

An Intrapersonal Addition Paradox

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Abstract

I present a new problem for those of us who wish to avoid the repugnant conclusion. The problem is an intrapersonal, risky analogue of the mere addition paradox. The problem is important for three reasons. First, it highlights new conditions at least one of which must be rejected in order to avoid the repugnant conclusion. Some solutions to Parfit's original puzzle do not obviously generalize to our intrapersonal puzzle in a plausible way. Second, it raises new concerns about how to make decisions under uncertainty for the sake of people whose existence might depend on what we do. Different answers to these questions suggest different solutions to the extant puzzles in population ethics. And, third, the problem suggests new difficulties for leading views about the value of a person's life compared to her nonexistence.

1 The Mere Addition Paradox

Many of us want to avoid what Parfit (1984) calls

The Repugnant Conclusion: For any population of excellent lives, there is some population of mediocre lives whose existence would be better.

By "better," I mean something like what (Parfit 2011, 41) calls the *impartial-reason-implicating sense*. One thing is better than another in this sense just in case, from an impartial point of view, we would have most reason to prefer the one to the other; two things are equally good in this sense just in case, from an impartial point of view, we would have most reason

to be indifferent between them. I only compare outcomes with respect to the distributions of well-being in those outcomes. There may be good- and bad-making features of outcomes other than their distributions of well-being. If so, I am concerned only with their goodness with respect to their distributions of well-being.

By “mediocre lives,” I mean lives that are worth living, but not very good. Lives might be mediocre because they are very short, or because they contain nearly enough bad things to outweigh the good things, or because they are lived by psychologically simple creatures that only experience mild pleasure. Many of us find it repugnant to conclude that some number of such lives would be better than a sufficiently large population of excellent lives.

The repugnant conclusion, however, follows from some highly plausible premises. The argument can be illustrated by comparing the three populations depicted in table 1.

Table 1: The Mere Addition Paradox

	k people	n other people
A	100	
$A+$	110	1
Z	2	2

The number in each cell (if there is one) represents the welfare of some group of people (column) in that population (row). (An empty cell represents nonexistence.) These numbers are supposed to be values on an interpersonal ratio scale of well-being. This means, for example, that one person’s life at level 2 is twice as good as any other person’s life at level 1. I assume that a life at level 100 is excellent, that a life at level 2 is mediocre, and that any life at a positive level is worth living.

In A , there are k people with excellent lives. In $A+$, those same people are better off, but there are n additional people with mediocre lives. Intuitively, for any k and n , $A+$ would be better than A . After all, it would be better for everyone who would exist in A , and would otherwise differ from A only via the addition of lives worth living. This seems to make $A+$ better than A . For even if we do not think that the addition of lives worth living would, by itself, make the world better, their existence should not, intuitively, “swallow up” (as Broome 2004 puts it) the benefit to all of the A -people.

In Z , there are $k + n$ people, all with mediocre lives, but better than the mediocre lives in $A+$. Intuitively, for any k , there is some n such that Z would be better than $A+$. For if n is

sufficiently larger than k , the average—and therefore total—well-being in Z may be greater than in $A+$. And this greater quantity of well-being is more equally distributed in Z than the lesser quantity is in $A+$. This seems to make Z better than $A+$.

For any k , Z seems better than $A+$ (for some n), which seems better than A (for any n). And *better than* is transitive (or so I assume throughout this paper, along with the transitivity of equal goodness).¹ Our intuitions therefore imply that, for any k , there is some n such that Z is better than A . But that seems repugnant, because all of the lives in A are excellent and all of the lives in Z are mediocre. This argument from seemingly true principles to a seemingly repugnant conclusion is (a version of) the mere addition paradox.²

The literature contains many responses to the paradox, some of which I mention later in this paper. I do not, however, find any of the extant responses particularly compelling—in part because they seem not to generalize in a plausible way to an *intrapersonal* analogue of the mere addition paradox, which I present in section 2.

2 The Probable Addition Argument

Suppose that some couple wants to have a child through *intracytoplasmic sperm injection*. This is an in vitro fertilization method in which a single sperm is injected into a single egg. Suppose that our couple has their sperm and egg selected, and that only one possible person could originate from this pair of gametes. Call this person *Sally*.

Suppose that the couple is nearly certain—and rationally so, given their evidence—that one of them has some condition (call it *the nearly certain condition*), which would prevent the injection from resulting in fertilization, unless some other material is co-injected along with the sperm.³ There are two options for co-injection. Both would ensure that Sally is conceived and later born. But they would have different effects on her well-being. The couple's options

¹Transitivity is questioned by Rachels (1998; 2001) and Temkin (1987; 1996; 2012). For responses to these arguments, see Binmore and Voorhoeve (2003); Qizilbash (2005); Benbaji (2009); Huemer (2013); Voorhoeve (2013); Handfield (2014); Nebel (2017a); Pummer (2017).

²This version of the argument is closer to the versions in Schwartz (1979), Huemer (2008), and Parfit (2016) than to Parfit's original version. Parfit first published his version after Schwartz, in Parfit (1982), but his argument had already been discussed by Singer (1976) and McMahan (1981), based on a draft called "Overpopulation" circulated as early as 1973.

³The thought experiment involves some science fiction, but nothing particularly farfetched. Some effects of various co-injection possibilities are studied, for example, by Wu et al. (2007), Tournaye (2009), Kato and Nagao (2012), and Ma et al. (2017).

are depicted in table 2.

Table 2: An Intrapersonal Addition Paradox

	State 1 (p)	State 2 ($1 - p$)
A	100	
$A+$	110	1
Z	2	2

The columns in table 2 represent states of the world—mutually exclusive and exhaustive propositions over which the couple has no causal influence. State 1 is the state in which the couple lacks the nearly certain condition, and p is its (very low, nonzero) probability, understood as the couple’s rational credence that the state obtains. State 2 is the state in which they have the condition. Each row represents a *prospect* available to the couple. Each prospect assigns an outcome to each state of the world. The number in each cell (if there is one) represents Sally’s well-being in each outcome.

Prospect A represents what will happen if the couple inject the sperm without any other material. If they lack the condition, Sally will have an excellent life. If they have the condition, Sally will not exist.

Prospect $A+$ represents what we might call the *maybe wonderful* injection. If the couple lacks the condition, this injection would cause Sally to have a wonderful life—even better than the life she would have under A in state 1. If they have the condition, the maybe wonderful injection would cause Sally to have a mediocre life.

Prospect Z represents what a *certainly mediocre* injection. This will cause Sally to have a mediocre life no matter what. But her life would be better than the mediocre life she would have under $A+$ in state 2.

I am interested in which prospects would be better or worse *for Sally*—that is, which ought to be preferred for her sake by a fully rational agent concerned solely with her interests.⁴ Some might doubt whether anything could be better or worse for Sally because, depending on what the couple does, she might not exist. I discuss this kind of doubt in section 5. For now, we might set it aside by stipulating that Sally will in fact exist, but that our couple does not know this. The mere epistemic possibility for the couple of Sally’s nonexistence should not preclude things from being better or worse for Sally.

⁴For this gloss on personal betterness, see (e.g.,) Arneson (1990) and Voorhoeve and Fleurbaey (2016).

Intuitively, for any (nonzero—I henceforth drop this qualification) probability p , $A+$ is better for Sally than A . This follows from

The Probable Addition Principle: For any prospects A and $A+$, and any person S who might exist in those prospects: if, in every state of the world in which S would exist in A , S would be better off in $A+$, and if, in every other state of the world, S 's life would be worth living in $A+$, then $A+$ is better for S than A .

This principle can be supported by the following argument. $A+$ would be better for Sally in one state of the world (namely, state 1). And there is no state in which $A+$ would be worse for her. For it cannot be *worse* for a person to exist with a life worth living than never to have been born. If $A+$ is better for Sally in one state, and worse in no state, then (we might think) $A+$ must be better for her. (I reject this argument on page 17, but I hope it provides some *prima facie* motivation for the principle. I give another argument for it in section 7.)⁵

Intuitively, for *some* nonzero probability p , Z would be better for Sally than $A+$. This follows from

Minimal Prudence: Any prospect in which a person is certain to exist at some positive level of well-being is better for her than any risky prospect in which she is certain to exist, but with lower expected well-being.

If p is sufficiently low, Z offers Sally greater expected well-being. And Z is less risky than $A+$. This seems to make Z better for Sally than $A+$, for some low p .

Most decision theorists would accept minimal prudence. But some (e.g., Buchak 2016) believe that it can be rational to be attracted to risk. It is therefore worth noting that a weaker principle is sufficient for the premise that, for some p , Z is better for Sally than $A+$:

Super-Minimal Prudence: For any excellent welfare level a , there are some mediocre welfare levels z and $z-$ (where $z > z-$) and some probability p , such that any prospect in which a person is certain to exist at level z is better for her than any prospect in which she might, with any probability less than or equal to p , exist at level a , and would otherwise exist at level $z-$.

⁵A more direct argument might appeal to Roberts (2017)'s intuition that a greater probability of existence is better for someone, even if the outcome in which she exists is not better for her. I do not, however, share Roberts's intuition.

This principle is a bit of a mouthful, but only because it is so weak. It says that, no matter how excellent some life would be, there is *some* probability—say, one-in-a-googolplex—and *some* pair of mediocre lives—one of which may be *considerably* better than the other—such that a sure-thing of the better mediocre life would be better than a gamble that might (with one-in-a-googolplex probability) yield the excellent life but would almost certainly yield the worse mediocre life. This seems to me beyond serious doubt. There are limits to the rationality of risk-seeking.

By the probable addition principle, $A+$ is better for Sally than A , for any probability p . By (super-)minimal prudence, Z is better for her than $A+$, for some probability p (and any probability less than that). And betterness for Sally is transitive. Thus, for some such p (and any probability less than that), Z is better for Sally than A . Call this *the probable addition argument*.

The argument has the following, more general, implication:

The Intrapersonal Repugnant Conclusion: For any person S , there is some probability p such that any prospect in which S would have an excellent life with probability p or less, and would not exist otherwise, is worse for S than a certainly mediocre life.

This conclusion is not, in itself, repugnant. But it seems to me at least somewhat counterintuitive, especially on the common view that it cannot be worse for a person never to have been born. On that view, for any probability p , no possible outcome of A is worse for Sally than any possible outcome of Z , and some possible outcome of A is better for Sally than *every* possible outcome of Z . That makes it hard to see how, for some p , A could be worse for Sally than Z . For one would expect a prospect that is better for someone to offer her some chance of a better outcome.

More importantly, however, even if we do not find the intrapersonal repugnant conclusion implausible in its own right, we must reject it in order to avoid the *interpersonal* repugnant conclusion. That is the claim of section 3.

3 From Intrapersonal to Interpersonal Repugnance

My aim in this section is to show that the interpersonal repugnant conclusion follows from its intrapersonal analogue, given some other highly plausible axiological assumptions (none

of which directly make comparisons between outcomes in which different numbers of people would exist). This claim may seem uninteresting to those who already find the intrapersonal repugnant conclusion implausible, or to those already convinced that both conclusions should be handled in the same way. But my argument from intrapersonal to interpersonal repugnant conclusion will have broader implications of importance to population ethics.

3.1 Setup

To set up the argument, suppose that the intrapersonal repugnant conclusion is true. Take any population A containing any number k of lives at any excellent welfare level a . Then take any probability p and welfare level z that satisfy the intrapersonal repugnant conclusion—that is, any probability p such that, for any person S , any prospect in which S would have an excellent life with probability p or less, and would not exist otherwise, is worse for S than a certainly mediocre life at level z . Now take any (natural) number n where $n \geq \frac{k}{p}$. I will show that, given some highly plausible auxiliary assumptions, a population Z of n mediocre lives at level z is better than A .⁶

Start by considering two prospects, Certain A and Certain Z , which yield A and Z respectively in every state of the world. These are riskless prospects. How should they be compared? Presumably, the better prospect is the one with the better outcome. More generally,

Certainty Equivalence: For any prospects X and Y , and any outcomes x and y , if X yields x in every state of the world, and Y yields y in every state of the world, then X is better than (or as good as) Y just in case x is better than (as good as) y .

Given certainty equivalence—which seems to me indubitable—we can show that Z is better than A by showing that Certain Z is better than Certain A .

We can show that Certain Z is better than Certain A by considering two further prospects, Impartial Z and Impartial A , which we construct as follows. Impartial Z is simple: it yields, in every state of the world, a fixed population of n lives at level z (not necessarily the same lives as those in our original Z). Impartial A is more complicated. Consider the set of n

⁶It might be wondered why we are entitled to assume that all the excellent lives in A are at the same level. Well, suppose they're not. Then surely there is some distribution A' in which everyone who exists in A is at the same excellent level (e.g., the highest level instantiated in A), such that A' is at least as good as A . If we can show that Z is better than A' , then Z must be better than A .

people who exist in Impartial Z . A k -combination of a set S is just a k -sized subset of S . For example, a poker hand is a 5-combination from a set of 52 cards. Impartial A is constructed by considering all the k -combinations of the set of n people who exist in Impartial Z . In each state of the world, Impartial A selects a distinct k -combination of these people to live at level a , leaving the other $n - k$ people unborn. I illustrate this idea with a simple example, depicted in table 3.

Table 3: Impartial A and Z when $k = 2$ and $n = 3$

Prospect	Person	State 1 ($\frac{1}{3}$)	State 2 ($\frac{1}{3}$)	State 3 ($\frac{1}{3}$)
Impartial A	i	a	a	
	j	a		a
	k		a	a
Impartial Z	i	z	z	z
	j	z	z	z
	k	z	z	z

In table 3, $k = 2$ and $n = 3$. Impartial Z yields a fixed population of three people at level z . This forms our set of possible people. Impartial A rotates between the different 2-combinations of this set, so that each combination is equally likely to obtain, and assigns welfare level a to each person in each combination.

The most important thing to notice about table 3 is that each person's probability of existence in Impartial A is $\frac{2}{3}$. More generally, for any k and n , each person's probability of existence in a prospect that assigns equal probability to every k -combination of n possible people is $\frac{k}{n}$. This is intuitive, but it requires proof, which I provide in a footnote.⁷

How do Impartial A and Z relate to Certain A and Z ? Impartial A seems just as good as Certain A , and Impartial Z seems just as good as Certain Z . This judgment can be supported as follows.

Every possible outcome of Impartial A seems at least as good as every possible outcome of Certain A , and vice versa (likewise for Impartial Z and Certain Z). This follows from a version of Parfit (1984)'s

⁷Each person's probability of existence in such a prospect is the number of k -combinations in which she exists divided by the total number of k -combinations of n possible people. The denominator is just $\frac{n!}{k!(n-k)!}$. The numerator is $\frac{(n-1)!}{(k-1)!((n-1)-(k-1))!}$. So each person's probability of existence is $\frac{(n-1)!}{(k-1)!((n-1)-(k-1))!} \div \frac{n!}{k!(n-k)!} = \frac{(n-1)!}{n!} \cdot \frac{k!(n-k)!}{(k-1)!(n-1-k+1)!} = \frac{(n-1) \cdot (n-2) \cdots 2 \cdot 1}{n \cdot (n-1) \cdot (n-2) \cdots 2 \cdot 1} \cdot \frac{k \cdot (k-1) \cdot (k-2) \cdots 2 \cdot 1}{(k-1) \cdot (k-2) \cdots 2 \cdot 1} = \frac{k}{n}$.

Same-Number Quality Claim: For any same-sized populations X and Y , if everyone in X is at least as well off as everyone in Y , then X is at least as good as Y .

This principle implies that every outcome of Impartial A is at least as good as every outcome of Certain A , and vice versa (likewise for Impartial Z and Certain Z). I know of no plausible population axiology that violates the same-number quality claim. It is hard to see how it could be false, given the sense of *better than* to which we restricted our interest at the start of this paper: one outcome is better than another in this sense, just in case, from an impartial perspective, we would have most reason to prefer the one to the other—at least, with respect to their distributions of well-being. From such an impartial perspective, we would have no reason to care which people lead which lives. So we would have most reason to prefer that those who exist lead better lives than those who might otherwise exist, and would be indifferent between different populations in which everyone's lives are equally good. These judgments are captured, in their weakest form, by the same-number quality claim.

Since every outcome of Impartial A is at least as good as every outcome of Certain A , and vice versa, this makes Impartial A and Certain A equally good prospects (likewise for Impartial Z and Certain Z). This follows from

Outcome Dominance: For any prospects X and Y , if every possible outcome of Y is at least as good as every possible outcome of X , then Y is at least as good as X .

By outcome dominance, Impartial A is at least as good as Certain A , and vice versa, so they are equally good (likewise for Impartial Z and Certain Z). This principle is relatively uncontroversial among decision theorists. It is questioned by some egalitarians, for reasons that I do not discuss here.⁸ But egalitarians would have no objection to what we can call *egalitarian-friendly* outcome dominance, which is just outcome dominance restricted to prospects that guarantee perfectly equal distributions of well-being: for any such prospects X and Y , if every possible outcome of Y is at least as good as every possible outcome of X , then Y is at least as good as X . The egalitarian-friendly version suffices for my argument, because the prospects under consideration guarantee perfectly equal distributions of well-being.

By the same-number quality claim and outcome dominance, Impartial A is just as good as Certain A , and Impartial Z is just as good as Certain Z . And, by certainty equivalence, Z is

⁸It is rejected by Nissan-Rozen (forthcoming). Diamond (1967) rejects the much stronger sure-thing principle (defined in footnote 22) but would also reject outcome dominance.

better than A just in case Certain Z is better than Certain A . Thus, Z is better than A just in case Impartial Z is better than Impartial A . It remains to show that, given the intrapersonal repugnant conclusion, Impartial Z is indeed better than Impartial A .

3.2 Pareto

Recall that n was chosen to be such that $n \geq \frac{k}{p}$, where p satisfies the intrapersonal repugnant conclusion. Because each person's probability of existence in Impartial A is $\frac{k}{n}$, it is therefore less than or equal to p . So, given the intrapersonal repugnant conclusion, Impartial Z is better for each person than Impartial A . This is because Impartial Z guarantees each person a mediocre life, which (by the intrapersonal repugnant conclusion) is better than a p -or-less chance of an excellent life.

Impartial Z is better for each person than Impartial A . Very plausibly, this makes Impartial Z a better prospect than Impartial A . This follows from

Weak Pareto for Prospects: Take any two prospects X and Y such that everyone who might exist in X might also exist in Y , and vice versa. If Y is a better prospect than X for each person who might exist, then Y is a better prospect than X .

This premise—whose name I abbreviate as *Pareto*—is more controversial than the others. I can think of two main reasons why one might reject it (other than merely wanting to avoid the interpersonal repugnant conclusion, after having accepted the other premises of the argument).

First, this version of Pareto might be rejected on the grounds that a prospect cannot be better than, or as good as, another for people who merely *might* exist. I consider and reject this view in section 5. But even those who hold this view need not reject the principle. They merely think the antecedent (“if Y is better than X for everyone who might exist”) is satisfied only in the special case where everyone who might exist does in fact, or is certain to, exist. That is no objection to the principle.

Second, the principle might, like outcome dominance, be rejected by egalitarians of a certain stripe.⁹ But, as with outcome dominance, egalitarians would have no objection to what we

⁹See, for example, Fleurbaey and Voorhoeve (2013). The problem also arises for prioritarists—see Adler (2011)—but I consider egalitarianism for simplicity.

might call *egalitarian-friendly* Pareto, which is just Pareto restricted to prospects in which, in every possible outcome, everyone who ever lives is equally well off.¹⁰ Egalitarians can accept this principle, because it never recommends prospects that might yield unequal outcomes. And they should accept it. For, as far as I know, egalitarians' reason for rejecting Pareto is merely that it generates conflicts between their egalitarianism and other doctrines. They have not dispelled the independent plausibility of the principle, or shown it to have other unacceptable implications. So they have no reason to reject the egalitarian-friendly version. The literature contains various arguments for Pareto-like principles.¹¹ I find those arguments compelling. But I want to suggest an argument that is specific to the egalitarian-friendly version.

Take any two prospects X and Y in which only a single person S_1 might exist. Clearly, if Y is a better prospect than X for S_1 , then Y is better than X .¹² For if Y is better for S_1 , then one ought to prefer Y for S_1 's sake. And if one ought to prefer Y to X for the sake of the only person who might exist, then, from an impartial perspective, one ought to prefer Y to X . This is just to say that Pareto is true for all prospects in which only a single person might exist. This claim will serve as the base case in an inductive argument.

For the inductive step, consider any prospects X and Y in which any number n of people S_1, \dots, S_n might exist and are guaranteed to be equally well off if they exist. For any such X and Y , let X' and Y' be prospects just like X and Y , but in which some additional person S_{n+1} might exist, also guaranteed to be just as well off as the others if she exists. Plausibly, *if* the fact that Y is better than X for all of S_1, \dots, S_n is sufficient to make Y better than X —more generally: if Pareto holds when there are n epistemically possible people—then the fact that Y' is better than X' for all of S_1, \dots, S_n, S_{n+1} is sufficient to make Y' better than X' —more generally: then the principle holds when there are $n + 1$ epistemically possible people. For the only difference between these pairs of prospects is the possible existence of one more person. And, by the claim of the previous paragraph, the fact that Y' is better for her would make Y' better if she were the only one who might exist. So, if Y' is not better than X' despite

¹⁰Compare Fleurbaey (2010)'s “weak Pareto for equal risk.” I assume that the only objectionable inequalities are between people who exist in the same states of the world (see Otsuka 2012). The situation may be different for some prioritarrians (e.g., Adler 2008), who believe that possible people have claims to be born with good lives. I here ignore this kind of view, because its proponents (e.g., Holtug 2010) tend to accept the repugnant conclusion anyway.

¹¹See, for example, Broome (1991), Frick (2013), Broome (2015), and Hare (2016).

¹²At least, this seems clear to me. Prioritarrians who like expected utility theory seem forced to reject it (Otsuka and Voorhoeve 2009). If (like Buchak 2017) prioritarrians appeal to a risk-averse decision theory, they seem able to avoid this problem.

being better for everyone, this should be for some reason having to do with some relation between S_{n+1} and the others. It would otherwise be hard to see how her possible existence would prevent Y' from being better than X' . But what relation is the culprit? If there were any risk of inequality, we could blame the relational fact that some might be worse off than others, through no fault of their own. But that is not true in this kind of case. I therefore find it hard to see why the principle should be true for n but not for $n + 1$.

The only natural place to resist the inductive step would seem to be its first instance: from one epistemically possible person to two. But why should the principle fail in the two-person case, but not in the one-person case? Again, a plausible answer would have to point to some possible relation that might hold between two or more people, and which might make a prospect worse in a way that comes apart from its goodness for people. But there appears to be no such relation when our attention is restricted to prospects that guarantee equal outcomes.

I therefore believe that, for any natural number n , if egalitarian-friendly Pareto holds for prospects in which each of n people might exist, then it holds for prospects in which each of $n + 1$ people might exist. And I have argued that the principle holds when $n = 1$. So, by induction, egalitarian-friendly Pareto holds for any $n \geq 1$. This inductive argument shows that rejecting the egalitarian-friendly principle would require us to think either that it fails even when only a single person might exist, or that the difference between its true and false instances lies in the addition of only a single possible person, whose existence is certain not to generate a tradeoff between different people's interests. Neither of these thoughts seems to me very plausible. Perhaps one of these thoughts could be supported and explained by some population axiology on which A is better than Z . But it does not seem to me reasonable to be more confident in any particular axiology than in the egalitarian-friendly Pareto principle.

I do not pretend that this argument is decisive. If we are convinced that the intrapersonal repugnant conclusion is true, but that the interpersonal version is false, then rejecting egalitarian-friendly Pareto might be our least bad option. But the option seems to me quite bad, and not just because I find the principle so independently plausible. After all, many of us find the interpersonal repugnant conclusion hard to believe precisely because we care about goodness *for people*, and population Z is so much worse for the Z -people than A is for the A -people. We are not, as Cohen (2012, 164) puts it, mere "vessels of value." But if we must choose between rejecting Pareto and accepting the interpersonal repugnant conclusion, it's the former that seems to subordinate people's interests to the

impersonal goodness of outcomes. Those of us whose sense of repugnance is motivated by person-centered moral thinking should not, I think, reject Pareto, which seems to me much more attractive than the intrapersonal repugnant conclusion. (It would, in any case, be an interesting result if the most promising way of avoiding the interpersonal repugnant conclusion required us to reject the person-based thinking that underlies Pareto, given the influence of such thinking in many attempts to avoid the repugnant conclusion.)

Suppose we accept egalitarian-friendly Pareto. Then, given the intrapersonal repugnant conclusion, Impartial Z is better than Impartial A . And if Impartial Z is better than Impartial A , then Z must be better than A , by certainty equivalence, the same-number quality claim, and outcome dominance. So, given the intrapersonal repugnant conclusion, Z is better than A . This completes the argument from intrapersonal to interpersonal repugnance.

3.3 An Impartial Observer Principle

I promised, on page 7, a more general lesson. Here it is.

My argument from intrapersonal to interpersonal repugnance was not sensitive to the welfare levels or numbers of people in A and Z . Our principles—certainty equivalence, the same-number quality claim, (egalitarian-friendly) outcome dominance, and (egalitarian-friendly) Pareto—allow us to compare any pair of (equal) distributions by constructing prospects just like Impartial A and Z . Take any perfectly equal populations X and Y , with population sizes k and n respectively, where $n \geq k$. Let Impartial Y be a prospect that yields, in each state of the world, some fixed population of n people at level y (the level of the Y -people). Let Impartial X be a prospect that yields, in each state of the world, a different k -combination of those n people, all with lives at level x (the level of the X -people). Each person is certain to exist in Impartial Y , and exists with probability $\frac{k}{n}$ in Impartial X . Our principles imply that Y is better (or worse) than X if, for any individual, a prospect that guarantees level y is better (or worse) for her than a $\frac{k}{n}$ chance of level x and nonexistence otherwise. Call this the egalitarian-friendly *impartial observer principle*.¹³

¹³The principle is so-called because of its resemblance to the impartial observer theorem of Harsanyi (1953). According to Harsanyi, one distribution is better than another just in case, from behind a certain kind of veil of ignorance, we would have most reason to prefer the one to the other. Unlike Rawls (1971), Harsanyi's impartial observer is supposed to maximize her expected utility, based on a probability function that assigns an equal chance to occupying any given position in each distribution. Harsanyi argued that these assumptions lead to utilitarianism—specifically, average utilitarianism (for reasons that I revisit in section 6). Many argue that such veil-of-ignorance reasoning is implausible or inapplicable when applied to population ethics (see

This result may seem to be of limited interest, because of the restriction to perfectly equal distributions. But many of the important questions in population ethics can be raised without considering inequality. And I demonstrate an important implication of the egalitarian-friendly principle (beyond the move from intrapersonal to interpersonal repugnance) in section 6. I also mention, in a footnote, how to obtain a version of the impartial observer principle that is not restricted to equal distributions; we need only the egalitarian-unfriendly versions of outcome dominance and Pareto, and a principle of impartiality that generalizes the same-number quality claim.¹⁴

I have argued that the intrapersonal repugnant conclusion leads to its interpersonal analogue. So, in order to avoid the interpersonal repugnant conclusion, we must reject the probable addition argument. But how? I turn to this question in section 4.

4 The Value of Existence

The probable addition argument would perhaps be uninteresting if every response to the mere addition paradox could be extended, in some straightforward and plausible way, to the intrapersonal case. But that is not so.

Consider, for example, Parfit's own (2004; 2016) response. Parfit appeals to what he calls *perfectionist* considerations. According to Parfit's perfectionism, the absence in population *Z* of "the best things in life" cannot be outweighed by any gains in total or average well-being, or in benefits to the least well off. The analogous view, in the intrapersonal case, would seem to be that the epistemic impossibility of these things in Sally's life in prospect *Z* (the certainly mediocre injection) cannot be outweighed by gains in her expected well-being, or in improvements to her worst-case scenario. However plausible Parfit's perfectionism may be in the interpersonal case (not very, I think), its intrapersonal analogue seems to me absurd.

Barry 1977; Parfit 1984; Dasgupta 1994; Broome 2004). But my argument in this section shows that a kind of such reasoning is inescapable, given other plausible axiological assumptions. For a more general attempt to vindicate Harsanyi's approach, see McCarthy, Mikkola, and Thomas (2016).

¹⁴The requisite principle of impartiality is that all permutations of a distribution—understood as distributions that assign the same welfare levels to the same numbers of (perhaps distinct) people—are equally good (see Broome 2004). (This principle can be derived from the simple claim that replacing any member of a population with another person at the same level of well-being retains the value of the original population, because any permutation of a distribution can be obtained from some sequence of one-by-one replacements.) The argument is just as before, but using *k-permutations*—i.e., ordered arrangements of *k* people at different levels of well-being, selected from a set of *n* possible people—rather than *k-combinations*.

If the probability of Sally's best-case scenario in $A+$ is, say, one-in-a-googolplex, it would be manifestly unreasonable to take the risk of making her (almost certainly) worse off than she would be in Z . Perfectionism is not a plausible view of the goodness of individual prospects.

More generally, I find it much less plausible to deny that Z is better for Sally than $A+$ in the intrapersonal case than to deny the analogous step in the interpersonal case (although I find it implausible in the interpersonal case as well). We can perhaps live with an inegalitarian, nonutilitarian axiology. We cannot, I think, live with an absurdly reckless decision theory.

Consider, then, the move from A to $A+$, supported by the probable addition principle: $A+$ is better for Sally than A if $A+$ is better for her in every state in which she would exist in A , and good for her in every other state. Whether and how we can reject this principle depends on whether and how we can compare a mediocre life to a person's nonexistence, with respect to her own good. There are three main options.

We might believe, first, that a mediocre life is better for a person than nonexistence. This view leads quickly, however, to the probable addition principle. The principle would follow by

Weak Statewise Dominance: For any prospects X and Y (and any individual S), if X yields a better outcome (for S) than Y in every state of the world, then X is better (for S) than Y .

This principle is slightly stronger than the outcome dominance principle stated on page 9. But it is no less plausible.

It would not help to claim that a mediocre life is just as good as, but not better than, than nonexistence. For we would still obtain the probable addition principle, by

Strong Statewise Dominance: For any prospects X and Y (and any individual S), if X 's outcome is at least as good (for S) as Y 's in every state of the world, and better (for S) than Y 's in some state of the world, then X is better (for S) than Y .

And this principle, too, is eminently plausible.

The second option is to say that a mediocre life is *worse* for a person than nonexistence. This option might seem worth considering because of its resemblance to *critical-level* views in population ethics, which are highly influential among both philosophers and economists

(Broome 2004; Blackorby, Bossert, and Donaldson 2005). Critical-level theorists argue that there is a positive “critical level” of well-being below which a person’s existence makes the world worse, even though her life is worth living. Does this view have a plausible analogue in the intrapersonal case?

According to what we might call *the personal critical-level view*, there is some positive welfare level c below which a person’s existence is worse for her than her nonexistence. If $c > 1$, then $A+$ may be worse for Sally than A , because it may be worse for her in a sufficiently probable state of the world. And if $c > 2$, then Z must be worse for Sally than A , because it is worse for her in every state of the world.

The personal critical-level view, however, is dubiously coherent. For if some life were worse than nonexistence, then in what sense would its value be *positive*? We would expect our scale of well-being to be normalized in such a way that any life worse than nonexistence is assigned a negative value. If not, then we must have some other way of defining a neutral level of well-being, which does not involve comparisons with nonexistence. A few such methods have been proposed in the literature. But all of them, to my knowledge, are motivated primarily by the alleged incoherence of comparing lives with nonexistence. And the most plausible methods along these lines do not combine easily with the idea of a personal critical level.

Consider, for example, an elegant method proposed by Blackorby, Bossert, and Donaldson (2005). They imagine good and bad lives getting shorter and shorter and suggest that, as length of life gets arbitrarily close to zero, well-being approaches the same value. The value to which these shortenings converge is that of a neutral life, and is the zero level on their scale of well-being. Lives above this zero level are worth living; lives below it are not. But now suppose that we introduce a personal critical level c , and that this level is set above zero in order to avoid the intrapersonal repugnant conclusion. Consider some person whose life is at level c . We are now supposed to think that it would be worse for this person if her life were shortened to a length arbitrarily close to zero, but that it would be *better* for her if her length of life actually *were* zero. This discontinuity seems to me extremely unnatural.

I have considered two views about the personal value of a mediocre life compared to nonexistence: first, that such a life is better (or as good); second, that such a life is worse. The third option is to deny that such a life is even comparable to nonexistence.¹⁵ And that is what the

¹⁵On another view, due to Rabinowicz (2009), some lives are *on a par* with nonexistence, where parity is a value relation that implies comparability but rules out the standard relations of betterness, worseness, and equal goodness (Chang 2002). On Rabinowicz’s view, however, other lives (above some zone of parity) are

most influential critical-level theorists (Broome and Blackorby et al.) in fact believe. They accept

Noncomparativism: For any outcomes X and Y , and any person S , X is better for S than Y only if S lives in both X and Y .

The standard argument for noncomparativism goes like this (see Broome 1999, 168). If it is better (or worse) for a person to live than never to have been born, then it would be worse (or better) for her if she were never born. But if she were never born, then there would be no *her* for whom that could have been worse (or better). Thus, if a person does not exist in one (or both) of two outcomes, then neither outcome can be better for her than the other. Call this *the metaphysical argument*. Although there are other arguments for noncomparativism, the metaphysical argument is the most influential.

Can noncomparativists reject the probable addition principle? It might seem that they cannot. For we might seem able to strengthen our statewise dominance principle to

Statewise Pseudodominance: For any prospects X and Y (and any individual S), if X 's outcome is no worse (for S) than Y 's in any state of the world, and is better (for S) than Y 's in some state of the world, then X is better (for S) than Y .

This does, given noncomparativism, imply the probable addition principle. For if $A+$ is better for Sally than A in every state in which she would exist in A , and gives her a life worth living in every other state, then $A+$ is better for her in some state and worse for her in no state. (This was the argument given on page 5.) But noncomparativists would (and should) reject statewise pseudodominance. It leads to betterness cycles. Witness, for example, table 4.

B is better for Sally than A in state 2 and (by noncomparativism) no worse for her in any other state. So, by statewise pseudodominance, B is better than A . By the same reasoning, C

better than nonexistence, and that is enough to obtain a version of the intrapersonal repugnant conclusion: namely, that for any person S , there is some probability p such that a prospect in which S would have an excellent life with probability p (and would not exist otherwise) is worse for S than a sure-thing of a life that is only *barely better than nonexistence*. And this, of course, leads to the interpersonal analogue that, for any population A of excellent lives, there is some population Z of lives that are only barely better than nonexistence, such that Z is better than A . For other objections to Rabinowicz's view, see Broome (2009) and Nebel (2015).

Table 4: The Pseudodominance Cycle

	State 1 ($\frac{1}{3}$)	State 2 ($\frac{1}{3}$)	State 3 ($\frac{1}{3}$)
A	10	5	
B		10	5
C	5		10

is better than B , and A is better than C . That violates the acyclicity of *better than*. So statewise pseudodominance must be rejected (at least, by noncomparativists).

Noncomparativists are therefore not forced to accept the probable addition principle. But it remains to be seen whether they can plausibly explain why the probable addition principle is false. I turn to that question in section 5.

5 A Problem for Noncomparativists

The simplest way in which noncomparativists might reject the probable addition principle is by claiming that prospects A and $A+$ are not even comparable for Sally. (I suspect that is what Broome and Blackorby et al. would say.) But this claim does not simply *follow* from noncomparativism, which is a constraint on the goodness of outcomes. We need an account of how noncomparativism extends to the goodness of prospects, from which it follows that $A+$ and A are not comparable for Sally. And it is not obvious what that account might be. In this section, I consider the most likely options and argue that all of them fail, in a way that illustrates a deep problem with the metaphysical argument for noncomparativism.

The simplest extension of noncomparativism to prospects is

The Certain-Existence Restriction: For any prospects X and Y , and any person S , X is better for S than Y only if S would certainly live in both X and Y .

This seems to be the view of Blackorby, Bossert, and Donaldson (2007, 569), who write that “individual ex-ante assessments of prospects are meaningless if the person is not alive in all possible states.” The view can be motivated as follows. Suppose that, for any prospects X and Y , and any individual S , X is better for S than Y only if X ’s expected value for S —i.e., the probability-weighted average of X ’s outcome values for S —is greater than Y ’s. And suppose

that outcomes in which a person does not exist have *no* value—as opposed to a value of zero—for her. Then a prospect in which a person might not exist has no expected value for her. For the expectation of a variable over possible outcomes requires the variable to have a value in all of those outcomes. So prospects in which a person might not exist are not comparable to any other prospects.

The certain-existence restriction provides a simple response to the probable addition argument: neither *A*+ nor *Z* can be better for Sally than *A*, because Sally might not exist in *A*. But the certain-existence restriction seems false. Consider table 5, in which we are nearly certain that state 1 obtains, in which case Sally exists.

Table 5: Problem for the Certain-Existence Restriction

	State 1 (0.99)	State 2 (0.01)
<i>A</i>	100	
<i>B</i>	-100	

Our uncertainty in table 5 might be highly general—e.g., about the existence of other minds or whether one is a brain in a vat—or more specific to Sally in particular—e.g., whether her mother’s nearly competed pregnancy will come to term, or whether she has developed enough to be conscious. It seems clear to me that *A* is better for Sally than *B* even in the presence of such uncertainty. The mere epistemic possibility of other minds’ nonexistence, or of a nearly completed pregnancy not coming to term, should not make it impossible to promote the prospective good of our loved ones or of our future children. We ought to prefer *A* for Sally’s sake.

This judgment can be supported by the following reasoning. Intuitively, for any prospects *X* and *Y*, if *X* is better for *S* than *Y* in some state of the world, and if *X* and *Y* share the same outcomes in every other state of the world, then *X* is better for *S* than *Y*. Prospects that share outcomes in some states of the world should be compared by simply comparing the outcomes in which they differ. And this is true of *A* and *B* in table 5: *A* is better for Sally than *B* in state 1, and they share the same outcome—Sally’s nonexistence—in state 2. *A* should therefore be better for Sally than *B*, in violation of the certain-existence restriction.

Noncomparativists might resist the claim that *A* is better for Sally than *B*. For, after all, Sally might not even exist! So there might be no such person as Sally for whom *A* could be better. I will soon, on page 22, reject the metaphysical argument for noncomparativism, on which

this response seems to rest. But, in the meantime, we can dismiss the response for a different reason. We can simply stipulate that Sally does in fact exist, but that this fact is unknown to the agent. (Recall that our probabilities are the credences of some agent, who is choosing between the available prospects.) This stipulation makes the response unpersuasive. For it is hard to see why the mere *epistemic* possibility for some agent of Sally’s nonexistence—due to the agent’s uncertainty about the existence of other minds, or of the status of some pregnancy—should make it impossible, for *metaphysical* reasons, for any prospects available to this agent to be better or worse for Sally.

Noncomparativists might accommodate the intuitive judgment about table 5 by adopting a weaker restriction. According to

The Same-State Restriction: For any prospects X and Y , and any person S , X is better for S than Y only if S would live in the same states of the world in both X and Y .

The same-state restriction might be motivated as follows. Define an *event* as a subset of the set of states. Suppose that S exists in the same states in both A and B . Then there is some event E conditional on which every outcome of A and B has some value for S . So we need not worry about an undefined expectation if E obtains. And, conditional on $\neg E$, neither prospect would have any value for S . Noncomparativists might think that A is better for S than B just in case there is some event E such that (1) conditional on E , A has greater expected value for S than B , and (2) conditional on $\neg E$, no outcome of A or B has any value for S . This implies the same-state restriction because, if S exists in some state in A but not in B , then there is no event E that satisfies both (1) and (2).

The same-state restriction would allow the noncomparativist to reject the probable addition principle, while accommodating the right result in table 5. But consider table 6.

Table 6: Problem for the Same-State Restriction

	State 1 (0.01)	State 2 (0.98)	State 3 (0.01)
A	100	100	
B	-100	-100	
B'		-100	-100

In table 6, A seems clearly better for Sally than B' . This violates the same-state restriction because there are some unlikely states in which Sally’s existence depends on which prospect

is chosen. Notice, moreover, that it would be strange to admit that A is better for Sally than B in table 5 but to deny that A is better for her than B' in 6. For, surely, if A is better for Sally than B in table 5, then A is better for Sally than B in table 6: in both cases, there is some 0.99-probability event conditional on which Sally would be much better off in A than in B , and she has no probability of existing otherwise. But if A is better for Sally than B in table 6, then it would be strange to deny that A is better for Sally than B' . This is because B' can be obtained by rearranging the outcomes of B . Many of us would accept

Permutation Invariance: For any prospects X and Y , and any person S , if X and Y are permutations of each other—i.e., if they assign the same outcomes to states of the same probability—then X and Y are equally good for S .¹⁶

B' is a permutation of B , because it assigns the very same outcomes to states of the same probability. Thus, they are equally good, by permutation invariance. So, if A is better than B in table 5, then A must be better than B' in table 6—contrary to the same-state restriction.

There are other possible noncomparativist restrictions (e.g., a *same-probability* restriction) which face similar counterexamples. But we have seen enough to notice a deeper problem for noncomparativists—at least, those noncomparativists who are motivated by the metaphysical argument.

The metaphysical argument says that, for any outcomes X and Y and any individual S , if X is better for S than Y , then it would be worse for S if Y obtained, and that something can be worse for S only if she exists. Presumably, if this is true for outcomes, then something very similar must be true for prospects. (Otherwise, we would not expect the argument to support a restriction on the goodness of prospects that might rule out the probable addition principle. And, besides, the argument appeals to semantico-metaphysical considerations that seem not to be specific to outcomes.) The similar claim for prospects would seem to be that, for any prospects X and Y and any individual S , X is better for S than Y only if it would—or, at least, *could*—be worse for S if B were chosen. But this claim can be ruled out by the principles we advanced against the certain-existence and same-state restrictions. Consider table 7.¹⁷

¹⁶For a defense of this principle, see Rabinowicz (2016).

¹⁷This kind of case is an instance of Hare (2010)'s more general problem of *opaque sweetening*. It can also be regarded as an intrapersonal analogue of the nonidentity problem: instead of an outcome that seems better without being better for anyone, we have a prospect that seems better for someone without being better for her in any state.

Table 7: The Failure of Noncomparativism

	State 1 (0.5)	State 2 (0.5)
<i>C</i>	100	
<i>D</i>	-100	
<i>D'</i>		-100

In table 7, *C* is better for Sally than *D*. This follows from the principle to which I appealed when objecting to the certain-existence restriction: we can compare prospects that share outcomes by comparing the outcomes in which they differ. So if *C* yields a better outcome for Sally than *D* in some state, and yields the very same outcome as *D* in every other state, then *C* must be better for Sally than *D*. And, by permutation invariance, *D* and *D'* are equally good for Sally. *C* must therefore be better for Sally than *D'*.

But this conclusion—that *C* is better for Sally than *D'*—is hard to square with the metaphysical argument. For suppose that *C* is chosen. Either state 1 obtains or state 2 obtains. If state 1 obtains then, had *D'* been chosen, there would have been no Sally for whom that could have been worse. If state 2 obtains then there is no Sally for whom *C* could be better. So, whichever state obtains, the metaphysical argument predicts a barrier—either Sally’s actual nonexistence, or her counterfactual nonexistence—to *C*’s being better for Sally than *D'*. But *C* is better for Sally than *D'*. So the metaphysical argument cannot be sound.

This, of course, does not show that it can be better for a person to exist than not to exist. Nor does it diagnose the error in the metaphysical argument. It could be any of the following claims:

Counterfactual Support: For any outcomes *X* and *Y*, and any individual *S*, *X* is better for *S* than *Y* only if it would be worse for *S* if *Y* obtained.

The Being Constraint on Personal Betterness: For any outcomes *X* and *Y*, and any individual *S*, *X* is better for *S* than *Y* only if *S* exists.

Contingentism: It is contingent which individuals there are.

I do not know which of these assumptions I would reject. But making these assumptions explicit shows, I think, that the premises of the metaphysical argument are collectively less plausible than my objection to its conclusion. For one thing, there is some prima facie tension

between contingentism and principles like the being constraint (Williamson 2013, ch. 4). More importantly, however, the argument holds our convictions about prudence and beneficence unduly hostage to metaphysical fortune. For it is an open question in modal metaphysics whether ontology is necessary or contingent. *Necessitists* believe that, necessarily, everything is necessarily something. On this view, if Sally actually exists, then she would have existed even if she had never been born. She just wouldn't have been a concrete, living, conscious thing. If necessitism is true, then the metaphysical argument for noncomparativism fails. For if Sally were never born, she would still exist—there would be a *her* for whom that could be worse (at least, as far as the being constraint on personal betterness is concerned). But it seems absurd that the truth of the probable addition principle, of the intrapersonal repugnant conclusion, and therefore of the interpersonal repugnant conclusion should depend on the metaphysical question of necessitism. I am not claiming that it can be better for a person to be born. Nor am I claiming that necessitism is true. My claim is merely that the question of whether it can be better for a person to be born should not depend on the truth or falsity of necessitism. We would, therefore, do well to reject the metaphysical argument for noncomparativism, and to accept some of the comparisons between prospects that this argument would have us rule out.¹⁸

Of course, there may be other arguments for noncomparativism. My challenge to such noncomparativists is to (a) provide an argument for their view that is not similarly undermined by the case of table 7, while still (b) restricting the goodness of uncertain prospects in a plausible way that rules out the probable addition principle. Meanwhile, in section 6, I consider a different way of rejecting the probable addition principle.

¹⁸Why not simply follow Arrhenius and Rabinowicz (2015) in rejecting counterfactual support? Arrhenius and Rabinowicz assume that “a relation cannot exist without the existence of all the relata.” This leads them to reject counterfactual support because they think that people exist contingently but that states of affairs exist necessarily: so the relation of being better for Sally exists just in case Sally exists, but would not exist if Sally didn't. This package of views seems to me quite awkward: it is contingentism for individuals, contingentism for relations, but necessitism for states of affairs. The authors justify the latter on the grounds that states are abstract objects. But aren't relations? If the existence of a relation requires the existence of its relata, then the existence of a state would seem to require the existence of its constituents. I am therefore not convinced that counterfactual support is the culprit.

6 Conditional Expectations

We have considered a few different ways in which $A+$ might compare to A . According to the probable addition principle, $A+$ is better for Sally than A . This leads to the repugnant conclusion. According to the extensions of noncomparativism considered in section 5, $A+$ is neither better nor worse for Sally than A . No such extensions seem plausible. Might $A+$ be worse for Sally than A ? We already rejected one view on which that is so: the personal critical-level view. But there is another view, which is more plausible.

I considered, on page 20, the possibility of comparing prospects by comparing their expected values for a person *conditional* on the event (if there is one) in which the person would exist no matter which prospect is chosen. This amounts to ignoring the outcomes in which a person might not exist—hence the same-state restriction. But instead of conditionalizing on an event and then comparing the resulting expected values, we could instead assign a value to each prospect taken separately by conditionalizing on a person's existence *in that prospect*. Let me explain.

Voorhoeve and Fleurbaey (2016) utilize the notion of a person's expected well-being *conditional on her existence* in a prospect—for short, her conditional expected well-being.¹⁹ Whereas a person's *unconditional* expected well-being in a prospect is the probability-weighted average of her welfare levels in each of its outcomes, her conditional expected well-being is obtained by weighting each outcome instead by its *conditional* probability on the hypothesis that she exists. Equivalently, it is her unconditional expected well-being divided by her probability of existence. Informally, we simply ignore all of a prospect's outcomes in which the person does not exist, and renormalize so that the probabilities of the remaining outcomes sum to 1.

According to

The Conditional-on-Existence View: For any prospects X and Y , and any person S , X is better for S than Y just in case S 's conditional expected well-being in X is greater than it is in Y .

This view conflicts with the probable addition principle. In our initial puzzle (table 2), for example, the conditional-on-existence view entails that $A+$ is worse for Sally than A . This is

¹⁹Voorhoeve and Fleurbaey put the idea to quite different purposes than ours. Indeed, they define positive welfare levels as those that are better for a person than nonexistence—which rules out, by statewise dominance, the view considered in this section.

because her conditional expected well-being in A is 100, whereas in $A+$ it is closer to 1. The conditional-on-existence view has this result without claiming, with the personal-critical level view, that a life worth living can somehow be worse for Sally than her nonexistence.

Indeed, the conditional-on-existence view meshes quite nicely with noncomparativism, which the rejection of the probable addition principle appears to require. This is noted by Harsanyi in his 1977 correspondence with Ng (published in Ng 1983). Harsanyi argues that if he were uncertain about his own existence from behind the veil of ignorance,

[T]he only rational decision rule for me would be to maximize the conditional expectation of my utility function on the condition that I would in fact exist. ... This is so because only existing people can have real utility levels since they are the only ones able to enjoy objects with a positive utility, suffer from objects with a negative utility, and feel indifferent to objects with zero utility.

The conditional-on-existence view seems to reflect this lack of concern for the nonexistent, because it gives no weight to outcomes in which a person doesn't exist; they are simply ignored. That is as it should be, if noncomparativism is true. If a person's existence isn't better for her than her nonexistence, then making her more likely to exist should not, in itself, make the prospect better for her. Increasing the probability of a person's existence may perhaps improve that prospect for a person by making her more likely to enjoy a better life *if* she exists. But a mere difference in her probability of existence does not affect the value of her prospective existence, according to the conditional-on-existence view.

The implications of the conditional-on-existence view also converge with noncomparativism's verdicts about riskless prospects. For suppose that some prospect X is certain to bring Sally into existence with a life worth living, and that Y is certain to prevent Sally from coming into existence. The conditional-on-existence view implies that X is not better for Sally than Y , as noncomparativists would surely believe (and must believe, by certainty equivalence). It has this implication because Sally's conditional expected well-being in Y is undefined, because her probability of existence in Y —i.e., the denominator of her conditional expected well-being—is zero. Since a positive value is not greater than an undefined value, X is not better for her than Y .

The conditional-on-existence view has a simple analogue in the interpersonal case: namely, average utilitarianism.²⁰ Just as the conditional-on-existence view values a prospect for a

²⁰This is also observed in McCarthy, Mikkola, and Thomas (2016) and Handfield (2017).

person by dividing her unconditional expected well-being by her probability of existence, so average utilitarianism values a population by dividing its sum of well-being by the number of people in it. Indeed, we can derive a version of average utilitarianism from the conditional-on-existence view—hence Harsanyi’s interest in the view—given the impartial observer principle from page 13. The egalitarian-friendly version of this principle says that if all of the k people in outcome X are at level x , and all of the $n(\geq k)$ people in outcome Y are at level y , then Y is better (or worse) than X if, for any individual, a prospect that guarantees level y is better (or worse) for her than a $\frac{k}{n}$ chance of level x and nonexistence otherwise. If we feed this principle the conditional-on-existence view, it implies that population X is better than Y iff welfare level x is greater than y (assuming that $k > 0$). Population size, on this view, is simply ignored.

Because of its resemblance to average utilitarianism, we can expect the conditional-on-existence view to face problems much like those for average utilitarianism. And it does. Most obviously, the view has absurd implications when a person’s conditional expected well-being is negative. Consider table 8.

Table 8: Two Hellish Prospects

	State 1 (0.1)	State 2 (0.9)
$-A$	-100	
$-B$	-110	-98

The conditional-on-existence view implies that $-B$ is better for Sally than $-A$. But that is absurd: $-B$ offers Sally a certainly miserable existence, and $-A$ offers her the possibility of being better off or not existing at all. One ought to prefer $-A$ to $-B$ for Sally’s sake, contrary to the conditional-on-existence view.

This objection is decisive against the conditional-on-existence view as stated. But it may be reasonable to restrict the conditional-on-existence view to prospects in which a person’s conditional expected well-being is not negative.²¹ This may seem ad hoc, but it is perhaps justifiable if there is an asymmetry between good lives and bad lives in terms of how they compare to nonexistence. According to what we might call *asymmetric comparativism*, it cannot be better for someone to have a life worth living than never to have been born, but

²¹Analogous moves for average utilitarianism are considered by Blackorby, Bossert, and Donaldson (2005) and Nebel (2015). I say “not negative,” rather than “positive,” to include cases in which one’s conditional expected well-being is neutral or undefined.

it is always worse for someone to have a miserable life than never to have been born. The possibility of asymmetric comparativism has been overlooked in the literature on the value of existence (except by Arrhenius 2009). I suspect this is because the main reasons why people doubt that it can be better for a person to be born appeal to metaphysical constraints that would, if true, make it impossible for it to be *worse* for a person to be born—contrary to asymmetric comparativism. (Arrhenius quickly dismisses the view for this reason.) I’ve already expressed my skepticism about such metaphysical constraints. I think that if it cannot be better for a person to be born, this must be for more specifically ethical reasons, which might not preclude the possibility of lives being worse than nonexistence.

I do not claim here that asymmetric comparativism is true. I explore the possibility in other work. My claim is merely that *if* asymmetric comparativism is true, then it would not be ad hoc to restrict the conditional-on-existence view to prospects in which a person’s conditional expected well-being is nonnegative. So the objection from table 8 is not decisive, unless we can rule out asymmetric comparativism.

There are other objections to average utilitarianism that generalize to the conditional-on-existence view.²² But, interestingly, there is a new problem that arises from the interaction between the conditional-on-existence view and its implications for population axiology. It is illustrated by the case in table 9.

Table 9: An *Ex Post–Ex Ante* Inconsistency

Prospect	State 1 (0.5)		State 2 (0.5)		Conditional Expectations	
	<i>i</i>	<i>j</i>	<i>i</i>	<i>j</i>	<i>i</i>	<i>j</i>
<i>A</i>	4	4	1		2.5	4
<i>B</i>		5	2	2	2	3.5

In this case, there are two possible individuals, *i* and *j*, and two equiprobable states. According to the conditional-on-existence view, *A* is better than *B* for both *i* and *j*. And

²²One such objection is that the conditional-on-existence view favors prospects that offer slightly greater conditional expected well-being in exchange for a vastly lower probability of existence. But this should only bother those who think a person’s existence can be better for her than her nonexistence—which, as we’ve already seen, leads to the repugnant conclusion. Another, more important objection is that, the conditional-on-existence view violates Savage (1954)’s *sure-thing principle* according to which, if there is some event *E* such that *A* is better for *S* than *B* conditional on *E*, and *A* and *B* share the same outcomes conditional on $\neg E$, then *A* must be better for *S* than *B*. I do not press this objection because some (e.g., Buchak 2013) reject the sure-thing principle even when a person is certain to exist; the violations in this context seem not to raise entirely new issues.

both prospects guarantee perfectly equal outcomes. *A* should therefore be better than *B*, by egalitarian-friendly Pareto.

Compare, however, the outcomes of *A* and *B*, considered state by state. The conditional-on-existence view and (egalitarian-friendly) impartial observer principle together imply that *B*'s outcome is better than *A*'s in each state of the world. This is because *B* brings about greater average well-being (with no inequality) no matter which state obtains.²³

If *B*'s outcome is better than *A*'s in every state of the world, then *B* must be better than *A*, by weak statewise dominance (and by the egalitarian-friendly version of this principle, since both prospects guarantee equal outcomes). But the conditional-on-existence view implied that *A* was better than *B*, by weak Pareto for prospects. This is an *ex post–ex ante* inconsistency: comparing the prospects' outcomes, state by state, yields one verdict; comparing the individuals' prospects, person by person, yields another. Such inconsistencies are familiar to egalitarians. But the conditional-on-existence view generates the inconsistency even with egalitarian-friendly principles, which we have no independent reason to reject. Even if we were willing to reject such principles and to tolerate the *ex post–ex ante* inconsistency, that would make the conditional-on-existence view significantly less interesting for our purposes, because we would no longer need it for (and it would no longer entail) its solution to the interpersonal repugnant conclusion.

This result is of some significance, because the core of Harsanyi's arguments for utilitarianism is the importance of *ex post–ex ante* consistency. In order to defend his choice of average utilitarianism (as opposed to total utilitarianism) from behind his veil of ignorance, Harsanyi appeals to the conditional-on-existence view. And average utilitarianism does follow from the conditional-on-existence view, given the impartial observer principle. But the argument I have just given shows that this appeal to conditional expectations makes Harsanyi's own theory *ex post–ex ante* inconsistent.²⁴

²³In greater detail: In state 1, *A* has two people at level 4, and *B* has one person at level 5. So the impartial observer principle has us compare a prospect *A*₁, which guarantees level 4 for some arbitrary individual, to a prospect *B*₁, which offers her an even chance of level 5 on the one hand and nonexistence on the other. By the conditional-on-existence view, *B*₁ is better for her than *A*₁. So, by the impartial observer principle, *B*'s outcome is better than *A*'s in state 1. A similar argument holds for state 2.

²⁴I have not considered views—like Voorhoeve and Fleurbaey (2016)'s—that care about some hybrid of a person's conditional and unconditional expectations of well-being. For a critique of such views, see Nebel (2017b).

7 An Argument for Probable Addition

Those of us who wish to avoid the repugnant conclusion are in a difficult position. In order to avoid the repugnant conclusion, we must reject the probable addition principle. I have found no plausible way of doing that. We can reject the probable addition principle only by denying that a life worth living is better for a person than nonexistence. But I have given reasons to doubt the most influential argument for this view and the most obvious ways of extending it to decisions under uncertainty.

This does not, however, mean that the probable addition principle is true. And we might find comfort in the fact that the obvious argument for the principle turned out, in section 4, to be unsound. It may therefore seem reasonable to maintain that the principle is false, even if we do not know why it is false.

Unfortunately, there is a better argument for the probable addition principle—or, rather, for a slightly weaker principle that suffices to get the argument going. The argument has four steps, all of which concern table 10. In this case, the welfare levels are again Sally’s: a is any excellent welfare level, d some increase to this level, $-z$ some negative welfare level, y any positive welfare level, and p and q probabilities.

Table 10: An Argument for Probable Addition

	State 1 $(1-p)(1-q)$	State 2 $(p(1-q))$	State 3 (q)
A	a	a	
A'	$a+d$	$-z$	
$A+$	$a+d$	$a+d$	y

First, consider A and A' , but ignore state 3—i.e., suppose that $q = 0$. Most decision theorists would agree that, for any $a > 0$, there are *some* values of $d > 0$, $-z < 0$, and $0 < p < 1$ for which A' would be better for Sally than A (again, ignoring state 3). That is, there is *some* benefit that is worth *some* chance of a life that is, to *some* degree, not worth living. This claim would be violated only by the most radically risk-averse decision theories. So much the worse, I think, for such theories.

Second, suppose that $0 < q < 1$, and consider A and A' again. Intuitively, if A' was better for Sally than A for some d , $-z$, and p when $q = 0$, then it remains so when state 3 has positive probability. After all, the value of q does not affect the *relative* probabilities of states 1 and

2 compared to each other—i.e., the ratio of $(1 - p)(1 - q)$ to $p(1 - q)$. And it is the ratio of those probabilities that can justify the tradeoff between a possible gain of d and a possible loss of $a + z$. Since A and A' share the very same outcomes in state 3, the probability of this state should intuitively not affect which prospect is better for Sally.²⁵

Third, consider A' and $A+$, but ignore state 1—i.e., suppose that $p = 1$. $A+$ seems better for Sally than A' , when ignoring state 1, for any positive a , d , and y , any negative $-z$, and any q between 0 and 1. More generally, a prospect in which a person's life is certainly worth living is better for her than any prospect that, conditional on her existence, makes her life not worth living.²⁶ This judgment would be rejected by proponents of the same-state restriction considered on page 20. So much the worse, I think, for that restriction.

Fourth, suppose that $0 < p < 1$, and consider A' and $A+$ again. This introduces the possibility that Sally already exists, no matter what we do, with an excellent life that cannot be affected by our choice. Intuitively, if $A+$ was better for Sally than A' when ignoring state 1, then it should remain so when state 1 is possible, for any positive a , d , and y , any negative $-z$, and any probabilities p and q between 0 and 1. Since $A+$ and A' share the very same outcomes in state 1, the probability of this state should not affect which one is better for Sally. It is hard to see how, if we ought to prefer $A+$ to A' when $p = 1$ for Sally's sake, we might be permitted not to prefer $A+$ to A' for her sake, when these prospects only differ via the introduction of a possible state in which Sally's well-being is beyond our control. (One possible reply to this claim would be to appeal to the conditional-on-existence view. But that general view seems to me less plausible than the case-based judgment at hand, especially in light of the problems of section 6.)

Here is what we have shown. For some values of d , $-z$, and p , A' is better for Sally than A , for any a and q . That was the conclusion of steps one and two. And, for any values of a , d , $-z$, y , p , and q , $A+$ is better for Sally than A' . That was the conclusion of steps three and four. So, for some d , $-z$ and p , $A+$ is better for Sally than A , for any a , y , and q . Since the values of $-z$ and p are irrelevant to the comparison of A and $A+$ —the value of p does not affect Sally's well-being in either prospect, and neither prospect has any chance of giving Sally level $-z$ —we can state our conclusion as follows: there is some amount of well-being such that, if, in every state in which someone would exist in A , she is better off by that amount in $A+$, and

²⁵This step (along with the fourth step) is an instance of the sure-thing principle mentioned in footnote 22. But we need not accept that principle in order to judge that this one of its instances is true.

²⁶This is the prudential analogue of what Blackorby, Bossert, and Donaldson (2005) call “priority for lives worth living.”

if, in every other state of the world, her life in A^+ would be worth living, then A^+ is better for Sally than A . This conclusion holds regardless of the relative probabilities of those states (i.e., for any q). It is therefore enough to yield the intrapersonal repugnant conclusion, given super-minimal prudence: for any values of a and d , there must be some probability q and some mediocre welfare levels y and y^+ , such that a sure-thing of y^+ would be better than A^+ . Thus, for some q , a sure-thing of y^+ would be better than A .

This argument shows that rejecting the probable addition principle is not a simple matter. It is not the kind of principle that we can reasonably reject without a compelling explanation in hand for why it is false. In order to reject the probable addition principle—and, therefore, in order to avoid the repugnant conclusion—we would need to know where and why the argument just given fails.

8 Conclusion

We have found some reason to accept the probable addition principle, and no good reason to reject it—other than the fact that, given some other highly plausible principles, it leads to the repugnant conclusion. Some people, of course, are happy to accept the repugnant conclusion. If you are one such person, then you may welcome my arguments. I am not happy to accept the repugnant conclusion. I therefore regard the probable addition argument as a paradox, to which I have no satisfactory solution.

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