In Defense of No Best World

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November 10, 2019

Abstract

Recent work in the philosophy of religion has resurrected Leibnitz's idea that there is a best possible world, perhaps ours. In particular, Klaas Kraay's [2010] construction of a theistic multiverse and Nevin Climenhaga's [2018] argument from infinite value theory are novel defenses of a best possible world. I do not think that there is a best world, and show how both Kraay and Climenhaga may be resisted. First, I argue that Kraay's construction of a theistic multiverse can be resisted from plausible assumptions about set theory. Next, I argue against the value-theoretic assumptions that underlie Climenhaga's argument and show how to give an infinite value theory where there is no best world.

1 Introduction

Leibniz famously argued that God is justified in allowing the evils God does because ours is the best of all possible worlds. His contemporaries' reaction to this theodicy was mixed, highlighted by Voltaire's biting satire *Candide*, and the idea did not age well. But in recent years, several defenders of Leibniz have appeared. Klaas Kraay [2010] has attempted to describe the best possible world (of which our universe may be a part), while Nevin Climenhaga [2018] has argued that given some hypotheses a theist should adopt and a proper formal value theory, we should consider our world unsurpassable, if not uniquely best.

I disagree. Our world could be better. The lives lived in our world could be better. My reasons for thinking this are fairly general, and therefore apply to the other worlds as well. However, I do not have space here to both deflect the Kraay and Climenhaga arguments while laying out my positive reasons for these views. I will instead content myself with a defensive project, showing that neither Kraay nor Climenhaga has provided reason to revise them.

2 Against Kraay

First Kraay. Kraay argues for a best world by construction: he thinks there is one uniquely best world, and he can tell us the recipe by which it is made. Kraay's recipe is ingenius, but I think it masks a deep incoherence. I will remove the mask. The arguments I use against Kraay will also be useful against Climenhaga.

I will build the argument against Kraay in stages. In a first pass, I will lay out the basic argument in a fairly simple form. Then I will introduce a complication and show how the argument can be patched to avoid it.

2.1 First Pass

Kraay draws a distinction between worlds and universes. A universe is a causally closed, spatiotemporally connected mereological sum. Universes come in two varieties: those worthy of creating and those unworthy of creating. He doesn't say how universes get these statuses, but that's not a problem. This is a plausible partition, and creation-worthiness is the only relevant property of universes for his construction of a best world. A world is a complete description of reality, whatever it may contain. Worlds contain universes, sometimes more than one. These are called multiverses. The value of a multiverse depends on the value of the universes in it; it can be made better by including good universes or omitting bad ones, and made worse by omitting good universes or including bad ones. This all seems right. Kraay gives us a recipe to build a particular multiverse, TM for Theistic Multiverse, which he thinks constitutes the best possible world.

Kraay defines TM as a world containing all and only those possible universes worthy of creating. This makes it the best possible world. Any other possible world must be distinct from TM, so it must either contain universes that TM does not or omit universes that TM contains. Neither option is an improvement. If a multiverse omits a universe that TM contains, it omits a universe worth creating. This gives it strictly fewer good things than TM. That sounds worse. On the other hand, if a multiverse includes a universe that TM omits, then it has a universe that is not worth creating. That sounds worse. But those were the only ways to differ from TM, so TM must be the unique best world.

It's worth noting that the construction of TM relied on unrestricted quantification over possible universes. Otherwise, TM could be bettered by a universe containing all creatable universes and then a few more. Since there would be no 'all' whose domain exhausts the creatable universes, no definition of TM would be immune from this problem. Likewise, my objections will rely upon unrestricted quantification over possible universes.

Unfortunately, TM is impossible. There are two arguments to this conclusion. One is cheap and shallow; the other is more serious. Because the cheap, shallow argument sets up the serious one, we shall begin with it.

Some possible universes are incompossible. Consider this universe. In it, Obama is elected president in 2008, but not 2004. Consider an alternate universe in which Obama is elected president in 2004, but not 2008. Since Obama cannot be in two universes in the same world, those two universes cannot be together in the same world. Depending on which of the various essentialist theses one accepts, examples of incompossible universes can be multiplied indefinitely. And some of those are of universes worth creating.

A cheap objection has a cheap response. Instead of defining TM as the world containing all and only those universes worth creating, define TM as the world containing duplicates of all and only those possible universes that are worth creating. Problem solved.

Unfortunately, this exposes a more serious problem. For if a multiverse can contain a duplicate of a possible universe, why not two? Or three? Or arbitrarily many?. Assuming that there is no upper bound on the number of universes a multiverse could contain (which we must do if we are to avoid objectionable arbitrariness), we can make ever-better versions of TM by including ever more duplicates of creation-worthy universes. So how many duplicates of creation-worthy universes does TM contain? Options are plentiful. There could be κ-many for each cardinal number κ, or there could be more than that.

Neither option is great. if Kraay answers κ-many for some κ, then TM is not the best possible world. The one with 2^{κ}-many duplicates of each has more, and is therefore better. So Kraay must say: more than any κ. But allowing that there are some concreta that can be put into one-to-one correspondence with the cardinal numbers is known to cause problems, as Sider [2009] and Hawthorne and Uzquiano [2011] have shown.

I will focus here on one of those problems, adapting an argument from Hawthorne and Uzquiano. This starts with a proposed axiom of set theory, the urelement (A urelement is anything that is not a set. Like a table or a person.) set axiom:

URELEMENT SET: there is a set of all urelements.

They explore various ways to motivate this axiom, but the one I find most compelling is from the iterative conception of set. The set-theoretic universe is built in stages, with urelements and the null set on the ground floor. In the next stage, we find sets that have urelements and/or the null set as members, like the singletons. At the next stage, we find sets that have either ground floor or first stage inhabitants as members, and so on. At each stage, we can build sets only out of resources on lower levels. But this we should be able to do arbitrarily: we expect each level of the hierarchy to contain sets for every collection of inhabitants of lower levels. It follows from this iterative conception that a set of urelements lives on the first stage.

But then, they note, that if there is a set of urelements and we have some concreta that can be put into one-one correspondence with the cardinal numbers, then the axiom of replacement tells us that the cardinal numbers form a set. This is no good. If there were, then there would be a largest cardinal. But it would have a powerset (a set of all of its subsets), and by Cantor's Theorem would have cardinality smaller than that of its powerset. So it would be both the largest and not the largest cardinal, a contradiction.

2.2 A Wrinkle: The Identity of Indiscernibles

The first pass of my argument against Kraay relied on the claim that duplicate universes can inhabit the same world. Kraay denies this. I think the arguments against the principle of the identity of qualitative indiscernibles are compelling, especially that of Robert Adams [1979], but I am willing to grant him the objection and make a slight modification to the argument.

The fact of duplicates isn't what drove the argument. What was important was the possibility of a one to one map between creatable universes and cardinal numbers. A host of duplicates was one way for this to happen, but there are more. Consider, for instance, a knowledgeable mathematician - perhaps Kurt Gödel, Georg Cantor, or John von Neuman - who selects a favorite number. Each certainly could have done so. A mathematician who knows enough about infinity has a vast array of options to choose from. As many as there are cardinal numbers. Thus, while there may not be exact duplicates of this universe (or, if this one is uncreatable, some very nice universe full of skillful mathematicians), there will be trivial variants of it. And since it is plausible that Gödel, Cantor, or von Neumann was free to select any of the vast array of cardinal numbers as his favorite, it is plausible that there are trivial variants of this universe in 1-to-1 correspondence with the cardinals. This is enough to repair the argument.

It's worth noting that for it to be possible for Gödel, Cantor, or von Neumann to have chosen any number as his favorite, it need not have been possible for them to have been able to consider and explicitly reject all but the favorite. Perhaps the language of thought is countable, so that in any world, they could only have considered countably many candidates. This does not prevent it being possible that they chose any number. Let's call the set of numbers that a mathematician can choose as their favorite in a world as the 'menu' of options at that world. Since menus are countable sets of cardinal numbers, there will be class-many of them. Since they are sets of cardinal numbers, this won't cause any paradoxes, although there will be no set of menus. Now, for any menu, there could be a world very much like ours where that is the menu Gödel, Cantor, or von Neumann chooses their favorite number from. Since every cardinal number is on a menu, the end result is the same: a 1-to-1 correspondence between cardinal numbers and trivial variants of our world. Even though, in each world, no more than countably many numbers are available for selection.

In fact, we need not invoke the preferences of conscious agents for particular numbers in order to generate the problem. Because some kinds of particles (e.g. bosons) can colocate, Hawthorne and Uzquiano have convincingly argued that you could have a boson stack of κ-many bosons for any κ. If any such stack could exist in a creatable universe (and why couldn't it? Just take your favorite universe and add a stack of bosons to some unassuming point), then there could be arbitarily many axiologically indistinguishable variations of that universe. No favorite number required.

The problems with TM illustrates a larger lesson. When there could be κ-many Fs for every cardinal κ, talk of actualizing 'all possible Fs' isn't sensible. This lesson is worth bearing in mind, since it will return in the next section.

3 Against Climenhaga

Nevin Climenhaga [2018] argues that we live a world that cannot be surpassed. He argues that this conclusion follows from his theism-friendly assumptions plus components of the best formal value theory. Unlike Kraay, he does not think that our world need be uniquely best. It could be tied with or incomparable to other worlds. I will attempt to briefly reconstruct the reasoning before arguing that several of his key premises are false. But before we dive into the arguments, a quick word on method is in order.

In constructing his arguments, Climenhaga relies on a formal value theory. The goal of formal value theory is to bring the precision and power of mathematical tools to bear in the study of good and bad things. We have a jumble of judgments about cases and principles we find plausible, and we wish to use mathematical tools to turn those judgments and principles into a systematic and elegant theory. One way we do this is by using formal representations of relevant phenomena and tools like functions to manipulate those representations. In doing this we must be careful to keep our judgments in the driver's seat. Especially when dealing with infinities, where intuition has a nasty habit of betraying us, it is tempting to substitute features of our representations for the phenomena we are trying to study. We should fit our tools to the task.

We should also be cautious about overturning plausible judgments with the theories we construct. I am an instrumentalist through and through about the formal theories I adopt. If we find a formal theory that looks good, but does not cohere with our judgments about cases, we should look for an alternative theory that does. It should take a very powerful result, like an inability to find any coherent theory of value that affirms our judgment, before we abandon intuition at some formal theory's say-so. In this way, I see formal value theory's role as largely permissive: it will often tell us how to construct a theory that gives us permission to make the judgments we wish to make. It rarely will tell us that some judgment must be abandoned. With that foreword clearly in mind, we turn to the arguments.

Climenhaga's theist isn't any old believer. She accepts the following claims, which are by no means universally accepted among the religious; in fact, quite the opposite:

THEISTIC ASSUMPTION ONE: God will never cease to create new people.

THEISTIC ASSUMPTION TWO: Each person, at some point, will enter the beatific vision and will thereafter enjoy a union with God that is infinitely valuable compared to any other experience.

I'm not interested in denying either assumption, since I think our interesting disagreements will be about metaphysics and formal value theory.

Climenhaga's argument takes the form of a dilemma, and is clearly valid. I will lay out its basic structure here:

1. The theistic assumptions are true

2. Given the theistic assumptions, there are only two kinds of world that can surpass our world: those that add more good things to it while retaining everything our world has (adding locations) or those that improve some of the things in it without coutnervailing consequences while retaining everything else world has (improving locations)

3. Given the theistic assumptions, there is no world that surpasses our world by adding locations

4. Given the theistic assumptions, there is no world that surpasses our world by improving locations

therefore;

5. Given the theistic assumptions, our world cannot be surpassed

therefore;

6. The world cannot be surpassed

I will oppose Climenhaga on all three premises. Even given the theistic assumptions, there are ways to improve our world that don't involve merely adding good things or improving on the things that there are. But it can be improved by adding good things, and it can be improved by making the things it does contain better.

I will make my case by outlining my own preferred formal value theory, which is as sensible as anything on the market, and then showing how it can be used to model examples of worlds that surpass our own.

3.1 Against Premise 2

We can now sketch the bare bones of a style of formal value theory that is common, that Climenhaga appeals to in making his arguments, and that adequately schematizes my own preferred view. A formal value theory has at least two parts: some *representations of value* and a *ranking function*. A representation of value is some mathematical widget or other that stands in for the valuable thing to be theorized. The ranking function takes tuples of representations of value and says whether any are more valuable than the other(s), and if so which. For simplicity, we'll assume that the ranking function makes pairwise comparisons and return one of four verdicts: the first is better, the second is better, the two are equal, or there is no sensible comparison to be made.

A very simple example: we might make our representations of value real numbers and our ranking function one that mirrors the typical $\geq$ order for the reals. This is the basic theory behind most currencies: prices are assigned to items as representative of value, with more valuable items assigned to greater values. But it is too simple for our purposes. Neither I nor Climenhaga can, without begging the question, simply assign a single value to our world. Instead, we need to find a way to go from the values of things in the world to a ranking of worlds via a function that we can both acknowledge as reasonable.

This motivates us to provide more complicated representations of value. Instead of a single number, we would be better served with a list of the valuable things and representations of their value attached (these may end up being something tractable like numbers, or it may end up being more complicated objects for things that we can't agree on the value of and need to repeat our strategy for until we reach things we can assign simple representations to). Climenhaga calls the entries on these 'lists' *locations of value.* So for now, we will represent the value of worlds as ordered n-tuples of numbers $\langle l_1 ... l_n ... \rangle$ where each element is a number representing the value of something in the world, and where every valuable thing in the world is represented at some location.

This leaves the ranking function. We need some sort of function that uses the values of the items in the list in order to produce a pairwise value comparison between worlds. Again, the very simplest example is the function ADD (recall here that the w_i are in fact ordered tuples of numbers):

$$\text{ADD: } w_j \geq w_k \text{ iff } \sum_{j=1}^{\infty} w_j \geq \sum_{k=1}^{\infty} w_k.$$

This function just tells us to add up the values of the numbers in the lists, and then comparing the result. It's easy to use, so it gets a fair amount of attention in the literature. But as Climenhaga rightly notes, it is by no means obvious that this the right one to use. For instance, some people care more about average value than total value, and then the function AVG is better:

$$\text{AVG: } w_j \geq w_k \text{ iff } (\sum_{j=1}^{n} w_j \div n) \geq (\sum_{k=1}^{m} w_k \div m)$$

This one just says that the world with the highest average value is the best. It is worth pointing out that this function cannot handle worlds with infinitely many locations of value, for the simple fact that division by infinity isn't coherent when using standard numbers. There are more exotic number systems in which it is coherent, e.g. in Robinson Arithmetic or with John Conway's surreal numbers, but in this context it is not worth a detour through non-standard analysis to save a function that won't come up again.

So far, we have seen ranking functions that take roughly the following approach: distill the value in a world into a number and then rank worlds by comparing numbers. Climenhaga suggests, but does not explicitly state, that he thinks ranking functions work this way, e.g. when he says "So it seems that for most plausible determinants of the value of the world, the value of the world is infinite."[1] This is not the only way a ranking function can work. We may have a ranking function that operates without assigning numerical values to the worlds, and therefore according to which it makes no sense to say that a world's

[1] Climenhaga [2018] p. 373

value is finite, infinite, or anything of the sort.

In fact, I think that there is such a function that is superior to both ADD and AVG, and if not the whole truth about how to compare worlds, at least an important part of the truth. I call it the Sum of Differences function, and it stands to Mark Colyvan's Relative Expectation, expounded in Colyvan [2006], [2008], and Colyvan and Hajek [2017], as actual utility does to expected utility. Essentially, it operates by summing the difference in value of the elements of the worlds and then looking to see if the sum is positive. Here is its formal statement:

SD: $w_j \geq w_k$ iff $\sum_{n=1}^{\infty} w_{j_n} - w_{k_n} \geq 0$

As a simple example, let's assume that w_1 and w_2 each have four things: an apple, a banana, an orange, and a grape. It's built into the formalism that these are the same four things, but don't worry about that just yet. Let's further say that their values are the following in each world:

w_1: $\langle 2, 3, 4, 5 \rangle$

w_2: $\langle 1, 2, 3, 4 \rangle$

To compare the worlds, we subtract the value of each thing in w_2 from its value in w_1 and then add up the resulting series. If the sum is positive, w_1 is better. if the sum is negative, then w_2 is better. In our case, the equation is:

$$(2-1) + (3-2) + (4-3) + (5-4) =$$

$$1 + 1 + 1 + 1 =$$

$$4$$

and the clear verdict is that w_1 is better.

The SD function gives us a tidy and precise way of comparing the value of worlds without trying to assign an overall goodness score. And consequently it allows for certain advantages when dealing with infinities (in all finite cases - worlds with finitely many finitely valuable things - it's equivalent to ADD). For instance, we might be interested in comparing the value of a world with God and two delicious apples with the value of a world with God and two rotten apples. We might represent them as so:

w_3: $\langle \infty, 3, 3 \rangle$

w_4: $\langle \infty, -2, -2 \rangle$

Plugging these into the SD function gives us the following equation:

$$(\infty - \infty) + (3 - -2) + (3 - -2) =$$

$$? + 5 + 5$$

and here we must stop. $\infty - \infty$ is undefined in regular arithmetic as well as, once the vague ∞ is precisified as an actual infinite number like ω or $\aleph_0$, the most common transfinite arithmetics. Fortunately, there's a fix. If we use surreal arithmetic, infinite numbers behave more or less like finite numbers when applying familiar operations to them. In surreal arithmetic, $\omega - 1 > \omega$, and similarly for $\omega/2$. Furthermore, $\omega - \omega = 0$. In general, surreal arithmetic allows us to treat infinite numbers exactly the way we treat very large finite numbers in cases of simple operations like addition and multiplication.[2] This is what we want for a good value theory. We won't walk through the details of surreal mathematics here; the interested reader should consult Conway [1974] for the basics and Chen and Rubio [Forthcoming] for a clear presentation of and argument for their use in decision theory. For our purposes it suffices that we can use them to sensibly do math with infinite numbers without any nasty surprises. Thus, we can finish the comparison of w_3 and w_4 by swapping ∞ for the infinite surreal number ω, replacing our ? with a 0, and noting the obvious conclusion that w_3 is better.

This comparison brings forward another advantage of a relative utility ranking. Lots of theists balk at the idea that God + creation, even if creation is itself very good, is more valuable than God. This has lead some, e.g. Johnston [2018] and O'Conner [Ms.], to contend that God does not improve the world by creating. We can now see that this contention rests on an error. It assumes that any sensible ranking function uses the value of parts of a world and their arrangement to assign some value to the world itself, which can then be compared with things (like God) that have value. This is false. A relative utility ranking looks at the valuable things in a world in order to say which worlds are better or worse, but it does not

[2] But see Chen and Rubio [Forthcoming] on why you cannot replace infinite numbers with very large finite numbers.

assign the worlds numerical values directly, and thus asserting that w_3 is better than God is a category error. The most we can say so far is that w_3 is better with than the world with God and the two apples where the apples have 0 value.

So far SD looks nice. But it cannot compare worlds with different things in them - even when the things in one world are a superset of the things in another. We can try, perhaps by comparing w_3 to a world with God alone, w_0:

w_o: $\langle \omega \rangle$

As we can see, attempting to do this just results in a mess:

$$(\omega - \omega) + (3 - \_) + (3 - \_)$$

Since the apples are absent from w_5, there is nothing to subtract from their values in the equation, and our function throws a tantrum when asked to compute the relative utility.

Fortunately, we can adapt a technique from Chen and Rubio [Ms.] that solves a parallel problem with relative expectation theory. As we observe, adding random '+ 0s' to things doesn't change the outcome of equations. So whenever we are confronted with worlds that have different items, we can 'fill out' the relative utility equation by pretending that the missing item exists in the world where it is absent, but has no value. Thus, when we compare w_5 with w_3, we represent it as w_5*

w_5*: $\langle \omega, 0, 0 \rangle$

which 'fills out' w_5 with axiologically inert proxies for the missing items from w_3. So adjusted, we now get the right result

$$(\omega - \omega) + (3 - 0) + (3 - 0) =$$

$$0 + 3 + 3 =$$

$$6$$

with w_3 deemed as better.

With this idea of 'filling out,' we can now compare worlds with even very different things (and numbers of things) using a formalism that is essentially the SD function. First, the general formalism, which I will call SD*:

SD*: $w_j \geq w_k$ iff $\sum_{n=1}^{\infty} w_{j_n} * - w_{k_n} * \geq 0$, where w_j* is obtained from w_k by filling out w_j with placeholders for items in w_k but not w_j assigned to 0 value, and w_k* is obtained from w_j by filling out w_k with placeholders for items in w_j but not w_k assigned to 0 value.

Now an example. And since Climenhaga is primarily concerned with people or lives as locations of value, I will use worlds with different people in them. Let's say that in w_6 God creates Colin, Carmen, Tracey, and Javier while in w_7 God creates Javier, Molly, Emma, and Emmanuel. w_6 is quite nice, and everyone has a good life, while in w_7 things don't do so well and the lives are worth living but a bit dull. We might represent them as:

w_6: $\langle 100, 104, 108, 109 \rangle$

w_7: $\langle 20, 24, 28, 29 \rangle$

we then fill out the worlds, as in the table below:

Person	Colin	Carmen	Tracey	Javier	Molly	Emma	Emmanuel
w_6*	100	104	108	109	0	0	0
w_7*	0	0	0	20	24	28	29
SD*	100	104	108	85	-24	-28	-29

Table 1: w_6* vs. w_7*

We then simply sum the bottom line to see that w_6 is the better world.

Now that we have the basics in place, we can use the SD* ranking function to show that even in worlds with infinitely many locations of positive value (even infinite positive value), there are more ways to improve the world than by merely adding locations or by merely improving locations.

Let's say that w_8 has a countable infinity of people, w_9 has everyone in w_8 plus one more, who we'll call Raul, and w_{10} has everyone in w_8 except for Raul but does have two other people, Lora and Terrence. Let's also for simplicity assume that everyone's lives in each of the worlds is equally valuable. We can show that, using SD*, $w_{10} > w_9 > w_8$, and thus that worlds with infinitely many people all of whom have good lives can be surpassed by means other than merely adding locations or merely improving locations.

Person	p_1	...	Raul	...
w_8*	10	...	0	...
w_9*	10	...	10	...
SD*	0	0	-10	0

Table 2: w_8 vs. w_9

and, as we can see, summing the relative utilities give us -10, putting w_9 as better. Next, we compare w_9 with w_{10}:

Person	p_1	...	Raul	Lora	Terrence	...
w_9*	10	...	10	0	0	...
$w_{10}*$	10	...	0	10	10	...
SD*	0	0	10	-10	-10	0

Table 3: w_9 vs. w_{10}

when we sum the bottom row of the table, we see that w_{10} is better, even though w_{10} does not merely add to or improve upon the locations of value in w_9.

It's worth remarking a bit on the difference between w_9 and w_{10}. We achieved the improvement by removing someone and adding some other people. But there's a case to be made that we did not change the number of people in the world. Both worlds have a countable infinity of people in them. So if with Cantor we say 'same cardinality, same number,' then it is true that we have the same number of people in the world and yet we have still managed an improvement. Not only so, but we have managed this without appealing to the most common rival to the 'same cardinality, same number' theory of size. The population of w_{10} is not simply a superset of the population of w_9 where the extra people have good lives. We have produced a better world without changing the number of people or the fact that everyone in each world has an equally good life. In fact, since the choice of number to represent the goodness of the lives in the worlds was arbitrary, we could well have chosen an infinite number. As long as we also used surreal arithmetic to handle the math, we would still have succeeded. The key was ridding ourselves of the tempting but false thought that a ranking function must work by aggregating the value in a world to assign the world itself some number to represent its value.

3.2 Against Premise 3

So far, it has at least been necessary to add someone to a world full of people living good lives in order to make it better.[3] Consequently, if it is not possible, or at least unclear whether it is possible, to add people to our world, then Climenhaga's argument will stand with some modifications, or it will at least be unclear whether it fails. And in defending (3), Climenhaga does advance arguments for the conclusion that given his theistic assumptions, it is at least not clearly possible for God to have created additional people. To these we now turn.

Climenhaga defends (3) with a dilemma. There are two ways to create a world that is improved by adding locations. A world can be created with a greater number of locations, or a world can be created with the same locations as that world and then some. He then argues that it is at best unclear if either of these methods are available to God.

Start with the first. Climenhaga expresses some doubt that there could have been more than countably many people, perhaps because we have thick essences and there are could be at most countably many. But if there could have been more than that, he assumes that God could just create that many. And the same for any uncountable number.

The interesting case here will be where there are indefinitely extensibly many possible people - that is, for every cardinal number κ, there could have been κ-many people. I'm sceptical of the kind of essentialism that would put a hard cap on the number of possible people, and as long as we are countenancing multiverses with many disconnected spacetime structures, putting a limit on the number of people that could be in a world without putting that same limit on the number of possible people seems unacceptably arbitrary. Addressing this case, he writes: "it is as best unclear whether it is necessary that in [the actual world], God does not create as many locations as he could have.[4]"

This is in error. As argued in §2, there could not be so many things in one world that there are κ-many of them for every cardinal κ. But for each κ, there could have been a world with κ-many things. This leaves us in a situation where there is no upper bound on the number of people who could be in a world. For any world, there could have been one with more, without limit. Attempts to create all possible people, like attempts to create all possible universes, are doomed to paradox. Since the actual world is a world, there could have been more people than there will be.

This is true even if it is also true that there is no last person created, as Climenhaga's theistic assump-

[3] Indeed, in the case we are interested in (a world where every life is infinitely valuable), even views where removing someone with a positive but low level of well-being improves the world will not apply when everyone has the same infinitely high level of welfare.

[4] Climenhaga [2018] p. 380.

tions dictate. Consider the real numbers. There is no last real number, but there is a definite fact about the cardinality of $\mathbb{R}$. Likewise, there being no last person created is no barrier to there being a definite fact about the number of actual people.

Here Climenhaga may object that helping ourselves to a determinate set of all actual people is deceptive. Perhaps if the future is open, then there is no fact of the matter about which, or how many, people God will create. If so, then talk of 'all actual people' is not licit. I don't think this blocks the argument. Even if there is no fact of the matter about which possible world - here to be understood as a complete way things could be, with no commitment as to the ontology of possible worlds - is actual, perhaps because there are facts about God's future actions that are now indeterminate, it is determinate that the way things will be is or will be some complete way that things could be. Even the most militant open futurist admits that our history is an initial segment of many elements in a collection of complete possible histories.[5] And this remains true whether or not there is a last moment, and so whether or not there is any time at which the world is 'completed.' It is again helpful to think of the real numbers; the fact that there is no last real number does not mean that there is not a 'completed' real number line. So even if we can't say who, or how many, people are among those who are, have been, or will be created, we can say this: they will not be so numerous as to outnumber any number. No way the world could be has that many people. And so no way the world could be has so many people that there couldn't have been more.

A similar observation tells against Climenhaga's contention that the second way of improving the world - maintaining the *number* of people, but creating everyone now in the world plus someone with a good life who isn't - is also unavailable to God. Climenhaga offers a similar reason: perhaps there is no fact about which people will be created, and so no fact about which other worlds contain a superset of the people who have been, are being, or will be created.[6]

I'll address the second concern first. We have already laid out a response to the case where there is no fact about the number of people who will be created. A similar approach applies when there is simply no fact about the identity of the people who will be created. There are several ways we could have people who

[5]Indeed, this is precisely the assumption made by the Priorean semantic tradition in tense logic, as typified by Belnap and Green [1994].

[6]Climenhaga also entertains the possibility that people are worldbound, and so can only exist in one world. He doesn't say much about this case, but the defender of worldbound individuals must say something about the semantics of *de re* modal claims. Even if I am worldbound, I could have had an older sister. Since I do not actually have an older sister, as long as I could have had an older sister without excluding someone else from the world, God could have created a superset of the people who are actual. Even if we do not exist in other worlds, it will be a *de re* modal fact about me that I could have had an older sister, and a *de re* modal fact about everyone else that they (together with me) could have shared a planet, galaxy, universe, or multiverse with my older sister, and so however Climenhaga deals with *de re* modal facts he will end up having to say that there could have been everyone that there is and then some. Unless he has an argument that including anyone who is not actual necessarily excludes someone who is.

are determinately not actual, even if it's indeterminate which people are actual. The first is if there are incompossible people - groups of people who cannot all be actual together - one of whom is determinately actual. The second is if there are people who are excluded from actuality by settled fact. It could also be determinately the case that not all possible people will be actual, even if it's not determinate which possible people will not be actual. Suppose we have incompossible people, none of whom are determinately actual. As soon as one of them is determinately actual, the others are determinately not actual.

How do we get incompossible people? An example from Williamson [2013] will suffice. Assume that origins essentialism is true. Now take two people, Casey and Andre. Casey came from a particular sperm and egg, s_c and e_c. Likewise Andrew and s_a, e_a. But in a world where different people marry, someone could have been born from s_c and e_a. We'll call this person Ben. Ben is incompossible with Casey and Andre. If he is actual, neither of them is. If even one of them is actual, he is not. But they all seem perfectly possible.

All alone, this isn't enough to make our case. If the only possible people who aren't actual are those who are incompossible with actual people, then God couldn't have made more people by making all the actual people and then some. But being incompossible isn't the only way to be excluded from actuality by settled fact. Again, for definiteness we'll assume that origins essentialism is true. Now take a random sperm/egg pair that never make contact. If origins essentialism is true, then there is a possible person who would have come from their union, had their been any such union. Since there are presumably sperm/egg pairs that haven't met but could have, there are people who have been excluded from actuality by facts not because they are incompossible with actual people, but because of contingent facts about relationship decisions. It would be a bit hard to believe that necessarily, if any of those people had been actual, someone who is now actual would not be.[7]

This covers both ways of adding locations that Climanhaga considers. If even one of the counterarguments I have offered goes through, then it looks like premise 3 is false.

3.3 Against Premise 4

The second horn of the dilemma, premise 4, contends that the actual world cannot be improved by improving the lives of anyone. Climenhaga begins by arguing that if the locations of value are persons who at some point enter the beatific vision (as his theological assumptions demand), then each location plausibly has infinite value, and therefore cannot be improved. Thus, he thinks, his opponent must take

[7] In the easy case, consider someone who is not actual but could have been but would have died as an infant, long before they could have an effect on which couples make children.

something else - times, experiences, relationships, etc. - as the locations of value. He proceeds to argue that none of these is suitable as a location of value, and thus that no one's life could have been better in a way that makes the world better.

My strategy in response will, once again, be to challenge the choice of representative of value, rather than the choice of location of value. So far I've been content to go along with the assumption that the value of people/lives/things can be given with a number of some sort. But especially when infinities are in play, the use of an infinite number can obscure things that are more profitably brought into the light of day.[8]

Instead, I propose to represent lives as ordered sets of numbers, with the numbers representing the value of the experiences contained in the life. Climenhaga considers using experiences as locations of value, but rejects them as leading to widespread incomparability due to worries about the identity conditions of experiences across worlds, and has counterexamples to proposals, such as individuating experiences by the times at which they occur, that would naturally solve the problem.

But unlike the kinds of formalisms Climenhaga entertains, the SD* principle is well suited to dealing with worlds or lives that contain different locations of value, so even if experiences are worldbound, the SD* principle can compare lives. Whenever we find a location in one world/life but not another, we use the 'filling out' procedure from §3.1. Note that in the case of interest, we require the full power of surreal mathematics since the infinite utility of experiencing the beatific vision is involved. Replacing worlds with lives, we give it here:

SD*: $l_j \geq l_k$ iff $\sum_{n=1}^{\infty} l_{j_n}* - l_{k_n}* \geq 0$, where l_j* is obtained from l_k by filling out l_j with placeholders for items in l_k but not l_j assigned to 0 value, and l_k* is obtained from l_j by filling out l_k with placeholders for items in l_j but not l_k assigned to 0 value.

We can then give a very simple pointwise dominance rule for improving worlds by improving locations (this rule follows from but is weaker than the location-improvement principles endorsed by Climenhaga and by Kagan and Vallentyne [1997].)

WEAK DOMANANCE: w_j is better than w_k just in case the two worlds contain all the same people, every

[8] I should reiterate that I am happy to let surreal numbers stand for values. But then it will not follow, from the fact that we have represented the value of a life with a surreal infinite number, that it cannot be improved. Every surreal infinite number can be increased by adding even a very small number to it. I am not insisting on surreals here because to adopt either surreal or cardinal numbers would be to beg the question, and I can answer the argument without resorting to them. I should note, however, that a surreal value theory as in Chen and Rubio [Forthcoming], [Ms.] is perfectly adequate to representing infinitely valuable yet improvable lives.

person's life is at least as good in w_j as it is in w_k, and at least one person's life in w_j is better than it is in w_k.

We now have the pieces in place to give an example of improving locations that fits Climenhaga's theological criteria.

Our worlds will be very much like this one. The goal is to give a pair of worlds that are almost exactly similar, with one person's life improved. We'll call him Clarence. Let us suppose in w_{11}, which could be mistaken for our world if we aren't careful, Clarence eats one strawberry once, on his 1st birthday. The strawberry is of middling quality, and Clarence experiences an okay but by no means impressive sensation of tastiness when he eats it. The better world, w_{12}, is almost exactly like w_{11}. But in this world, God gives Clarence a small gift: the middling berry produces a sensation of tastiness that rivals that of the very best strawberries. This change has no impact on Clarence's future behavior. The memory, while a bit more pleasant than in the other world, fades as memories of 1st birthdays often do, and has no impact on Clarence's subconscious. It is a bit of gratuitous joy from a loving creator. It is extremely plausible that there are no offseting aftereffects of Clarence's slightly improved birthday. But the day is slightly improved. The taste of a good strawberry makes for a better time than the taste of a middling one.

We can represent the two worlds as below, with the representation of Clarence's life labelled 'c' and with the surreal number ω signifying the first in a string of experiences of the beatific vision:

w_{11}: $\{\langle n...\omega...\rangle_1...\langle n...1...\omega...\rangle_c...\ \}$

w_{12}: $\{\langle n...\omega...\rangle_1...\langle n...2...\omega...\rangle_c...\ \}$

As we can see, each world contains an unbounded infinite of lives, in accordance with the first theological stipulation. Each life eventually hits a point at which it has infinite-valued experiences, in accordance with the second theological stipulation. The only difference is in the value of Clarence's first birthday. But using SD*, we can rank Clarence's life in w_{12} as better than it is in w_{11} while leaving all else the same between the worlds, and therefore by WEAK DOMINANCE we can rank w_{12} as better than w_{11}. Even though both fulfill the theological stipulations, we have used a sensible formal value theory to show that a world not relevantly different from ours (for all we know Clarence is a real person; plenty of babies eat middling strawberries on their first birthdays) can be surpassed by having one of its locations improved.

To sum up: we have detected multiple flaws in Climenhaga's arguments, all stemming from an overreliance on numbers as representations of value. First: we have detected a way, according to a sensible value theory, to improve a world that fits Climenhaga's theological prescriptions without merely adding locations of value or merely improving existing locations of value. Second: we have seen how to add locations of value to worlds that fit Climenhaga's theological prescriptions, even if there is no determinate set of actual people. Third: we have shown how, according to a sensible value theory, we can surpass a world that fits Climenhaga's theological prescriptions by improving on the locations of value in it. This suffices to show that our world is not, in fact, unsurpassable.

4 Conclusion

I have examined two attempts to revive the Leibnitzian theory that there is a best of all possible worlds. Both failed. The first, by Klaas Kraay, posited the best world as a multiverse containing all and only creatable universes.It failed because, given some plausible principles of set theory and about what kinds of universes are possible, attempting to create all and only creatable universes would lead to paradox. So it can't be done. The second, by Nevin Climenhaga, attempted to use some theistic assumptions (such as universal salvation) and a formal value theory to argue that our world is unsurpassable. It is either better than, just as good as, or incomparable to all other worlds. This attempt failed because there are rival formal value theories, just as good as the one Climenhaga relies on, that do not deem our world unsurpassable. This does not show that our world is surpassable. But it does show that Climenhaga's argument is no impediment to believing that it is. Thus, while I acknowledge that I have not provided a positive argument for my own position, that there is no best world, I also insist that neither Kraay nor Climenhaga has presented a compelling argument for its negation.

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