufficientarian axiology can include into its overall evaluation of those cases. For instance, in the real world the very low number of lizards in Z_2 could affect the future wellbeing of those lizards and change the outcome of the comparison between B and Z_2 . The following sections also will discuss this option more in detail.

Multispecies individual-level sufficiency

Even if one would find the above arguments in favor of sufficientarianism plausible, the multispecies context creates further complexities that are especially challenging for the sufficientarian population ethics. To begin with, consider the real-world natural circumstances in which wild animal populations are in constant dynamic interaction between each other, predators functioning as a natural limitation on their prey but at same time causing a number of prey individuals to fall below the sufficiency threshold. Moreover, think of a possibility, discussed in the literature, that as a result of this “natural fight for survival” a significant number of non-human lives are not worth living at all, or, at least, they remain below the sufficiency threshold (Ng 1995; Gosseries and Meijers 2022; Sebo 2022). For instance, many animal species are so-called r-strategists who have high birth-rates but also high death-rates of new-born babies. This means a vast majority of new-born individuals “are either starved to death or physically hunted down and eaten” (Ng 1995: 271) well before adulthood and thus live lives that never reach the sufficiency threshold, or even the neutral level for a life worth living.

Because sufficientarians hold the amount of insufficient subthreshold individuals and their shortfall from the threshold as the primary criteria for the (dis)value of a population, prey populations or populations of r-strategists appear especially troublesome for them. The enormous amount of suffering and shortfall from sufficiency level related to these populations seems to lead sufficientarians to focus all their moral concern on how to minimize the number of these subthreshold lives of individual prey and r-strategists. Should not sufficientarians be committed to, for instance, “police the animal world, protecting vulnerable animals from predators” (Nussbaum 2006: 379)?⁴ Or, modify the genetic make-up of r-strategists, or even “exterminate these species that their members cannot reproduce further individuals below the threshold” (Gosseries and Meijers 2022: 553)?

Again, much depends on what else the multispecies sufficientarianism includes in the overall population axiology and, finally, to normative population ethics. I will return to this question in the following sections. Additionally, sufficientarians can remind us the relevant sufficiency threshold varies both within but especially across species. According to Martha Nussbaum’s non-anthropocentric capability approach, every sentient animal should be able to “flourish *as the sort of thing it is*” (2006: 349, emphasis added). Thus, what is sufficiently well-off, “decent”, flourishing life for a human being differs from what it is for an elephant, a lizard, or an insect.

Moreover, a sufficientarian can accept a *relativized* account, suggested by Shelly Kagan (2019), according to which the level of sufficiency threshold depends on the psychological capacities of individuals: for human beings and elephants the sufficiency threshold is therefore generally higher than for any lizard or insect. As Gosseries and Meijers (2022) note, this does not necessarily mean the relativized view endorses a *speciesist* axiology, in which the threshold solely

⁴This potential implication has come under great criticism, especially when it is related to multispecies *justice* theory that interprets the core sufficientarian idea as a *positive* guarantee of threshold-level capabilities for all sentient beings (see, e.g., Cripps 2010, Hailwood 2012; Ilea 2008; Kasperbauer 2013; Keulartz 2016; Wissenburg 2011).

depends on species membership, regardless of the actual capacities of the individual. So, what I will call here as the *species-relativized thresholds* for individual flourishing may be accepted only because species membership is a reliable proxy for capacities relevant for the certain sufficiency threshold.

The relativized account also means the amount of how much an individual lizard or an insect falls short from their respective species-relativized threshold (in absolute terms) is always going to be far less than what an individual human or an elephant do when they fall short from their respective thresholds (see, e.g., Kagan 2019). Following this line of argument, a sufficientarian can then hold that while the number of r-strategists (e.g., insects) below the threshold is always high, the absolute disvalue of that shortfall is not so enormous.⁵ Consequently, the practical demand created by the subthreshold lives of r-strategists is not so huge anymore and in making overall judgements about how to deal with these shortfalls it may well be that they are outweighed by more demanding sufficientarian shortfalls (e.g., deprivation of elephants or humans)—especially if these latter shortfalls would results from our attempts to decrease the previous ones (more on this below).

An alternative account for a sufficientarian could be to follow David Schlosberg's functional understanding of individual flourishing of natural animals and organisms:

part of the flourishing of animals is to be the protein for other life forms [...] To be food for others is the essence of functioning for some beings. Acorns can become oak trees, or they may become squirrel food; gazelles can breed in social units, or may become tiger food (Schlosberg 2007: 51).

⁵ Relatedly, in their recent paper Zach Groff and Yew-Kwang Ng (2019) note that their earlier paper (Ng 1995) may have overestimated the *intensity* of suffering for animals that die early in their lives.

Schlosberg's functional understanding of flourishing would remove many naturally caused individual shortfalls from the threshold of sufficient flourishing. As long as individuals fulfil their functional role in the web of ecosystem relations, on which their own flourishing is dependent, their suffering or premature death does not count negatively in the value of the population. However, functional understanding has been criticized for conflating the flourishing of the individual and the flourishing of the species. As Elizabeth Cripps (2010: 10) notes, Schlosberg's understanding is "convincing, so long as it concerns the species as a whole, whose flourishing in a context of limited resources will presumably benefit from population control and the weeding out of the least fit", but it seems clear this species-level flourishing often comes at a severe price at the level of individual flourishing. "It is hard to see how a painful death courtesy of a tiger can be said to contribute to the flourishing life of *that individual gazelle*", Cripps (ibid., 10; emphasis in original) concludes.

Similarly, Anna Wienhues (2020: 34–35) notes the problem with individual flourishing in many non-human populations in which an individual's action cannot be fully explained by its interest in pursuing its own flourishing but also must consider what is "inscribed into its genetic make-up that might benefit the species or colony overall". In bee colonies, for instance, it is the "task" of worker bees to defend the hive even by stinging intruders, which may be lethal for that particular bee. But even in such cases of self-sacrifice, Wienhues argues that the flourishing of the colony and species-specific flourishing of an individual member of that colony can come apart, unless it can "be shown that the continuation of this specific bee population is relevant to the individual bee's own internal good" (Ibid., 35).

Following this line of thought, I will next investigate whether the functional interrelation between individual and population-level flourishing may be interpreted more minimalistically than in Schlosberg's functional account of individual flourishing. Especially, I will consider the option of supplementing the relativized individual-level sufficiency thresholds with a minimum population-level threshold in the *overall* sufficientarian population axiology.

Population-level sufficiency threshold

Because sufficientarians do not value positively the number of flourishing individuals above the threshold, the size of the population itself does not matter for them. But if the flourishing of individuals requires a sufficient population, a population below this population-level threshold also causes its individuals to fall below their sufficient level of flourishing. Conservation biologists, for instance, refer to what they call the minimum viable population size, which is an estimate of the number of individuals required for a high probability of survival of a population over a given period of time. A commonly used definition is a higher than 95% probability of persistence over 100 years (Gilpin and Soulé 1986, Honnay 2008). While biologists' minimum viable population size is defined from the population's persistence point of view, Wiens (2020: 46) notes "most living organisms, to differing degrees, have the need to be immersed within a population in order to flourish". Many individual beings are thus highly dependent on being part of a viable population, and often "in practice it appears necessary to think in terms of populations instead of individuals in order to enable the flourishing of individuals" (Ibid., 46).⁶

Building on these suggestions about the essential relationship between individual flourishing and viable populations, a multispecies sufficientarian axiology could combine the relativized individual-level thresholds, discussed above, with a population-level threshold. In the resulting two-level view, the overall value of a population would depend, first, on the number of individual shortfalls from the species-relativized individual-level threshold and, second, on whether the population is viable enough for supporting the flourishing of its individual members. In the two-level view, the population size below the population-level viability

⁶ This understanding of populations highlights functional relationships as necessary in defining populations and their boundaries. Here it differs from 'statistical' views that define populations by the "repeated occurrence" of the organisms of the same species in a specified area (Jax 2006).

threshold subtracts the (expected level of) flourishing of current and future members of the population. Some of these negative effects on individual flourishing can be immediate, e.g., distress caused by the loss of sufficient social relationships, whereas others might take more time to occur and thus decrease the expected level of future flourishing. As a result, when a population falls below its viability threshold more individuals are likely to fall short from their individual-level thresholds and to a greater degree than when their population was still viable enough.

To be sure, the instrumental value of population for the flourishing of an individual varies and depends on the sort of thing the individual is. Even though I have referred to conservation biologists' concept of minimum viable population, it should be noted that in the suggested two-level account the 'viability' of a population should not primarily be understood from the viewpoint of population survival over time but rather from the perspective of individual flourishing. Therefore, the population-level sufficiency threshold depends on what the plausible account of species-relativized flourishing is and what its relation to the viable populations of each species is. Building on Nussbaum's capability approach, the relevant threshold for individual flourishing in many species would include goods such as love, friendship, and other kinds of social relationships. Consequently, the threshold for sufficient population for individuals whose flourishing requires such "social" goods should be defined accordingly.

Can the proposed two-level view help sufficientarians in making plausible overall population judgements in the case of prey populations and r-strategists, discussed above? Let us start with prey populations, which include lots of individual shortfalls due to their natural predators. According to the two-level view, the painful death of an individual gazelle in a healthy gazelle population would decrease the value of the population *only* through the individual shortfall of that gazelle, whereas if the gazelle population is already below its viability threshold, the death also would decrease the expected level of flourishing of other gazelles in that

population. Moreover, if the sub-threshold gazelle population would be in danger of extinction, we could assume a death of a gazelle would subtract the expected level of flourishing of each remaining individual, for instance, by decreasing the likelihood of finding a suitable mate. More importantly, the death of an endangered animal could seriously risk the flourishing of the future members of the population and this expected disvalue would reflect our concern for the survival of that population and the flourishing of its future members. When the population (or whole species) is at risk of extinction, an interfering policy to “protect vulnerable animals from predators” (Nussbaum 2006: 379) can be well-justified by the two-level sufficientarian account.

But the same two-level evaluation applies also to predators whose flourishing depends on the availability of prey. So, in the two-level view the overall judgement about how to react to the individual sufferings in prey populations need to reflect our estimates of the overall individual and population-level shortfalls of both prey as well as predator populations. A policy aimed at protecting vulnerable animals from predators could easily have complex (short- and long-term) effects on the viability of predator populations—and on all other populations dependent on the prey-predator relationship in that environment. All these potential population-level effects could add the expected disvalue of each (current and future) predator’s shortfall of its sufficiency threshold (and of each individual shortfall in other dependent populations). Thus, the overall sufficientarian judgement would need to estimate the overall expected disvalues of individual shortfalls resulting from each policy option and choose the one that minimizes the expected disvalue. The population-level threshold highlights (short- and long-term) effects of sufficient population size on the current and future individual shortfalls. Only when protecting vulnerable animals from predators would clearly result in minimum overall expected disvalue would the two-level sufficientarian view support it. Often, however, the view most likely would suggest policies that protect the viability of each population to minimize individual shortfalls.

Similar arguments would apply to r-strategists’ populations. Even if the number of individual shortfalls in those populations is high, their aggregated disvalue, if we accept the

relativized account, is not enormous. Moreover, in the two-level view the overall disvalue would depend on whether the size of the r-strategist population is above the viability threshold. In making overall judgment about how to deal with the shortfalls of r-strategists, the disvalue of their shortfalls needs to be weighed against the overall (short- and long-term) expected disvalue of the shortfalls in other populations that would result from policies aimed at minimizing r-strategists' shortfalls. Again, whether the populations are or could become to be below their population-level threshold would make a difference, as the risk of falling short of the threshold or, even worse, becoming in danger of extinction, would likely add the expected overall disvalue of individual shortfalls in different populations.

Two-level sufficientarianism and the upper limit of population?

I have suggested a two-level account of multispecies sufficientarianism above. This two-level view aims at minimizing the overall expected disvalue of individual shortfalls of species-relativized individual-level thresholds. But whether individuals live in a population viable enough to support their species-relativized flourishing will affect the overall disvalue of the individual shortfalls. The features of this two-level sufficientarian account seem to fit together nicely with our general intuitions about the value of populations. The size of the population itself does not matter, but it is an essential instrumental factor in the flourishing of the individuals. If the population of a species becomes too small, the flourishing of its members is at risk. Subthreshold populations are also a threat to the entire species and potentially to the larger ecosystemic network. As these threats are likely to cause more individual shortfalls in the subthreshold population itself as well as in other populations of the ecosystemic network, the two-level sufficientarian view would pay great attention to them. The specific importance of endangered species is thus well recognized by the two-level account.

But while individual flourishing is most often dependent on a sufficiently viable population, when resources are scarce population growth also becomes a limiting factor for individual flourishing. In the literature this upper limit is sometimes referred as the maximum sufficiency threshold (Spengler 2016). The environmental sustainability discourse in particular has emphasized the need to place upper “limits to growth” for human consumption and for the population to stay within (or return back to) the carrying capacity of the Earth. Population ethics with more applied motivations also discusses the morality of various population policies that aim to limit growth (Cafaro 2012, 2021; Cripps 2016a, 2016b).

Two-level multispecies sufficientarianism remains agnostic about the value of population growth above the threshold, however. As seen above, this helps the account to avoid The (Very) Repugnant Conclusion. Another way to explain this hesitancy in setting an upper threshold is to note the difference between the minimum and the maximum population-specific thresholds. The minimum threshold is based on the essential relationship between the flourishing of the individuals and the minimum size of a population. While this relation is affected by many external factors contingent on the specific ecological circumstances and resources available, a population viable enough to support the flourishing of its members seem to have some minimum independent of these factors. The upper limit, in contrast, seems to be almost wholly dependent on external factors, such as the availability of resources or the size of other populations that have a direct (e.g., predator-prey relation) or indirect (e.g., through competition for scarce resources) effect on the potential growth of a population.

But even if two-level sufficientarianism does not directly set a maximum population threshold, it allows several more indirect ways to discuss the growth of populations. The negative effects of the growth in one population to the expected level of species-specific flourishing in other populations, as discussed above, is one way. Additionally, several authors have suggested a hybrid model of environmental (or ecological) justice in which a sufficientarian approach is combined with an account of *ecological space* (Hayward 2007; Peeters, Dirix, and

Sterckx 2015; Vanderheiden 2009) The central idea of these models is that the availability of certain, often quite specific, ecological conditions—called ecological *niches*—is required for the persistence and flourishing of the organisms and their healthy populations. Ecological space is, as Hayward (2017) puts it:

[...] as what is provided for particular species or populations by their ecological *niche*. The niches of a variety of species may be found in the same physical location. Each niche is a particular kind of functional space that furnishes the sum of the habitat requirements that allow members of a species to persist and produce offspring. The ecological term ‘niche’ conveys the idea of a “space” for organisms to live in that is defined by parameters other than of physical extension (Hayward 2017: 313, emphasis in original).

As Hayward points out, ecologists distinguish between what they call the *fundamental niche* of a species or a population and its *realized niche*. The previous refers to the general conditions functionally required for the persistence and reproduction of a species or a population, while the latter refers to the actual, realized, circumstances that pertain for a given population (see, e.g., Hutchinson 1958, Schoener 2009). The population-level sufficiency threshold therefore also sets a threshold for the ecological space, understood as the fundamental niche required for a viable population.

However, the actual, realized niche can be either smaller or more expansive than the fundamental niche. In the case of many non-human natural populations their realized niche is momentarily often smaller than their fundamental niche required for viable population, because the conditions necessary for their flourishing also support predators and the populations of competitor species. In this way the ecological space available is scarce and sets limits on the growth of populations. As discussed above, the (expected) disvalue caused by this sort of natural population control depends on the assessment of (at least) two facts: first, on the resulting

individual shortfalls from the species-relativized threshold in different populations and, second, on the risk that any population falls short from its viability threshold, which especially affects the expected disvalue of future individual shortfalls.

But a population also can expand its realized ecological niche by adapting to new circumstances. Through technological innovations, human beings have, for instance, expanded the boundaries of their realized ecological niche significantly. But these extensions are not realized without costs to the ecological space of other species and populations. Hayward (2017) quotes Bill Freedman (2016), who writes: “it must be understood that the remarkable technological expansions of the realized niche of humans require large and continual subsidies of energy, food, and other resources”. The expansive human use of these scarce resources, in turn, affects the ecological space required for the sufficiently viable populations of other species. To the extent that the expansion of human ecological space destroys the fundamental niches of many non-human populations and makes them unable to support the flourishing of their individual members, it also creates populations that a two-level multispecies sufficientarianism would strongly disvalue. Again, this disvalue would provide a strong *prima facie* reason to avoid creating such populations by expanding our realized ecological niche.

Some concerns

In this paper I have proposed a non-anthropocentric account of population ethics along the lines of two-level sufficientarian axiology. I have suggested two kinds of sufficientarian thresholds for such an account. First, there is a *species-relativized individual-level* threshold for what species-specific flourishing is for an organism. Second, there is a *population-level* threshold for a sufficiently viable population enough to support the species-specific flourishing of individual members of that population.

Let me conclude my very rough sketch of this two-level account by discussing some concerns it faces. One concerns the relation between the value of population and the value of individual flourishing. As individual flourishing matters only when it falls short of the individual-level threshold, the concern here would be that the account is insensitive to the value of flourishing individuals above the threshold. The fact that there would be more flourishing individuals (e.g., humans) above the sufficiency threshold has no additional value for the population in question. As the discussion about the *Indifference and Lexicality Objection* has suggested, this is the price sufficientarians are ready pay to avoid The (Very) Repugnant Conclusion. I also have suggested that being indifferent to the population size above the viability threshold required for individual flourishing has some intuitive plausibility.

A second concern comes from the opposite direction regarding the potential minimalism and hidden anthropocentric bias of the suggested relativized sufficientarian account. Jeff Sebo warns against potential biases related to any species-relativized account about flourishing, because “we intuitively underestimate the capacities of nonhuman animals for a variety of reasons” (2021: 695). Freya Mathews (2016) also has argued conservation biologists’ focus on minimum viable populations and on the concept of biodiversity has led to only minimal conservation targets that reflect an anthropocentric orientation. She writes:

[...] the biases inherent in the biodiversity concept lead conservationists to acquiesce in the extravagant double standard that sets population goals for non-human species in the low thousands while condoning for humans a population in the billions. This willingness implicitly to defer to human hegemony implies that, whatever the private moral aspirations of conservationists, their deferral to an ethic of biodiversity results in an anthropocentric orientation in conservation. For if conservationists are not prepared to uphold, in principle, the entitlement of living things to their own existence, whether they

are endangered or not, then from whence does the commitment to preserving species diversity arise (Ibid., 142)?

My respond to these concerns is to note that in evaluating population changes or the required conservation target, much depends on the details. What are the individual and population-level thresholds in each case? To correct or mitigate, at least, the biases in multispecies evaluations, we should be careful in defining the individual and population-level thresholds. I already have suggested in the two-level sufficientarian account the thresholds should be defined from the perspective of individual flourishing, which can include goods such as love, friendship, and perhaps even some artistic or cultural achievements. And, if Mathews (2016: 141) is right and the viability of some species and their populations is “premised on abundance” rather than on a certain viable minimum, then perhaps there are even species-specific reasons based on individual flourishing to set the population-level threshold higher than the biological minimum to allow for “buffers against unforeseeable and hence statistically unquantifiable environmental set-backs and contingencies” (ibid., 142) that might risk the flourishing of future members of a population.

Alternatively, a *pluralist* sufficientarian could include some specific values related to populations in their all-things-considered judgements even if they are not part of any plausible account of flourishing (cf. Huseby 2012). Nothing in the suggested account prevents a pluralist sufficientarian from appealing to, for instance, the intrinsic value of some ecological units (e.g., species) or features, in their all-things-considered judgements. To the extent the existence of these values requires populations that are well above the minimum biological viability threshold, a pluralist sufficientarian can appreciate the value of these larger populations—at least as long as these values do not deprive individuals of their species-relativized flourishing. Of course, a pluralist view would need to define more clearly what the relationship between population-level values and individual flourishing is.

Concluding remarks

In this paper, I sketch a non-anthropocentric and multispecies account of population ethics. In my suggested two-level sufficientarianism there are two thresholds that affect the value of the population. At the individual level, it matters whether the members of a population fall short from their species-relativized threshold of flourishing. At the population level, it matters whether populations fall short of the threshold at which they are viable to support the flourishing of their current and future individual members. I have argued generally this is well in line with our intuitions about the instrumental value of the populations. Yet it is clear that, for a full-fledged account of non-anthropocentric population ethics, much more needs to be said about the instrumental role of populations in individual flourishing of different kinds of beings. Whether these gaps are filled with neo-Aristotelian accounts of flourishing (e.g., Foot 2001) or a capability approach, or purely with a biologically informed account, plays a huge role in how the relevant population-level thresholds are defined. However, this indispensable discussion is out of scope of this paper.

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